LONGHORN ARMY AMMUNITION PLANT

KARNACK, TEXAS

ADMINISTRATIVE RECORD

VOLUME 4 of 5

Jan. - Apr. 2005

Bate Stamp Numbers
037510 - 038502

Prepared for:

Department of the Army
Longhorn Army Ammunition Plant

VOLUME 4 of 5

Year - 2005

A: Title: Report (continued) – Final Plant-Wide Perchlorate Investigation for the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas
Author: Solutions To Environmental Problems, Inc. (STEP), Oak Ridge, TN
Recipient: U.S. Army Corps of Engineers (USACE), Tulsa District
Date: April 2005
Bate Stamp: 037510 - 038502

Appendix A

Data Validation Reports

DATA VALIDATION REPORT
PLANT-WIDE PERCHLORATE INVESTIGATION
LONGHORN ARMY AMMUNITION PLANT, KARNACK, TEXAS
Wet Season Sampling Event
(March 4 through March 17, 2002)

Solution to Environmental Problems, Inc. (STEP) has completed the Wet Season Sampling Event for the Plant-Wide Perchlorate Investigation at Longhorn Army Ammunition Plant (LHAAP). STEP personnel mobilized to the site on Monday, March 4, 2002 and commenced sampling activities the following morning. Sampling was completed on Sunday, March 17, 2002, for a total of 14 field days.

Samples collected during this event included soil and water samples. All primary and Quality Control (QC) duplicate samples were submitted to General Engineering Laboratories of Charleston, South Carolina. The samples were analyzed by EPA Method SW846 314.0.

DataChek of Oak Island, North Carolina conducted the third-party data validation and provided the following data usability evaluation. The validated form I, and validation calculation packages are included in Attachment 1.

DATA USABILITY

This usability report reflects the data validation findings for samples associated with the LHAAP. The validated data set consisted of 250 soil and 211 water samples in 32 Sample Delivery Groups (SDGs) that had been analyzed for the presence of perchlorate. Overall the data was of excellent quality and all measurements required to satisfy the project QC objectives, Precision, Accuracy, Representativeness, Comparability, and Completeness (PARCC) parameters were met. Each of these measures and specific data qualifications are discussed below.

Accuracy: Accuracy is measured by the results from the recovery of known amounts of compounds or elements from laboratory control samples (LCS), matrix spikes (MS) and surrogate spikes. The overall measure of accuracy for the site was calculated by comparing the number of spike recoveries that exceeded the laboratory limits by the total number of LCS, MS and surrogate spikes. Accuracy was measured 99.5%.

Precision: Precision is a measure of the agreement between duplicate sample measurements of the same quantity and is reflected in the RPD between spikes and the RPD for the field duplicate analysis. The overall project QC objective for precision is 90% or greater, and the measurement for Longhorn is 92.0%.

Representativeness: The measures of representativeness -- sample handling, analytical blank analysis, field blanks – were met for all sites. Designated analytical protocols were followed. Holding times were met. Overall, no major problems were identified resulting from analytical failure.

Comparability: All data were analyzed using the appropriate approved methods of analysis (SW846-314.0). All data results were reported correctly and in standard units.

Completeness: Completeness is the amount of valid data compared to the planned amount and is expressed as a percent of the usable data points divided by the total number of analytes for each parameter analyzed. Of the 461 data points, no values were rejected, resulting in a completeness of 100.0 %.

SPECIFIC DATA QUALIFIERS

The analytical results were acceptable except for 10 soil and 8 water samples that had the results qualified as "J" due to a relative percent difference in the field duplicate that exceeded the QC limit of 15% as specified in the method. Also, 5 water samples, 3 in SDG 57702 and 2 in SDG 57717 were qualified as "U" or non-detects due to the presence of contamination in the associated method blanks.

ATTACHMENT 1

WET SEASON DATA PACKAGES

SDG: 57328 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Soil - 20

Validation Samples: Validation Samples: 475504(0-0.5) 475503(0-0.5) 475502(1-2)
475507(0-0.5) 475508(1-2) 475504(1-2) 475503(0-0.5) dup. 475501(0-0.5)
475507(1-2) 475509(0-0.5) 475505(0-0.5) 475503(1-2) 475501(1-2)
475508(0-0.5) 475509(1-2) 475505(1-2) 475502(0-0.5) 475506(0-0.5)
475508(0-0.5)dup. 475506(1-2)

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Date: 4/4/2000

Validator's Signature: J. Thomas Hutchings

Peer Reviewer: _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	47SS04(0-0.5)	Project:	STEP00202
Sample ID:	57328001	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	18.1%		

Parameter	Qualifier	Result	Req Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.6	48.6	ug/kg	1	MAR103/27/02	0906	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on a dry weight basis except where prohibited by the analytical procedure.
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47SS04(1-2)	Project:	STEP00202
Sample ID:	57328002	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	18.9%		

Parameter	Qualifier	Result	RwQwJ	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.7	49.1	ug/kg	1	MAR103/27/02	0946	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
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Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	47SS05(0-0.5)	Project:	STEP00202
Sample ID:	57328003	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	23.9%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	12.5	52.2	ug/kg	1	MAR1	03/27/02	0957	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47SS05(1-2)	Project:	STEP00202
Sample ID:	57328004	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	19.7%		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.8	49.4	ug/kg	1	MAR103/27/02	1007	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 47SS03(0-0.5)
Sample ID: 57328005
Matrix: Soil
Collect Date: 10-MAR-02
Receive Date: 12-MAR-02
Collector: Client
Moisture: 18.7%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	11.7	49.0	ug/kg	1	MAR1	03/27/02	1017	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

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Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47SS03(0-0.5)DUP	Project:	STEP00202
Sample ID:	57328006	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	13.7%		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.0	46.0	ug/kg	1	MAR103/27/02	1027	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by John. Byrd

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 47SS03(1-2)
Sample ID: 57328007
Matrix: Soil
Collect Date: 10-MAR-02
Receive Date: 12-MAR-02
Collector: Client
Moisture: 14%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.1	46.4	ug/kg	1	MAR103/27/02	1037	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

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Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	47SS02(0-0.5)	Project:	STEP00202
Sample ID:	57328008	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	29.3%		

Parameter	Qualifier	Result	RLQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	13.5	56.3	ug/kg	1	MAR103/27/02	1107	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	47SS02(1-2)	Project:	STEP00202
Sample ID:	57328009	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	13.9%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.1	46.5	ug/kg	1	MAR103/27/02	1117	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47SS01(0-0.5)	Project:	STEP00202
Sample ID:	57328010	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	23.1%		

Parameter	Qualifier	Result	Re Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.4	51.9	ug/kg	1	MAR103/27/02	1127	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47SS01(1-2)	Project:	STEP00202
Sample ID:	57328011	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	15.2%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	UI	11.3	47.2	ug/kg	1	MAR103/27/02	1138	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
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Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47SS06(0-0.5)	Project:	STEP00202
Sample ID:	57328012	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	18.7%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.7	49.0	ug/kg	1	MAR103/27/02	1148	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: April 1, 2002

Project: Longhorn A.A.P.

Client Sample ID:	47SS06(1-2)	Project:	STEP00202
Sample ID:	57328013	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	20.6%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	3.31	U	12.0	50.2	ug/kg	1	MAR103/27/02	1158	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47SS07(0-0.5)	Project:	STEP00202
Sample ID:	57328014	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	29.3%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	13.5	56.5	ug/kg	1	MAR1 03/27/02	1208	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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U Indicates the compound was analyzed for but not detected above the detection limit
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47SS07(1-2)	Project:	STEP00202
Sample ID:	57328015	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	16%		

Parameter	Qualifier	Result	Revised	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	4	11.4	47.4	ug/kg	1	MAR103/27/02	1218	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	47SS08(0-0.5)DUP	Project:	STEP00202
Sample ID:	57328016	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	23%		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.3	51.4	ug/kg	1	MAR103/27/02	1228	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 47SS08(1-2)
Sample ID: 57328017
Matrix: Soil
Collect Date: 10-MAR-02
Receive Date: 12-MAR-02
Collector: Client
Moisture: 19.8%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.2	46.8	ug/kg	1	MAR1 03/28/02	0300	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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H Holding time exceeded
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47SS09(0-0.5)	Project:	STEP00202
Sample ID:	57328018	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	19.1%		

Parameter	Qualifier	Result RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00 U	10.4	43.4	ug/kg	1	MAR1 03/28/02	0310	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	47SS09(1-2)	Project:	STEP00202
Sample ID:	57328019	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	16.3%		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.6	44.1	ug/kg	1	MAR1 03/28/02	0320	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by Jeffrey M. Byrd

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47SS08(0-0.5)	Project:	STEP00202
Sample ID:	57328020	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	23.8%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.3	43.2	ug/kg	1	MAR1 03/28/02	0330	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037536

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 51328 Matrix/No. Samples: S-20

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	Yes	No	N/A
	2. Were all samples received in proper condition?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A
	Cooler @ 16° C 61° F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	Yes	No	N/A
	2. Were correct analyses performed on samples?	Yes	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	Yes	No	N/A
	2. Were any qualifications required based on this information?	Yes	No	N/A

SAMPLED	PREPPED/ANALYZED
3/10	

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 std. 0-100	Yes	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90-110	Yes	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110	Yes	No	N/A
	4. Was there an ending calibration standard (ECCS)?	Yes	No	N/A
	5. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

3/27 ICV 49.51/50 = 99.0

3/27 CCV@8:46 — 26.02/25 = 104.1

10:47 81.24/75 = 108.3

12:38 26.38/25 = 105.5

3/28 CCV@1:59 26.63/25 = 106.5

4:00 81.27/75 = 108.4

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 57328 Matrix/No. Samples: S-20

III. Blanks			
1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 188983 MB 3/28 U

190170 MB 3/28 U

ICB
allCCBs } all zeros.

IV. Instrument Performance Check Sample (IPC)			
1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 3/27 IPC 24.55/25 = 98.2

V. Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	(N/A)
2. Are all solid LCS %R within control limits established by the laboratory?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 188990 525/500 = 105%

190177 541/500 = 108.2%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037538

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 57328 Matrix/No. Samples: S-20

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 28001 u/u
3/27

3/25 28020 u/u

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

28001 144/121 = 119
168 = 138.8
RPD 24/156 = 15.4

28020 113/111 = 101.8
110/110 = 100
RPD = 2/111 = 1.8%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037539

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 51328 Matrix/No. Samples: S-26

X. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	Yes	No	N/A
2. Were correct calculations used to determine sample results?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A
Comments/Qualifications:			

XI. Field QC			
1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
b. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

475508 (0-0.5) 475508 (0-0.5) dup.
U U
475503 (0-0.5) 475503 (0-0.5) dup.
U U

XII. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A
Comments/Qualifications:			

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SDG: 57329 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Soil - 9

Validation Samples: Validation Samples: 045502 (1-2)
475510 (0-0.5) 045501 (0-0.5) 045503 (0-0.5)
475510 (1-2) 045501 (1-2) 045503 (0-0.5) dup.
045502 (0-0.5) 045503 (1-2)

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	X	
12.	Overall Assessment	X	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57329 Method: Perchlorate EPA 314.0

Qualifications:

17 : The results for 045503 (0-0.5) & (0-0.5) dup1, were qualified as "J" due to a high RPD in the field duplicate analysis.

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as qualified.

Date: 4/4/2002

Validator's Signature: J. Thomas Kitchings

Peer Reviewer: _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	47SS10(0-0.5)	Project:	STEP00202
Sample ID:	57329001	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	19.5%		

Parameter	Qualifier	Result	RW QMP	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.8	49.5	ug/kg	1	MAR1 03/28/02	0431	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	47SS10(1-2)	Project:	STEP00202
Sample ID:	57329002	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	14.8%		

Parameter	Qualifier	Result	Rev 2nd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	25.5	J	10.7	44.6	ug/kg	1	MAR1 03/28/02	0511	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	04SS01(0-0.5)	Project:	STEP00202
Sample ID:	57329003	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	23.6%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		53.0		12.2	50.8	ug/kg	1	MAR103/28/02	0521	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	04SS01(1-2)	Project:	STEP00202
Sample ID:	57329004	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	14.5%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	24.5	J	9.66	40.3	ug/kg	1	MAR103/28/02	0531	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	04SS02(0-0.5)	Project:	STEP00202
Sample ID:	57329005	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	22.1%		

Parameter	Qualifier	Result	ReyQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.4	43.6	ug/kg	1	MAR1 03/28/02	0541	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

037548

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS02(1-2)	Project:	STEP00202
Sample ID:	57329006	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	16.6%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC								3/28 JTR			
Perchlorate	U	0.00	U	9.66	40.3	ug/kg	1	MAR1 03/29/02	0551	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company :
Address : 318 Caswel Beach Road
Oak Island, North Carolina 28465

Report Date: April 1, 2002

Contact: Tom Kitchings
Project: Longhorn A.A.P.

Client Sample ID:	04SS02(1-2)	Project:	STEP00202
Sample ID:	57329006	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	16.6%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.66	40.3	ug/kg	1	MAR103/28/02	0551	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS03(0-0.5)	Project:	STEP00202
Sample ID:	57329007	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	11.9%		

Parameter	Qualifier	Result RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		61.4 J 17	9.97	41.6	ug/kg	1	MAR103/28/02	1538	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID: 04SS03(0-0.5)DUP
Sample ID: 57329008
Matrix: Soil
Collect Date: 10-MAR-02
Receive Date: 12-MAR-02
Collector: Client
Moisture: 9.39%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		72.3	J 17	9.88	41.3	ug/kg	1	MAR1 03/28/02	1548	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	04SS03(1-2)	Project:	STEP00202
Sample ID:	57329009	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	13.4%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		866		10.9	45.5	ug/kg	1	MAR1 03/28/02	1558	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037553

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 57329 Matrix/No. Samples: S-9

I.	**Sample Management**			
	A. **Sample Preservation, Handling and Transport**			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 16°C – 61°F			
	B. **Chain of Custody**			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. **Holding Times**			
	1. Were samples analyzed within acceptable holding times (28 days)?	Yes	No	N/A
	2. Were any qualifications required based on this information?	Yes	No	N/A

SAMPLED	PREPPED/ANALYZED	
3/10	3/22	3/28

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0-100	~~Yes~~	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lcb @ 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lcb @ 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/27 ICV 49.51/50. = 99.0

CCV @ 4:00 81.27/75 = 108.4

CCV @ 6:02 26.78/25 = 107.1

3/28 IC 47.72/50 = 95.4

CCV @ 15:18 23.97/25 = 95.9

037554

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 57329 Matrix/No. Samples: S-9

III. Blanks			
1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

190170 3/28 MC @ u

3/27 ICB, CCBs] - all zero.

3/28 ICB, CCBs] - all zeros.

IV. Instrument Performance Check Sample (IPC)			
1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

IPC 3/27 @ 24.55/25 = 98.2

IPC 3/28 23.75/25 = 95

V. Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	(N/A)
2. Are all solid LCS %R within control limits established by the laboratory?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

190177 LCS 541/500 = 108.2%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037555

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 57329 Matrix/No. Samples: S - 1

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 29001 Dupl. u/u
3/28

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

29001 141 / 121 = 116.5
142 / 120 = 118.3

RPD = 1 / 141.5 = 0.726

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037556

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 57329 Matrix/No. Samples: S-9

X.	Sample Result Qualification Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A
	Comments/Qualifications:			

XI.	Field QC			
	1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	(No)	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	(No)	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	(Yes)	No	N/A

Comments/Qualifications: 045503 (0-0.5) 045503 (0-0.5) dup.

61.4 72.3

10.9 / 66.85 = 16.3% (J)

XII.	Overall Assessment of Data			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A
	Comments/Qualifications:			

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037558

SDG: 57331 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No. of Samples: Soil - 19

Validation Samples: Validation Samples: 045508 (0-0.5) 045509 (1-2) 045503 (4-5)
045504 (0-0.5) 045506 (0-0.5) 045508 (0-0.5) dup. 045515 (0-0.5) 045512 (0-0.5)
045504 (1-2) 045506 (1-2) 045508 (1-2) 045515 (1-2 045512 (1-2
045505 (0-0.5) 045507 (0-05) 045509 (0-0.5) 045509 (4-5)
045504 (1-2) 045507 (1-2)

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as

Date: 4/4/2012

Validator's Signature: J Thomas Kitchings

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	04SS04(0-0.5)	Project:	STEP00202
Sample ID:	57331001	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	15.8%		

Parameter	Qualifier	Result	Rej Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		122		10.9	45.5	ug/kg	1	MAR1 03/28/02	1608	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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E Concentration exceeds instrument calibration range
H Holding time exceeded
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS04(1-2)	Project:	STEP00202
Sample ID:	57331002	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	13.3%		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		124		10.6	44.1	ug/kg	1	MAR1 03/28/02	1635	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS05(0-0.5)	Project:	STEP00202
Sample ID:	57331003	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	14.8%		

Parameter	Qualifier	Result Rev Qnd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		2210	288	1200	ug/kg	25	MAR1 03/28/02	1645	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by Sarah Bashaw

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS05(1-2)	Project:	STEP00202
Sample ID:	57331004	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	12.2%		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		9340		1080	4500	ug/kg	100	MAR1 03/28/02	1655	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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E Concentration exceeds instrument calibration range
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS06(0-0.5)	Project:	STEP00202
Sample ID:	57331005	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	13.7%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		163000		10600	44500	ug/kg	1000	MAR1 03/28/02	1706	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS06(1-2)	Project:	STEP00202
Sample ID:	57331006	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	13.9%		

Parameter	Qualifier	Result ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		160000	18100	75700	ug/kg	2000	MAR1 03/28/02	1716	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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H Holding time exceeded
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 04SS07(0-0.5)
Sample ID: 57331007
Matrix: Soil
Collect Date: 11-MAR-02
Receive Date: 12-MAR-02
Collector: Client
Moisture: 20.2%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	29.3	J	11.1	46.3	ug/kg	1	MAR1 03/28/02	1726	154494	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1000	154492

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS07(1-2)	Project:	STEP00202
Sample ID:	57331008	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	10.9%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		46.0		10.7	44.9	ug/kg	1	MAR1 03/29/02	2324	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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H Holding time exceeded
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Reviewed by John. Byrd

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS08(0-0.5)DUP	Project:	STEP00202
Sample ID:	57331009	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	12.7%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		434		10.9	45.5	ug/kg	1	MAR1 03/29/02	2334	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS08(1-2)	Project:	STEP00202
Sample ID:	57331010	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	12.9%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate		171		11.0	45.9	ug/kg	1	MAR1	03/29/02	2344	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 04SS09(0-0.5)
Sample ID: 57331011
Matrix: Soil
Collect Date: 11-MAR-02
Receive Date: 12-MAR-02
Collector: Client
Moisture: 17.3%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev 2nd	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	11.6	48.2	ug/kg	1	MAR1	03/29/02	2354	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Reviewed by Sylvia B. Bashaw

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS09(1-2)	Project:	STEP00202
Sample ID:	57331012	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	17.9%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	14.6	J	11.6	48.6	ug/kg	1	MAR1 03/30/02	0004	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS15(0-0.5)	Project:	STEP00202
Sample ID:	57331013	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	20.7%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.1	50.3	ug/kg	1	MAR1 03/30/02	0014	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	04SS15(1-2)	Project:	STEP00202
Sample ID:	57331014	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	12.6%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	10.8	45.2	ug/kg	1	MAR1	03/30/02	0024	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS09(4-5)	Project:	STEP00202
Sample ID:	57331015	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	18.1%		

Parameter	Qualifier	Result	Rw Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate		289		11.6	48.4	ug/kg	1	MAR1	03/30/02	1314	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1. 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS03(4-5)	Project:	STEP00202
Sample ID:	57331016	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	16.5%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		10000		1150	4790	ug/kg	100	MAR1 03/31/02	0009	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS12(0-0.5)	Project:	STEP00202
Sample ID:	57331017	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	15.1%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.1	46.3	ug/kg	1	MAR1 03/30/02	1334	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID: 04SS12(1-2)
Sample ID: 57331018
Matrix: Soil
Collect Date: 11-MAR-02
Receive Date: 12-MAR-02
Collector: Client
Moisture: 13.9%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		97.1		10.9	45.5	ug/kg	1	MAR1 03/30/02	1345	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS08(0-0.5)	Project:	STEP00202
Sample ID:	57331019	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	13.6%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.0	45.8	ug/kg	1	MAR103/30/02	1355	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

037579

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 57331 Matrix/No. Samples: S-19

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 15°C 59°F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs? 46RS01 - client signed time of collection @ 15:23 COC 16:32 - note for client 16:32 correct.	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED	PREPPED/ANALYZED
3/11	3/28
154492 3/22	3/29, 3/30, 3/31
154578 3/27	

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds. 0 - 100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/28 ICV 47.72/50 = 95.4

CCV @ 15:18 23.91/23 = 95.9

17:45 73.23/75 = 97.6

3/29 CCV @ 22:38 73.86/75 = 98.5

3/30 @ 00:39 24.45/25 = 97.8

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037580

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 57331 Matrix/No. Samples: S-19

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/28 MB 190170 U — LCB 3/28 CCB 15:28, 17:55

3/29 MB 190312 U — 3/29 CCB 22:48, 3/30 CCB 00:49

3/10

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/28 IPC 23.25/25 = 95%

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	(N/A)
	2. Are all solid LCS %R within control limits established by the laboratory?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

190177 LCS 3/28 541/500 = 108.2

190319 LCS 3/29 494/500 = 98.8

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 57331 Matrix/No. Samples: S-19

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/28 28020 u/u
29001 u/u

3/30 31019 u/u
32001 139/147 = B/143 = 5.6% RPD

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

28020 113/111 = 101.8
111/110 = 100.9
RPD 2/112 = 1.8% ✓

29001 141/121 = 116.5
142/120 = 118.3
1/141.5 = 0.7% ✓

31019 125/115 = 108.7
~~122/116 = 105.2~~
3/123.5 = 2.4% ✓

32001 258-139/129 = 92.2
259-139/130 = 92.3
1/1195 = 0.8% ✓

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

C37582

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 51331 Matrix/No. Samples: S-19

X. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
2. Were correct calculations used to determine sample results?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	No	(N/A)

Comments/Qualifications:

XI. Field QC			
1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	(Yes)	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	(Yes)	No	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	(No)	N/A
b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

04RS01 3/11 @12:52 U

045508 (0-0.5) U

045508/(0-0.5) dup. 434

XII. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A

Comments/Qualifications:

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(divider page)

SDG: 57332 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Soil - 14

Validation Samples: Validation Samples: 045513(1-2) 465501(1-2)
045511 (0-0.5) 045510(0-0.5) 045514(0-0.5) 465502(0-0.5)
045511 (0-0.5)dup 045510(1-2) 045514(1-2) 465502(0-0.5)dup.
045511 (1-2 045513(0-0.5) 465501(0-0.5) 465502(1-2

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	X	
12.	Overall Assessment	X	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57332 Method: Perchlorate EPA 314.0

Qualifications:

17 • The RPD for 045511 (0-0.5) / 045511 (0-0.5) dup exceeded 100% and the result was qualified as "J" for both samples.

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as qualified

Date: 4/4/2002

Validator's Signature: J. Thomas Hutchings

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	04SS11(0-0.5)	Project:	STEP00202
Sample ID:	57332001	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	23.1%		

Parameter	Qualifier	Result	Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		139	J	12.4	51.8	ug/kg	1	MAR1 03/30/02	1455	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS11(0-0.5) Dup.	Project:	STEP00202
Sample ID:	57332002	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	25.7%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	J	38.5	J (7	12.8	53.6	ug/kg	1	MAR1	03/30/02	1536	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS11(1-2)	Project:	STEP00202
Sample ID:	57332003	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	19%		

Parameter	Qualifier	Result	RawQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.8	49.2	ug/kg	1	MAR1 03/30/02	1546	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	04SS10(0-0.5)	Project:	STEP00202
Sample ID:	57332004	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	22.1%		

Parameter	Qualifier	Result	Raw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.2	51.0	ug/kg	1	MAR1 03/30/02	1556	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	04SS10(1-2)	Project:	STEP00202
Sample ID:	57332005	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	14.6%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	14.0	J	11.2	46.8	ug/kg	1	MAR1 03/30/02	1606	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
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Reviewed by

Certificate of Analysis

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS13(0-0.5)	Project:	STEP00202
Sample ID:	57332006	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	19.7%		

Parameter	Qualifier	Result	RegQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	UL	11.9	49.7	ug/kg	1	MAR1 03/30/02	1616	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID: 04SS13(1-2)
Sample ID: 57332007
Matrix: Soil
Collect Date: 11-MAR-02
Receive Date: 12-MAR-02
Collector: Client
Moisture: 18.1%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.7	48.8	ug/kg	1	MAR1 03/30/02	1626	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
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H Holding time exceeded
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Reviewed by

Certificate of Analysis

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04SS14(0-0.5)	Project:	STEP00202
Sample ID:	57332008	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	22.8%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.3	51.4	ug/kg	1	MAR1 03/30/02	1656	154591	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154578

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	04SS14(1-2)	Project:	STEP00202
Sample ID:	57332009	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	22.9%		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00	12.4	51.6	ug/kg	1	MAR1 03/28/02	1826	154620	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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U Indicates the compound was analyzed for but not detected above the detection limit
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: April 1, 2002

Project: Longhorn A.A.P.

Client Sample ID:	46SS01(0-0.5)	Project:	STEP00202
Sample ID:	57332010	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	36.8%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	14.6	61.0	ug/kg	1	MARI 03/28/02	1906	154620	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MARI	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46SS01(1-2)	Project:	STEP00202
Sample ID:	57332011	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	21.5%		

Parameter	Qualifier	Result Raw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00 U	11.4	47.4	ug/kg	1	MAR1 03/28/02	1916	154620	I

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
I	EPA 314.0	

Notes:
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Reviewed by Joseph A. Bagwell

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	46SS02(0-0.5) Dup.	Project:	STEP00202
Sample ID:	57332012	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	55.9%		

Parameter	Qualifier	Result	Req'd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	u	21.5	89.7	ug/kg	1	MAR1 03/29/02	1149	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

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Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	46SS02(1-2)	Project:	STEP00202
Sample ID:	57332013	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	21%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.1	50.5	ug/kg	1	MAR1 03/29/02	1159	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	46SS02(0-0.5)	Project:	STEP00202
Sample ID:	57332014	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	34.8%		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	14.5	60.6	ug/kg	1	MAR1 03/29/02	1209	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037600

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 57332 Matrix/No. Samples: S-14

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 15° 59°F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED		PREPPED/ANALYZED
3/11	154578 3/27	3/30
	154619 3/27	3/28
	154985 3/26	3/29

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0 - 100 ~	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

154619 3/28 CCV 17:45 — 73.23/75 = 97.6
19:47 — 24.63/25 = 98.5

3/28 ICV 47.72/50

154985 3/29 CCV 11:29 — 24.24/25 = 97
13:30 — 74.49/75 = 99.3

154578 3/30 CCV 14:36 — 73.73/75 = 98.3
16:36 — 24.56/25 = 98.2

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 57332 Matrix/No. Samples: S-14

III. Blanks			
1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

190312 MB 3/29 - U

190391 MB 3/28 - U

191377 MB 4/1 - U

ICB and all CCBs - @3U

IV. Instrument Performance Check Sample (IPC)			
1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: IPC 23.75/25 = 95% 3/28

V. Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	(N/A)
2. Are all solid LCS %R within control limits established by the laboratory?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

190319 LCS 3/29 494/500 = 98.8

190348 LCS 3/28 478/500 = 95.6

191384 LCS 4/1 486/500 = 97.2

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 57332 Matrix/No. Samples: S-14

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 32001 147/139 = 8/143 = 5.6%

32009 u/u

320114 u/u

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 32001 258 - 134/129 = 92.2
258 - 134/130 = 92.3
RPD 1/119.5 = 0.8%

32009 124/128 = 96.9
121/127 = 95.3
RPD 3/122.5 = 2.4%

32014 158/153 = 103.3
149/151 = 98.7
RPD 9/153.5 = 5.9%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037603

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 57332 Matrix/No. Samples: S-14

X. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	Yes	No	N/A
2. Were correct calculations used to determine sample results?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

XI. Field QC			
1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
b. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

46RS01
@ 1.025

~~046502 (0-0.5)~~ u

046502 (0-0.5) dup. u

100.5 / 88.25 = 113.2%

045511 (0-0.5) 134

045511 (0-0.5) dup. 38.5

XII. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A

Comments/Qualifications:

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(divider page)

037605

SDG: 57322 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 17

Validation Samples: Validation Samples: 46WW02 46WW19 DUP, 46WW18
47WW27 47WW23 47WW21 46WW01 46WW04 46WW17
47WW53 50WW01 dupl. QC 47WW60 46WW19 46WW13 46WW23
47WW54 50WW01

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	See Comments #1
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

Qualifications:

Significant Findings/Recommendations:

#1 • The nom. conc. used by the lab for calculating the recovery for the CCV's on 3/22 (@ 18:15 & 20:16) were reversed by the lab who reported the recoveries w/in limits which they weren't - if the calcs were correct. — The nom. conc. values were changed by the reviewer

Overall Data Quality:

Acceptable as reported

Date: 4/4/2002

Validator's Signature: J. Thomas Kitchings

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 28, 2002

Client Sample ID:	47WW27	Project:	STEP00202
Sample ID:	57322001	Client ID:	STEP001
Matrix:	Water		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		164		9.58	40.0	ug/L	10	MAR103/22/02	1856	153079	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 28, 2002

Client Sample ID:	47WW53	Project:	STEP00202
Sample ID:	57322002	Client ID:	STEP001
Matrix:	Water		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result Rw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		9.32	0.958	4.00	ug/L	1	MAR1 03/21/02	2231	153079	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47WW54	Project:	STEP00202
Sample ID:	57322003	Client ID:	STEP001
Matrix:	Water		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	u	0.958	4.00	ug/L	1	MAR103/21/02	2241	153079	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
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X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47WW23	Project:	STEP00202
Sample ID:	57322004	Client ID:	STEP001
Matrix:	Water		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/21/02	2251	153079	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
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U Indicates the compound was analyzed for but not detected above the detection limit
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 28, 2002

Client Sample ID:	50WW01QC Dup
Sample ID:	57322005
Matrix:	Water
Collect Date:	09-MAR-02
Receive Date:	12-MAR-02
Collector:	Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/21/02	2301	153079	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47WW21	Project:	STEP00202
Sample ID:	57322006	Client ID:	STEP001
Matrix:	Water		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/21/02	2311	153079	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47WW60	Project:	STEP00202
Sample ID:	57322007	Client ID:	STEP001
Matrix:	Water		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		56700		4790	20000	ug/L	5000	MAR103/25/02	1822	153470	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46WW02	Project:	STEP00202
Sample ID:	57322008	Client ID:	STEP001
Matrix:	Water		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		9.01	0.958	4.00	ug/L	1	MAR103/22/02	1916	153470	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46WW01	Project:	STEP00202
Sample ID:	57322009	Client ID:	STEP001
Matrix:	Water		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1	03/22/02	1926	153470	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	46WW19	Project:	STEP00202
Sample ID:	57322010	Client ID:	STEP001
Matrix:	Water		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Re Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/22/02	1936	153470	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
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U Indicates the compound was analyzed for but not detected above the detection limit
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn

Project: Longhorn A.A.P.

Client Sample ID:	46WW19QC dup JTK	Project:	STEP00202
Sample ID:	57322011	Client ID:	STEP001
Matrix:	Water		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/22/02	1946	153470	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
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B Analyte found in the sample as well as the associated blank.
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H Holding time exceeded
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Reviewed by

Certificate of Analysis

Company : Step. Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 46WW04
Sample ID: 57322012
Matrix: Water
Collect Date: 10-MAR-02
Receive Date: 12-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Raw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		14.0		0.958	4.00	ug/L	1	MAR1 03/22/02	1956	153470	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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B Analyte found in the sample as well as the associated blank.
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H Holding time exceeded
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn

Project: Longhorn A.A.P.

Client Sample ID:	46WW13	Project:	STEP00202
Sample ID:	57322013	Client ID:	STEP001
Matrix:	Water		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 03/22/02	2006	153470	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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B Analyte found in the sample as well as the associated blank.
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H Holding time exceeded
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Reviewed by

037620

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46WW18	Project:	STEP00202
Sample ID:	57322014	Client ID:	STEP001
Matrix:	Water		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	u	0.958	4.00	ug/L	1	MAR103/22/02	2037	153470	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

037621

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Cl
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46WW17	Project:	STEP00202
Sample ID:	57322015	Client ID:	STEP001
Matrix:	Water		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/22/02	2047	153470	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Reviewed by Sarah Bashaw

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Repon Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46WW23	Project:	STEP00202
Sample ID:	57322016	Client ID:	STEP001
Matrix:	Water		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/22/02	2057	153470	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 28, 2002

9th

Client Sample ID:	50WW01 QC	Project:	STEP00202
Sample ID:	57322017	Client ID:	STEP001
Matrix:	Water		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/22/02	2107	153470	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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< Actual result is less than amount reported
> Actual result is greater than amount reported
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E Concentration exceeds instrument calibration range
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UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by _____

037624

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: JTR 4/4

Project: Longhorn AAP SDG: 57322 Matrix/No. Samples: Wdw - 17

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 16° - 61°F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs? Sample SOW not mislabelled on Form I - changed by reviewer - ...QC	(Yes)	No	N/A
	2. Were correct analyses performed on samples? - both dupl. labelled as... dupl. by reviewer.	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED	PREPPED/ANALYZED
3/9 , 3/10	153019 - 3/21 , 22
	153470 - 3/22, 3/25

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0 - 100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90 - 110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 9 - 110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/21 ICV ~~23.37~~ 49.16/50 = 98.3 JTR

CCV 21:50 81.55/75 = 108.7

CCV 23:21 26.78/25 = 107.1

3/22

ICV 50.33/50 = 100.7

CCV 18:15 25.1/25 = 100.4

CCV 20:16 78.16/75 = 104.2

037625

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 57322 Matrix/No. Samples: 4-17

III. Blanks			
1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

186955 3/21 @ nondetects

187919 3/23 @ "

3/21 ICB
CCB 22:00
CCB 23:31
— zeros

3/22
ICB
CCB
CCB
— zeros

IV. Instrument Performance Check Sample (IPC)			
1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/21 IPC 23.37/25 = 93.5

3/22 IPC 23.56/25 = 94.2

V. Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/21 186961 52.2/50 = 104.4

3/23 187926 50.7/50. = 101.4

037626

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 57322 Matrix/No. Samples: 0-17

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

207003 3/21 18:38 u/u
240001 19:19 u/u

322017 3/22 21:17 u/u
333001 21:58 u/u

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

240001 10.3 / 10.0 = 103%
10.1 = 101%
.2 / 10.2 = 1.96

22017 9.43 / 10.0 = 94.3%
9.95 = 99.5%
.52 / 9.69 = 5.4

333001 10.1 / 10.0 = 101%
10.2 = 102%
.1 / 10.15 = 0.99%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/4

Project: Longhorn AAP SDG: 57322 Matrix/No. Samples: W-17

X.	Sample Result Qualification Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A
	Comments/Qualifications:			

XI.	Field QC			
	1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	(Yes)	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	(No)	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	Yes	(No)	N/A
	Comments/Qualifications:			

50WW01 50WW01D. 46WW19 46WW19D

L u J L u J

XII.	Overall Assessment of Data			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A
	Comments/Qualifications:			

037628

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037629

SDG: 57355 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water- 14 Soil-13 JTK

Validation Samples: Validation Samples: 18WW08 46WW03 18WWMW-8
18WW11 18WWMW-17 18WW20 18WW09 46WW22 18WWMW-8 DUP
18WW10 18WW19 18WW07 04WW02 50WW02

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	JTK ~~N/A~~ X	
12.	Overall Assessment	~~A~~ X	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57355 Method: Perchlorate EPA 314.0

Qualifications:

17 . The field duplicate RPD for 18WHMW-8 / 8 DUP was 182%. and the results for both samples were qualified as "J"

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported

Date: 4/3/2002

Validator's Signature: J. Thomas Kibbey

Peer Reviewer: _____

037631

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18WW11	Project:	STEP00202
Sample ID:	57355001	Client ID:	STEP001
Matrix:	Water		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RegQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/22/02	2339	153470	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 18WW10
Sample ID: 57355002
Matrix: Water
Collect Date: 11-MAR-02
Receive Date: 12-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rw2nd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/22/02	2349	153470	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	18WWMW-17	Project:	STEP00202
Sample ID:	57355003	Client ID:	STEP001
Matrix:	Water		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		225	24.0	100	ug/L	25	MAR103/25/02	1832	153470	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

DUP

Client Sample ID:	18WWMW-8QC	Project:	STEP00202
Sample ID:	57355004	Client ID:	STEP001
Matrix:	Water		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		41500	J 17	4790	20000	ug/L	5000	MAR103/25/02	1842	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
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X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18WW19	Project:	STEP00202
Sample ID:	57355005	Client ID:	STEP001
Matrix:	Water		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RawQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/23/02	0120	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	18WW20	Project:	STEP00202
Sample ID:	57355006	Client ID:	STEP001
Matrix:	Water		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RawQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/23/02	0130	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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H Holding time exceeded
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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

037637

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18WW07	Project:	STEP00202
Sample ID:	57355007	Client ID:	STEP001
Matrix:	Water		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/23/02	0140	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge. Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18WW08	Project:	STEP00202
Sample ID:	57355008	Client ID:	STEP001
Matrix:	Water		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		4520		958	4000	ug/L	1000	MAR103/25/02	1852	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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U Indicates the compound was analyzed for but not detected above the detection limit
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X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 18WW09
Sample ID: 57355009
Matrix: Water
Collect Date: 09-MAR-02
Receive Date: 12-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RW2nd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/23/02	0200	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID: 04WW02
Sample ID: 57355010
Matrix: Water
Collect Date: 10-MAR-02
Receive Date: 12-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RL/Dnd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/23/02	0210	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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H Holding time exceeded
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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Reviewed by Sylvia Byrd

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	46WW03	Project:	STEP00202
Sample ID:	57355011	Client ID:	STEP001
Matrix:	Water		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/23/02	0240	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 46WW22
Sample ID: 57355012
Matrix: Water
Collect Date: 11-MAR-02
Receive Date: 12-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RW Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/23/02	0251	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	50WW02	Project:	STEP00202
Sample ID:	57355013	Client ID:	STEP001
Matrix:	Water		
Collect Date:	11-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		6840		240	1000	ug/L	250	MAR1 03/25/02	1902	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID: 18WWMW-8
Sample ID: 57355014
Matrix: Water
Collect Date: 11-MAR-02
Receive Date: 12-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Reqd Det	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		1980	J 17	240	1000	ug/L	250	MAR1 03/25/02	1912	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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H Holding time exceeded
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U Indicates the compound was analyzed for but not detected above the detection limit
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Reviewed by

037645

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: 57355 Matrix/No. Samples: ~~S-13~~ W-14

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 16°C - 61°F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED	PREPPED/ANALYZED
MW19 3/9 20 09 07 3/9 04MW02 08 3/10 all others 3/11	3/22, 23, 25

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 10 0 - 100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/22 ICV 50.33/50 = 100.7

CCV @ 00:19 78.5/75 = 104.7

02:20 25.45/25 = 101.8

3/25

ICV 49.24/50 = 98.5

CCV @ 18:02 74.72/75 = 99.6

19:53 24.56/25 = 98.2

037646

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: 57355 Matrix/No. Samples: ~~5-13~~ W-14

III. Blanks			
1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	No	N/A
2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

3/22
ICB
CCB 00:29
CCB 02:30
→ Zero

187919 MB 3/23 - U

187975 MB 3/23 - U

3/25
ICB
CCB 18:12
CCB 20:03
→ Zero

IV. Instrument Performance Check Sample (IPC)			
1. Was the IPC sample run at the beginning and end of each sample analysis run?	Yes	No	N/A
2. Is the IPC %R within 80-120% acceptable control limits?	Yes	No	N/A
3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

187926 LCS 3/23 50.7/50 = 101.4

187982 LCS 3/23 51.2/50 = 102.4

IPC 3/22
23.56/250 = 94.2%

IPC 3/25 23.72/25 = 94.9%

V. Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	N/A
2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037647

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: 57355 Matrix/No. Samples: ~~S-13~~ W-14

VI. Duplicates			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

22017 u/u

33001 u/u

55014 $\frac{2010-1980}{(\quad)/2} = \frac{30}{1995} = 1.5\%$

92001 1.50 / u = 6%

VII. Matrix Spike			
1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

22017 9.43 / 100 = 94.3%
9.95 / 100 = 99.5%
RPD = .52/9.69 = 5.4%

33001 10.1 / 10.0 = 101%
10.2 / 10.0 = 102%
.1/10.15 = 0.99%

355014 16.9-7.93 / 10.0 = 89.7
17.3-7.93 / 10.0 = 93.7
.4/9.17 = 4.4%

92001 10-1.52 / 10.0 = 84.8%
10.2-1.52 / 10.0 = 86.8%
.2/8.58 = 23%

037648

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: 57355 Matrix/No. Samples: ~~S-13~~ W-14

X.	Sample Result Qualification Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	N/A
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A
	Comments/Qualifications:			

XI.	Field QC			
	1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

18WWMW-8 1980

WMW-8D 41500

39,520 / 21,740 = 181.8%

XII.	Overall Assessment of Data			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A
	Comments/Qualifications:			

037649

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(divider page)

SDG: ~~57548~~ 57239 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Soil - 11

Validation Samples: Validation Samples: 175546(0-0.5)dup. 175546(1-2) 175537(0-0.5)
175544(0-0.5) 175545(1-2) 175547(0-0.5) 175537(1-2)
175544(1-2) 175546(0-0.5) 175547(1-2)
175545(0-0.5)

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: ~~57326~~ 57239 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Date: 4/3/2002

Validator's Signature: J. Thomas Kitchings

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 29, 2002

Client Sample ID:	17SS44(0-0.5)	Project	STEP00202
Sample ID:	57239001	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	23.7%		

Parameter	Qualifier	Result	Revised	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	6.02	U	12.5	52.0	ug/kg	1	MAR1	03/27/02	1749	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 29, 2002

Client Sample ID:	17SS44(1-2)	Project:	STEP00202
Sample ID:	57239002	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	21.7%		

Parameter	Qualifier	Result	Reqd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.0	50.2	ug/kg	1	MAR103/27/02	1829	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by _____

Certificate of Analysis

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: March 29, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17SS45(0-0.5)	Project:	STEP00202
Sample ID:	57239003	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	28.1%		

Parameter	Qualifier	Result	RW2 nd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	13.2	55.1	ug/kg	1	MAR103/27/02	1839	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by Jeff M. Byrd

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 29, 2002

Client Sample ID:	17SS45(1-2)	Project:	STEP00202
Sample ID:	57239004	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	28.7%		

Parameter	Qualifier	Result	Rejected	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	13.4	56.0	ug/kg	1	MAR103/27/02	1849	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: March 29, 2002

Project: Longhorn A_A_P.

Client Sample ID:	17SS46(0-0.5)	Project:	STEP00202
Sample ID:	57239005	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	30.7%		

Parameter	Qualifier	Result	Revised	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	13.8	57.6	ug/kg	1	MAR1 03/27/02	1920	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: March 29, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17SS46(0-0.5)DUP	Project:	STEP00202
Sample ID:	57239006	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	27.4%		

Parameter	Qualifier	Result	Rev2 ud	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	13.1	54.8	ug/kg	1	MARI 03/27/02	2015	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
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Contact: Doug Hawn

Report Date: March 29, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17SS46(1-2)	Project:	STEP00202
Sample ID:	57239007	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	23.6%		

Parameter	Qualifier	Result	Re-Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.5	52.4	ug/kg	1	MAR1 03/27/02	2025	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 29, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS47(0-0.5)	Project:	STEP00202
Sample ID:	57239008	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	21.6%		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.2	50.8	ug/kg	1	MAR103/27/02	0356	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 29, 2002

Client Sample ID: 17SS47(1-2)
Sample ID: 57239009
Matrix: Soil
Collect Date: 08-MAR-02
Receive Date: 09-MAR-02
Collector: Client
Moisture: 16.1%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Re-Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.3	47.3	ug/kg	1	MAR1 03/27/02	0437	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 29, 2002

Client Sample ID:	17SS37(0-0.5)	Project:	STEP00202
Sample ID:	57239010	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	22.9%		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.4	51.8	ug/kg	1	MAR103/27/02	0447	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 29, 2002

Client Sample ID:	17SS37(1-2)	Project:	STEP00202
Sample ID:	57239011	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	19.6%		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.9	49.8	ug/kg	1	MAR103/27/02	0457	153901	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	0900	153900

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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H Holding time exceeded
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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037663

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: ~~57228~~ 57239 Matrix/No. Samples: S - 11

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 20°C - 68°F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

	SAMPLED	PREPPED/ANALYZED
153898	3/8	3/25 3/27

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0 - 100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? lab @ 90 - 110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? lab @ 90 - 110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICV 3/27 49.51/50 = 99.0

CCV 3/27 3:16 25.49/25 = 102.0

CCV 5 5:07 81.06/75 = 108.1

17:01 26.79/25 = 107.2

19:55 81.44/75 = 108.6

1

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037664

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: ~~57329~~ 57239 Matrix/No. Samples: S - 11

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

188975 MB 3/28 @ 11 ICB - zero

188983 MB 3/28 @ 11 CCB 3:26, 5:17, 17:11, 20:05 - zero

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/27 IPC 24.55/25 = 98.2

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	(N/A)
	2. Are all solid LCS %R within control limits established by the laboratory?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

188982 LCS 530/500 = 106%
3/27

188990 LCS 525/500 = 105%

037665

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: ~~57328~~ 57239 Matrix/No. Samples: S- 11

VI. Duplicates			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 188977 DUP u/u 3/27

188984 DUP u/u 3/27

VII. Matrix Spike			
1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/27 239001 143/129 = 106.2 (6.02) 8/132.98 = 6.02%

135/130 = 99.2 (6.02)

239008 152/128 = 118.8 5/154.5 = 3.2%

157/126 = 124.6

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037666

Reviewer: Kitchings MK Date: 4/3

Project: Longhorn AAP SDG: ~~57328~~ 57239 Matrix/No. Samples: S-11

X.	Sample Result Qualification Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A
	Comments/Qualifications:			

XI.	Field QC			
	1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	(Yes)	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	(Yes)	No	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	(No)	N/A
	b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: ORIG FD

175546(0-0.5) 175546(0-0.5)dup 17RS09@ U-

U U

XII.	Overall Assessment of Data			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A
	Comments/Qualifications:			

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(divider page)

SDG: 57238 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Soil -20

Validation Samples: Validation Samples: 175538(0-0.5) 175540(0-0.5) 175541(1-2)
175534(0-0.5) 175535(1-2) 175538(1-2) 175540(1-2) 175542(0-0.5)
~~175534(0-0.5)dup~~ 175536(0-0.5) 175539(0-0.5) 175541(0-0.5) 175542(1-2)
175534(1-2) 175536(0-0.5)dup 175539(1-2) 175541(0-0.5)dup. 175543(0-0.5)
175535(0.-0.5) 175536(1-2) 175543(1-2)

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	X	
12.	Overall Assessment	X	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57238 Method: Perchlorate EPA 314.0 Page 2

Qualifications:

17. 175541 (0-0.5) / 175541 (0-0.5) dup had a field duplicate RPD of >100% and the results were qualified as "J".

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as qualified.

Date: 4/3/2002

Validator's Signature: J. Thomas Hutchings

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 29, 2002

Client Sample ID:	17SS41(0-0.5)	Project:	STEP00202
Sample ID:	57238001	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	27%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	17.0	J 17	12.9	53.7	ug/kg	1	MAR1 03/26/02	0649	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by John M. Bg

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 29, 2002

Client Sample ID:	17SS34(0-0.5)	Project:	STEP00202
Sample ID:	57238002	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	17.2%		

Parameter	Qualifier	Result	Requal	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.6	48.3	ug/kg	1	MAR1 03/26/02	0749	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 29, 2002

Client Sample ID:	17SS34(1-2)	Project:	STEP00202
Sample ID:	57238003	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	10.2%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.7	44.8	ug/kg	1	MAR1 03/26/02	0759	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
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Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 29, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS35(0-0.5)	Project:	STEP00202
Sample ID:	57238004	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	24%		

Parameter	Qualifier	Result	Rev 2 4/4	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.4	51.7	ug/kg	1	MAR1 03/26/02	0809	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

037674

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 29, 2002

Client Sample ID: 17SS35(1-2)
Sample ID: 57238005
Matrix: Soil
Collect Date: 08-MAR-02
Receive Date: 09-MAR-02
Collector: Client
Moisture: 18.5%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.8	49.5	ug/kg	1	MAR1 03/26/02	0840	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: March 29, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17SS36(0-0.5)	Project:	STEP00202
Sample ID:	57238006	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	24.5%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.8	53.4	ug/kg	1	MAR103/26/02	0819	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MARI	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 29, 2002

Client Sample ID: 17SS36(0-0.5)DUP
Sample ID: 57238007
Matrix: Soil
Collect Date: 08-MAR-02
Receive Date: 09-MAR-02
Collector: Client
Moisture: 21.4%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Reviewed	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	12.1	50.6	ug/kg	1	MAR1	03/26/02	0830	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 29, 2002

Client Sample ID: 17SS36(1-2)
Sample ID: 57238008
Matrix: Soil
Collect Date: 08-MAR-02
Receive Date: 09-MAR-02
Collector: Client
Moisture: 15.1%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RQ	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.2	46.9	ug/kg	1	MARI 03/27/02	1319	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: March 29, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17SS38(0-0.5)	Project:	STEP00202
Sample ID:	57238009	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	30.6%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	20.0	J	13.7	57.4	ug/kg	1	MAR103/27/02	1359	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: March 29, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17SS38(1-2)	Project:	STEP00202
Sample ID:	57238010	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	21.4%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		394		12.0	50.3	ug/kg	1	MAR103/27/02	1429	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 29, 2002

Client Sample ID: 17SS39(0-0.5)
Sample ID: 57238011
Matrix: Soil
Collect Date: 08-MAR-02
Receive Date: 09-MAR-02
Collector: Client
Moisture: 21.9%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Raw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.2	51.1	ug/kg	1	MAR1 03/27/02	1439	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 29, 2002

Client Sample ID: 17SS39(1-2)
Sample ID: 57238012
Matrix: Soil
Collect Date: 08-MAR-02
Receive Date: 09-MAR-02
Collector: Client
Moisture: 16.7%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.5	48.0	ug/kg	1	MAR103/27/02	1449	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by J. M. Bashaw

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 29, 2002

Client Sample ID:	17SS40(0-0.5)	Project:	STEP00202
Sample ID:	57238013	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	28.5%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate		70.9		13.3	55.7	ug/kg	1	MAR1	03/27/02	1520	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 29, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS40(1-2)	Project:	STEP00202
Sample ID:	57238014	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	17.4%		

Parameter	Qualifier	Result	Req'd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	25.5	J	11.6	48.3	ug/kg	1	MAR1 03/27/02	1530	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
I	EPA 314.0	

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Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: March 29, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17SS41(0-0.5)DUP	Project:	STEP00202
Sample ID:	57238015	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	27.4%		

Parameter	Qualifier	Result	Rev2 ul	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		102	J 17	13.1	54.9	ug/kg	1	MAR1 03/27/02	1540	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 29, 2002

Client Sample ID:	17SS41(1-2)	Project:	STEP00202
Sample ID:	57238016	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	17.9%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		85.8		11.6	48.5	ug/kg	1	MAR103/27/02	1610	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 29, 2002

Client Sample ID:	17SS42(0-0.5)	Project:	STEP00202
Sample ID:	57238017	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	18.7%		

Parameter	Qualifier	Result	Req'd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		65.8		11.7	48.8	ug/kg	1	MAR1 03/27/02	1620	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 29, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS42(1-2)	Project:	STEP00202
Sample ID:	57238018	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	21.6%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	11.2	U	12.1	50.4	ug/kg	1	MAR103/27/02	1630	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 29, 2002

Client Sample ID:	17SS43(0-0.5)	Project:	STEP00202
Sample ID:	57238019	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	15.7%		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		146		11.2	47.0	ug/kg	1	MAR103/27/02	1641	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: March 29, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17SS43(1-2)	Project:	STEP00202
Sample ID:	57238020	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		
Moisture:	16.1%		

Parameter	Qualifier	Result Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		323	11.4	47.6	ug/kg	1	MAR1 03/27/02	1651	153899	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	03/25/02	1030	153898

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

037690

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: 57238 Matrix/No. Samples: S-20

I. Sample Management			
A. Sample Preservation, Handling and Transport			
1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
2. Were all samples received in proper condition?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A
Cooler @ 20°C — 68°F			
B. Chain of Custody			
1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
2. Were correct analyses performed on samples?	(Yes)	No	N/A
C. Holding Times			
1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
2. Were any qualifications required based on this information?	Yes	(No)	N/A

	SAMPLED	PREPPED/ANALYZED
153477	3/8	3/22 3/26
153898		3/25 3/27

II. Calibrations			
1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 STDs 0-100	(Yes)	No	N/A
2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? lab. 90-110	(Yes)	No	N/A
3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110	(Yes)	No	N/A
4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/25 ICV 49.24/50

CCV @ 7:29 = 26.55/25 = 106.2

@ 9:10 = 78.91/75 = 105.2

3/26 ICV 49.51/50 = 99.0

CCV @ 12:38 26.38/25 = 105.5

@ 14:59 81.82/75 = 109.1

@ 17:01 26.79/25 = 107.2

037691

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/3

Project: Longhorn AAP **SDG:** 57238 **Matrix/No. Samples:** S-20

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

187952 MB 3/26 - U

188975 MB 3/25 - U

3/25 ICB CCB @ 7:39 @ 9:20 → 3 samples.

3/26 ICB CCB @ 12:48 15:10 17:11 → 3 samples

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/25

23.72/25 = 94.9

3/26

24.55/25 = 98.2

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	(N/A)
	2. Are all solid LCS %R within control limits established by the laboratory?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

187959 LCS 3/26 536/500 = 107.2

188982 LCS 3/27 530/500 = 106.0%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/3

Project: Longhorn AAP **SDG:** 57238 **Matrix/No. Samples:** S-20

VI. Duplicates			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

238001 34.7 -17.0 J both less than the PQL RPD not calc.

238008 — same ↑

VII. Matrix Spike			
1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	No	N/A
2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

187956 $150-17/136 = 97.8$ $164-17/135 = 108.9$ RPD $= 14/140 = 10\%$

188978 $206/235 = 91.6$ $220/233 = 94.4$ RPD $= 14/213 = 6.6\%$

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/3

Project: Longhorn AAP **SDG:** 57238 **Matrix/No. Samples:** S-20

X.	**Sample Result Qualification** Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A
	Comments/Qualifications:			

XI.	**Field QC**			
	1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	(No)	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	(Yes)	No	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	(No)	N/A
	b. Were any qualifications required based on this information?	(Yes)	No	N/A

Comments/Qualifications:

SS36 (0-0.5) — u

SS36 (0-0.5) dup. — u

SS41 (0-0.5) — 17.6

SS41 (0-05) dup. — 102

\ J /

85 / 59.5 > 100%

17RS08 @ u

XII. Overall Assessment of Data

	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A

Comments/Qualifications:

037694

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(divider page)

SDG: 51270 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: G.Water - 8

Validation Samples: Validation Samples: 47WW20 47WW26
47WW11 47WW18 47WW56
47WW57 47WW19 47WW55
47WW18 DUP

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	N/A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57270 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Date: 4/2/2002

Validator's Signature: J. Thomas Kitchings

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 27, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47WW11	Project:	STEP00202
Sample ID:	57270001	Client ID:	STEP001
Matrix:	Water		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		836	24.0	100	ug/L	25	MAR1 03/22/02	1835	153079	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 27, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	47WW57	Project:	STEP00202
Sample ID:	57270002	Client ID:	STEP001
Matrix:	Water		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	UL	0.958	4.00	ug/L	1	MAR1 03/21/02	2029	153079	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 27, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 47WW18
Sample ID: 57270003
Matrix: Water
Collect Date: 08-MAR-02
Receive Date: 09-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RW Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 03/21/02	2039	153079	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 27, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

DUPL.

Client Sample ID:	47WW18QC	Project:	STEP00202
Sample ID:	57270004	Client ID:	STEP001
Matrix:	Water		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/21/02	2049	153079	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 27, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47WW19	Project:	STEP00202
Sample ID:	57270005	Client ID:	STEP001
Matrix:	Water		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RwQu4	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/21/02	2100	153079	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 27, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 47WW20
Sample ID: 57270006
Matrix: Water
Collect Date: 08-MAR-02
Receive Date: 09-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/21/02	2110	153079	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 27, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47WW56	Project:	STEP00202
Sample ID:	57270007	Client ID:	STEP001
Matrix:	Water		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/21/02	2120	153079	I

The following Analytical Methods were performed

Method	Description	Analyst Comments
I	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on an "as received" basis.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 27, 2002

Client Sample ID:	47WW55	Project:	STEP00202
Sample ID:	57270008	Client ID:	STEP001
Matrix:	Water		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RaQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/21/02	2130	153079	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 27, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47WW26	Project:	STEP00202
Sample ID:	57270009	Client ID:	STEP001
Matrix:	Water		
Collect Date:	08-MAR-02		
Receive Date:	09-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		671		24.0	100	ug/L	25	MAR1 03/22/02	1846	153079	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

037706

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/2

Project: Longhorn AAP **SDG:** 57270 **Matrix/No. Samples:** W - 8

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 20°C 68°F - ok			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples? 47 ww11 & 47 ww26 required dilutions due to high concentr. of perchlor.	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED	PREPPED/ANALYZED
3/8	3/21, 3/22

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)?	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? lab. 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? lab 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICV 49.16/50 = 98.3

CCV 19:49 26.13/25 = 104.5

6 stds

0 - 100

CCV 20:50 81.55/75 = 108.7

3/22

ICV for dilutions. 50.33/50 = 100.7

CCV 3/22 @ 18:15 25.1/25.0 = 100.4

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/2

Project: Longhorn AAP **SDG:** 57270 **Matrix/No. Samples:** W-8

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

186955 M 3/21 @ 18:08 - U

ICB 3/21 @ 11:35 - U
CCB 3/21 @ 19:59 - U
CCB 3/21 @ 22:00 - U

dilution. ICB 3/22 @ 17:45 - U
CCB 3/22 @ 18:25 - U

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

IPC 3/21 @ 11:45
$\frac{23.37}{25.00} = 93.5\%$

IPC for dilutions 3/22 @ 17:55
$\frac{23.56}{25} = 94.2\%$

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
	2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

186961 3/21 $52.2/50.0 = 104.4$

037708

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/2

Project: Longhorn AAP **SDG:** 57270 **Matrix/No. Samples:** W-8

VI.	**Duplicates**			
	1. Were samples used for duplicate sample analysis identified as field blanks?	**Yes**	**No**	**N/A**
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	**Yes**	**No**	**N/A**
	3. Were any qualifications required based on this information?	**Yes**	**No**	**N/A**

Comments/Qualifications:

270003 - U/U ✓

240001 - U/U ✓

VII.	**Matrix Spike**			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	**Yes**	**No**	**N/A**
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)? lab. 70-130 ✓	**Yes**	**No**	**N/A**
	3. Were any qualifications required based on this information?	**Yes**	**No**	**N/A**

Comments/Qualifications:

mislabelled by lab. as 207003 MS → 27003 9.86/10.0 = 98.6

240001

10.3 / 10.0 = 103

10.1 / 10.0 = 101

RPD = .2/10.2 = 1.962 ✓

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/2

Project: Longhorn AAP **SDG:** 57270 **Matrix/No. Samples:** W-8

X.	**Sample Result Qualification** Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A
	Comments/Qualifications:			

XI.	**Field QC**			
	1. Were any Field Duplicates associated with this SDG?	Yes	(No)	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	(No)	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	Yes	(No)	N/A
	Comments/Qualifications:			

XII.	**Overall Assessment of Data**			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A
	Comments/Qualifications:			

037710

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037711

SDG: 57227 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Soil - 6

Validation Samples: Validation Samples: 175531 (0-0.5) dup 175532 (1-2)
175531 (1-2) 175533 (0-0.5)
175532 (0-0.5) 175533 (1-2)

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	A	Sample 175531 (0-0.5) in SDG 57226
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57227 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Date: 4/2/2002

Validator's Signature: J. Thomas Hutchings

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 28, 2002

Client Sample ID:	17SS31(0-0.5)dup	Project:	STEP00202
Sample ID:	57227001	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	14.7%		

Parameter	Qualifier	Result	Raw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.3	47.1	ug/kg	1	MAR1 03/26/02	0548	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on a dry weight basis except where prohibited by the analytical procedure.
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: March 28, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17SS31(1-2)	Project:	STEP00202
Sample ID:	57227002	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	16.7%		

Parameter	Qualifier	Result	Rpt Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	40.4	4	11.6	48.3	ug/kg	1	MAR103/26/02	0558	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS32(0-0.5)	Project:	STEP00202
Sample ID:	57227003	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	28.9%		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		71.3		13.4	55.9	ug/kg	1	MAR1 03/26/02	0609	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS32(1-2)	Project:	STEP00202
Sample ID:	57227004	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	25.6%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		2460		324	1350	ug/kg	25	MAR1 03/26/02	1338	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS33(0-0.5)	Project:	STEP00202
Sample ID:	57227005	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	19.4%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		544		11.8	49.4	ug/kg	1	MAR1 03/26/02	0629	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 28, 2002

Client Sample ID:	17SS33(1-2)	Project:	STEP00202
Sample ID:	57227006	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	17%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		7110		1150	4780	ug/kg	100	MAR1 03/26/02	1348	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

037719

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/2

Project: Longhorn AAP **SDG:** 57227 **Matrix/No. Samples:** S-6

I.	**Sample Management**			
A.	**Sample Preservation, Handling and Transport**			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 4^0 - 39°F			
B.	**Chain of Custody**			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
C.	**Holding Times**			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED		**PREPPED/ANALYZED**
3/7	3/22	3/26 ✓

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 std 0 - 100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? lab @ 90 - 110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? lab @ 90 - 110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/25 ICV 49.24/50 = 98.5 ✓

CCV @ 5:28 79.65/75 = 106.2 ✓

CCV @ 7:24 26.55/25 = 106.2 ✓

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/2

Project: Longhorn AAP **SDG:** 52277 **Matrix/No. Samples:** 5 - 6

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

187952MB 3/26 @ 8:50 @ u

3/25
ICB@ zero
CCB 5:38 @ zero
7:34 @ zero.

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/25 IPC 23.72/25 = 94.9

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	(N/A)
	2. Are all solid LCS %R within control limits established by the laboratory?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

187959 536/500 = 107.2 %v

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/2

Project: Longhorn AAP **SDG:** 57277 **Matrix/No. Samples:** S-6

VI.	**Duplicates**			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

Dupl. < 5X RL

RPD's not performed

VII.	**Matrix Spike**			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

187455 ~~153~~ 63 / 67 — RPD 6%

187456 150-17/136 = 97.8%

164-17/136 = 108.9

RPD = 14/140 = 10%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/2

Project: Longhorn AAP **SDG:** 57227 **Matrix/No. Samples:** S-6

X.	**Sample Result Qualification** Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A
	Comments/Qualifications:			

XI.	**Field QC**			
	1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	(Yes)	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	(Yes)	No	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	(No)	N/A
	b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

175531 (0-0.5) → 6080 From

175531 (0-0.5) dup. → U

no quals required

17RS06 - U's

17RS07 - U -

17FB02 - U

XII.	**Overall Assessment of Data**			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A
	Comments/Qualifications:			

037723

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037724

SDG: 57226 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Soil - 20

Validation Samples: Validation Samples: 175516 (0-0.5) 175517 (1-2) 175520 (0-0.5)
175522 (0-0.5) 175514 (1-2) 175516 (0-0.5) DUP. 175518 (0-0.5) 175520 (1-2)
175513 (0-0.5) 175515 (0-0.5) 175516 (1-2) 175518 (1-2) 175530 (1-2)
175513 (1-2) 175515 (1-2) 175517 (0-0.5) 175519 (0-0.5) 175531 (0-0.5)
175514 (0-0.5) Data Validation Report Summary 175519 (1-2)

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	A	
11.	Field QC Samples	QTR A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57226 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Date: 4/2/2002

Validator's Signature: J. Thomas Kuhlman

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 28, 2002

Client Sample ID:	17SS22(0-0.5)	Project:	STEP00202
Sample ID:	57226001	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	10.8%		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.9	45.3	ug/kg	1	MAR1 03/27/02	2257	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
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Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS13(0-0.5	Project:	STEP00202
Sample ID:	57226002	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	18%		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	u	11.7	48.8	ug/kg	1	MAR1 03/27/02	2337	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 28, 2002

Client Sample ID:	17SS13(1-2)	Project:	STEP00202
Sample ID:	57226003	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	18.3%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	UL	11.8	49.5	ug/kg	1	MAR1 03/27/02	2347	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 28, 2002

Client Sample ID:	17SS14(0-0.5)	Project:	STEP00202
Sample ID:	57226004	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	17.2%		

Parameter	Qualifier	Result	Rev 2	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	6.29	U	11.6	48.3	ug/kg	1	MAR1	03/28/02	0018	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS14(1-2)	Project:	STEP00202
Sample ID:	57226005	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	21.8%		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.2	50.8	ug/kg	1	MAR1 03/28/02	0028	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 17SS15(0-0.5)
Sample ID: 57226006
Matrix: Soil
Collect Date: 07-MAR-02
Receive Date: 08-MAR-02
Collector: Client
Moisture: 16.9%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.4	47.6	ug/kg	1	MAR103/28/02	0038	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS15(1-2)	Project:	STEP00202
Sample ID:	57226007	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	13.3%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.0	46.0	ug/kg	1	MAR1 03/28/02	0048	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by John. Byrd

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS16(0-0.5)	Project:	STEP00202
Sample ID:	57226008	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	18.9%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	6.45	UL	11.9	49.6	ug/kg	1	MAR1 03/28/02	0058	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 28, 2002

Client Sample ID:	17SS16(0-0.5)DUP	Project:	STEP00202
Sample ID:	57226009	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	17.7%		

Parameter	Qualifier	Result	RawQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.7	48.9	ug/kg	1	MAR103/28/02	0108	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concenuration exceeds instrument calibration range
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Reviewed by John M. Bash

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: March 28, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17SS16(1-2)	Project:	STEP00202
Sample ID:	57226010	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	15.1%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	18.4	J	11.2	46.9	ug/kg	1	MAR103/28/02	0118	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 28, 2002

Client Sample ID:	17SS17(0-0.5)	Project:	STEP00202
Sample ID:	57226011	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	19.8%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	9.55	U	11.7	49.0	ug/kg	1	MAR1	03/28/02	0129	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	17SS17(1-2)	Project:	STEP00202
Sample ID:	57226012	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	17.3%		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	UL	11.5	48.1	ug/kg	1	MAR103/28/02	0139	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS18(0-0.5)	Project:	STEP00202
Sample ID:	57226013	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	23.3%		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		87.9	12.4	51.9	ug/kg	1	MAR1 03/28/02	0149	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 28, 2002

Client Sample ID:	17SS18(1-2)	Project:	STEP00202
Sample ID:	57226014	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	25.2%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		424		12.7	53.2	ug/kg	1	MAR1 03/26/02	0347	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: March 28, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17SS19(0-0.5)	Project:	STEP00202
Sample ID:	57226015	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	16.4%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		69.7		11.6	48.3	ug/kg	1	MAR1 03/26/02	0357	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS19(1-2)	Project:	STEP00202
Sample ID:	57226016	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	13.1%		

Parameter	Qualifier	Result	Reqd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.9	45.4	ug/kg	1	MAR1 03/26/02	0407	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: March 28, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17SS20(0-0.5)	Project:	STEP00202
Sample ID:	57226017	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	23%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	25.7	J	12.4	51.9	ug/kg	1	MAR1 03/26/02	0417	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: March 28, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17SS20(1-2)	Project:	STEP00202
Sample ID:	57226018	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	13.8%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.0	45.8	ug/kg	1	MAR1 03/26/02	0427	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 28, 2002

Client Sample ID:	17SS30(1-2)	Project:	STEP00202
Sample ID:	57226019	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	15.8%		

Parameter	Qualifier	Result	Rvqual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	32.5	J	11.3	47.3	ug/kg	1	MAR103/26/02	0438	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 28, 2002

Client Sample ID:	17SS31(0-0.5)	Project:	STEP00202
Sample ID:	57226020	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	12.6%		

Parameter	Qualifier	Result	RwQnd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		60.8		11.0	45.7	ug/kg	1	MAR1 03/26/02	0448	153485	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	1210	153477

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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H Holding time exceeded
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Reviewed by

037746

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/2

Project: Longhorn AAP **SDG:** 51226 **Matrix/No. Samples:** S-20

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 4°C - 39°F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED		PREPPED/ANALYZED
3/7	3/22	3/26, 3/27, 3/28

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 STDs 0 - 100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab @ 90 - 110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90 - 110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/25 ICV @ 17:01 49.24/50 = 98.5

CCV @ 3:27 26.17/25 = 104.7

@ 5:28 79.65/75 = 106.2

3/26 ICV 49.51/50 = 99.0

CCV @ 23:58 = 82.48/75 = 110% (109.99)

CCV @ 01:59 26.63/25 = 106.5

3/28 ICV 47.72/50 = 95.4

CCV @ 14:17 73.57/75 = 98.1

CCV @ 15:18 23.97/25 = 95.9

037747

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/2/2002

Project: Longhorn AAP **SDG:** 57226 **Matrix/No. Samples:** S-20

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

186907 MB 3/27 @ 20:35 - U

3/25 ICB @ zero
CCB @ 3:37 - U
@ 5:38 - U

187952 MB 3/26 @ 8:50 - U

3/26 ICB
CCB @ 00:08 - U
CCB @ 02:09 - U

3/28 ICB - U
CCB @ 14:27 - zero - U
15:28 - zero - U

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/25 IPC 23.72/25 = 94.9

3/26 IPC 24.55/25 = 98.2

3/28 IPC 23.75/25 = 95%

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	(N/A)
	2. Are all solid LCS %R within control limits established by the laboratory?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/27 186914 521/500 = 104.2%

3/26 187959 536/500 = 107.2%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/2

Project: Longhorn AAP **SDG:** 57226 **Matrix/No. Samples:** S-20

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 3/27 25014 u/u
3/27 26001 u/u

3/26 26020 } <5x PQL w/in 1 PQL } RPD - not calc.
3/26 38001 }

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 25014 109/98 RPD@11

26001 98/99 RPD@2%

26020 ~~114/13~~ 133-60.8/114 = 63.3 RPD 4/74.2 = 5.4%
137-60.8/114 = 66.8

38001 150-17/136 = 97.8 RPD = 14/140 = 10%
3. 164-17/135 = 108.9

037749

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/2

Project: Longhorn AAP **SDG:** 57226 **Matrix/No. Samples:** S-20

X.	**Sample Result Qualification** Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A
	Comments/Qualifications:			

XI.	**Field QC**			
	1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	(Yes)	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	(Yes)	No	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	(No)	N/A
	b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 175516 0-0.5 → u's ← 175516(0-0.5) DUPL. 175513 17RS04-u 17FB02 -u

OR16 175531(0-0.5) → FD from SDG 57227 60.8 u

5530 31 17RS06 -u

XII.	**Overall Assessment of Data**			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A
	Comments/Qualifications:			

037750

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037751

SDG: 57225 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Soil -20

Validation Samples: 175521 (0-0.5), 175521 (0-0.5) dup., 175521 (1-2), 175522 (1-2, 175523 (0-0.5), 175523 (1-2), 175524 (0-0.5, 175524 (1-2), 175525 (0-0.5), 175525 (1-2), 175526 (0-0.5) dup., 175526 (1-2), 175527 (0-0.5), 175527 (1-2), 175528 (0-0.5), 175528 (1-2, 175529 (0-0.5), 175529 (1-2), 175530 (0-0.5)

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	A	
11.	Field QC Samples	X	
12.	Overall Assessment	X	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57225 Method: Perchlorate EPA 314.0

Qualifications:

17. Samples 175526 (0-0.5) / 0-0.5 dupl. had an RPD that exceeded the QC limit of 15% and was qualified as "J" in both samples samples.

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as qualified

Date: 4/1/2002

Validator's Signature: J. Thomas Hutchings

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 28, 2002

Client Sample ID:	17SS21(0-0.5)	Project:	STEP00202
Sample ID:	57225001	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	16.4%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.5	47.8	ug/kg	1	MAR1 03/26/02	0025	152753	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0800	152750

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS22(1-2)	Project:	STEP00202
Sample ID:	57225002	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	11.3%		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.8	45.2	ug/kg	1	MAR1 03/26/02	0105	152753	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0800	152750

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Repon Date: March 28, 2002

Client Sample ID:	17SS23(0-0.5)	Project:	STEP00202
Sample ID:	57225003	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	22.9%		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		96.3		12.4	51.6	ug/kg	1	MAR1 03/26/02	0115	152753	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0800	152750

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS23(1-2)	Project:	STEP00202
Sample ID:	57225004	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	19.8%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.9	49.6	ug/kg	1	MAR1 03/26/02	0126	152753	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0800	152750

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS24(0-0.5)	Project:	STEP00202
Sample ID:	57225005	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	7.18%		

Parameter	Qualifier	Result	Rwqnd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		65.5		10.4	43.3	ug/kg	1	MAR1 03/26/02	0136	152753	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0800	152750

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS24(1-2)	Project:	STEP00202
Sample ID:	57225006	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	13.3%		

Parameter	Qualifier	Result	RL Wet	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate		397		11.0	46.1	ug/kg	1	MAR1	03/26/02	0206	152753	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0800	152750

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 28, 2002

Client Sample ID:	17SS25(0-0.5)	Project:	STEP00202
Sample ID:	57225007	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	9.31%		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	J	28.9	J	10.5	43.8	ug/kg	1	MAR1	03/26/02	0216	152753	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0800	152750

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 17SS25(1-2)
Sample ID: 57225008
Matrix: Soil
Collect Date: 07-MAR-02
Receive Date: 08-MAR-02
Collector: Client
Moisture: 9.66%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rep Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate		128		10.5	43.9	ug/kg	1	MAR1	03/26/02	0226	152753	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0800	152750

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 17SS26(0-0.5)
Sample ID: 57225009
Matrix: Soil
Collect Date: 07-MAR-02
Receive Date: 08-MAR-02
Collector: Client
Moisture: 13%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	23.8	J 17	11.0	46.1	ug/kg	1	MAR1 03/26/02	0236	152753	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0800	152750

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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E Concentration exceeds instrument calibration range
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 28, 2002

Client Sample ID:	17SS26(0-0.5) dup	Project:	STEP00202
Sample ID:	57225010	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	13.1%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	30.8	J U7	11.0	46.0	ug/kg	1	MAR1 03/26/02	0246	152753	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0800	152750

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: March 28, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17SS26(1-2)	Project:	STEP00202
Sample ID:	57225011	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	13.6%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		61.9		11.1	46.1	ug/kg	1	MAR1 03/26/02	0256	152753	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0800	152750

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS27(0-0.5)	Project:	STEP00202
Sample ID:	57225012	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	14.9%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.1	46.4	ug/kg	1	MAR1 03/26/02	0307	152753	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0800	152750

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 17SS27(1-2)
Sample ID: 57225013
Matrix: Soil
Collect Date: 07-MAR-02
Receive Date: 08-MAR-02
Collector: Client
Moisture: 15.4%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	25.9	J	11.3	47.3	ug/kg	1	MAR1 03/26/02	0317	152753	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0800	152750

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 17SS28(0-0.5)
Sample ID: 57225014
Matrix: Soil
Collect Date: 07-MAR-02
Receive Date: 08-MAR-02
Collector: Client
Moisture: 27.7%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	13.2	55.0	ug/kg	1	MAR1 03/27/02	2056	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS28(1-2)	Project:	STEP00202
Sample ID:	57225015	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	22.1%		

Parameter	Qualifier	Result	Reqd Rl	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	u	12.4	51.9	ug/kg	1	MAR1 03/27/02	2136	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS29(0-0.5)	Project:	STEP00202
Sample ID:	57225016	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	16.2%		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00	11.4	47.8	ug/kg	1	MAR1 03/27/02	2146	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by Jeffrey Byrd

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS29(1-2)	Project:	STEP00202
Sample ID:	57225017	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	18.2%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	11.5	48.2	ug/kg	1	MAR1	03/27/02	2217	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 17SS30(0-0.5)
Sample ID: 57225018
Matrix: Soil
Collect Date: 07-MAR-02
Receive Date: 08-MAR-02
Collector: Client
Moisture: 12.6%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	11.1	46.2	ug/kg	1	MAR1	03/27/02	2227	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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> Actual result is greater than amount reported
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by John R. Byrd

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS21(0-0.5)DUP	Project:	STEP00202
Sample ID:	57225019	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		
Moisture:	16.4%		

Parameter	Qualifier	Result	Revised	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.5	48.1	ug/kg	1	MAR1 03/27/02	2237	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Reviewed by Jeffrey A. Boyd

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 28, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 17SS21(1-2)
Sample ID: 57225020
Matrix: Soil
Collect Date: 07-MAR-02
Receive Date: 08-MAR-02
Collector: Client
Moisture: 16%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.3	47.0	ug/kg	1	MAR1 03/27/02	2247	153074	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0900	153071

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on a dry weight basis except where prohibited by the analytical procedure.
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by John Boyd

037773

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/1

Project: Longhorn AAP SDG: 57225 Matrix/No. Samples: S-20

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 4°C — ~~39°F~~			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

all others except 153071
SS21 (0-0.5)

SAMPLED	PREPPED/ANALYZED
3/7	3/22 batch 152750 3/26, 3/27

batch 153071
SS21 (0-0.5) DUP SS29 (0-0.5)
SS21 (1-2) SS29 (1-2)
SS28 (0-0.5) SS30 (0-0.5)
SS28 (1-2)

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0-100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? lab @ 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110%	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/25 ICV @ 17:01 49.24/50 = 98.5%
CCV @ 23:45 — 25.83/25 = 103.3
CCV @ 01:46 = 77.35/75 = 103.1
CCV @ 03:27 = 26.17/25 = 104.7

3/26 ICV @ 01:45 49.51/50 = 99.0
CCV @ 21:56 27.31/25 = 109.2

037774

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/1

Project: Longhorn AAP **SDG:** 57225 **Matrix/No. Samples:** S-20

III.	**Blanks**			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/25
ICB@1:55-0 - u's
CCB@22:06-0 - u's.

186084 MB - u's.
3/25@22:04

186907 MB - u's,
3/27@20:35

3/26 ICB@17:11 zero

CCB 23:55
01:56
03:37
} 3 zeros
u's

IV.	**Instrument Performance Check Sample (IPC)**			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/25 IPC 23.72/25 = 94.9

3/26 IPC 24.55/25 = 98.2

V.	**Laboratory Control Sample (LCS)**			
	1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	(N/A)
	2. Are all solid LCS %R within control limits established by the laboratory?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

186091 3/25@22:14 515/500 = 103% ✓

186914 3/27@20:46 521/500 = 104.2% ✓

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037775

Reviewer: Kitchings **Date:** 4/1

Project: Longhorn AAP **SDG:** 57225 **Matrix/No. Samples:** S-20

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:
145021 DUP - u/u 3/25 @ 22:14
25001 - u/u 3/26 @ 22:04

25014 - u's 3/27@21:06
26001 - u's. 3/27@ 23:07

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:
45021 3/26@11:31 ~101 ~108 RPD@ 7

25001 3/26 @11:52 — 104 107 RPD@ 2

25014 3/28 @ 14:35 138 . = 150/138 = 108.7 RPD 15/142.5 = 10.5%
= 135/138 = 97.8

26001 3/28@ 14:56
to 98, 98%, RPD@ 2

037776

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/1

Project: Longhorn AAP **SDG:** 57225 **Matrix/No. Samples:** S-20

X.	**Sample Result Qualification** Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	N/A
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A
	Comments/Qualifications:			

XI.	**Field QC**			
	1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

ORIG
175521(0-0.5) → U

FD
175521(0-0.5)dupl. ←

17FB02 – U

6.8/27.2 = 25%

175526(0-0.5) 23.8 (J)

175526(0-0.5)dupl. 30.6

17RS05 – U
17RS06 – U

XII.	**Overall Assessment of Data**			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A
	Comments/Qualifications:			

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(divider page)

SDG: 57219 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Gound. Water - 9

Validation Samples: Validation Samples: 18WW17 47WW47
18WWC08 18WWC4 47WW42 47WW46
18WWC08DUP 18WW18 47WW43

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	Sample 18WWC8 was mislabelled, corrected by lab.
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 51219 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported

Date: 4/1/2002

Validator's Signature: J. Hunter Kitchings

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 27, 2002

Client Sample ID:	18WWC08	Project:	STEP00202
Sample ID:	57219001	Client ID:	STEP001
Matrix:	Water		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/19/02	1717	152685	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step. Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 27, 2002

Client Sample ID:	18WWC08 DUP	Project:	STEP00202
Sample ID:	57219002	Client ID:	STEP001
Matrix:	Water		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 03/19/02	1757	152685	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 27, 2002

Client Sample ID:	18WWC4	Project:	STEP00202
Sample ID:	57219003	Client ID:	STEP001
Matrix:	Water		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/19/02	1807	152685	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on an "as received" basis.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 27, 2002

Client Sample ID:	18WW18	Project:	STEP00202
Sample ID:	57219004	Client ID:	STEP001
Matrix:	Water		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev'd Ind	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	N	0.958	4.00	ug/L	1	MAR 03/19/02	1817	152685	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 27, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18WW17	Project:	STEP00202
Sample ID:	57219005	Client ID:	STEP001
Matrix:	Water		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/21/02	1236	152685	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds insurument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: March 27, 2002

Client Sample ID:	47WW42	Project:	STEP00202
Sample ID:	57219006	Client ID:	STEP001
Matrix:	Water		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		7.10	0.958	4.00	ug/L	1	MAR103/19/02	1837	152685	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on an "as received" basis.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 27, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47WW43	Project:	STEP00202
Sample ID:	57219007	Client ID:	STEP001
Matrix:	Water		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev'd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR103/19/02	1848	152685	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 27, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47WW47	Project:	STEP00202
Sample ID:	57219008	Client ID:	STEP001
Matrix:	Water		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 03/19/02	1918	152685	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 27, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47WW46	Project:	STEP00202
Sample ID:	57219009	Client ID:	STEP001
Matrix:	Water		
Collect Date:	07-MAR-02		
Receive Date:	08-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	2.28	J	0.958	4.00	ug/L	1	MAR1 03/19/02	1928	152685	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on an "as received" basis.

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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037789

Reviewer: Kitchings Date: 4/1

Project: Longhorn AAP SDG: 57219 Matrix/No. Samples: W-9

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 4°C – 34°C			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs? Sample LBWWCO had the "WW" missing from the labels on the sample.	Yes	(No)	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED	PREPPED/ANALYZED
3/7	3/19 , 3/21

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 10 – 100 ✓	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? lab @ 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? lab @ 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/19
ICV 47.36/50 = 94.7
CCV@16:57 24.64/25 = 98.6
18:58 79.2/75 = 105.6

3/21
ICV 49.16/50 = 98.3
CCV@12:16 75.99/75 = 101.3

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037790

Reviewer: Kitchings Date: 4/1

Project: Longhorn AAP SDG: 57219 Matrix/No. Samples: W-9

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

185925 MB
3/19 @15:25 @ nondetect - U

3/19
ICB
CCB@17:07 -U
@19:08

3/21
ICB
CCB@12:26 -U

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

IPC
3/19 24.68/25 = 98.7

IPC 23.37/25 = 93.5

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
	2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

~~PS/PSD~~ ~~LCS~~ ~~8.77/10.0~~

TK
185932 48.8/50.00 = 97.6%
3/19@15:36

037791

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/1

Project: Longhorn AAP **SDG:** 57219 **Matrix/No. Samples:** w-9

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

19001 DUPL

4/4

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

MS/MSD 18WWC08

MS 8.77/10.00 = 87.7%

MSD. 10.2/10.00 = 102%

RPD $\frac{1.43}{9.505}$ = 15.0%

037792

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/1

Project: Longhorn AAP **SDG:** 57219 **Matrix/No. Samples:** w-9

X.	**Sample Result Qualification** Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	N/A
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A
	Comments/Qualifications:			

XI.	**Field QC**			
	1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications: OP1G 18WWC08 FP 18WWC08DUPL.
↳ U's ↵

XII.	**Overall Assessment of Data**			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A
	Comments/Qualifications:			

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(divider page)

037794

SDG: 57145 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Soil 27

Validation Samples: Validation Samples: 175504 (1-2) 175506 (0-0.5) dup 175508 (0-0.5) 175510 (0-0.5) 175511 (1-2)
175501 (0-0.5) 175502 (1-2) 175505 (0-0.5) 175506 (1-2) 175508 (1-2) 175510 (1-2) 175512 (0-0.5)
175501 (0-0.5) dup 175503 (0-.5) 175505 (1-2) 175507 (0-0.5) 175509 (0-0.5) 175511 (0-0.5) 175512 (1-2)
175501 (1-2) 175503 (1-2) 175506 (0-0.5) 175507 (1-2) 175509 (1-2) 175511 (0-0.5) dup.
175502 (0-0.5) 175504 (0-0.5) Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	Sample 175511 (1-2) not listed on COC
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57145 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported

Date: 4/1/2002

Validator's Signature: J. Thomas Kitchings

Peer Reviewer:

037796

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	17SS01(0-0.5)	Project:	STEP00202
Sample ID:	57145001	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	06-MAR-02		
Receive Date:	07-MAR-02		
Collector:	Client		
Moisture:	22.8%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC			U								
Perchlorate	U	0.00		9.46	39.5	ug/kg	1	MAR1 03/20/02	1401	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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H Holding time exceeded
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UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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iewed by Sarah Bashaw

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Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID: 17SS11(0-0.5)
Sample ID: 57145003
Matrix: Soil
Collect Date: 06-MAR-02
Receive Date: 07-MAR-02
Collector: Client
Moisture: 24.6%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.60	40.1	ug/kg	1	MAR103/21/02	1707	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	17SS01(0-0.5)DUP	Project:	STEP00202
Sample ID:	57145004	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	06-MAR-02		
Receive Date:	07-MAR-02		
Collector:	Client		
Moisture:	23.4%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.58	40.0	ug/kg	1	MAR1 03/27/02	0255	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	17SS01(1-2)	Project:	STEP00202
Sample ID:	57145005	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	06-MAR-02		
Receive Date:	07-MAR-02		
Collector:	Client		
Moisture:	20.2%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.56	39.9	ug/kg	1	MAR1 03/27/02	0306	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	17SS02(0-0.5)	Project:	STEP00202
Sample ID:	57145006	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	06-MAR-02		
Receive Date:	07-MAR-02		
Collector:	Client		
Moisture:	21.1%		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.58	40.0	ug/kg	1	MAR1 03/21/02	1607	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Contact: Doug Hawn

Report Date: April 5, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17SS02(1-2)	Project:	STEP00202
Sample ID:	57145007	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	06-MAR-02		
Receive Date:	07-MAR-02		
Collector:	Client		
Moisture:	21.2%		

Parameter	Qualifier	Result	Raw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.58	40.0	ug/kg	1	MAR103/21/02	1617	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	17SS03(0-0.5)	Project:	STEP00202
Sample ID:	57145008	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	06-MAR-02		
Receive Date:	07-MAR-02		
Collector:	Client		
Moisture:	16.5%		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.56	39.9	ug/kg	1	MAR1 03/21/02	1627	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Sarah Bashaw
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Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS03(1-2)	Project:	STEP00202
Sample ID:	57145009	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	06-MAR-02		
Receive Date:	07-MAR-02		
Collector:	Client		
Moisture:	20.5%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.56	39.9	ug/kg	1	MAR103/21/02	1637	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	17SS04(0-0.5)	Project:	STEP00202
Sample ID:	57145010	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	06-MAR-02		
Receive Date:	07-MAR-02		
Collector:	Client		
Moisture:	19.8%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.58	40.0	ug/kg	1	MAR1 03/21/02	1647	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
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Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 177SS04(1-2)
Sample ID: 57145011
Matrix: Soil
Collect Date: 06-MAR-02
Receive Date: 07-MAR-02
Collector: Client
Moisture: 22.9%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Re Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.51	39.7	ug/kg	1	MAR103/21/02	1657	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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H Holding time exceeded
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Reviewed by Sarah Bashaw

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Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	17SS05(0-0.5)	Project:	STEP00202
Sample ID:	57145012	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	06-MAR-02		
Receive Date:	07-MAR-02		
Collector:	Client		
Moisture:	17.3%		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		60.9		9.58	40.0	ug/kg	1	MAR103/21/02	1415	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID: 17SS05(1-2)
Sample ID: 57145013
Matrix: Soil
Collect Date: 06-MAR-02
Receive Date: 07-MAR-02
Collector: Client
Moisture: 18.6%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.58	40.0	ug/kg	1	MAR1 03/21/02	1425	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 27, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS06(0-0.5)	Project:	STEP00202
Sample ID:	57145002	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	06-MAR-02		
Receive Date:	07-MAR-02		
Collector:	Client		
Moisture:	17.1%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.6	48.3	ug/kg	1	MAR1 03/20/02	1442	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 27, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS06(0-0.5)DUP	Project:	STEP00202
Sample ID:	57145014	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	06-MAR-02		
Receive Date:	07-MAR-02		
Collector:	Client		
Moisture:	16.7%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.5	48.1	ug/kg	1	MAR103/21/02	1436	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 17SS06(1-2)
Sample ID: 57145015
Matrix: Soil
Collect Date: 06-MAR-02
Receive Date: 07-MAR-02
Collector: Client
Moisture: 14.2%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	9.60	40.1	ug/kg	1	MAR1	03/21/02	1446	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 17SS07((0-0.5)
Sample ID: 57145016
Matrix: Soil
Collect Date: 06-MAR-02
Receive Date: 07-MAR-02
Collector: Client
Moisture: 14.4%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rejud	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.65	40.3	ug/kg	1	MAR1 03/21/02	1456	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: March 27, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS07(1-2)	Project:	STEP00202
Sample ID:	57145017	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	06-MAR-02		
Receive Date:	07-MAR-02		
Collector:	Client		
Moisture:	18%		

Parameter	Qualifier	Result	Rev 2nd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	UL	11.7	48.7	ug/kg	1	MAR1 03/21/02	1506	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Company : Step, Inc.
Address : 1066 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 17SSS08(0-0.5)
Sample ID: 57145018
Matrix: Soil
Collect Date: 06-MAR-02
Receive Date: 07-MAR-02
Collector: Client
Moisture: 22%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Raw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.63	40.2	ug/kg	1	MAR1 03/21/02	1516	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	17SS08(1-2)	Project:	STEP00202
Sample ID:	57145019	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	06-MAR-02		
Receive Date:	07-MAR-02		
Collector:	Client		
Moisture:	17.3%		

Parameter	Qualifier	Result	Rw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.53	39.8	ug/kg	1	MAR1 03/21/02	1526	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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H Holding time exceeded
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Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID: 17SS09(0-0.5)
Sample ID: 57145020
Matrix: Soil
Collect Date: 06-MAR-02
Receive Date: 07-MAR-02
Collector: Client
Moisture: 16.2%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.56	39.9	ug/kg	1	MAR1 03/21/02	1536	152640	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/19/02	0808	152639

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17SS09(1-2)	Project:	STEP00202
Sample ID:	57145021	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	06-MAR-02		
Receive Date:	07-MAR-02		
Collector:	Client		
Moisture:	19.5%		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.57	39.9	ug/kg	1	MAR1 03/25/02	2224	152753	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0800	152750

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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Sarah Bashaw
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Address : 1006 Floyd Culler Ct.
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Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID: 17SS10(0-0.5)
Sample ID: 57145022
Matrix: Soil
Collect Date: 06-MAR-02
Receive Date: 07-MAR-02
Collector: Client
Moisture: 19.6%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.60	40.1	ug/kg	1	MAR1 03/25/02	2304	152753	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0800	152750

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	17SS10(1-2)	Project:	STEP00202
Sample ID:	57145023	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	06-MAR-02		
Receive Date:	07-MAR-02		
Collector:	Client		
Moisture:	19.2%		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.58	40.0	ug/kg	1	MAR1 03/25/02	2314	152753	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
314.0	EPA 314.0 Prep Perchlcrate by IC	MAR!	03/22/02	0800	152750

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UJ Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Sarah Bashaw
iewed by

P O Box 30712 • Charleston, SC 29417 • 2040 Savage Road • 29407
(843) 556-8171 • Fax (843) 766-1178

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GENERAL ENGINEERING LABORATORIES

Meeting today's needs with a vision for tomorrow.

Certificate of Analysis

Company : Step, Inc.
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Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	17SS11(0-0.5)DUP	Project:	STEP00202
Sample ID:	57145024	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	06-MAR-02		
Receive Date:	07-MAR-02		
Collector:	Client		
Moisture:	26.7%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		104		9.56	39.9	ug/kg	1	MAR1 03/25/02	2324	152753	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0800	152750

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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037820

GENERAL ENGINEERING LABORATORIES

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Certificate of Analysis

Company: Step, Inc.
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Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 5, 2002

Client Sample ID:	17SS11(1-2)	Project:	STEP00202
Sample ID:	57145025	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	06-MAR-02		
Receive Date:	07-MAR-02		
Collector:	Client		
Moisture:	23.8%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.60	40.1	ug/kg	1	MAR1 03/25/02	2335	152753	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/22/02	0800	152750

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037821

Reviewer: Kitchings Date: 4/1

Project: Longhorn AAP SDG: 57145 Matrix/No. Samples: S-27

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 14°C — @57°F ok			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs? Sample 175511 (1-2) not listed on the C-O-C	Yes	(No)	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED

3/6

~~3/14~~

3/15 (batch 152639)

3/22 batch 152750

PREPPED/ANALYZED

3/20 SS01(a-s), SS06(a-s), 3/21 — all others

3/27 - SS01 dup, SS01(1-2)

3/25 - all 152750

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 @ 0-100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? lab 90-110%	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? lab @ 90-110%	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/20 @ 12:40
ICV @ 48.48/50 = 97%

CCV 3/20 @ 13:27 23.62/25 = 94.5

3/21 @ 11:25
ICV 49.16/50 = 98.3

CCV @ 12:16 75.99/75 = 101.3

CCV @ 15:46 25.73/25 = 102.9

3/27 @ 01:45
ICV 49.51/50 = 99.0

CCV @ 2:35 77.27/75 = 103

3/25 ICV @ 17:01 49.24/50 = 98.5

CCV @ 21:44 77.76/75 = 103.7

CCV @ 23:44 — 25.83/25 — 103.3

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037822

Reviewer: Kitchings **Date:** 4/1

Project: Longhorn AAP **SDG:** 57145 **Matrix/No. Samples:** S-27

III. Blanks			
1. Are any analytes reported in the method or calibration blanks above the RDL?	(Yes)	(No)	N/A
2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

QC1200185785 MB @ 0.00 - U
3/20 @ 13:41

1200186084 MB @ 0.00 - U
3/25 @ 22:04

3/25 FCB @ 3:00
CCB @ 21:54 - U
CCB @ 23:55 - U

3/20 ICB @ 14:50 0 / 5002 - both U's
CCB 13:31 @ 0
CCB 3/20 @ 16:07 @ 2.28
3/21 all ICB + CCB's 0
3/27 ICB + CCB @ 2:45 + A's.

IV. Instrument Performance Check Sample (IPC)			
1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

IPC 3/20
24.09/250 = 96.4

IPC @ 3/21
23.37/25 = 93.5

IPC @ 24.55/25 = 98.2
3/27

IPC
3/25 @ 23.72/25 = 94.9

V. Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	(N/A)
2. Are all solid LCS %R within control limits established by the laboratory?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

185795 LCS
3/20 @ 13:51 493/500 = 98.6 %

186091
3/25 @ 22:14 515/500 = 103.0 %

037823

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/1

Project: Longhorn AAP **SDG:** 57145 **Matrix/No. Samples:** S-27

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

57145001 - u / u

57145002 - u / u

57145003 - u / u

57145021 - u/u

57225001 - u/u

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/20 145001 MS/MSD = 114/98.8 = 115.4% ✓ RPD = 18.9/104.55 = 18.1% ✓

95.1/98.8 = 96.3% ✓

3/20 145002 C 100% 100% RPD@ zero

3/21 145003 103 95.8 RPD@ 8% ✓

3/26 145021 101% 108% RPD 7% ✓

3/26 225001 = 124 / 119 = 104.2

= 127/119 = 106.7

RPD = 3/125.5 = 2.4% ✓

037824

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 4/1

Project: Longhorn AAP **SDG:** 57145 **Matrix/No. Samples:** 5-27

X.	**Sample Result Qualification** Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	N/A
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

No raw data - level III

XI.	**Field QC**			
	1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

FB 3/6 @ 7:45 – U's

17RS01 3/6 @ 14:35 – U
17RS02 " @ 14:35 – U
17RS03 @ 16:55 – U
end of

175501 (0-0.5) orig 175501 (0-0.5) dup
↳ U ↵

175506 (0-0.5) 175506 (0-0.5)
↳ U ↵

175511 (0-0.5) 175511 (0-0.5)
U @ 9.6 10 y

no qual req.

XII.	**Overall Assessment of Data**			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A

Comments/Qualifications:

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(divider page)

037826

SDG: 51704 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No of Samples: Water - 7

Validation Samples: Validation Samples: 18PW10 18DW02 17DW01
18DW01 MW18
18DW01DUP MW19

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57702 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported

Date: 4/11/2002

Validator's Signature: J. Thomas Kitchings

Peer Reviewer: _____

037828

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18PW10	Project:	STEP00202
Sample ID:	57704001	Client ID:	STEP001
Matrix:	Water		
Collect Date:	17-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rad Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1	04/05/02	0402	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18DW01	Project:	STEP00202
Sample ID:	57704002	Client ID:	STEP001
Matrix:	Water		
Collect Date:	17-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		4310		95.8	400	ug/L	100	MAR104/09/02	1812	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 10, 2002

Dup

Client Sample ID:	18DW01QC
Sample ID:	57704003
Matrix:	Water
Collect Date:	17-MAR-02
Receive Date:	19-MAR-02
Collector:	Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		4270	95.8	400	ug/L	100	MAR1	04/09/02	1822	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18DW02	Project:	STEP00202
Sample ID:	57704004	Client ID:	STEP001
Matrix:	Water		
Collect Date:	17-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/05/02	0503	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	MW18	Project:	STEP00202
Sample ID:	57704005	Client ID:	STEP001
Matrix:	Water		
Collect Date:	17-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/05/02	0513	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: MW19
Sample ID: 57704006
Matrix: Water
Collect Date: 17-MAR-02
Receive Date: 19-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Re-Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	399	J	95.8	400	ug/L	100	MAR1 04/05/02	0523	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID: 17DW01
Sample ID: 57704007
Matrix: Water
Collect Date: 17-MAR-02
Receive Date: 19-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	J	14.0	J	9.58	40.0	ug/L	10	MAR1	04/05/02	0553	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

037835

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/11

Project: Longhorn AAP SDG: 57702 Matrix/No. Samples: W - 7

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 4°C			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED 3/17

155529 all others 4/5

18DW01 18DW01Dup 4/9

PREPPED/ANALYZED

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0 - 100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

4/3 ICV 49.48/50 = 99%

CCB 4/5 3:32@ 79.69/75 = 1063

5:43@ 25.05/25 = 1002

4/9 ICV 53.09/50

CCV 4/9 17:51 80.68/75 = 1076

18:42 24.99/25 = 100%

037836

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/11

Project: Longhorn AAP SDG: 57702 Matrix/No. Samples: W-7

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	(Yes)	No	N/A
	2. Was a laboratory fortified blank analyzed: %R @ 85-115?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

192825 MB @ U 4/3 ICB@zero

4/5 CCB 3:52 - U
5:33 - 0.84
all smps@nd or >5x the blk.

4/9 ICB/CCBs@zero.

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 4/3 IPC 25.37/25 = 101.5

4/9 IPC. 25.88/25 = 103.5

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
	2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

192832 53.4/50.0 = 106.8

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037837

Reviewer: Kitchings Date: 4/11

Project: Longhorn AAP SDG: 57702 Matrix/No. Samples: w-7

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 04001 Dup u/u

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%), are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

57704w1 8.84 / 10.0 = 88.4 %

9.47 / 10.0 = 94.7 %

RPD = $\frac{.63}{9.155}$ = 6.9 %

037838

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/11

Project: Longhorn AAP SDG: 57702 Matrix/No. Samples: W-7

X. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	Yes	No	N/A
2. Were correct calculations used to determine sample results?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A
Comments/Qualifications:			

XI. Field QC			
1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
b. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications: 18DW01 4310 18DW01 Dup. 4270 $\frac{40}{4290} = 0.93\%$

XII. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A
Comments/Qualifications:			

037839

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(divider page)

037840

SDG: 57720 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 11

Validation Samples: Validation Samples: 16WW31 16WW33 16WW24
16WWEW01 16WW34 16WW22 16WW23
16WW32 16WW37 16WW27 04WWMW01

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	N/A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Date: 4/11/2002

Validator's Signature: J. Thomas Kitchings

Peer Reviewer: _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 10, 2002

Client Sample ID:	16WWEW01	Project:	STEP00202
Sample ID:	57720001	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	108	J	47.9	200	ug/L	50	MAR104/08/02	1102	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by John B. Bell

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16WW32	Project:	STEP00202
Sample ID:	57720002	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	7.45	U	9.58	40.0	ug/L	10	MAR104/05/02	0221	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

037844

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 16WW31
Sample ID: 57720003
Matrix: Water
Collect Date: 16-MAR-02
Receive Date: 19-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	10.3	J	9.58	40.0	ug/L	10	MAR104/05/02	0231	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16WW34	Project:	STEP00202
Sample ID:	57720004	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.58	40.0	ug/L	10	MAR104/05/02	0241	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 16WW37
Sample ID: 57720005
Matrix: Water
Collect Date: 16-MAR-02
Receive Date: 19-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Reqd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	41.7	J	19.2	80.0	ug/L	20	MAR104/08/02	0402	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 10, 2002

Client Sample ID:	16WW33	Project:	STEP00202
Sample ID:	57720006	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev 2 ud	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	UL	9.58	40.0	ug/L	10	MAR104/05/02	0302	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by John. Byd

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 16WW22
Sample ID: 57720007
Matrix: Water
Collect Date: 16-MAR-02
Receive Date: 19-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Reqd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	38.4	J	9.58	40.0	ug/L	10	MAR104/05/02	0312	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge. Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 16WW27
Sample ID: 57720008
Matrix: Water
Collect Date: 17-MAR-02
Receive Date: 19-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	11.1	J	9.58	40.0	ug/L	10	MAR104/08/02	0543	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 10, 2002

Client Sample ID: 16WW24
Sample ID: 57720009
Matrix: Water
Collect Date: 17-MAR-02
Receive Date: 19-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Req'd	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	9.58	40.0	ug/L	10	MAR1	04/09/02	1832	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 10, 2002

Client Sample ID: 16WW23
Sample ID: 57720010
Matrix: Water
Collect Date: 17-MAR-02
Receive Date: 19-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Re Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	12.6	J	9.58	40.0	ug/L	10	MAR104/05/02	0835	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 10, 2002

Client Sample ID:	04WWMW01	Project:	STEP00202
Sample ID:	57720011	Client ID:	STEP001
Matrix:	Water		
Collect Date:	17-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.917	U	0.958	4.00	ug/L	1	MAR1 04/05/02	0845	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037853

Reviewer: Kitchings Date: 4/11

Project: Longhorn AAP SDG: 57720 Matrix/No. Samples: W-11

I.	**Sample Management**			
A.	**Sample Preservation, Handling and Transport**			
1.	Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
2.	Were all samples received in proper condition?	(Yes)	No	N/A
3.	Were any qualifications required based on this information?	Yes	(No)	N/A
Cooler @	4°C.			
B.	**Chain of Custody**			
1.	Were all samples properly recorded on COCs?	(Yes)	No	N/A
2.	Were correct analyses performed on samples?	(Yes)	No	N/A
C.	**Holding Times**			
1.	Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
2.	Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED	PREPPED/ANALYZED
3/16	4/4
3/17	4/5
	4/8-dil.
	1, 8, 9
	5

II.	**Calibrations**			
1.	Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0-100	(Yes)	No	N/A
2.	Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90-110	(Yes)	No	N/A
3.	Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110	(Yes)	No	N/A
4.	Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
5.	Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICV 49.48/50 = 99

4/5 @ 201 26.62/25 = 106.5
3:42 79.69/75 = 106.3
7:24 79.96/75 = 106.6
8:55 23.16/25 = 92.6

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037854

Reviewer: Kitchings Date: 4/11

Project: Longhorn AAP SDG: 55720 Matrix/No. Samples: W - 11

III. Blanks			
1. Are any analytes reported in the method or calibration blanks above the RDL?	(Yes)	No	N/A
2. Was a laboratory fortified blank analyzed: %R @ 85-115?	Yes	(No)	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

4/4 192817 MB @ 1.17 - no smp. affected

4/5 192825 MB @ U

IV. Instrument Performance Check Sample (IPC)			
1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: IPC 25.37 / 25 = 101.5

V. Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

192824 LCS 53.7/50 = 107.4

192832 53.4/50 = 106.8

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037855

Reviewer: Kitchings Date: 4/11

Project: Longhorn AAP SDG: 57720 Matrix/No. Samples: W-11

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)? (lab design . range .)	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

± 200

577200 6 108 77 31/92.5 = 33.5

577200 8 11.1 u - ok.

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

20001 9.55 - 2.15 / 10 = 74%
9.56 - 2.15 / 10 = 74.1%

RPD @ .01/7.405 = 0.14%

low → 20008 (5) 6.46 - 1.11 / 10 = 53.5%
7.16 - 1.11 / 10 = 60.5%

.70/5.70 = 12.3%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037856

Reviewer: Kitchings Date: 4/11

Project: Longhorn AAP SDG: 55720 Matrix/No. Samples: W-11

X.	Sample Result Qualification Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A
	Comments/Qualifications:			

XI.	Field QC			
	1. Were any Field Duplicates associated with this SDG?	Yes	(No)	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	(No)	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	Yes	(No)	N/A
	Comments/Qualifications:			

XII.	Overall Assessment of Data			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A
	Comments/Qualifications:			

037857

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(divider page)

037858

SDG: 57576 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 13

Validation Samples: Validation Samples: 29WW12 17WW04 17WW13
29WW16 29WW15 29WW17 17WW14 17WW01
29WW16DUP 29WW18 29WW19 17WW07 17WW08

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57576 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Date: 4/8/2002

Validator's Signature: J. Thomas Hutchins

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29WW16	Project:	STEP00202
Sample ID:	57576001	Client ID:	STEP001
Matrix:	Water		
Collect Date:	14-MAR-02		
Receive Date:	15-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result Raw Qual		DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/03/02	1251	155519	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	29WW16QC	Project:	STEP00202
Sample ID:	57576002	Client ID:	STEP001
Matrix:	Water		
Collect Date:	14-MAR-02		
Receive Date:	15-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/03/02	1332	155519	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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< Actual result is less than amount reported
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

037862

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 4, 2002

Client Sample ID:	29WW15	Project:	STEP00202
Sample ID:	57576003	Client ID:	STEP001
Matrix:	Water		
Collect Date:	14-MAR-02		
Receive Date:	15-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		61400	958	4000	ug/L	1000	MAR104/03/02	1342	155519	1

Rev 2nd

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 4, 2002

Client Sample ID:	29WW18	Project:	STEP00202
Sample ID:	57576004	Client ID:	STEP001
Matrix:	Water		
Collect Date:	14-MAR-02		
Receive Date:	15-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		84.7		0.958	4.00	ug/L	1	MAR104/03/02	1352	155519	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 4, 2002

Client Sample ID: 29WW17
Sample ID: 57576005
Matrix: Water
Collect Date: 14-MAR-02
Receive Date: 15-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Req'd	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1	04/03/02	1402	155519	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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** Indicates the analyte is a surrogate compound.
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H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 29WW19
Sample ID: 57576006
Matrix: Water
Collect Date: 14-MAR-02
Receive Date: 15-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/03/02	1703	155519	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 4, 2002

Client Sample ID: 29WW12
Sample ID: 57576007
Matrix: Water
Collect Date: 14-MAR-02
Receive Date: 15-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/03/02	1713	155519	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17WW14	Project:	STEP00202
Sample ID:	57576008	Client ID:	STEP001
Matrix:	Water		
Collect Date:	14-MAR-02		
Receive Date:	15-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Re-Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	1.01	J	0.958	4.00	ug/L	1	MAR104/03/02	1723	155519	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 4, 2002

Client Sample ID:	17WW07	Project:	STEP00202
Sample ID:	57576009	Client ID:	STEP001
Matrix:	Water		
Collect Date:	14-MAR-02		
Receive Date:	15-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/03/02	1733	155519	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 17WW04
Sample ID: 57576010
Matrix: Water
Collect Date: 14-MAR-02
Receive Date: 15-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/03/02	1743	155519	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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E Concentration exceeds instrument calibration range
H Holding time exceeded
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U Indicates the compound was analyzed for but not detected above the detection limit
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 17WW01
Sample ID: 57576011
Matrix: Water
Collect Date: 14-MAR-02
Receive Date: 15-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		161000		1920	8000	ug/L	2000	MAR104/04/02	1210	155519	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 4, 2002

Client Sample ID:	17WW08	Project:	STEP00202
Sample ID:	57576012	Client ID:	STEP001
Matrix:	Water		
Collect Date:	14-MAR-02		
Receive Date:	15-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		159		9.58	40.0	ug/L	10	MAR1 04/04/02	1220	155519	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
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J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

037872

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17WW13	Project:	STEP00202
Sample ID:	57576013	Client ID:	STEP001
Matrix:	Water		
Collect Date:	14-MAR-02		
Receive Date:	15-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/04/02	0843	155519	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037873

Reviewer: Kitchings Date: 4/8

Project: Longhorn AAP SDG: 57576 Matrix/No. Samples: W-13

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 20° 68°F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED	PREPPED/ANALYZED
3/14	155519 4/3, 4/4
3/14	

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds. 0-100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

CCVs 4/3 @ 12:11 74.72/75 = 99.6

@ 14:12 24.78/25 = 99.1

18:56 77.47/75 = 103.3

ICV

49.48/50 = 98.96

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/8

Project: Longhorn AAP SDG: 57526 Matrix/No. Samples: W/3

III. Blanks			
1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
2. Was a laboratory fortified blank analyzed: %R @ 85-115?	Yes	(No)	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

192785 4/3 MB - U ICB & all CCBs @ zero.

IV. Instrument Performance Check Sample (IPC)			
1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

4/3 IPC @ 25.37/25 = 101.5

V. Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

192792 4/3 49.2/50 = 98.4 -

037875

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/8

Project: Longhorn AAP SDG: 57576 Matrix/No. Samples: W-13

VI. Duplicates			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

576001 DUP.
u / u

VII. Matrix Spike			
1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

576001 MS/MSD: 9.74 / 10.1 | 10 = 97.4% / 101%

RPD .36 / 9.92 = 3.6

037876

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/8

Project: Longhorn AAP SDG: 57576 Matrix/No. Samples: W-13

X. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
2. Were correct calculations used to determine sample results?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A
Comments/Qualifications:			

XI. Field QC			
1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	(Yes)	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	(No)	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

29WW16 29WW16DUP

– 4 –

XII. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A
Comments/Qualifications:			

037877

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(divider page)

SDG: 57518 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 16

Validation Samples: Validation Samples: 47PW38 47PW02
47PW24 47PW28 47PW32 47PW40 47PW34
47PW25 47PW29 47PW36 47PW40DUP. 47PW22
47PW26 47PW31 47PW37 47PW41

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57578 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Date: 4/8/2002

Validator's Signature: J. Thomas Keeling

Peer Reviewer: _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 4, 2002

Client Sample ID:	47PW25	Project:	STEP00202
Sample ID:	57578002	Client ID:	STEP001
Matrix:	Water		
Collect Date:	14-MAR-02		
Receive Date:	15-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RW QW	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/03/02	1956	155519	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
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H Holding time exceeded
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X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47PW26	Project:	STEP00202
Sample ID:	57578003	Client ID:	STEP001
Matrix:	Water		
Collect Date:	14-MAR-02		
Receive Date:	15-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/03/02	2006	155519	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 4. 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 47PW28
Sample ID: 57578004
Matrix: Water
Collect Date: 14-MAR-02
Receive Date: 15-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	3.91	J	0.958	4.00	ug/L	1	MAR1 04/03/02	2016	155519	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

037883

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 47PW29
Sample ID: 57578005
Matrix: Water
Collect Date: 14-MAR-02
Receive Date: 15-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RWQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/03/02	2026	155519	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

037884

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 47PW31
Sample ID: 57578006
Matrix: Water
Collect Date: 14-MAR-02
Receive Date: 15-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1	04/03/02	2036	155519	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Report Date: April 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47PW32	Project:	STEP00202
Sample ID:	57578007	Client ID:	STEP001
Matrix:	Water		
Collect Date:	14-MAR-02		
Receive Date:	15-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/03/02	2046	155519	1

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Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 4, 2002

Client Sample ID:	47PW36	Project:	STEP00202
Sample ID:	57578008	Client ID:	STEP001
Matrix:	Water		
Collect Date:	14-MAR-02		
Receive Date:	15-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		8.17		0.958	4.00	ug/L	1	MAR1 04/03/02	2137	155522	1

The following Analytical Methods were performed

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1	EPA 314.0	

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Reviewed by

037887

Certificate of Analysis

Company : Step. Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47PW37	Project:	STEP00202
Sample ID:	57578009	Client ID:	STEP001
Matrix:	Water		
Collect Date:	14-MAR-02		
Receive Date:	15-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		4.86		0.958	4.00	ug/L	1	MAR104/03/02	2147	155522	1

The following Analytical Methods were performed

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1	EPA 314.0	

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Certificate of Analysis

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: April 4, 2002

Project: Longhorn A.A.P.

Client Sample ID:	47PW38	Project:	STEP00202
Sample ID:	57578010	Client ID:	STEP001
Matrix:	Water		
Collect Date:	14-MAR-02		
Receive Date:	15-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/03/02	2157	155522	1

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1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 4, 2002

Client Sample ID: 47PW39
Sample ID: 57578011
Matrix: Water
Collect Date: 14-MAR-02
Receive Date: 15-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/03/02	2207	155522	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 4, 2002

Client Sample ID: 47PW40QC
Sample ID: 57578012
Matrix: Water
Collect Date: 14-MAR-02
Receive Date: 15-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RW Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	UA	0.958	4.00	ug/L	1	MAR1 04/03/02	2217	155522	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
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Reviewed by

037891

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 47PW41
Sample ID: 57578013
Matrix: Water
Collect Date: 14-MAR-02
Receive Date: 15-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/03/02	2227	155522	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 4, 2002

Contact: Doug Hawn

Project: Longhorn A.A.P.

Client Sample ID:	47PW02	Project:	STEP00202
Sample ID:	57578014	Client ID:	STEP001
Matrix:	Water		
Collect Date:	14-MAR-02		
Receive Date:	15-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Re-Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/03/02	2237	155522	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 4, 2002

Contact: Doug Hawn

Project: Longhorn A.A.P.

Client Sample ID:	47PW34	Project:	STEP00202
Sample ID:	57578015	Client ID:	STEP001
Matrix:	Water		
Collect Date:	14-MAR-02		
Receive Date:	15-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/03/02	2248	155522	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by John M. Boyd

037894

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47PW22	Project:	STEP00202
Sample ID:	57578016	Client ID:	STEP001
Matrix:	Water		
Collect Date:	14-MAR-02		
Receive Date:	15-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		14.2		0.958	4.00	ug/L	1	MAR104/03/02	2318	155522	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 4, 2002

Client Sample ID:	47PW40	Project:	STEP00202
Sample ID:	57578017	Client ID:	STEP001
Matrix:	Water		
Collect Date:	14-MAR-02		
Receive Date:	15-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00	0.958	4.00	ug/L	1	MAR104/03/02	2328	155522	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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Reviewed by

037896

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/8

Project: Longhorn AAP SDG: 57578 Matrix/No. Samples: W-16

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 20° — 68°F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED		PREPPED/ANALYZED
3/14	155519	4/3

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0-100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: ICV 49.48/50 = 99%.

CCV 4/3 18:56 = 77.47/75 = 103.3

20:57 = 24.67/25 = 98.7

22:58 = 78.06/75 = 104.1

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037897

Reviewer: Kitchings Date: 4/8

Project: Longhorn AAP SDG: 51578 Matrix/No. Samples: W - 16

III. Blanks			
1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:
192785 4/3 MB - U 4/3 ICB
± all CCBs
192793 4/3 MB - U @ zero

IV. Instrument Performance Check Sample (IPC)			
1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 4/3 IPC 25.37/25 = 101.5

V. Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:
192792 49.2/50 = 98.4
4/3
192800 53.5/50 = 107

037898

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/8

Project: Longhorn AAP SDG: 57578 Matrix/No. Samples: W-4

VI. Duplicates			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

78001 DUPL u/u

78017 DUP u/u

VII. Matrix Spike			
1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

78601 10.7 = 107
10.2/10.0 = 102
RPD $\frac{.5}{10.45}$ = 4.8%

78017 9.64 = 96.4
10.5 / 10 = 105
RPD = $\frac{.86}{10.07}$ = 8.5%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037899

Reviewer: Kitchings Date: 4/8

Project: Longhorn AAP SDG: 57578 Matrix/No. Samples: W -10

X. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	Yes	No	N/A
2. Were correct calculations used to determine sample results?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A
Comments/Qualifications:			

XI. Field QC			
1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
b. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

47PW40 47PW40DUPL.

↳ U ←

XII. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A

Comments/Qualifications:

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(divider page)

SDG: 57702 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 20

Validation Samples: Validation Samples: 18PW11 47PW44 47PW50
29DW01 46DW07 04DW02 18PW13 47PW45 47PW47
29DW02 04DW01 DUP 04DW03 18PW20 47PW46 47PW47DUP
04DW01 18PW07 47PW43 47PW48 47PW42

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	X	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	X	
12.	Overall Assessment	X	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57702 Method: Perchlorate EPA 314.0

Qualifications:

17 • The results for 47DW47 & 47DW47 DUP were qualified as "J" due to a high RPD in the field duplicate analysis.

6a • Samples 29DW01, 46DW07 and 47PH42 had the result qualified as "u" due to contamination in the associated method blank.

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as qualified.

Date: 4/11/2002

Validator's Signature: J. Thomas Kitchings

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 8, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29DW01	Project:	STEP00202
Sample ID:	57702001	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	1.39	U 6a	0.958	4.00	ug/L	1	MAR1 04/04/02	2108	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 8, 2002

Client Sample ID:	29DW02	Project:	STEP00202
Sample ID:	57702002	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/04/02	2118	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: April 8, 2002

Project: Longhorn A.A.P.

Client Sample ID:	46DW07	Project:	STEP00202
Sample ID:	57702003	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	1.39	U Qa	0.958	4.00	ug/L	1	MAR104/04/02	2129	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 8, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04DW01QC (Dup.)
Sample ID:	57702004
Matrix:	Water
Collect Date:	16-MAR-02
Receive Date:	19-MAR-02
Collector:	Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result (Raw 2nd)	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00 (U)	0.958	4.00	ug/L	1	MAR1 04/04/02	1230	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 8, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 04DW02
Sample ID: 57702005
Matrix: Water
Collect Date: 16-MAR-02
Receive Date: 19-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/04/02	1240	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 8, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID: 04DW03
Sample ID: 57702006
Matrix: Water
Collect Date: 16-MAR-02
Receive Date: 19-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Re-Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	1.33	J	0.958	4.00	ug/L	1	MAR104/04/02	1250	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 8, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18PW07	Project:	STEP00202
Sample ID:	57702007	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/04/02	1300	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 8, 2002

Client Sample ID:	18PW11	Project:	STEP00202
Sample ID:	57702008	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Req'd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	4	0.958	4.00	ug/L	1	MAR1 04/05/02	1310	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

037911

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 8, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18PW13	Project:	STEP00202
Sample ID:	57702009	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQud	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1	04/04/02	1321	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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E Concentration exceeds instrument calibration range
H Holding time exceeded
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 8, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 18PW20
Sample ID: 57702010
Matrix: Water
Collect Date: 16-MAR-02
Receive Date: 19-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.58	40.0	ug/L	10	MARI 04/04/02	1331	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 8, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 47PW43
Sample ID: 57702011
Matrix: Water
Collect Date: 16-MAR-02
Receive Date: 19-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/04/02	1341	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 8, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 47PW44
Sample ID: 57702012
Matrix: Water
Collect Date: 16-MAR-02
Receive Date: 19-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rw2nd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	2.97	J	0.958	4.00	ug/L	1	MAR104/04/02	1411	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 8, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47PW45	Project:	STEP00202
Sample ID:	57702013	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Req'd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/04/02	1532	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 8, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47PW46	Project:	STEP00202
Sample ID:	57702014	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/04/02	1542	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 8, 2002

Client Sample ID:	47PW48	Project:	STEP00202
Sample ID:	57702015	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev 2	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/04/02	1713	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 8, 2002

Client Sample ID:	47PW50	Project:	STEP00202
Sample ID:	57702016	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Raw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.848	U	0.958	4.00	ug/L	1	MAR1 04/04/02	1723	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 8, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47PW47	Project:	STEP00202
Sample ID:	57702017	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	2.20	J V7	0.958	4.00	ug/L	1	MAR1 04/04/02	1733	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 8, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

DUPL

Client Sample ID:	47PW47QC	Project:	STEP00202
Sample ID:	57702018	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	1.46	J	0.958	4.00	ug/L	1	MAR104/04/02	1743	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 8, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47PW42	Project:	STEP00202
Sample ID:	57702019	Client ID:	STEP001
Matrix:	Water		
Collect Date:	17-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.788	U 6a	0.958	4.00	ug/L	1	MAR1	04/04/02	2219	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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Reviewed by JM. Byd

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 8, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	04DW01	Project:	STEP00202
Sample ID:	57702020	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/04/02	1753	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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H Holding time exceeded
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X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

037923

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/11

Project: Longhorn AAP SDG: 57702 Matrix/No. Samples: W - 20

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	~~Yes~~	No	N/A
	2. Were all samples received in proper condition?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	~~No~~	N/A
	Cooler @ 4^{0}C.			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	Yes	No	N/A
	2. Were correct analyses performed on samples?	Yes	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	Yes	No	N/A
	2. Were any qualifications required based on this information?	Yes	~~No~~	N/A

SAMPLED		PREPPED/ANALYZED	
3/16, 3/17	all others 155524	4/4, 4/5 16PW11	
	47PW42 155526	4/4	

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0 - 100	Yes	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90-110	Yes	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110	Yes	No	N/A
	4. Was there an ending calibration standard (ECCS)?	Yes	No	N/A
	5. Were any qualifications required based on this information?	Yes	~~No~~	N/A

Comments/Qualifications:

4/4 ICV 52.61/50 = 105.2

CCV @ 13:51 26.89/25 = 107.6

CCV @ 16:53 24.93/25 = 99.7

21:59 25.41/25 = 101.6

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037924

Reviewer: Kitchings Date: 4/11

Project: Longhorn AAP SDG: 57102 Matrix/No. Samples: W- 20

III. Blanks			
1. Are any analytes reported in the method or calibration blanks above the RDL?	(Yes)	No	N/A
2. Was a laboratory fortified blank analyzed: %R @ 85-115?	Yes	(No)	N/A
3. Were any qualifications required based on this information?	(Yes)	No	N/A

Comments/Qualifications:

004, 6, 7, 9, 10, 11 – 192809 4/4 – nondetect

192817 4/4 1.17 J

1, 2, 3, 19 / 1.39 1.39 U @ 21:39 ?

29 DW01 46 DW07 47 PW42 -U

CCB 4/4 @ 22:09

IV. Instrument Performance Check Sample (IPC)			
1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

IPC 4/3 25.37/25 = 101.5

IPC 4/4 25.31/25 = 101.2

V. Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

192816 51.9/50 = 103.8

192824 53.7/50 = 107.4

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037925

Reviewer: Kitchings Date: 4/11

Project: Longhorn AAP SDG: 57702 Matrix/No. Samples: W-20

VI. Duplicates			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 23011 Dup. u/a

VII. Matrix Spike			
1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

57702020 10.7 = 107 %

9.99 /10 = 99.9 %

RPD .71/10.345 = 6.9 %

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037926

Reviewer: Kitchings Date: 4/11

Project: Longhorn AAP SDG: 57702 Matrix/No. Samples: W-20

X.	Sample Result Qualification Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

No raw data

XI.	Field QC			
	1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	(No)	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	(No)	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	(Yes)	No	N/A

Comments/Qualifications:

04DW01 — U

04DW01 DUP. — U

47PW47 — 2.20

47PW47 DUP. — 1.46

.74 / 1.80 = 41.1%

(J)

XII.	Overall Assessment of Data			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A

Comments/Qualifications:

037927

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(divider page)

SDG: 57620 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 20

Validation Samples: Validation Samples: 18PW19 50DW02 16DW04
18PW02 18PW04DUP. 18PW16 18PW19DUD 46DW05 50DW04
18PW03 18PW08 18PW17 50DW05 16DW01 50DW06
18PW04 18PW12 18PW14 16DW02 50DW01

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57620 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported

Date: 4/9/2002

Validator's Signature: J. Thomas Kutchis

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 5, 2002

Client Sample ID:	18PW02	Project:	STEP00202
Sample ID:	57620001	Client ID:	STEP001
Matrix:	Water		
Collect Date:	15-MAR-02		
Receive Date:	16-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/04/02	0008	155522	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18PW03	Project:	STEP00202
Sample ID:	57620002	Client ID:	STEP001
Matrix:	Water		
Collect Date:	15-MAR-02		
Receive Date:	16-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/04/02	0049	155522	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18PW04	Project:	STEP00202
Sample ID:	57620003	Client ID:	STEP001
Matrix:	Water		
Collect Date:	15-MAR-02		
Receive Date:	16-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Dup	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	LL	0.958	4.00	ug/L	1	MAR1	04/04/02	0119	155522	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

DUP

Client Sample ID: 18PW04QC
Sample ID: 57620004
Matrix: Water
Collect Date: 15-MAR-02
Receive Date: 16-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/04/02	0129	155522	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 18PW08
Sample ID: 57620005
Matrix: Water
Collect Date: 15-MAR-02
Receive Date: 16-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RwQu	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1	04/04/02	0139	155522	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18PW12	Project:	STEP00202
Sample ID:	57620006	Client ID:	STEP001
Matrix:	Water		
Collect Date:	15-MAR-02		
Receive Date:	16-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/04/02	0149	155522	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 18PW16
Sample ID: 57620007
Matrix: Water
Collect Date: 15-MAR-02
Receive Date: 16-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/04/02	0159	155522	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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H Holding time exceeded
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U Indicates the compound was analyzed for but not detected above the detection limit
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X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18PW17	Project:	STEP00202
Sample ID:	57620008	Client ID:	STEP001
Matrix:	Water		
Collect Date:	15-MAR-02		
Receive Date:	16-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/04/02	0209	155522	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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E Concentration exceeds instrument calibration range
H Holding time exceeded
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18PW14	Project:	STEP00202
Sample ID:	57620009	Client ID:	STEP001
Matrix:	Water		
Collect Date:	15-MAR-02		
Receive Date:	16-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		39.9		0.958	4.00	ug/L	1	MAR1 04/04/02	0219	155522	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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E Concentration exceeds instrument calibration range
H Holding time exceeded
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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 5, 2002

DUP

Client Sample ID: 18PW19QC
Sample ID: 57620010
Matrix: Water
Collect Date: 15-MAR-02
Receive Date: 16-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result		DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/04/02	0229	155522	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 5, 2002

Client Sample ID:	5D0W05	Project:	STEP00202
Sample ID:	57620011	Client ID:	STEP001
Matrix:	Water		
Collect Date:	15-MAR-02		
Receive Date:	16-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Re-Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/04/02	0320	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 5, 2002

Client Sample ID:	50DW02	Project:	STEP00202
Sample ID:	57620012	Client ID:	STEP001
Matrix:	Water		
Collect Date:	15-MAR-02		
Receive Date:	16-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Reqmd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		63600	U	958	4000	ug/L	1000	MAR1 04/04/02	1421	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46DW05	Project:	STEP00202
Sample ID:	57620013	Client ID:	STEP001
Matrix:	Water		
Collect Date:	15-MAR-02		
Receive Date:	16-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		35.3	0.958	4.00	ug/L	1	MAR104/04/02	0340	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 16DW01
Sample ID: 57620014
Matrix: Water
Collect Date: 15-MAR-02
Receive Date: 16-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/04/02	0350	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 16DW02
Sample ID: 57620015
Matrix: Water
Collect Date: 15-MAR-02
Receive Date: 16-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/04/02	0400	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by John. Byrd

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 16DW04
Sample ID: 57620016
Matrix: Water
Collect Date: 15-MAR-02
Receive Date: 16-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/04/02	0410	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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< Actual result is less than amount reported
> Actual result is greater than amount reported
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 50DW04
Sample ID: 57620017
Matrix: Water
Collect Date: 15-MAR-02
Receive Date: 16-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		106		1.92	8.00	ug/L	2	MAR104/04/02	1431	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 50DW06
Sample ID: 57620018
Matrix: Water
Collect Date: 15-MAR-02
Receive Date: 16-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/04/02	0431	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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U Indicates the compound was analyzed for but not detected above the detection limit
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 50DW01
Sample ID: 57620019
Matrix: Water
Collect Date: 15-MAR-02
Receive Date: 16-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1	04/04/02	0441	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 5, 2002

Client Sample ID: 18PW19
Sample ID: 57620020
Matrix: Water
Collect Date: 15-MAR-02
Receive Date: 16-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/04/02	0511	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037950

Reviewer: Kitchings Date: 4/9

Project: Longhorn AAP SDG: 57620 Matrix/No. Samples: W - 20

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 20° 68° F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED		PREPPED/ANALYZED
3/15	155522	4/4
	155523	

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0-100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lcls 90 - 110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lcls 90 - 110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICV 49.48/50 = 99%

4/4 @ 22:58 78.06/75 = 104.1

4/4 @ 00:59 25.15/25 = 100.6

4/4 @ 3:00 79.30/75 = 105.7

4/4 @ 4:51 25.54/25 = 102.2

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/9

Project: Longhorn AAP SDG: 57620 Matrix/No. Samples: W-20

III. Blanks			
1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

192793 4/3 MB @ U ICB 4/3 and all CCBs @ zero.

192801 4/4 MB @ U

IV. Instrument Performance Check Sample (IPC)			
1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: IPC @ 25.37/25 = 101.5

V. Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

192800 LCS 4/3 53.5/50 = 107%

192808 LCS 4/4 52.9/50 = 105.8%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/9

Project: Longhorn AAP SDG: 57620 Matrix/No. Samples: W-26

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 20001 Dup. u/n

20020 DUP u/n

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

20001 9.66 / 10 = 96.6% 10.7 / 10 = 107 % RPD 1.04 / 10.18 = 10.2%

20020 10.3 / 10 = 103 10.1 / 10 = 101 RPD .2 / 10.2 = 2.%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037953

Reviewer: Kitchings Date: 4/9

Project: Longhorn AAP SDG: 57260 Matrix/No. Samples: W-20

X. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	Yes	No	N/A
2. Were correct calculations used to determine sample results?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A
Comments/Qualifications:			

XI. Field QC			
1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
b. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications: 18PW04 PW04 DUP

18PW19 18PW19 DUP

XII. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A
Comments/Qualifications:			

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(divider page)

SDG: 57717 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 20

Validation Samples: Validation Samples: 4WW01 4WW01 DUP. 16WW38
17WW05 12WW05 12WW12 12WW17 dup 16WW25 16WWEW05
12WW11 24WW13 16WW29 16WWEW08 16WW28 12WW17
12WW10 12WW13 16WW30 16WW12 12WW12 DUP.

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	X	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	A	
12.	Overall Assessment	X	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57717 Method: Perchlorate EPA 314.0

Qualifications:

6a • Sample results for 12WW10 and 12WW05 were qualified as "u" due to contamination in the associated method blank.

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as qualified.

Date: 4/11/2002

Validator's Signature: J. Thomas Kitchings

Peer Reviewer: _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 10, 2002

Client Sample ID:	17WW05	Project:	STEP00202
Sample ID:	57717001	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	UA	0.958	4.00	ug/L	1	MAR104/04/02	2229	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	12WW11	Project:	STEP00202
Sample ID:	57717002	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev 2 Ltd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.58	40.0	ug/L	10	MAR1 04/04/02	2310	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by John Byrd

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	12WW10	Project:	STEP00202
Sample ID:	57717003	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	J	3.97	J u 6a	0.958	4.00	ug/L	1	MAR1	04/04/02	2320	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 12WW05
Sample ID: 57717004
Matrix: Water
Collect Date: 16-MAR-02
Receive Date: 19-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	1.37	UI 6a	0.958	4.00	ug/L	1	MAR104/04/02	2330	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 10, 2002

Client Sample ID:	29WW13	Project:	STEP00202
Sample ID:	57717005	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/04/02	2340	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 10, 2002

Client Sample ID:	12WW13	Project:	STEP00202
Sample ID:	57717006	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev2 mf	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.58	40.0	ug/L	10	MAR104/04/02	2350	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	12WW12	Project:	STEP00202
Sample ID:	57717007	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		15.6		0.958	4.00	ug/L	1	MAR104/05/02	0020	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	16WW29	Project:	STEP00202
Sample ID:	57717008	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Raw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	2.99	J	1.92	8.00	ug/L	2	MAR104/08/02	0241	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16WW30	Project:	STEP00202
Sample ID:	57717009	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		553	9.58	40.0	ug/L	10	MAR1 04/08/02	0251	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 10, 2002

Client Sample ID:	12WW17QC Dup	Project:	STEP00202
Sample ID:	57717010	Client ID:	STEP001
Matrix:	Water		
Collect Date:	17-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/05/02	0603	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by _____

Certificate of Analysis

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16WWEW08	Project:	STEP00202
Sample ID:	57717011	Client ID:	STEP001
Matrix:	Water		
Collect Date:	17-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	UL	19.2	80.0	ug/L	20	MAR104/08/02	0432	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16WW12	Project:	STEP00202
Sample ID:	57717012	Client ID:	STEP001
Matrix:	Water		
Collect Date:	17-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		2430	192	800	ug/L	200	MAR104/08/02	0442	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	4WW01	Project:	STEP00202
Sample ID:	57717013	Client ID:	STEP001
Matrix:	Water		
Collect Date:	17-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	3.98	J	0.958	4.00	ug/L	1	MAR104/05/02	0634	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 10, 2002

Client Sample ID:	4WW01QC Dup.	Project:	STEP00202
Sample ID:	57717014	Client ID:	STEP001
Matrix:	Water		
Collect Date:	17-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/05/02	0644	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

037971

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID: 16WW25
Sample ID: 57717015
Matrix: Water
Collect Date: 17-MAR-02
Receive Date: 19-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00	958	4000	ug/L	1000	MAR104/08/02	0452	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16WW28	Project:	STEP00202
Sample ID:	57717016	Client ID:	STEP001
Matrix:	Water		
Collect Date:	17-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	J	12.0	J	9.58	40.0	ug/L	10	MAR1	04/08/02	0523	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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H Holding time exceeded
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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 10, 2002

Client Sample ID:	12WW12QC	Project:	STEP00202
Sample ID:	57717017	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev'd/mcl	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		27.4		0.958	4.00	ug/L	1	MAR104/05/02	0051	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16WW38	Project:	STEP00202
Sample ID:	57717018	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.943	U	0.958	4.00	ug/L	1	MAR104/05/02	0101	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Certificate of Analysis

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 10, 2002

Client Sample ID:	16WWEW05	Project:	STEP00202
Sample ID:	57717019	Client ID:	STEP001
Matrix:	Water		
Collect Date:	16-MAR-02		
Receive Date:	19-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rerun	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		1760		95.8	400	ug/L	100	MAR104/05/02	0111	155526	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 12WW17
Sample ID: 57717020
Matrix: Water
Collect Date: 17-MAR-02
Receive Date: 19-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00	4.79	20.0	ug/L	5	MAR104/08/02	0533	155529	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037977

Reviewer: Kitchings Date: 4/11

Project: Longhorn AAP SDG: 57717 Matrix/No. Samples: W-20

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 4°C. 39°F ✓			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs? 12WW12QC not on COC but added by client.	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED
3/16
3/17

PREPPED/ANALYZED
155526 12WW13 12WW05 12WW11 -05 -10 2229-2350 4/4
12WW05 12WW11 16WW38 1WW12C WWEW05 WW1
4/5 12WW12 12WW17 DUP. 16WW6W08 4WW01, DUP.
155529 16WW29 30 WWEW08 4/8 16WW05 16WW28 12WW17

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5. range 4-400 ug/l)? 6 stds 0 - 100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICV
49.48/50 = 99%

CCV 4/4 @ 21:59 25.41/25 = 101.6 ✓
00:00 79.51/75 = 106.0 ✓
02:01 26.62/25 = 106.5 ✓
4/5 @ 5:53 25.05/25 = 100.2 ✓
7:24 79.96/75 = 106.6 ✓

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037978

Reviewer: Kitchings Date: 4/11

Project: Longhorn AAP SDG: 57717 Matrix/No. Samples: W - 20

III. Blanks			
1. Are any analytes reported in the method or calibration blanks above the RDL?	(Yes)	No	N/A
2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
3. Were any qualifications required based on this information?	(Yes)	No	N/A

Comments/Qualifications:

192817 4/4 @ 21:39 MB @ 1.17 "U" 12WW10, 12WW05

192825 4/5 MB @ 03:22 @ U BLK @ 5:33 @ 0.84

IV. Instrument Performance Check Sample (IPC)			
1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

4/3 IPC 25.37/25 = 101.5

V. Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

192824 4/4 53.7/50.00 = 107.4

192832 4/5 53.4/50.00 = 106.8

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037979

Reviewer: Kitchings Date: 4/11

Project: Longhorn AAP SDG: 57717 Matrix/No. Samples: W-20

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 57717 DUP u / u

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

57717001

11.4 / 10.0 = 114

10.2 / 10.0 = 102

1.2 / 10.8 = 11.1

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037930

Reviewer: Kitchings Date: 4/11

Project: Longhorn AAP SDG: 57717 Matrix/No. Samples: W-

X. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
2. Were correct calculations used to determine sample results?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A
Comments/Qualifications:			

XI. Field QC			
1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	(Yes)	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	(No)	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

12WW17	12WW17 DUP
U	U
4WW01	4WW31 DUP
3.98	U

no quals required.

XII. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A
Comments/Qualifications:			

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(divider page)

037982

SDG: 57623 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 10 JAK

Validation Samples: Validation Samples: 29WW08 17WW02 17WW11
29WW20 12WW01 ~~29WW38 R JAK~~ 17WW130
29WW20 DUP. 12WW01 DUP. 12WW18 17WW12

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57623 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported

Date: 4/8/2002

Validator's Signature: J. Thomas Hicks

Peer Reviewer: _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	17WW02	Project:	STEP00202
Sample ID:	57623001	Client ID:	STEP001
Matrix:	Water		
Collect Date:	15-MAR-02		
Receive Date:	16-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		139000		1920	8000	ug/L	2000	MAR1 04/04/02	1442	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 5, 2002

Client Sample ID:	17WW130	Project:	STEP00202
Sample ID:	57623002	Client ID:	STEP001
Matrix:	Water		
Collect Date:	15-MAR-02		
Receive Date:	16-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		28800		1920	8000	ug/L	2000	MAR1 04/04/02	1834	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 5, 2002

Client Sample ID:	17WW12	Project:	STEP00202
Sample ID:	57623003	Client ID:	STEP001
Matrix:	Water		
Collect Date:	15-MAR-02		
Receive Date:	16-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RaQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		119		9.58	40.0	ug/L	10	MAR1 04/04/02	0642	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17WW11	Project:	STEP00202
Sample ID:	57623004	Client ID:	STEP001
Matrix:	Water		
Collect Date:	15-MAR-02		
Receive Date:	16-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1	04/04/02	0712	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29WW20	Project:	STEP00202
Sample ID:	57623005	Client ID:	STEP001
Matrix:	Water		
Collect Date:	15-MAR-02		
Receive Date:	16-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/04/02	0722	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 29WW20QC
Sample ID: 57623006
Matrix: Water
Collect Date: 15-MAR-02
Receive Date: 16-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/04/02	0732	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 5, 2002

Client Sample ID: 29WW08
Sample ID: 57623007
Matrix: Water
Collect Date: 15-MAR-02
Receive Date: 16-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/04/02	0742	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 5, 2002

Client Sample ID:	29WW08RS	Project:	STEP00202
Sample ID:	57623008	Client ID:	STEP001
Matrix:	Water		
Collect Date:	15-MAR-02		
Receive Date:	16-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/04/02	0752	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 5, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 12WW18
Sample ID: 57623009
Matrix: Water
Collect Date: 15-MAR-02
Receive Date: 16-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rejected	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1	04/04/02	0802	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 5, 2002

Client Sample ID: 12WW01QC
Sample ID: 57623010
Matrix: Water
Collect Date: 15-MAR-02
Receive Date: 16-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/04/02	0813	155523	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 5, 2002

Client Sample ID: 12WW01
Sample ID: 57623011
Matrix: Water
Collect Date: 15-MAR-02
Receive Date: 16-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/04/02	1904	155524	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

037995

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/8

Project: Longhorn AAP SDG: 57623 Matrix/No. Samples: W-10

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 20°C - 68° F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED	PREPPED/ANALYZED
3/15	155523 4/4

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0-100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

CCV 4/4 6:52 77.64/75 = 103.5

ICV. 49.48/50 = 99%

8:53 25.90/25 = 103.6

4/4 dl 1:1

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037996

Reviewer: Kitchings Date: 4/8

Project: Longhorn AAP SDG: 57623 Matrix/No. Samples: W-10

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed: %R @ 85-115?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

192801 MB 4/4 U 4/4 all ICV CCBs @ zero.

192809 MB 1/4 U

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

4/8 ICP 25.37/25 = 101.5

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
	2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

192808 LCS. 52.9/50 = 105.8

192816 LCS. 51.9/50 = 103.8

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/8

Project: Longhorn AAP SDG: 57623 Matrix/No. Samples: W-10

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 23001 DUP 139000 / 137000

$RPD = \frac{2000}{138000} = 1.4\%$

23011 DUP. N/A

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

23001 MS $99.6 - 69.4 / 10 = 102\%$, $78.8 - 69.4 / 10 = 94\%$ / 9.8 = 8.1%

23011 $10.3 / 18.0 = 103\%$ $9.69 / 18.0 = 96.5\%$ RPD = $\frac{.61}{9.995} = 6.1$

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

037998

Reviewer: Kitchings Date: 4/6

Project: Longhorn AAP SDG: 57623 Matrix/No. Samples: W-16

X.	Sample Result Qualification Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A
	Comments/Qualifications:			

XI.	Field QC			
	1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	(Yes)	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	(Yes)	No	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	(No)	N/A
	b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

29WW08RS 3/15

29WW20 29WW20 DUP — U

↳ U ↵

12WW01 12WW01 DUP

↳ U ↵

XII.	Overall Assessment of Data			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A
	Comments/Qualifications:			

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(divider page)

SDG: 57512 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 9

Validation Samples: Validation Samples: 47PW20 46DW06
47PW16 47PW18 47PW21
47PW17 47PW19 46DW04
47PW17 DUP.

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	X	
12.	Overall Assessment	X	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57512 Method: Perchlorate EPA 314.0

Qualifications:

- The field duplicate RPD exceeded the QC limit and the results for samples 47PW17 and 47PW17DUP were qualified as "J".

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as qualified

Date: 4/9/2002

Validator's Signature: J. Thomas Hitchings

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 3, 2002

Client Sample ID: 47PW16
Sample ID: 57512001
Matrix: Water
Collect Date: 13-MAR-02
Receive Date: 14-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/02/02	0108	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on an "as received" basis.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038003

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 3, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47PW18	Project:	STEP00202
Sample ID:	57512002	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/02/02	0138	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038004

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 3, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47PW17	Project:	STEP00202
Sample ID:	57512003	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		7.62	J	0.958	4.00	ug/L	1	MAR1 04/02/02	0148	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 3, 2002

Client Sample ID:	47PW17QC DUP	Project:	STEP00202
Sample ID:	57512004	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rvqual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		5.09	J	0.958	4.00	ug/L	1	MAR1 04/02/02	0158	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 3, 2002

Client Sample ID: 47PW19
Sample ID: 57512005
Matrix: Water
Collect Date: 13-MAR-02
Receive Date: 14-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/02/02	0209	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 3, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47PW20	Project:	STEP00202
Sample ID:	57512006	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/02/02	0219	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 3, 2002

Client Sample ID:	47PW21	Project:	STEP00202
Sample ID:	57512007	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		22.3	0.958	4.00	ug/L	1	MAR1 04/02/02	0229	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: April 3, 2002

Project: Longhorn A.A.P.

Client Sample ID:	46DW04	Project:	STEP00202
Sample ID:	57512008	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	UL	0.958	4.00	ug/L	1	MAR1 04/02/02	0239	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 3, 2002

Client Sample ID:	46DW06	Project:	STEP00202
Sample ID:	57512009	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Req Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/02/02	0249	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on an "as received" basis.

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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038011

Reviewer: Kitchings Date: 4/9

Project: Longhorn AAP SDG: 57512 Matrix/No. Samples: W-9

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 20°C - 68°F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED		PREPPED/ANALYZED
3/13	155517	4/2

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0 - 100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

4/2 1:18 24.93 / 25 =

4/1 ICV 47.43/50 2:59 75.02/75 =

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038012

Reviewer: Kitchings Date: 4/9

Project: Longhorn AAP SDG: 57512 Matrix/No. Samples: W -9

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

192771 4/1 MB - U ICB all CCBs @ zero

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

4/1 IPC 23.95/25 = 95.8%

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
	2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

192778 47.7/50 = 95.4%

038013

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/9

Project: Longhorn AAP SDG: 57512 Matrix/No. Samples: W-9

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

S10003 u/u

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

10012 $\frac{18.8 - 8.69}{10.00} = 101.1\%$

$\frac{18.0 - 8.69}{10.00} = 93.1\%$

$RPD = \frac{.8}{9.71} = 8.2\%$

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038014

Reviewer: Kitchings Date: 4/9/2007

Project: Longhorn AAP SDG: 57512 Matrix/No. Samples: W-5

X. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
2. Were correct calculations used to determine sample results?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

XI. Field QC			
1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	(No)	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	(No)	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
b. Were any qualifications required based on this information?	(Yes)	No	N/A

Comments/Qualifications:

47PW17 47PW17

7.62 5.09

2.53 / 6.355 = 39.8% (J)

XII. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A

Comments/Qualifications:

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(divider page)

038016

SDG: 57510 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water-17

Validation Samples: Validation Samples: 47PW09 47PW14
47PW01 47PW04 47PW07 47PW10 47PW15
47PW03 47PW05 47PW08 47PW13 47PW14 Dup.

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	X	
12.	Overall Assessment	X	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57510 Method: Perchlorate EPA 314.0

Qualifications:

17. The RPD for 47PW14 & 47PW14 DUP. exceeded 15% and the results for those 2 samples were qualified as "J".

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as qualified

Date: 4/9/2002

Validator's Signature: J. Thomas Hatchett

Peer Reviewer: _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 3, 2002

Client Sample ID:	47PW01	Project:	STEP00202
Sample ID:	57510001	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev 2 Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	1.41	J	0.958	4.00	ug/L	1	MAR1 04/01/02	2105	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step. Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 3, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47PW03	Project:	STEP00202
Sample ID:	57510002	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/01/02	2136	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 3, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47PW04	Project:	STEP00202
Sample ID:	57510003	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MARI 04/01/02	2206	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 3, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47PW05	Project:	STEP00202
Sample ID:	57510004	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		7.47		0.958	4.00	ug/L	1	MAR104/01/02	2246	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 3, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47PW07	Project:	STEP00202
Sample ID:	57510005	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/01/02	2257	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038023

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	47PW08	Project:	STEP00202
Sample ID:	57510006	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/01/02	2307	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: April 3, 2002

Project: Longhorn A.A.P.

Client Sample ID:	47PW09	Project:	STEP00202
Sample ID:	57510007	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Revised	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1	04/01/02	2337	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 3, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47 PW10	Project:	STEP00202
Sample ID:	57510008	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/01/02	2347	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 3, 2002

Client Sample ID: 47PW13
Sample ID: 57510009
Matrix: Water
Collect Date: 13-MAR-02
Receive Date: 14-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev 2 mf	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/01/02	2357	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 3, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 47PW15
Sample ID: 57510010
Matrix: Water
Collect Date: 13-MAR-02
Receive Date: 14-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Reviewed	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/02/02	0007	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 3, 2002

Client Sample ID:	47PW14QC DUP	Project:	STEP00202
Sample ID:	57510011	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		7.26	J	17	0.958	4.00	ug/L	1 MAR1 04/02/02	0017	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
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H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 3, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47PW14	Project:	STEP00202
Sample ID:	57510012	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		8.69	J	0.958	4.00	ug/L	1	MAR104/02/02	0028	155517	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038030

Reviewer: Kitchings Date: 4/9

Project: Longhorn AAP SDG: 57510 Matrix/No. Samples: W-12

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 20° — 68°F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED		PREPPED/ANALYZED
3/13	15551?	4/1, 4/2

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0-100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICV
47.43/50
= 94.9

CCV 4/1 @ 21:16 24.26/25 = 97.0
@ 23:17 73.43/25 = 97.9
4/2 @ 1:18 24.93/25 = 99.7

038031

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/9

Project: Longhorn AAP SDG: 57510 Matrix/No. Samples: w-12

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed: %R @ 85-115?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

4/1 191401 MB-U

ICB 4/1 all CCBs @ zero

4/1 192771 MB-U

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

IPC 23.95/25 = 95.8% ✓

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
	2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

191408 4/1 48.3 / 50.0 = 96.6

192778 4/1 47.7 / 50.0 = 95.4

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038032

Reviewer: Kitchings Date: 4/9

Project: Longhorn AAP SDG: 57510 Matrix/No. Samples: W-12

VI. Duplicates			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

all dups @ u/u
except field dup.

VII. Matrix Spike			
1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

4/1 30001 $\frac{9.26}{10.60} / 10 = 92.6$ $= 106\%$

$\frac{1.34}{9.93} = 13.5\%$

4/2 10003 $\frac{10.8}{10.3} / 10 = 108\%$ $= 103\%$

$\frac{.5}{10.55} = 4.7\%$

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038033

Reviewer: Kitchings Date: 4/9

Project: Longhorn AAP SDG: 57510 Matrix/No. Samples: W-12

X.	Sample Result Qualification Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A
	Comments/Qualifications:			

XI.	Field QC			
	1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	(No)	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	(No)	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	(Yes)	No	N/A

Comments/Qualifications: 47PW14 47PW14 DUP

RPD 8.69 7.26

$\frac{1.43}{7.995} = 17.93\%$ J

XII.	Overall Assessment of Data			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A
	Comments/Qualifications:			

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(divider page)

038035

SDG: 51389 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Soil - 19

Validation Samples: Validation Samples: 465507 (0-0.5) 465508 (1-2) 465510 (1-2)
465503 (0-0.5) 465505 (0-0.5) 465507 (0-0.5) dup 465509 (0-0.5) 465511 (0-0.5)
465503 (1-2) 465505 (1-2) 465507 (1-2) 465509 (1-2) 465511 (1-2)
465504 (0-0.5 465506 (0-0.5) 465508 (0-0.5) 465510 (0-0.5)
465504 (1-2 465506 (1-2)

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as

Date: 4/5/2002

Validator's Signature: J. Thomas Hutchings

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 2, 2002

Client Sample ID:	46SS03(0-0.5)	Project:	STEP00202
Sample ID:	57389001	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	32.6%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	14.1	59.0	ug/kg	1	MAR1 03/29/02	1250	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on a dry weight basis except where prohibited by the analytical procedure.
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46SS03(1-2)	Project:	STEP00202
Sample ID:	57389002	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	16.1%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.2	47.0	ug/kg	1	MAR1 03/29/02	1350	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 46SS04(0-0.5)
Sample ID: 57389003
Matrix: Soil
Collect Date: 12-MAR-02
Receive Date: 13-MAR-02
Collector: Client
Moisture: 27.5%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rewqual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.9	54.1	ug/kg	1	MAR1 03/29/02	1400	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46SS04(1-2)	Project:	STEP00202
Sample ID:	57389004	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	16.4%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.4	47.5	ug/kg	1	MAR1 03/29/02	1410	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46SS05(0-0.5)	Project:	STEP00202
Sample ID:	57389005	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	22.5%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.2	51.1	ug/kg	1	MAR1 03/29/02	1420	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46SS05(1-2)	Project:	STEP00202
Sample ID:	57389006	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	20.8%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.8	49.4	ug/kg	1	MARI 03/29/02	1430	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MARI	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 46SS06(0-0.5)
Sample ID: 57389007
Matrix: Soil
Collect Date: 12-MAR-02
Receive Date: 13-MAR-02
Collector: Client
Moisture: 17.2%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.4	47.6	ug/kg	1	MAR1 03/29/02	1441	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 2, 2002

Client Sample ID: 46SS06(1-2)
Sample ID: 57389008
Matrix: Soil
Collect Date: 12-MAR-02
Receive Date: 13-MAR-02
Collector: Client
Moisture: 26.4%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	13.0	54.3	ug/kg	1	MARI	03/29/02	1451	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MARI	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: April 2, 2002

Project: Longhorn A.A.P.

Client Sample ID:	46SS07(0-0.5)	Project:	STEP00202
Sample ID:	57389009	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	25.7%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.8	53.4	ug/kg	1	MAR1 03/29/02	1501	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 2, 2002

Client Sample ID:	46SS07(0-0.5)DUP	Project:	STEP00202
Sample ID:	57389010	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	25.3%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.8	53.3	ug/kg	1	MAR1 03/29/02	1511	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

038047

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46SS07(1-2)	Project:	STEP00202
Sample ID:	57389011	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	23.2%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.4	51.9	ug/kg	1	MARI 03/29/02	1521	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MARI	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID: 46SS08(0-0.5)
Sample ID: 57389012
Matrix: Soil
Collect Date: 12-MAR-02
Receive Date: 13-MAR-02
Collector: Client
Moisture: 18.6%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.8	49.2	ug/kg	1	MAR1 03/29/02	1551	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

038049

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46SS08(1-2)
Sample ID:	57389013
Matrix:	Soil
Collect Date:	12-MAR-02
Receive Date:	13-MAR-02
Collector:	Client
Moisture:	11.3%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Re Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.6	44.4	ug/kg	1	MAR1 03/29/02	1601	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 2, 2002

Client Sample ID:	46SS09(0-0.5)	Project:	STEP00202
Sample ID:	57389014	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	31.5%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	13.9	57.8	ug/kg	1	MAR1 03/29/02	1611	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

038051

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46SS09(1-2)	Project:	STEP00202
Sample ID:	57389015	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	14.5%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.2	46.7	ug/kg	1	MAR1 03/29/02	1621	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: April 2, 2002

Project: Longhorn A.A.P.

Client Sample ID:	46SS10(0-0.5)	Project:	STEP00202
Sample ID:	57389016	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	30.8%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	13.6	56.8	ug/kg	1	MAR103/29/02	1631	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on a dry weight basis except where prohibited by the analytical procedure.
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038053

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 46SS10(1-2)
Sample ID: 57389017
Matrix: Soil
Collect Date: 12-MAR-02
Receive Date: 13-MAR-02
Collector: Client
Moisture: 22%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.3	51.3	ug/kg	1	MAR103/29/02	1641	154986	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/26/02	1530	154985

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 46SS11(0-0.5)
Sample ID: 57389018
Matrix: Soil
Collect Date: 12-MAR-02
Receive Date: 13-MAR-02
Collector: Client
Moisture: 21.4%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev 2 Ud	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.1	50.5	ug/kg	1	MAR1 03/30/02	1726	154989	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	1125	154987

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on a dry weight basis except where prohibited by the analytical procedure.
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038055

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46SS11(1-2)	Project:	STEP00202
Sample ID:	57389019	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	19%		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00 U	11.6	48.6	ug/kg	1	MAR1 03/30/02	1736	154989	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	1125	154987

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on a dry weight basis except where prohibited by the analytical procedure.
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038056

Reviewer: Kitchings Date: 4/5

Project: Longhorn AAP SDG: 57389 Matrix/No. Samples: S-19

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 6°C 43°F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED		PREPPED/ANALYZED
3/12	154985	3/26 3/29
	154987	3/27 3/30
		465511(0-0.5)
		465511(1-2)

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0-100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICV 47.72 / 50.00 = 95.4

3/29 @ 13:30 74.49 / 75 = 99.3
15:31 25.01 / 25 = 100.0
16:51 74.69 / 75 = 99.6

3/30 16:36 24.56 / 25 = 98.2
18:37 74.09 / 75 = 98.8

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038057

Reviewer: Kitchings Date: 4/5

Project: Longhorn AAP SDG: 57389 Matrix/No. Samples: S-19

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

191377 4/1 MB - U

191424 3/30 MB - U

ICB & CCBs - all @ zero.

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/28 IPC 23.75/25 = 95%

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	(N/A)
	2. Are all solid LCS %R within control limits established by the laboratory?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

191384 LCS 480/500 = 97.2
4/1

191430 LCS. 482/500 = 96.4
3/30

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038058

Reviewer: Kitchings Date: 4/5

Project: Longhorn AAP SDG: 57389 Matrix/No. Samples: S-19

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

all dupl. e u's - all ok
no quals.

3/29
389001 DUP u/u

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

389001 142/146 = 97.3 2/141.5 = 1.4% ✓
140/145 = 96.6

~~389001~~

57332014 @ 104%, 98% - RPD 6% ✓

390001 192/195 = 98.5
178/193 = 92.2
RPD = 14/185 = 7.6% ✓

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038059

Reviewer: Kitchings Date: 4/5

Project: Longhorn AAP SDG: 57389 Matrix/No. Samples: S-19

X.	Sample Result Qualification Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	N/A
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A
	Comments/Qualifications:			

XI.	Field QC			
	1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	(Yes)	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	(Yes)	No	N/A
	a. If yes, were any analytes reported in samples >IDL?	(Yes)	No	N/A
	b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

465507 (0-0.5) 465507 (0-0.5) dup.

↳ U ↵

46 RS02
@ 1.52 J

all samples @ nondetect - no quals.

XII.	Overall Assessment of Data			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A
	Comments/Qualifications:			

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038661

SDG: 51392 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 4

Validation Samples: Validation Samples: 04DW04 46DW01
46DW02
46DW02DUP

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57392 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Date: 4/6/2002

Validator's Signature: J. Thomas Kitchings

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID: 04DW04
Sample ID: 57392002
Matrix: Water
Collect Date: 12-MAR-02
Receive Date: 13-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Reqmt	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	ND	U	0.958	4.00	ug/L	1	MARI 03/25/02	2023	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID: 46DW01
Sample ID: 57392003
Matrix: Water
Collect Date: 12-MAR-02
Receive Date: 13-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	ND	U	0.958	4.00	ug/L	1	MAR103/25/02	2053	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

038065

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID: 46DW02
Sample ID: 57392004
Matrix: Water
Collect Date: 12-MAR-02
Receive Date: 13-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	ND	U	0.958	4.00	ug/L	1	MAR1 03/25/02	2103	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by Sarah M. Bashaw

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	46DW02DUP	Project:	STEP00202
Sample ID:	57392005	Client ID:	STEP001
Matrix:	Water		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	ND	U	0.958	4.00	ug/L	1	MAR103/25/02	2113	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038067

Reviewer: Kitchings Date: 4/6

Project: Longhorn AAP SDG: 57392 Matrix/No. Samples: W - 4

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 6° C / 43° F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED	PREPPED/ANALYZED
3/12	3/25

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0 - 100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? lab 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? lab 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICV @ 49.24 / 50 = 98.5

CCV @ 19:53 = 24.56 / 25 = 98.2

CCV @ 21:44 77.76 / 75 = 103.7

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038068

Reviewer: Kitchings Date: 4/6

Project: Longhorn AAP SDG: 57392 Matrix/No. Samples: W-4

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

187975 MB 3/23 @ u

ICB - 0

3/21 CCB@ 12:26 - 0

3/25 ICB → all CCBs @ zero

3/22 ICB & all CCBs @ zero.

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: IPC 3/21 23.37/25 = 93.5 %

3/25 23.72/25

IPC 3/22 23.56/25 = 94.2

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
	2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

187982 LCS 51.2/500 = 102.4

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038069

Reviewer: Kitchings Date: 4/6

Project: Longhorn AAP SDG: 57392 Matrix/No. Samples: W-4

VI. Duplicates			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

92001 DUP. 1.52/U → ↘

VII. Matrix Spike			
1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

$10 - 1.52/10 = 85.8\%$

$10.2 - 1.52/10 = 86.8\%$

$RPD = \frac{.2}{8.58} = 2.3\%$

038070

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/6

Project: Longhorn AAP SDG: 57392 Matrix/No. Samples: W-4

X.	Sample Result Qualification Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	N/A
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A
	Comments/Qualifications:			

XI.	Field QC			
	1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications: 46DW02 46DW02 DUP

↳ U ↵

XII.	Overall Assessment of Data			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A
	Comments/Qualifications:			

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038072

SDG: 57390 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Soil - 9

Validation Samples: Validation Samples: 46 5513 (0-0.5) 46 5514 (1-2)
46 5512 (0-0.5) 46 5513 (1-2) 46 5515 (0-0.5)
46 5512 (0-0.5) dup 46 5514 (0-0.5) 46 5515 (1-2)
46 5512 (1-2)

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57390 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Date: 4/4/2002

Validator's Signature: J. Thomas Hodges

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 2, 2002

Client Sample ID:	46SS12(0-0.5)	Project:	STEP00202
Sample ID:	57390001	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	48.7%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	18.5	77.2	ug/kg	1	MAR1 03/30/02	1746	154989	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	1125	154987

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on a dry weight basis except where prohibited by the analytical procedure.
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46SS12(0-0.5)DUP	Project:	STEP00202
Sample ID:	57390002	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	44.7%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	17.4	72.7	ug/kg	1	MAR1 03/30/02	1827	154989	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	1125	154987

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038077

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46SS12(1-2)	Project:	STEP00202
Sample ID:	57390003	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	21.9%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.0	50.0	ug/kg	1	MAR1 03/30/02	1857	154989	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	1125	154987

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 2, 2002

Client Sample ID:	46SS13(0-0.5)	Project:	STEP00202
Sample ID:	57390004	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	22.2%		

Parameter	Qualifier	Result	Re Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.4	51.9	ug/kg	1	MAR103/30/02	1907	154989	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	1125	154987

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038079

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46SS13(1-2)	Project:	STEP00202
Sample ID:	57390005	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	20%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.0	50.0	ug/kg	1	MAR103/30/02	1917	154989	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	1125	154987

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46SS14(0-0.5)	Project:	STEP00202
Sample ID:	57390006	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	22.1%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	12.4	51.6	ug/kg	1	MAR1	03/30/02	1927	154989	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	1125	154987

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46SS14(1-2)	Project:	STEP00202
Sample ID:	57390007	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	13.5%		

Parameter	Qualifier	Result	RaQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.1	46.5	ug/kg	1	MAR103/30/02	1937	154989	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	1125	154987

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46SS15(0-0.5)
Sample ID:	57390008
Matrix:	Soil
Collect Date:	12-MAR-02
Receive Date:	13-MAR-02
Collector:	Client
Moisture:	39.4%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Re Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	16.0	66.7	ug/kg	1	MAR1 03/30/02	1947	154989	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	1125	154987

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on a dry weight basis except where prohibited by the analytical procedure.
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038083

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	46SS15(1-2)	Project:	STEP00202
Sample ID:	57390009	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		
Moisture:	42.7%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	16.2	67.7	ug/kg	1	MAR103/30/02	1957	154989	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	1125	154987

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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< Actual result is less than amount reported
> Actual result is greater than amount reported
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J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038084

Reviewer: Kitchings Date: 4/6

Project: Longhorn AAP SDG: 57390 Matrix/No. Samples: S- 9

I. Sample Management			
A. Sample Preservation, Handling and Transport			
1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
2. Were all samples received in proper condition?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A
Cooler @ 6°C 43°F			
B. Chain of Custody			
1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
2. Were correct analyses performed on samples?	(Yes)	No	N/A
C. Holding Times			
1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED		PREPPED/ANALYZED
3/12	3/27	3/30

II. Calibrations			
1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0-100	(Yes)	No	N/A
2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90-110	(Yes)	No	N/A
3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110	(Yes)	No	N/A
4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICV 47.72/50 = 95.4

CCV@18:37 74.09/75 = 98.8

CCV@ 20:37 24.90/25 = 99.6

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038085

Reviewer: Kitchings Date: 4/6

Project: Longhorn AAP SDG: 57390 Matrix/No. Samples: S-9

III. Blanks			
1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
2. Was a laboratory fortified blank analyzed: %R @ 85-115?	Yes	(No)	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

191424 MB @ 3/30 - U ICB & all CCBs @ zero

IV. Instrument Performance Check Sample (IPC)			
1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/28 IPC 23.75/25 = 95%

V. Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	(N/A)
2. Are all solid LCS %R within control limits established by the laboratory?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

191430 LCS 482/500 = 96.4

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/6

Project: Longhorn AAP SDG: 57390 Matrix/No. Samples: S-9

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 390001 DUP u/u

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

390001 $192/195 = 98.5$

$178/193 = 92.2$

RPD $\frac{14}{185} = 7.6\%$

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038087

Reviewer: Kitchings Date: 4/6

Project: Longhorn AAP SDG: 57390 Matrix/No. Samples: S-9

X. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
2. Were correct calculations used to determine sample results?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

XI. Field QC			
1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	(Yes)	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	(Yes)	No	N/A
a. If yes, were any analytes reported in samples >IDL?	(Yes)	No	N/A
b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

46SS12(0-0.5) /(0-0.5)dup. 3/12 46RS02

↳ U ↵ 1.52 J

all samples @ nondet.

XII. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A

Comments/Qualifications:

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(divider page)

038089

SDG: 57430 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 13

Validation Samples:	Validation Samples:	29WW05	29WW22	17WW06
50WW04	29WW117	29WW21	460W03	17WW09
50WW03	29WW116	29WW21DUP	17WW03	17WW10

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	see comment #1
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57430 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

#1 Sample 29WW21 dup. was mislabelled as 29W21QC by the lab, and cleansed by the reviewer.

Overall Data Quality:

Acceptable as reported

Date: 4/5/2002

Validator's Signature: J. Thomas Hutchings

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 2, 2002

Client Sample ID:	50WW04	Project:	STEP00202
Sample ID:	57430001	Client ID:	STEP001
Matrix:	Water		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RW Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/01/02	1733	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	50WW03	Project:	STEP00202
Sample ID:	57430002	Client ID:	STEP001
Matrix:	Water		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/01/02	1814	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID: 29WW117
Sample ID: 57430003
Matrix: Water
Collect Date: 12-MAR-02
Receive Date: 13-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RawQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/01/02	1824	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

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Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 2, 2002

Client Sample ID:	29WW116	Project:	STEP00202
Sample ID:	57430004	Client ID:	STEP001
Matrix:	Water		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		665	19.2	80.0	ug/L	20	MAR104/02/02	1107	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 2, 2002

Client Sample ID:	29WW05	Project:	STEP00202
Sample ID:	57430005	Client ID:	STEP001
Matrix:	Water		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		77.1		0.958	4.00	ug/L	1	MAR104/01/02	1844	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 2, 2002

Client Sample ID: 29WW21
Sample ID: 57430006
Matrix: Water
Collect Date: 12-MAR-02
Receive Date: 13-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Reported	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1	04/01/02	1854	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Jeffrey M. Byrd
Reviewed by

038097

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

29W21 dup.

Client Sample ID: ~~29W21QC~~
Sample ID: 57430007
Matrix: Water
Collect Date: 12-MAR-02
Receive Date: 13-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/01/02	1904	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 2, 2002

Client Sample ID: 29WW22
Sample ID: 57430008
Matrix: Water
Collect Date: 12-MAR-02
Receive Date: 13-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/01/02	1935	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 2, 2002

Client Sample ID:	46DW03	Project:	STEP00202
Sample ID:	57430009	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/01/02	1945	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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H Holding time exceeded
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Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 2, 2002

Client Sample ID:	17WW03	Project:	STEP00202
Sample ID:	57430010	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate		631		9.58	40.0	ug/L	10	MAR1	04/01/02	1955	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Company : Step, Inc.
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Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 17WW06
Sample ID: 57430011
Matrix: Water
Collect Date: 13-MAR-02
Receive Date: 14-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		217000		9580	40000	ug/L	10000	MARI 04/02/02	1323	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
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Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	17WW09	Project:	STEP00202
Sample ID:	57430012	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		83.6		0.958	4.00	ug/L	1	MAR1 04/01/02	2015	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 2, 2002

Client Sample ID:	17WW10	Project:	STEP00202
Sample ID:	57430013	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		259		9.58	40.0	ug/L	10	MAR1 04/02/02	1127	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038104

Reviewer: Kitchings Date: 4/5

Project: Longhorn AAP SDG: 57430 Matrix/No. Samples: W-13

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 6°C 43°F / 20° 68°F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED	PREPPED/ANALYZED
50WW04 29W... 3/12	4/1, 4/2
460W03 17WW... 3/13	

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0 - 100	Yes	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90 - 110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90 - 110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICV = 47.43/50 = 94.9

4/1 CCV 17:13 24.24/25 = 97.0%

CCV 19:14 74.30/75 = 99.1

CCV 21:16 24.26/25 = 97.0

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038105

Reviewer: Kitchings Date: 4/5

Project: Longhorn AAP SDG: 57430 Matrix/No. Samples: W-13

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

41 MB 191401 @ U ICB & all CCBs @ zero.

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

4/1 IPC 23.95/25 = 95.8

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
	2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

191408 LCS 4/1 48.3/50.0 = 96.6

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038106

Reviewer: Kitchings Date: 4/5

Project: Longhorn AAP SDG: 57430 Matrix/No. Samples: W-B

VI. Duplicates			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 23005
4/1 43001 } - DUPL. aff @ U/U
82001

VII. Matrix Spike			
1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

30001 9.26 } HO = 92.6
10.6 } = 106

RPD $\frac{1.34}{9.93} = 13.5\%$

23005 9.92 / 10 = 99.2
10.6 = 106

RPD $\frac{.68}{10.26} = 6.6\%$

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038107

Reviewer: Kitchings Date: 4/5

Project: Longhorn AAP SDG: 57430 Matrix/No. Samples: W-B

X.	Sample Result Qualification Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	N/A
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A
	Comments/Qualifications:			

XI.	Field QC			
	1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	Yes	No	N/A
	Comments/Qualifications: 29WW21 29WW21 DUP L N's J			

XII.	Overall Assessment of Data			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A
	Comments/Qualifications:			

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(divider page)

SDG: 57423 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 8

Validation Samples: Validation Samples: 18WWC02 29WW06 29WW14
18WWMW20 29WW11 29WW07
29WW09 29WW10

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	N/A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 57423 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Date: 4/5/2002

Validator's Signature: J. Thomas Kitchens

Peer Reviewer: _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	18WWC02	Project:	STEP00202
Sample ID:	57423001	Client ID:	STEP001
Matrix:	Water		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RwQ 4d	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	u	0.958	4.00	ug/L	1	MAR103/23/02	2124	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on an "as received" basis.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	18WWMW20	Project:	STEP00202
Sample ID:	57423002	Client ID:	STEP001
Matrix:	Water		
Collect Date:	12-MAR-02		
Receive Date:	13-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	3.76	J	0.958	4.00	ug/L	1	MAR103/25/02	2134	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 29WW09
Sample ID: 57423003
Matrix: Water
Collect Date: 13-MAR-02
Receive Date: 14-MAR-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Reduced	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	479	2000	ug/L	500	MAR103/26/02	0930	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29WW06	Project:	STEP00202
Sample ID:	57423004	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		2710		479	2000	ug/L	500	MAR103/26/02	1021	153490	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29WW11	Project:	STEP00202
Sample ID:	57423005	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00 U	9.58	40.0	ug/L	10	MAR1 04/01/02	1603	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29WW10	Project:	STEP00202
Sample ID:	57423006	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR104/01/02	1643	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 2, 2002

Client Sample ID:	29WW14	Project:	STEP00202
Sample ID:	57423007	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/01/02	1653	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

** Indicates the analyte is a surrogate compound.
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 2, 2002

Contact: Doug Hawn

Project: Longhorn A.A.P.

Client Sample ID:	29WW07	Project:	STEP00202
Sample ID:	57423008	Client ID:	STEP001
Matrix:	Water		
Collect Date:	13-MAR-02		
Receive Date:	14-MAR-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	0.958	4.00	ug/L	1	MAR1 04/01/02	1703	154992	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038119

Reviewer: Kitchings Date: 4/5

Project: Longhorn AAP SDG: 57423 Matrix/No. Samples: W-8

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 6°C / 20° 43° - 68°			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED	PREPPED/ANALYZED
18's 3/12	3/23 , 3/25
24's. 3/13	3/26 , 4/1

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0 - 100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab @ 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab @ 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/22, ICV @ 50.33/50 = 100.7
3/23 all CCVs @ 102-105% range ✓

3/25 ICV 49.24/50 = 98.5
3/26 CCV @ 9:10 78.91/75 = 105.2
@ 11:11 25.94/25 = 103.8

4/1 ICV 47.43/50 = 94.9
CCV @ 15:22 74.7/75 = 99.6
@ 17:13 24.24/25 = 97%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038120

Reviewer: Kitchings Date: 4/5

Project: Longhorn AAP SDG: 57423 Matrix/No. Samples: W-8

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 3/23 187975 MB - U 3/22, 3/23 ICB & CCBs @ zero.
4/1 ICB & CCBs @ zero.
4/1 191401 MB - U

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 3/22,23 IPC 23.56/25 = 94.2
3/25 IPC 23.72/25 = 94.9
4/1 IPC 23.95/25 = 95.8

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
	2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:
3/23 187982 51.2/50 = 102.4
4/1 191408 48.3/50 = 96.6

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038121

Reviewer: Kitchings Date: 4/5

Project: Longhorn AAP SDG: 57423 Matrix/No. Samples: W 8

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 55014 1980/2010 = 30/1995 = 1.5%

all other dups @ u/u

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

55014 16.9 - 7.93/10 = 8.97

3/25 17.3 - 7.93/10 = 93.7

RPD = .4/9.17 = 4.4

92001 10 - 1.52/10 = 84.8

10.2 - 1.52/10 = 86.8

RPD = .2/8.58 = 2.3%

23005 9.92/10 = 99.2

4/1 10.6/10 = 106

.68/10.26 = 6.6%

430001 9.26/10 = 92.6

10.60/10 = 106

1.34/9.93 = 13.5%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038122

Reviewer: Kitchings Date: 4/5

Project: Longhorn AAP SDG: 57423 Matrix/No. Samples: 4-8

X. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
2. Were correct calculations used to determine sample results?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A
Comments/Qualifications:			

XI. Field QC			
1. Were any Field Duplicates associated with this SDG?	Yes	(No)	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	(No)	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
b. Were any qualifications required based on this information?	Yes	(No)	N/A
Comments/Qualifications:			

XII. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A
Comments/Qualifications:			

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038124

SDG: 57347 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Soil - 20

Validation Samples: Validation Samples: 185504(1-2) 185506(1-2) 505502(1-2)
185501(0-0.5) 185503(0-0.5) 185505(0-0.5) 505501(0-0.5) 505503(0-0.5)
185501(1-2) 185503(1-2) 185505(1-2) 505501(1-2) 505503(0-0.5)dup
185501(0-0.5) 185504(0-0.5) 185506(0-0.5) 505502(0-0.5) 505503(1-2)
185501(1-2) 185504(0-0.5)dup.

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	X	
12.	Overall Assessment	X	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as qualified.

Date: 4/3/2002

Validator's Signature: J. Thomas Kitchings

Peer Reviewer:

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	18SS01(0-0.5)	Project:	STEP00202
Sample ID:	57347001	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	16%		

Parameter	Qualifier	Result	Raw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.9	45.7	ug/kg	1	MAR1 03/29/02	1732	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma specuroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on a dry weight basis except where prohibited by the analytical procedure.
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18SS01(1-2)	Project:	STEP00202
Sample ID:	57347002	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	18.6%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.5	48.0	ug/kg	1	MAR1 03/29/02	1812	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Srep, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18SS02(0-0.5)	Project:	STEP00202
Sample ID:	57347003	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	25.7%		

Parameter	Qualifier	Result Raw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00 U	12.6	52.7	ug/kg	1	MAR1 03/29/02	1822	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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< Actual result is less than amount reported
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by John M. Bash

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 18SS02(1-2)
Sample ID: 57347004
Matrix: Soil
Collect Date: 09-MAR-02
Receive Date: 12-MAR-02
Collector: Client
Moisture: 18.1%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Raw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.6	48.4	ug/kg	1	MAR1 03/29/02	1832	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18SS03(0-0.5)	Project:	STEP00202
Sample ID:	57347005	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	27.2%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.6	52.5	ug/kg	1	MAR1 03/29/02	1842	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	18SS03(1-2)	Project:	STEP00202
Sample ID:	57347006	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	21.1%		

Parameter	Qualifier	Result	Rw Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	11.9	49.7	ug/kg	1	MAR1	03/29/02	1912	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18SS04(0-0.5)DUP	Project:	STEP00202
Sample ID:	57347007	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	24.7%		

Parameter	Qualifier	Result	Rw Qnd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.4	52.0	ug/kg	1	MAR103/29/02	1922	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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U Indicates the compound was analyzed for but not detected above the detection limit
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18SS04(1-2)	Project:	STEP00202
Sample ID:	57347008	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	19.6%		

Parameter	Qualifier	Result	Raw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		516		11.8	49.4	ug/kg	1	MAR1 03/29/02	1932	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18SS05(0-0.5)	Project:	STEP00202
Sample ID:	57347009	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	26.4%		

Parameter	Qualifier	Result	RL w Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		2430		321	1340	ug/kg	25	MAR103/30/02	2218	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18SS05(1-2)	Project:	STEP00202
Sample ID:	57347010	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	18.9%		

Parameter	Qualifier	Result Raw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		123	11.6	48.6	ug/kg	1	MAR1 03/29/02	1952	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

038136

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18SS06(0-0.5)	Project:	STEP00202
Sample ID:	57347011	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	23%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	16.0	J	12.0	50.0	ug/kg	1	MAR1 03/29/02	2003	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 18SS06(1-2)
Sample ID: 57347012
Matrix: Soil
Collect Date: 09-MAR-02
Receive Date: 12-MAR-02
Collector: Client
Moisture: 19%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.7	49.0	ug/kg	1	MAR1 03/29/02	2013	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by Sarah Bashaw

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	50SS01(0-0.5)	Project:	STEP00202
Sample ID:	57347013	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	14.3%		

Parameter	Qualifier	Result Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		45600	1120	4670	ug/kg	100	MAR1 03/30/02	2228	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	50SS01(1-2)	Project:	STEP00202
Sample ID:	57347014	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	20.5%		

Parameter	Qualifier	Result	RawQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.9	49.8	ug/kg	1	MARI 03/30/02	2259	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MARI	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 50SS02(0-0.5)
Sample ID: 57347015
Matrix: Soil
Collect Date: 09-MAR-02
Receive Date: 12-MAR-02
Collector: Client
Moisture: 16.1%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		15100		2280	9510	ug/kg	200	MAR103/30/02	2309	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	50SS02(1-2)	Project:	STEP00202
Sample ID:	57347016	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	14%		

Parameter	Qualifier	Result	Raw Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	11.0	46.0	ug/kg	1	MAR1	03/29/02	2113	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn

Project: Longhorn A.A.P.

Client Sample ID:	50SS03(0-0.5)	Project:	STEP00202
Sample ID:	57347017	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	15.7%		

Parameter	Qualifier	Result	Rev 2 Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	40.6	J 17	11.3	47.0	ug/kg	1	MAR1 03/29/02	2123	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	50SS03(0-0.5)DUP	Project:	STEP00202
Sample ID:	57347018	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	17.1%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	14.7	J 17	11.4	47.6	ug/kg	1	MAR103/29/02	2133	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: April 1, 2002

Project: Longhorn A.A.P.

Client Sample ID:	50SS03(1-2)	Project:	STEP00202
Sample ID:	57347019	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	13.9%		

Parameter	Qualifier	Result	RL DL	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	LL	11.0	45.8	ug/kg	1	MAR1	03/29/02	2143	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: April 1, 2002

Project: Longhorn A.A.P.

Client Sample ID:	18SS04(0-0.5)	Project:	STEP00202
Sample ID:	57347020	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	27%		

Parameter	Qualifier	Result	Reported	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	13.1	54.5	ug/kg	1	MAR1	04/01/02	0946	153922	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/08/02	1125	153921

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038146

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: 57347 Matrix/No. Samples: S-20

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 16°C - 61°F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

	SAMPLED	PREPPED/ANALYZED
batch 153921	3/9	3/8 3/29
	185504 (0-0.5)	3/8 4/1

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0-100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/28 ICV 47.72/50 = 95.4%

CCV @ 16:51 74.69/75 = 99.6

18:52 24.73/25 = 98.9

20:53 74.78/75 = 99.7

22:33 24.49/25 = 98%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: 57347 Matrix/No. Samples: S-20

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

188997 MB 3/29 @ 4

3/28 ICB
CCB 17:01
19:02
21:03
22:44
— all zeros.

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/28 IPC 23.75/25 = 95%

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	(N/A)
	2. Are all solid LCS %R within control limits established by the laboratory?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

189004
489/500 = 97.8

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038148

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: 57347 Matrix/No. Samples: S-20

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 47001 DUP. 3/29 u/u

47020 3/29 u/u

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 347001 102/115 = 88.7

105/115 = 91.3

3/103.5 = 2.9 %

347020 146/136 = 107.4

146/136 = 107.4

RPD @ zero.

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038149

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: 57347 Matrix/No. Samples: S-26

X. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
2. Were correct calculations used to determine sample results?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

XI. Field QC			
1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	(No)	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	(Yes)	No	N/A
a. If yes, were any analytes reported in samples >IDL?	(Yes)	No	N/A
b. Were any qualifications required based on this information?	(Yes)	No	N/A

Comments/Qualifications:

ORIG FD
185504(0-0.5) 185504(0-0.5)dup.

U U
505503(0-0.5) 505503(0-0.5)dup.
40.6 14.7

22.9 → 87.4
26.19

18R501 @ 1.55 ug/L
SX
1.85
Samples @ nd or > SX the ER.

XII. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A

Comments/Qualifications:

038150

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(divider page)

038151

SDG: 57352 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Soil -19

Validation Samples: 505504 (0-0.5), 505504 (1-2), 505505 (0-0.5), 505505 (1-2)

Validation Samples: 295501 (0-0.5), 295501 (1-2), 295502 (0-0.5), 295502 (1-2)

295503 (0-0.5), 295503 (0-0.5) dup., 295503 (1-2), 295504 (0-0.5)

295504 (1-2), 295505 (0-0.5), 295505 (1-2), 295506 (0-0.5)

295506 (1-2), 295507 (0-0.5), 295507 (1-2)

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 51352 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Date: 4/3/2002

Validator's Signature: J. Thomas Kitchings

Peer Reviewer:

038153

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	50SS04(0-0.05)	Project:	STEP00202
Sample ID:	57352001	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	15.9%		

Parameter	Qualifier	Result	Rw Q Ltd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.7	44.8	ug/kg	1	MAR1 03/29/02	0009	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VH1	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	50SS04(1-2)	Project:	STEP00202
Sample ID:	57352002	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	14.4%		

Parameter	Qualifier	Result	Raw Q Mod	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	LA	9.90	41.3	ug/kg	1	MAR1 03/29/02	0019	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VH1	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID: 50SS05(0-0.5)
Sample ID: 57352003
Matrix: Soil
Collect Date: 09-MAR-02
Receive Date: 12-MAR-02
Collector: Client
Moisture: 18%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.53	39.8	ug/kg	1	MAR103/29/02	0029	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VHI	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	50SS05(1-2)	Project:	STEP00202
Sample ID:	57352004	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	21.5%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	LA	10.9	45.6	ug/kg	1	MAR1	03/29/02	0039	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VH1	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by /s/ M. Fry

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	29SS01(0-0.5)	Project:	STEP00202
Sample ID:	57352005	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	16.4%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	UA	10.9	45.7	ug/kg	1	MAR103/29/02	0049	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VH1	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	29SS01(1-2)	Project:	STEP00202
Sample ID:	57352006	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	15.6%		

Parameter	Qualifier	Result	Raw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.2	42.7	ug/kg	1	MAR103/29/02	0059	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VH1	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by _____

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Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29SS02(0-0.5)	Project:	STEP00202
Sample ID:	57352007	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	17.9%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		104	9.85	41.1	ug/kg	1	MAR1	03/29/02	0110	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VH1	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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** Indicates the analyte is a surrogate compound.
< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29SS02(1-2)	Project:	STEP00202
Sample ID:	57352008	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	13.6%		

Parameter	Qualifier	Result Raw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		2410	505	2110	ug/kg	50	MAR1 04/01/02	0956	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VH1	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	29SS03(0-0.5)DUP	Project:	STEP00202
Sample ID:	57352009	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	13.9%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	21.4	10.4	43.5	ug/kg	1	MAR1	03/29/02	0807	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VH1	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29SS04(0-0.5)	Project:	STEP00202
Sample ID:	57352010	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	14.6%		

Parameter	Qualifier	Result	RwQncl	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.3	42.9	ug/kg	1	MAR1 03/29/02	0817	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VH1	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	29SS03(1-2)	Project:	STEP00202
Sample ID:	57352011	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	15.9%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.6	44.1	ug/kg	1	MAR1 03/29/02	0827	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VH1	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	29SS04(1-2)	Project:	STEP00202
Sample ID:	57352012	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	10.5%		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		43.6	9.77	40.8	ug/kg	1	MAR1 03/29/02	0837	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VH1	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	29SS05(0-0.5)	Project:	STEP00202
Sample ID:	57352013	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	17.4%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.4	43.6	ug/kg	1	MAR1 03/29/02	0847	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VH1	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID: 29SS05(1-2)
Sample ID: 57352014
Matrix: Soil
Collect Date: 09-MAR-02
Receive Date: 12-MAR-02
Collector: Client
Moisture: 12.5%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev 2 wl	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	9.99	41.7	ug/kg	1	MAR1	03/29/02	0857	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VH1	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	29SS06(0-0.5)	Project:	STEP00202
Sample ID:	57352015	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	9.67%		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	J	29.8	10.4	43.3	ug/kg	1	MAR1 03/29/02	0907	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VH1	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29SS06(1-2)	Project:	STEP00202
Sample ID:	57352016	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	9.76%		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		62.8		10.2	42.5	ug/kg	1	MAR103/29/02	0917	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VHI	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	29SS07(0-0.5)	Project:	STEP00202
Sample ID:	57352017	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	14.4%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	26.7		9.13	38.1	ug/kg	1	MAR1 03/29/02	0927	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VH1	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29SS07(1-2)	Project:	STEP00202
Sample ID:	57352018	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	09-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	14%		

Parameter	Qualifier	Result		DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	9.14	38.2	ug/kg	1	MAR103/29/02	0938	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VHI	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

038171

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 29SS03(0-0.5)
Sample ID: 57352019
Matrix: Soil
Collect Date: 09-MAR-02
Receive Date: 12-MAR-02
Collector: Client
Moisture: 15%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.0	45.8	ug/kg	1	MAR103/29/02	1008	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VH1	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038172

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: 57352 Matrix/No. Samples: S-19

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 16°C - 61°F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED	PREPPED/ANALYZED	
batch 154615 3/9	3/26	3/29 295502 (12)4/1

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 10 0-100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/28 ICV 47.72/50 = 95.4
CCV @ 23:29 24.54/25 = 98.2
@ 1:30 80.04/75 = 106.7
@ 7:46 24.40/25 = 97.6
@ 9:48 74.12/75 = 98.8

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038173

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: 57352 Matrix/No. Samples: S - 9

III. Blanks			
1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
2. Was a laboratory fortified blank analyzed: %R @ 85-115?	Yes	(No)	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

190383 MB 3/28 – U

3/28 ICB
CCB @ 23:29
1:10
7:56
9:58
3 hrs.

IV. Instrument Performance Check Sample (IPC)			
1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/28 IPC 23.75/250 = 95%

V. Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	(N/A)
2. Are all solid LCS %R within control limits established by the laboratory?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

190340 LCS 482/500 = 96.4

3/28

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: 57352 Matrix/No. Samples: S-19

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

52019 DUP
< 5x PQL - no RPD calc'n

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

52019 $119/113 = 105.3$

$123/116 = 106.0$

$RPD = .84/122.58 = 0.7\%$

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038175

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: 57352 Matrix/No. Samples: _____

X.	Sample Result Qualification Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

XI.	Field QC			
	1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	(Yes)	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	(Yes)	No	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	(No)	N/A
	b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

29SS03(0-0.5) U

29SS03(0-0.5)DUP 21.4 J

no quals required.

3/9 29RS01 ~~29RS02~~ } U's.

XII.	Overall Assessment of Data			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A

Comments/Qualifications:

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(divider page)

SDG: 57353 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Soil-17

Validation Samples: Validation Samples: 295508 (0-0.5), 295508 (0-0.5) dup, 295508 (1-2), 295509 (0-0.5), 295509 (1-2), 295510 (0-0.5), 295510 (1-2), 295511 (0-0.5), 295511 (1-2), 295512 (0-0.5), 295512 (1-2), 295513 (0-0.5) dup, 295514 (0-0.5), 295513 (1-2), 295514 (1-2), 295515 (0-0.5), 295515 (1-2)

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	N/A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as

Date: 4/3/2002

Validator's Signature: J. Thomas Kotas

Peer Reviewer:

038179

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	29SS08(0-0.5)	Project:	STEP00202
Sample ID:	57353001	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	19.4%		

Parameter	Qualifier	Result	RisQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.4	47.6	ug/kg	1	MAR103/29/02	1048	154616	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	VH1	03/26/02	1300	154615

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29SS08(0-0.5)DUP	Project:	STEP00202
Sample ID:	57353002	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	16.8%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.5	47.8	ug/kg	1	MAR1 03/28/02	1926	154620	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	29SS08(1-2)	Project:	STEP00202
Sample ID:	57353003	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	13.8%		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.9	45.4	ug/kg	1	MAR1 03/28/02	1936	154620	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Certificate of Analysis

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: April 1, 2002

Project: Longhorn A.A.P.

Client Sample ID:	29SS09(0-0.5)	Project:	STEP00202
Sample ID:	57353004	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	15.3%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.7	44.8	ug/kg	1	MAR1 03/28/02	2007	154620	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	29SS09(1-2)	Project:	STEP00202
Sample ID:	57353005	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	17%		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.0	45.9	ug/kg	1	MAR103/28/02	2017	154620	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Address : 1006 Floyd Culler Cl.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29SS10(0-0.5)	Project:	STEP00202
Sample ID:	57353006	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	12.1%		

Parameter	Qualifier	Result	Raw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.9	45.4	ug/kg	1	MAR1 03/28/02	2027	154620	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID: 29SS10(1-2)
Sample ID: 57353007
Matrix: Soil
Collect Date: 10-MAR-02
Receive Date: 12-MAR-02
Collector: Client
Moisture: 14.8%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Re Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.7	44.5	ug/kg	1	MAR1 03/28/02	2037	154620	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler CL
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: April 1, 2002

Project: Longhorn A.A.P.

Client Sample ID:	29SS11(0-0.5)	Project:	STEP00202
Sample ID:	57353008	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	13.8%		

Parameter	Qualifier	Result	Re-Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.7	44.8	ug/kg	1	MAR103/28/02	2047	154620	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	29SS11(1-2)	Project:	STEP00202
Sample ID:	57353009	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	11.8%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	UI	10.2	42.4	ug/kg	1	MAR1 03/28/02	2057	154620	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Repon Date: April 1, 2002

Client Sample ID: 29SS12(0-0.5)
Sample ID: 57353010
Matrix: Soil
Collect Date: 10-MAR-02
Receive Date: 12-MAR-02
Collector: Client
Moisture: 16%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.3	42.8	ug/kg	1	MAR1 03/28/02	2107	154620	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	29SS12(1-2)	Project:	STEP00202
Sample ID:	57353011	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	11.5%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	10.5	44.0	ug/kg	1	MAR1	03/28/02	2117	154620	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	29SS13(0-0.5)DUP	Project:	STEP00202
Sample ID:	57353012	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	21.3%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	12.1	50.7	ug/kg	1	MAR1 03/28/02	2128	154620	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29SS14(0-0.5)	Project:	STEP00202
Sample ID:	57353013	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	18.7%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.4	47.4	ug/kg	1	MARI 03/28/02	2138	154620	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MARI	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: April 1, 2002

Project: Longhorn A.A.P.

Client Sample ID:	29SS13(1-2)	Project:	STEP00202
Sample ID:	57353014	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	12.4%		

Parameter	Qualifier	Result	Req Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	30.2		9.70	40.5	ug/kg	1	MAR1 03/28/02	2208	154620	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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H Holding time exceeded
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	29SS14(1-2)	Project:	STEP00202
Sample ID:	57353015	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	15.3%		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.3	47.2	ug/kg	1	MAR103/28/02	2218	154620	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: April 1, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29SS15(0-0.5)	Project:	STEP00202
Sample ID:	57353016	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	18.6%		

Parameter	Qualifier	Result	Rejund	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	11.5	48.2	ug/kg	1	MAR103/28/02	2228	154620	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MAR1	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: April 1, 2002

Client Sample ID:	29SS15(1-2)	Project:	STEP00202
Sample ID:	57353017	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	10-MAR-02		
Receive Date:	12-MAR-02		
Collector:	Client		
Moisture:	12.9%		

Parameter	Qualifier	Result	RawQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	10.7	44.6	ug/kg	1	MARI 03/28/02	2238	154620	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	MARI	03/27/02	0900	154619

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038196

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: 57353 Matrix/No. Samples: S-17

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 16°C - 61°F			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED

3/10

Batch 154615

3/26

154615 3/27

PREPPED/ANALYZED

3/29 295508 (0-0.5)

3/28 all others

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)? 6 stds 0-100	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%? Lab @ 90-110	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)? Lab @ 90-110	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICV 47.72/50 = 95.4 ↘

CCV @ 19:47 24.63/25 = 98.5

3/28 @ 21:48 73.67/75 = 98.2

@ 23:29 24.54/25 = 98.2

3/29 CCV @ 11:29 24.24$_1$/25 = 97% ↘

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038197

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: 57353 Matrix/No. Samples: S-17

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

190383 MB 3/28 @ U

190391 MB 3/28 @ U

ICB
3/28 @ 19:57
@ 21:58
@ 23:39
3/29 @ 11:39
-3 yds

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 3/28 23.75/25 = 95% ✓

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	(N/A)
	2. Are all solid LCS %R within control limits established by the laboratory?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

3/28 190390 LCS 482/500 = 96.4

3/28 190398 LCS 478/500 = 95.6

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038198

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: 57353 Matrix/No. Samples: S-17

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 53001 3/29 u/u

53018 3/28 u/u

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

53001 113/110 = 102.7 13/119.5 = 10.9%

126/126 = 100

53018 115/122 = 94.3 10/110 = 9.1%

~~90394~~

105/108 = 97.2

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038199

Reviewer: Kitchings Date: 4/3

Project: Longhorn AAP SDG: 57353 Matrix/No. Samples: S-17

X.	Sample Result Qualification Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	(N/A)
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

XI.	Field QC			
	1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	(Yes)	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	(Yes)	No	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	(No)	N/A
	b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

295508 (0-0.5) U

295508 (0-0.5) U

29R502 -U

dup
295130.0.5
-U

XII.	Overall Assessment of Data			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A

Comments/Qualifications:

038200

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(divider page)

DATA VALIDATION REPORT
PLANT-WIDE PERCHLORATE INVESTIGATION
LONGHORN ARMY AMMUNITION PLANT, KARNACK, TEXAS
Dry Season Sampling Event
(September 16 through September 25, 2002)

Solution to Environmental Problems, Inc. (STEP) has completed the Dry Season Sampling Event for the Plant-Wide Perchlorate Investigation at Longhorn Army Ammunition Plant (LHAAP). STEP personnel mobilized to the site on Monday, September 16, 2002 and commenced sampling activities the following morning. Sampling was completed on Wednesday, September 25, 2002, for a total of 10 field days.

Samples collected during this event included soil and water samples. All primary and Quality Control (QC) duplicate samples were submitted to General Engineering Laboratories of Charleston, South Carolina. The majority of samples were analyzed for perchlorate by EPA Method SW846 314.0. Two water samples were analyzed for volatile organic compounds (VOCs) by EPA Method SW846 8260B.

DataChek of Oak Island, North Carolina conducted the third-party data validation and provided the following data usability evaluation. The validated form I, and validation calculation packages are included in Attachment 1.

DATA USABILITY

This usability report reflects the data validation findings for samples associated with the LHAAP. The validated data set consisted of 144 water samples that had been analyzed for perchlorate, 23 soil samples for perchlorate and 2 water samples for VOCs. Overall the data was of excellent quality and all measurements required to satisfy the project QC objectives, Precision, Accuracy, Representativeness, Comparability, and Completeness (PARCC) parameters were met. Each of these measures and specific data qualifications are discussed below.

Accuracy: Accuracy is measured by the results from the recovery of known amounts of compounds or elements from laboratory control samples (LCS), matrix spikes (MS) and

surrogate recoveries. The overall measure of accuracy for the site was calculated by comparing the number of spike recoveries that exceeded the laboratory limits by the total number of LCS, MS and surrogate spikes. For both analyte groups accuracy was measured 97.5%.

Precision: Precision is a measure of the agreement between duplicate sample measurements of the same quantity and is reflected in the RPD between spikes and the RPD for the field duplicate analysis. The overall project QC objective for precision is 90% or greater, and the measurement for Longhorn is 96.9%.

Representativeness: The measures of representativeness -- sample handling, analytical blank analysis, field blanks – were met for all sites. Designated analytical protocols were followed. Holding times were met. Overall, no major problems were identified resulting from analytical failure.

Comparability: All data were analyzed using appropriate approved methods of analysis. All data results were reported correctly and in standard units.

Completeness: Completeness is the amount of valid data compared to the planned amount and is expressed as a percent of the usable data points divided by the total number of analytes for each parameter analyzed. No data were rejected, resulting in a completeness of 100%.

SPECIFIC DATA QUALIFIERS

Volatiles: **The 1,2-dichloroethylene (total) and trichloroethylene results for sample 16SW01 exceeded the instrument calibration limits and required a dilution. The dilution results were acceptable over the original values.**

Perchlorate: A high continuing calibration verification associated with sample 16WW33 from SDG 67641 resulted in a "J" qualifier being added to the sample concentration. A "J" qualifier was added to the 16WW22 and 16WW22D results due to a high relative percent difference in the field duplicate analysis from SDG67638.

ATTACHMENT 1

DRY SEASON DATA PACKAGES

SDG: 67441 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Soil -3

Validation Samples: Validation Samples: 295528 (0-0.5)
295526 (0-0.5)
295527 (0-0.5)

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 67441 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported

Date: 10/14/2002

Validator's Signature: J. Thomas Kitchens

Peer Reviewer:

Page: 3 of 3
Project #: LONGHORN ARMY PLANT
GEL Quote #:
COC Number [1]: LHAAP01
LIMS Number:

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONGHORN ARMY AMMUNITION PLANT

Client Name: STEP, INC. Phone #: (865) 481-7837 Fax #: (865) 481-0290

Address: 1006 FLOYD CULLER COURT, OAK RIDGE, TN 37830

Collected by: D. BLANKENSHIP / S. SHERLOCK Send Results To: DOLD, HAWN

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Field Sample ID	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending) (FT)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Total Number of Containers	RADIONUCLIDE										Remarks
295525 (0-0.5)	ND	9-18-02	14:28	0 - 0.5	N	N	SO	1	1										
295526 (0-0.5)	"	"	14:38	0 - 0.5	N	N	SO	1	1										
295527 (0-0.5)	"	"	14:48	0 - 0.5	N	N	SO	1	1										
295528 (0-0.5)	"	"	15:08	0 - 0.5	N	N	SO	1	1										
295528 (0-0.5) DUP	"	"	15:08	0 - 0.5	FD	N	SO	1	1										DUPLICATE SAMPLE
295528 (0-0.5) MS	"	"	15:08	0 - 0.5	MS	N	SO	1	1										MATRIX SPIKE SAMPLE
~~295528~~ 295502	"	"	15:59	N/A	EB	N	OX	1	1										* O = OTHER; RINSATE SAMPLE

Robert Shuler 9-18-02

TAT Requested: X Normal: X Rush: _____ (Subject to Surcharge) Fax Results: (Yes) / No Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)

FEDEX # 8348 4005 5631

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1. Robert Shuler	9-18-02	19:00	1.		
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab: _____ Shipped: _____

Method of Shipment: _____ Airbill #: _____

Analytical Lab: _____ Location: _____

Lab Recipient: J. M. Harley Date: 9/19/02 Time: 0900

For Lab Receiving Use Only

Custody Seal Intact? (YES) NO

Cooler Temp: 18 °C

1.) Chain of Custody Number = Client Determined

2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.

4.) Matrix Codes: DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste

5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1)

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

0382206

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 3, 2002

Client Sample ID:	29SS28(0-0.5)	Project:	STEP00202
Sample ID:	67441001	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	18-SEP-02 15:08		
Receive Date:	19-SEP-02		
Collector:	Client		
Moisture:	24.6%		

Parameter	Qualifier	Result	Reqnd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	u	19.3	53.0	ug/kg	1	MAR1 09/27/02	1710	204167	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	09/26/02	1423	204165

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on a dry weight basis except where prohibited by the analytical procedure.
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 3, 2002

Client Sample ID:	29SS26(0-0.5)	Project:	STEP00202
Sample ID:	67441002	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	19-SEP-02 14:38		
Receive Date:	19-SEP-02		
Collector:	Client		
Moisture:	23.1%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	18.7	51.5	ug/kg	1	MAR1 09/27/02	1751	204167	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	09/26/02	1423	204165

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
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P The response between the confirmation column and the primary column is >40%D
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UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 3, 2002

Client Sample ID:	29SS27(0-0.5)	Project:	STEP00202
Sample ID:	67441003	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	19-SEP-02 14:48		
Receive Date:	19-SEP-02		
Collector:	Client		
Moisture:	24.7%		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	19.3	53.1	ug/kg	1	MAR109/27/02	1801	204167	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	SJB1	09/26/02	1423	204165

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package

The above sample is reported on a dry weight basis except where prohibited by the analytical procedure.
Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038210

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/14

Project: Longhorn AAP SDG: 67441 Matrix/No. Samples: S-3

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 18°C. - no ice, no preservative required			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs? sample. 28(a-a.5) dup was on the C-o-C but not in the sample packet.	(Yes)	(No)	N/A
	2. Were correct analyses performed on samples?	(Yes)	(No)	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED		PREPPED/ANALYZED
9/18	batch 204167	9/27

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)?	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%?	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)?	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

9/26 ICV @ 12:53 46.76 / 50 = 93.5 ✓

CCV @ 16:30 27.18 / 25 = 108.7 ✓

@ 18:21 81.04 / 75 = 108.1 ✓

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 10/14

Project: Longhorn AAP **SDG:** 67441 **Matrix/No. Samples:** S-3

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

7321 MB 204167 – nondetect. ICB, CCB } u's.

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the ~~ICP~~ IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

IPC @ 13:14 $25.25/25 = 101\%$

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	(N/A)
	2. Are all solid LCS %R within control limits established by the laboratory?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

7042 4167 LCS $\frac{50.9}{50} = 101.8\%$

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 10/14

Project: Longhorn AAP **SDG:** 67441 **Matrix/No. Samples:** S-3

VI. Duplicates			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

7039 DUP 41001 ORIG U DUP U

VII. Matrix Spike			
1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

41001 MS = $\frac{183}{132}$ = 138.6

RPD $\frac{5}{180.5}$ = 2.8 % ✓

MSD = $\frac{178}{132}$ = 134.8

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/14

Project: Longhorn AAP SDG: 67441 Matrix/No. Samples: S-3

VIII. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	**Yes**	No	N/A
2. Were correct calculations used to determine sample results?	Yes	No	**N/A**
3. Were any qualifications required based on this information?	Yes	**No**	N/A

Comments/Qualifications:

No perchlorate detected.

IX. Field QC			
1. Were any Field Duplicates associated with this SDG?	Yes	**No**	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	**Yes**	**No**	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	**No**	N/A
b. Were any qualifications required based on this information?	Yes	**No**	N/A

Comments/Qualifications:

2QRS02 @ nondetect.

X. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	**No**	N/A

Comments/Qualifications:

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(divider page)

038215

SDG: 67440 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Soil - 20

Validation Samples: Validation Samples: 295519(1-2) 295521(0-0.5 295522(1-2
295516(0-0.5) 295516(1-2) 295519(0-0.5) 295521(0-0.5)dup 295523(0-0.5
295517(0-0.5) 295518(0-0.5) 295520(0-0.5 295521(1-2) 295523(1-2)
295517(1-2) 295518(1-2) 295520(1-2) 295522(0-0.5) 295524(0-0.5)
295524(1-2)
295525(0-0.5)

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	see comments 1 & 2
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 67440 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

#1 295516 (0-0.5) DUP (field duplicate) on the C-O-C but not in the data package.

#2 See attached nonconformance report - no qualifiers required.

Overall Data Quality:

Acceptable as reported.

Date: 10/14

Validator's Signature: J. Thomas Kibbiss

Peer Reviewer:

038217

General Engineering Laboratories
Form GEL-XXX
Rev. 06/02

NCR Report No.: 5682
Revision No.: 1

COMPANY - WIDE NONCONFORMANCE REPORT

Mo.Day Yr. 03-OCT-02	**Division:** Federal		**Type:** Process
Instrument Type: BALANCE	**Quality Criteria:** QAP or QAPJP		**Client Code:** STEP00202
Test / Method: Perchlorate	**Matrix Type:** Solid	**Batch ID:** 203565	**Sample Numbers:** Entire batch

Application Issues:

Failure to maintain Custody

Specification and Requirements Nonconformance Description:	**NRG Disposition:**
The samples were not scanned to the custody of the prep analyst prior to sample prep.	The prep analyst had possession of the samples during the prep process. The analyst did have custody of the smaples for the analysis. The project manager was notified.

Originator's Name:
Dee Reilly 03-OCT-02

Data Validator/Group Leader:

Quality Review:

Corrective Action:

Director:

Corrective Action ID and Complete Date:

Page: 1 of 3
Project #: LONGHORN AMM. PLANT
GEL Quote #:
COC Number [1]: LHAAP01
LIMS Number:

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONGHORN ARMY AMMUNITION PLANT

Client Name: STEP, INC Phone #: (865) 481-7837 Fax #: (865) 481-0298

Address: 1006 FLOYD CULLER CT, OAK RIDGE, TN 37830

Collected by: D. BLANK / R. SHEELES Send Results To: DOUG HAMM

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Field Sample ID 67440%	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending) (FT)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Total Number of Containers	PERCHLORATE										Remarks
295516(0-0.5)	NO	9-17-02	10:30	0 - 0.5	N	N	SO	1	1										
295516(0-0.5)DUP	"	"	10:30	0 - 0.5	FB	N	SO	1	1										DUPLICATE SAMPLE
295516(0-0.5) MS	"	"	10:30	0 - 0.5	MS	N	SO	1	1										MATRIX SPIKE SAMPLE
2 295517(0-0.5)	"	"	10:55	0 - 0.5	N	N	SO	1	1										
3 295517(1-2)	"	"	10:55	1 - 2	N	N	SO	1	1										
4 295516(1-2)	"	"	10:30	1 - 2	N	N	SO	1	1										
5 295518(0-0.5)	"	"	11:05	0 - 0.5	N	N	SO	1	1										
6 295518(1-2)	"	"	11:05	1 - 2	N	N	SO	1	1										
7 295519(0-0.5)	"	"	13:50	0 - 0.5	N	N	SO	1	1										
8 295519(1-2)	"	"	13:50	1 - 2	N	N	SO	1	1										
9 295520(0-0.5)	"	"	14:00	0 - 0.5	N	N	SO	1	1										

TAT Requested: X Normal: X Rush: ____ (Subject to Surcharge) Fax Results: (Yes) / No Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)

FED EX # 834840055631

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
Robert Sheeles	9-18-02	19:00	1.		
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab: Shipped:
Method of Shipment: Airbill #:
Analytical Lab: Location:
Lab Recipient: J M Haley Date: 9/19/02 Time: 0900

For Lab Receiving Use Only
Custody Seal Intact? (YES) NO
Cooler Temp: 1.8

1.) Chain of Custody Number = Client Determined
2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3.) Field Filtered: For liquid matrices, indicate with a "Y" for yes the sample was field filtered or "N" for sample was not field filtered.
4.) Matrix Codes: DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

C03218

C03218

Page: 4 of 3
Project #: LONGHORN AMM. PLANT
GEL Quote #:
COC Number (1): LHAAP01
LIMS Number:

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONGHORN ARMY AMMUNITION PLANT

Client Name: STEP, INC. Phone #(865)481-7837 Fax #(865)481-0290

Address: 1006 FLOYD COLLIER COURT, OAK RIDGE, TN 37830

Collected by: D. BLANK / R. STERLES Send Results To: DOUG HAHN

Sample Analysis Requested (5) (Fill in the number of containers for each test)

	Field Sample ID (67442% W. 67440%)	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mmm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Total Number of Containers	PERCHLORATE										Remarks
0	295520(1-2)	ND	9-17-02	14:00	1-2	N	N	SO	1	1										
1	295521(0-0.5)	ND	"	14:10	0-0.5	N	N	SO	1	1										
2	295521(0-0.5)DUP	"	"	14:10	0-0.5	FD	N	SO	1	1										DUPLICATE SAMPLE
3	295521(1-2)	"	"	14:10	1-2	N	N	SO	1	1										
4	295522(0-0.5)	"	9-18-02	13:06	0-0.5	N	N	SO	1	1										
5	295522(1-2)	"	"	13:06	1-2	N	N	SO	1	1										
6	295523(0-0.5)	"	"	13:20	0-0.5	N	N	SO	1	1										
7	295523(1-2)	"	"	13:20	1-2	N	N	SO	1	1										
8	295524(0-0.5)	"	"	13:36	0-0.5	N	N	SO	1	1										
9	295524(1-2)	"	"	13:36	1-2	N	N	SO	1	1										
10	29RS01	"	"	14:10	N/A	EB	N	O*	1	1										X-O=OTHER RINSATE SAMPLE
11																				

TAT Requested: X Normal: X Rush: _____ (Subject to Surcharge) Fax Results: (Yes) / No Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)

FEDEX # 8348 4005 5631

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1. [signature]	9-18-02	19:00	1.		
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab: _____ Shipped: _____

Method of Shipment: _____ Airbill #: _____

Analytical Lab: _____ Location: _____

Lab Recipient: [signature] Date: 9/19/02 Time: 0900

For Lab Receiving Use Only

Custody Seal Intact? (YES) NO

Cooler Temp: 18 °C

1.) Chain of Custody Number = Client Determined

2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.

4.) Matrix Codes: DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste

5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

0382219

Page: 3 of 3
Project #: LONG HORN ARMY PLANT
GEL Quote #:
COC Number [1]: LHAAP01
LIMS Number:

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONG HORN ARMY AMMUNITION PLANT

Client Name: STEP, INC. Phone #: (865) 481-7837 Fax #: (865) 481-0290

Address: 1006 FLOYD CULLER COURT, OAK RIDGE, TN 37830

Collected by: D. BLANKENSHIP / S. HEDGES Send Results To: DOLDS, HAWN

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Field Sample ID	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending) (FT)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Total Number of Containers	Preservative	Remarks
295525 (0-0.5)	NO	9-18-02	14:28	0 - 0.5	N	N	SO	1	1	
295526 (0-0.5)	"	"	14:38	0 - 0.5	N	N	SO	1	1	
295527 (0-0.5)	"	"	14:48	0 - 0.5	N	N	SO	1	1	
295528 (0-0.5)	"	"	15:08	0 - 0.5	N	N	SO	1	1	
295528 (0-0.5) DUP	"	"	15:08	0 - 0.5	FD	N	SO	1	1	DUPLICATE SAMPLE
295528 (0-0.5) MS	"	"	15:08	0 - 0.5	MS	N	SO	1	1	MATRIX SPIKE SAMPLE
295528 - 295502	"	"	15:59	N/A	EB	N	OT	1	1	OT = OTHER; RINSATE BLANK

Robert Blanken 9-18-02

TAT Requested: X Normal: X Rush: (Subject to Surcharge)

Fax Results: (Yes) / No

Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)

FEDEX # 8348 4005 5631

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1. Robert Blanken	9-18-02	19:00	1.		
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab:
Shipped:
Method of Shipment:
Airbill #:
Analytical Lab:
Location:
Lab Recipient: J. M. Harley
Date: 9/19/02 Time: 0900

For Lab Receiving Use Only

Custody Seal Intact? YES NO

Cooler Temp: C

1.) Chain of Custody Number = Client Determined

2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.

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5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1)

WHITE = LABORATORY YELLOW = FIL PINK = CLIENT

G38220

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 4, 2002

Client Sample ID:	29SS16(0-0.5)	Project:	STEP00202
Sample ID:	67440001	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	17-SEP-02 10:30		
Receive Date:	19-SEP-02		
Collector:	Client		
Moisture:	4.31%		

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	14.8	40.8	ug/kg	1	MAR1	09/27/02	0058	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on a dry weight basis except where prohibited by the analytical procedure.
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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29SS17(0-0.5)	Project:	STEP00202
Sample ID:	67440002	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	17-SEP-02 10:55		
Receive Date:	19-SEP-02		
Collector:	Client		
Moisture:	7.09%		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		425	15.6	42.9	ug/kg	1	MAR1 09/27/02	0139	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step. Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: October 4, 2002

Project: Longhorn A.A.P.

Client Sample ID:	29SS17(1-2)	Project:	STEP00202
Sample ID:	67440003	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	17-SEP-02 10:55		
Receive Date:	19-SEP-02		
Collector:	Client		
Moisture:	5.88%		

Parameter	Qualifier	Result	Re Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		220		15.5	42.7	ug/kg	1	MAR1 09/27/02	0149	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 4, 2002

Client Sample ID: 29SS16(I-2)
Sample ID: 67440004
Matrix: Soil
Collect Date: 17-SEP-02 10:30
Receive Date: 19-SEP-02
Collector: Client
Moisture: 3.75%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	15.1	41.7	ug/kg	1	MAR1 09/27/02	0159	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 4, 2002

Client Sample ID:	29SS18(0-0.5)	Project:	STEP00202
Sample ID:	67440005	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	17-SEP-02 11:05		
Receive Date:	19-SEP-02		
Collector:	Client		
Moisture:	8.47%		

Parameter	Qualifier	Result		DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	15.9	43.8	ug/kg	1	MAR1 09/27/02	0209	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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P The response between the confirmation column and the primary column is >40%D
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 4, 2002

Contact: Doug Hawn

Project: Longhorn A.A.P.

Client Sample ID:	29SS18(1-2)	Project:	STEP00202
Sample ID:	67440006	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	17-SEP-02 11:05		
Receive Date:	19-SEP-02		
Collector:	Client		
Moisture:	8.97%		

Parameter	Qualifier	Result	Rev Qual.	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	16.0	44.1	ug/kg	1	MAR109/27/02	0239	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29SS19(0-0.5)	Project:	STEP00202
Sample ID:	67440007	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	17-SEP-02 13:50		
Receive Date:	19-SEP-02		
Collector:	Client		
Moisture:	5.44%		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00	15.3	42.2	ug/kg	1	MAR1 09/27/02	0249	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
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H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 29SS19(1-2)
Sample ID: 67440008
Matrix: Soil
Collect Date: 17-SEP-02 13:50
Receive Date: 19-SEP-02
Collector: Client
Moisture: 5.62%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev. Qual.	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	15.5	42.8	ug/kg	1	MARI 09/27/02	0259	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
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J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
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Reviewed by

038229

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 4, 2002

Client Sample ID:	29SS20(0-0.5)	Project:	STEP00202
Sample ID:	67440009	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	17-SEP-02 14:00		
Receive Date:	19-SEP-02		
Collector:	Client		
Moisture:	3.39%		

Parameter	Qualifier	Result		DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	15.1	41.6	ug/kg	1	MAR109/27/02	0309	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 29SS20(1-2)
Sample ID: 67440010
Matrix: Soil
Collect Date: 17-SEP-02 14:00
Receive Date: 19-SEP-02
Collector: Client
Moisture: 3.39%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00	15.2	41.8	ug/kg	1	MAR1 09/27/02	0320	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 4, 2002

Client Sample ID: 29SS21(0-0.5)
Sample ID: 67440011
Matrix: Soil
Collect Date: 17-SEP-02 14:10
Receive Date: 19-SEP-02
Collector: Client
Moisture: 5.8%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rpt Qual.	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	15.1	41.7	ug/kg	1	MAR1 09/27/02	0330	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: October 4, 2002

Project: Longhorn A.A.P.

Client Sample ID:	29SS21(0-0.5)DUP	Project:	STEP00202
Sample ID:	67440012	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	17-SEP-02 14:10		
Receive Date:	19-SEP-02		
Collector:	Client		
Moisture:	5.86%		

Parameter	Qualifier	Result	Rev. Qual.	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	15.5	42.6	ug/kg	1	MAR109/27/02	0340	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 4, 2002

Client Sample ID: 29SS21(1-2)
Sample ID: 67440013
Matrix: Soil
Collect Date: 17-SEP-02 14:10
Receive Date: 19-SEP-02
Collector: Client
Moisture: 7.43%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00	15.8	43.4	ug/kg	1	MAR1 09/27/02	0350	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
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P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 4, 2002

Client Sample ID:	29SS22(0-0.5)	Project:	STEP00202
Sample ID:	67440014	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	18-SEP-02 13:06		
Receive Date:	19-SEP-02		
Collector:	Client		
Moisture:	6.07%		

Parameter	Qualifier	Result	Rev. Qual.	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	15.4	42.4	ug/kg	1	MAR1 09/27/02	0400	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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B Analyte found in the sample as well as the associated blank.
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J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
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Reviewed by

038235

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 4, 2002

Client Sample ID:	29SS22(1-2)	Project:	STEP00202
Sample ID:	67440015	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	18-SEP-02 13:06		
Receive Date:	19-SEP-02		
Collector:	Client		
Moisture:	3.82%		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00	14.9	41.1	ug/kg	1	MAR109/27/02	0410	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
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H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 4, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 29SS23(0-0.5)
Sample ID: 67440016
Matrix: Soil
Collect Date: 18-SEP-02 13:20
Receive Date: 19-SEP-02
Collector: Client
Moisture: 6.03%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00	15.5	42.7	ug/kg	1	MARI 09/27/02	0440	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 4, 2002

Client Sample ID: 29SS23(1-2)
Sample ID: 67440017
Matrix: Soil
Collect Date: 18-SEP-02 13:20
Receive Date: 19-SEP-02
Collector: Client
Moisture: 4.96%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00	15.0	41.4	ug/kg	1	MAR1 09/27/02	0450	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 4, 2002

Contact: Doug Hawn

Project: Longhorn A.A.P.

Client Sample ID:	29SS24(0-0.5)	Project:	STEP00202
Sample ID:	67440018	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	18-SEP-02 13:36		
Receive Date:	19-SEP-02		
Collector:	Client		
Moisture:	3.65%		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00	14.9	41.1	ug/kg	1	MAR1 09/27/02	0500	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 4, 2002

Client Sample ID: 29SS24(1-2)
Sample ID: 67440019
Matrix: Soil
Collect Date: 18-SEP-02 13:36
Receive Date: 19-SEP-02
Collector: Client
Moisture: 6.17%

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev. Qual.	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	15.7	43.2	ug/kg	1	MAR109/27/02	0511	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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X Lab-specific qualifier - must be fully described in case narrative and data summary package
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 4, 2002

Contact: Doug Hawn

Project: Longhorn A.A.P.

Client Sample ID:	29SS25(0-0.5)	Project:	STEP00202
Sample ID:	67440020	Client ID:	STEP001
Matrix:	Soil		
Collect Date:	18-SEP-02 14:28		
Receive Date:	19-SEP-02		
Collector:	Client		
Moisture:	31.3%		

Parameter	Qualifier	Result	Rev. Qual.	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	20.3	56.0	ug/kg	1	MAR109/27/02	0551	203565	1

The following Prep Methods were performed

Method	Description	Analyst	Date	Time	Prep Batch
EPA 314.0	EPA 314.0 Prep Perchlorate by IC	DAR	09/25/02	1350	203563

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038241

Reviewer: Kitchings Date: 10/14

Project: Longhorn AAP SDG: 67440 Matrix/No. Samples: S-20

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 18°C. – no ice, no preservative required.			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs? internally the lab didn't scan the custody fx to the prep analysis – client notified. the sample prior to prep.	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

	SAMPLED	PREPPED/ANALYZED
16-21	9/17	
22-25 (0.03)	9/18	batch 203565 9/27

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)?	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%?	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)?	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)? CCV.	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICV 9/26 @ 12:53 46.76/50 = 93.5

CCV @ 00:18 25.18/25 = 100.7

@ 02:19 78.21/75 = 104.3

@ 04:20 24.85/25 = 99.4

@ 06:01 77.19/75 = 102.9

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/14

Project: Longhorn AAP SDG: 67440 Matrix/No. Samples: S-20

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	(Yes)	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

5460 - 3563-MB @ nondetect.

ICB
CCB's } u's.

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

9/26 @ 13:14 $\frac{25.25}{25}$ = 101% ✓

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	(N/A)
	2. Are all solid LCS %R within control limits established by the laboratory?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

5467 - LCS 495/495 = 100% ✓
3563

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038243

Reviewer: Kitchings Date: 10/14

Project: Longhorn AAP SDG: 67440 Matrix/No. Samples: S-20

VI. Duplicates			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

S461
440001
ORIG U's
DUPL U's.

S462
440019
ORIG U's
DUPL U's.

VII. Matrix Spike			
1. Were samples used for matrix spike sample analysis identified as field blanks?	(Yes)	No	N/A
2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

440001
MS 112/103 = 108.7
RPD = 6/115 = 5.2
MSD 118/104 = 113.5

440019
MS 101/106 = 95.3
RPD = 16/109 = 14.7
MSD 117/107 = 109.3

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 10/14

Project: Longhorn AAP **SDG:** 67440 **Matrix/No. Samples:** S-20

VIII. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	Yes	No	N/A
2. Were correct calculations used to determine sample results?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

295517 (0-0.5) = .0008366(46686)+.4974 → 425

$\frac{34.55(9.97506)}{.9291} = 424.62$ ✓

295517 (1-2) = .0008366(23984) + .4974 → 220

$\frac{20.562(10.05025)}{.9412} = 219.6$ ✓

IX. Field QC			
1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
b. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

29RS01 10/3@17:53 – nondetect.

295521 0-0.5 (orig) → FD

U's → U's ✓

X. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A

Comments/Qualifications:

038245

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(divider page)

038246

SDG: 67435 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 7

Validation Samples: Validation Samples: LHSMW1 04WW02 17WW14
04WW01 17WW09
04TW01 17WW10

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	see comment #1
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	A	
11.	Field QC Samples	N/A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 67435 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

#1 Sample LHSMW1D (field duplicate) was listed on the C-O-C but was not a part of the data package.

Overall Data Quality:

Acceptable as reported.

Date: 10/14/2002

Validator's Signature: J. Thomas Hutchings

Peer Reviewer:

Page: 1 of 1
Project #: Longhorn
GEL Quote #:
COC Number [1]: LHAAP02
LIMS Number:

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: Longhorn Army Ammunition Plant

Client Name: STEP, Inc. Phone #: 8654817837 Fax #: 4810290

Address: 1006 Floyd Collar Ct. Oak Ridge, TN

Collected by: Doug Hawn Send Results To: Doug Hawn

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Field Sample ID 67435	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Total Number of Containers	Perchlorate	Remarks
LHSMW1	NO	09-18-02	1135	-	N		GW	1	✓	
LHSMW1D	NO	09-18-02	1135	-	FD		GW	1	✓	
LHSMW1M	NO	09-18-02	1135	-	MSD		GW	1	✓	
04WW02	NO	09-18-02	1342	-	N	N	GW	1	✓	
04WW01	NO	09-18-02	1445	-	N	N	GW	1	✓	
04TW01	NO	09-18-02	1415	-	N	N	DW	1	✓	
17WW14	NO	09-18-02	1556	-	N	N	GW	1	✓	
17WW09	NO	09-18-02	1725	-	N	N	GW	1	✓	
17WW10	NO	09-18-02	1830	-	N	N	GW	1	✓	
				-						
				-						

TAT Requested: X Normal: X Rush: _____ (Subject to Surcharge)

Fax Results: Yes / No

Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1. Doug Hawn	9-18-02	1900	1.		
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab: _____ Shipped: _____

Method of Shipment: _____ Airbill #: _____

Analytical Lab: _____ Location: _____

Lab Recipient: J M Hanley Date: 9/19/02 Time: 0900

For Lab Receiving Use Only

Custody Seal Intact? (YES) NO

Cool Temp: 1 °C

1.) Chain of Custody Number = Client Determined

2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.

4.) Matrix Codes: DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste

5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

WHITE = LABORATORY , YELLOW = F PINK = CLIENT

038248

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 9, 2002

Client Sample ID: LHSMW1
Sample ID: 67435001
Matrix: Ground Water
Collect Date: 18-SEP-02 11:35
Receive Date: 19-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MARI 10/03/02	1551	203833	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: October 9, 2002

Project: Longhorn A.A.P.

Client Sample ID:	04WW02	Project:	STEP00202
Sample ID:	67435002	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	18-SEP-02 13:42		
Receive Date:	19-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MARI 10/03/02	1632	203833	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 9, 2002

Client Sample ID: 04WW01
Sample ID: 67435003
Matrix: Ground Water
Collect Date: 18-SEP-02 14:45
Receive Date: 19-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/03/02	1642	203833	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 9, 2002

Client Sample ID:	17WW14	Project:	STEP00202
Sample ID:	67435004	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	18-SEP-02 15:56		
Receive Date:	19-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/03/02	1652	203833	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
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H Holding time exceeded
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 9, 2002

Client Sample ID:	17WW09	Project:	STEP00202
Sample ID:	67435005	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	18-SEP-02 17:25		
Receive Date:	19-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/03/02	1702	203833	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: October 9, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17WW10	Project:	STEP00202
Sample ID:	67435006	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	18-SEP-02 18:30		
Receive Date:	19-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	3.86	J	1.45	4.00	ug/L	1	MAR1 10/03/02	1732	203833	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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P The response between the confirmation column and the primary column is >40%D
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 9, 2002

Client Sample ID:	04TW01	Project:	STEP00202
Sample ID:	67435007	Client ID:	STEP001
Matrix:	Drinking Water (Potable)		
Collect Date:	18-SEP-02 14:15		
Receive Date:	19-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1	10/03/02	1742	203833	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

038256

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 10/14

Project: Longhorn AAP **SDG:** 67435 **Matrix/No. Samples:** W-7

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 18°C - no preservative or ice required.			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs? LHSMWID was listed on C-O-C but	Yes	(No)	N/A
	2. Were correct analyses performed on samples? was not part of data package.	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED	PREPPED/ANALYZED
9/18	all batch 203833 10/3

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)?	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ +or – 10%?	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)?	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

10/3 @ 14:31 ICV 50.04/50 = 100.1

@ 15:11 CCV 25.7/25 = 102.8

@ 17:12 CCV 79.57/75 = 106.1

@ 19:13 CCV 24.75/25 = 99.0

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 10/14

Project: Longhorn AAP **SDG:** 67435 **Matrix/No. Samples:** W-7

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	No	(N/A)
	3. Were any qualifications required based ~~on this information~~?	Yes	(No)	N/A

Comments/Qualifications:

10/3 06138-MB - @ nondet. LCB - U
CCB's @ nondetects,

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the ~~ICP~~ IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: IPC 10/3 @ 14:51 $\frac{25.24}{25}$ =

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
	2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
	3. Were any qualifications required based ~~on this information~~?	Yes	(No)	N/A

Comments/Qualifications:

06145 LCS 10/3 $\frac{52.87}{50.0}$ = 104.3

038258

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 10/14

Project: Longhorn AAP **SDG:** 67435 **Matrix/No. Samples:** W-7

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:
10/3 35001 DUP both @ U U
10/3 60001 DUP. both @ U U

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 35001 PS $\frac{11.17}{10.0}$ = 112%

RPD $\frac{.23}{11.055}$ = 2.1% ~~2.7%~~

PSD $\frac{10.94}{10.0}$ = 109%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 10/14

Project: Longhorn AAP **SDG:** 67435 **Matrix/No. Samples:** W 7

VIII.	**Sample Result Qualification** Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	(Yes)	No	N/A
	2. Were correct calculations used to determine sample results?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

17WW10 Rpt. As

35006 4017 (.008360) + .4978 3.84

= 3.858 ↘

IX.	**Field QC**			
	1. Were any Field Duplicates associated with this SDG?	Yes	(No)	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	(No)	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

LHSMW1D - not analyzed
- on C-O-C but not in data package

X.	**Overall Assessment of Data**			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A

Comments/Qualifications:

038260

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(divider page)

SDG: 67563 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 8

Validation Samples: Validation Samples: 17WW02 17WW01D 46WW02
17WW04 46WW01 LHSMW19
17WW01 LHSMW18

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 67563 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported

Date: 10/15/2002

Validator's Signature: J. Thomas Hutchings

Peer Reviewer: _____

Page: 3 of 3
Project #: LHAAP
GEL Quote #:
COC Number (1):
LIMS Number: 675637

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONGHORN ARMY AMMUNITION PLANT

Client Name: STEP, INC Phone #: (865) 481-7837 Fax #: (865) 481-0290

Address: 1006 FLOYD COLLIER COURT, OAK RIDGE, TN 37830

Collected by: D. BLANK / D. SHERLES Send Results To: DOUG HAWN

Sample Analysis Requested (5) (Fill in the number of containers for each test)

	Field Sample ID	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mmm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Total Number of Containers	PERCHLORATE										Remarks
1	17WW02	NO	9-20-02	14:40	N/A	N	N	GW	1	1										
2	17WW04	"	"	15:30	N/A	N	N	GW	1	1										
3	17WW01	"	"	16:25	N/A	N	N	GW	1	1										
4	17WW01D	"	"	16:25	N/A	FD	N	GW	1	1										DUPLICATE SAMPLE
5	46WW01	"	"	11:28	N/A	N	N	GW	1	1										
6	LHSMW18	"	"	17:00	N/A	N	N	GW	1	1										
7	LHSMW02	"	"	13:06	N/A	N	N	GW	1	1										
8	LHSMW19	"	"	10:16	N/A	N	N	GW	1	1										

Robert Shuck 9-20-02

TAT Requested: X Normal: X Rush: _____ (Subject to Surcharge) Fax Results: (Yes) / No Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)

FEDEX # 8348 4005 5653

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
Robert Shuck	9-20-02	17:00	1.		
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab: _____ Shipped: _____

Method of Shipment: _____ Airbill #: _____

Analytical Lab: _____ Location: _____

Lab Recipient: Paulette Mabe Date: 9/25/02 Time: 0930

For Lab Receiving Use Only

Custody Seal Intact? YES NO

Cooler Temp: 6 °C

1) Chain of Custody Number = Client Determined

2) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.

4) Matrix Codes: DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste

5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. *8260B* - 3, *6010B/7470A* - 1).

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

638263

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID:	17WW02	Project:	STEP00202
Sample ID:	67563001	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	20-SEP-02 14:40		
Receive Date:	21-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		197000		2900	8000	ug/L	2000	MAR1 10/08/02	1835	203834	3

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	
3	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17WW04	Project:	STEP00202
Sample ID:	67563002	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	20-SEP-02 15:30		
Receive Date:	21-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		13.3		1.45	4.00	ug/L	1	MAR1 09/26/02	2157	203834	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: October 10, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17WW01	Project:	STEP00202
Sample ID:	67563003	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	20-SEP-02 16:25		
Receive Date:	21-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate		194000		2900	8000	ug/L	2000	MARI	10/08/02	1845	203834	3

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	
3	EPA 314.0	

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Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID: 17WW01D
Sample ID: 67563004
Matrix: Ground Water
Collect Date: 20-SEP-02 16:25
Receive Date: 21-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		198000		2900	8000	ug/L	2000	MAR1 10/08/02	1855	203834	3

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	
3	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: October 10, 2002

Project: Longhorn A.A.P.

Client Sample ID:	46WW01	Project:	STEP00202
Sample ID:	67563005	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	20-SEP-02 11:28		
Receive Date:	21-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate		11.1		1.45	4.00	ug/L	1	MAR1	09/26/02	2227	203834	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
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H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID: LHSMW18
Sample ID: 67563006
Matrix: Ground Water
Collect Date: 20-SEP-02 17:00
Receive Date: 21-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00	1.45	4.00	ug/L	1	MAR109/26/02	2257	203834	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
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P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID: 46WW02
Sample ID: 67563007
Matrix: Ground Water
Collect Date: 20-SEP-02 13:06
Receive Date: 21-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	EMK 09/26/02	1107	203834	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	LHSMW19	Project:	STEP00202
Sample ID:	67563008	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	20-SEP-02 10:16		
Receive Date:	21-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Final	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 09/26/02	2317	203834	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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B Analyte found in the sample as well as the associated blank.
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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038272

Reviewer: Kitchings Date: 10/15

Project: Longhorn AAP SDG: 67563 Matrix/No. Samples: W 8

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 6°C.			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED

9/20

PREPPED/ANALYZED

17WW02 10/8
17WW01
17WW1D
9/26 - others

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)?	(Yes)	No	N/A
	2. ~~Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%?~~	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)?	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	(No)	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICV 9/26 @ 12:53 46.76/50 10/8 ICV @ 103

CCV 18:42 = 103% CCV @ 109

20:33 = 102% CCV @ 110

22:37 77.19/75 =

00:18 25.18/25 =

9/26 @ R^2 > 0.999

038273

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/15

Project: Longhorn AAP SDG: 67563 Matrix/No. Samples: W-8

III. Blanks			
1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

306146 MB 9/26 @ nondetect. 9/26 ICB - zero

CCB's - zero.

10/8 all @ zero

IV. Instrument Performance Check Sample (IPC)			
1. Was the ICP IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: IPC 9/26 @ 13:14 $\frac{25.25}{25} = 101\%$

V. Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	(N/A)
2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

630001PS 9.17/10 = 91.7%

630001PSD 9.15/10 = 91.5%

RPD $\frac{.02}{9.16} = 0.2\%$

to MS/MSD Section P.3 # VII

038274

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/15

Project: Longhorn AAP SDG: 67563 Matrix/No. Samples: W-8

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Comments/Qualifications: DUPL. 630001 9/26 @ both W's			

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits ~~(56-149%)~~ 83-123; are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Comments/Qualifications: LCS 306153 to page 2 Section V. LCS $\frac{50.8}{50} = 101.6$			

038275

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/15

Project: Longhorn AAP SDG: 67563 Matrix/No. Samples: W8

VIII. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	(Yes)	No	N/A
2. Were correct calculations used to determine sample results?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

67563005 12618(.0008366)+.4974 Rpt. As
46WW01 = 11.05 11.1

67563001 197000
17WW02 61867(.001575)+.8726
df 2000 = 98.313(2000) = 196,626

IX. Field QC			
1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	(Yes)	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	(No)	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

17WW01 17WW01D
194000 198000 $\frac{4000}{196000} = 2.0\%$

X. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A

Comments/Qualifications:

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(divider page)

038277

SDG: 67560 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 20

Validation Samples: Validation Samples: LHSMW23 12WW17 17WW08
12WW18 17WWMW19 17WW12 46WW04 12WW13 17WW13
12WW01 17WW120D 17WW11 12WW05 12WW11 17WW06
12WW10 17WWMW18 17WW130 12WW12 17WW07

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 67560 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported

Date: 10/15/2002

Validator's Signature: J. Thomas Hutchings

Peer Reviewer:

Page: ___ of 3
Project #: LHAAP
GEL Quote #: ___
COC Number [1]: ___
LIMS Number: ___

GEL Chain of Custody and Analytical Request

675607

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONGHORN ARMY AMMUNITION PLANT

Client Name: STEP, INC Phone # (865) 481-7837 Fax # (865) 481-0290

Address: 1006 FLOYD CULLER CT, OAK RIDGE, TN 37830

Collected by: D. BLANK / R. SHEPLES Send Results To: DOUG HAWN

Sample Analysis Requested [5] (Fill in the number of containers for each test)

	Field Sample ID	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Total Number of Containers	PERCHLORATE												Remarks
1	12WW18	NO	9-19-02	09:50	N/A	N	N	GW	1	1												
2	12WW01	"	"	12:10	N/A	N	N	GW	1	1												
3	12WW10	"	"	15:30	N/A	N	N	GW	1	1												
4	17WWMW19	"	"	09:53	N/A	N	N	GW	1	1												
5	17WW120D	"	"	12:05	N/A	FD @ 17WW01	N	GW	1	1												DUPLICATE SAMPLE
6	17WWMW18	"	"	08:40	N/A	N	N	GW	1	1												
7	17WW12	"	"	12:05	N/A	N	N	GW	1	1												
8	17WW11	"	"	11:05	N/A	N	N	GW	1	1												
9	17WW130	"	"	15:20	N/A	N	N	GW	1	1												
10	LHSMW23	"	"	16:30	N/A	N	N	GW	1	1												
11	46WW04	"	"	11:58	N/A	N	N	GW	1	1												

TAT Requested: X Normal: X Rush: ___ (Subject to Surcharge) Fax Results: (Yes) / No Deliverable: C of A / QC Summary / Level 1 / Level 2 (Level 3) Level 4

Comments: (attach compound and/or element list requested)

FEDEX # 8348 4005 5653

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1. [signature]	9-20-02	17:00	1.		
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab: ___ Shipped: ___
Method of Shipment: ___ Airbill #: ___
Analytical Lab: ___ Location: ___
Lab Recipient: [signature] Date: 9/4/02 Time: 0930

1.) Chain of Custody Number = Client Determined
2.) QC Codes N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
4.) Matrix Codes DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

For Lab Receiving Use Only
Custody Seal Intact? YES NO
Cooler Temp: 6 °C

038279

Page: 2 of 3
Project # LONGHORN ARMY. PLANT
GEL Quote #:
COC Number (1):
LIMS Number:

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONGHORN ARMY AMMUNITION PLANT

Client Name: STEP, INC Phone #: (865)481-7837 Fax #: (865)481-0290

Address: 1006 FLOYD CULLER CT., OAK RIDGE, TN 37830

Collected by: D. BLANK / R. SHEPLES Send Results To: DOUG HAWN

Sample Analysis Requested (5) (Fill in the number of containers for each test)

	Field Sample ID	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Total Number of Containers	PERCHLORATE	Remarks
2	12WW05	NO	9-20-02	15:31	N/A	N	N	GW	1	1	
3	12WW12	"	"	0942	N/A	N	N	GW	1	1	
4	12WW17	"	"	11:21	N/A	N	N	GW	1	1	
5	12WW13	"	"	10:36	N/A	N	N	GW	1	1	
6	12WW11	"	"	14:36	N/A	N	N	GW	1	1	
7	17WW07	"	"	08:40	N/A	N	N	GW	1	1	
8	17WW08	"	"	09:50	N/A	N	N	GW	1	1	
9	17WW13	"	"	11:00	N/A	N	N	GW	1	1	
10	17WW13D	"	"	11:00	N/A	FD	N	GW	1	1	DUPLICATE SAMPLE
9	17WW13M	"	"	11:00	N/A	MS	N	GW	1	1	MATRIX SAMPLE
10	17WW06	"	"	12:10	N/A	N	N	GW	1	1	

TAT Requested: X Normal: X Rush: _____ (Subject to Surcharge) Fax Results: (Yes) / No Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)

FED EX # 8348 4005 5653

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1. [signature]	9-20-02	17:00	1.		
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab: _____ Shipped: _____

Method of Shipment: _____ Airbill #: _____

Analytical Lab: _____ Location: _____

Lab Recipient: Paulette Wade Date: 9/25/02 Time: 0930

For Lab Receiving Use Only

Custody Seal Intact? YES NO

Cooler Temp: 6

1.) Chain of Custody Number = Client Determined

2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.

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WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

03828O

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: October 10, 2002

Project: Longhorn A.A.P.

Client Sample ID:	12WW18	Project:	STEP00202
Sample ID:	67560001	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	19-SEP-02 09:50		
Receive Date:	21-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	RaQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	K	1.45	4.00	ug/L	1	MAR1 10/03/02	1813	203833	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID: 12WW01
Sample ID: 67560002
Matrix: Ground Water
Collect Date: 19-SEP-02 12:10
Receive Date: 21-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Req'd Det	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	EMK	10/03/02	1853	203833	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: October 10, 2002

Project: Longhorn A.A.P.

Client Sample ID:	12WW10	Project:	STEP00202
Sample ID:	67560003	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	19-SEP-02 15:30		
Receive Date:	21-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MARI 10/03/02	1903	203833	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: October 10, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17WWMW19	Project:	STEP00202
Sample ID:	67560004	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	19-SEP-02 09:53		
Receive Date:	21-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		33.9	1.45	4.00	ug/L	1	MAR110/03/02	1933	203833	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038285

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID:	17WW12OD	Project:	STEP00202
Sample ID:	67560005	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	19-SEP-02 12:05		
Receive Date:	21-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR110/03/02	1943	203833	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID: 17WWMW18
Sample ID: 67560006
Matrix: Ground Water
Collect Date: 19-SEP-02 08:40
Receive Date: 21-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/03/02	1954	203833	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID: 17WW12
Sample ID: 67560007
Matrix: Ground Water
Collect Date: 19-SEP-02 12:05
Receive Date: 21-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Req'd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/03/02	2004	203833	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID: 17WW11
Sample ID: 67560008
Matrix: Ground Water
Collect Date: 19-SEP-02 11:05
Receive Date: 21-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Reqmd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MARI 10/03/02	2014	203833	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038289

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID: 17WW130
Sample ID: 67560009
Matrix: Ground Water
Collect Date: 19-SEP-02 15:20
Receive Date: 21-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate		30500		1450	4000	ug/L	1000	MAR1	10/08/02	1754	203833	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID: LHSMW23
Sample ID: 67560010
Matrix: Ground Water
Collect Date: 19-SEP-02 16:30
Receive Date: 21-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	J	1.84	J	1.45	4.00	ug/L	1	MAR1 10/03/02	2034	203833	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038291

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID:	46WW04	Project:	STEP00202
Sample ID:	67560011	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	19-SEP-02 11:58		
Receive Date:	21-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		17.0		1.45	4.00	ug/L	1	MAR1 10/03/02	2044	203833	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 12WW05
Sample ID: 67560012
Matrix: Ground Water
Collect Date: 20-SEP-02 15:31
Receive Date: 21-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1	09/26/02	1922	203834	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: October 10, 2002

Project: Longhorn A.A.P.

Client Sample ID:	12WW12	Project:	STEP00202
Sample ID:	67560013	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	20-SEP-02 09:42		
Receive Date:	21-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 09/26/02	1932	203834	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID:	12WW17	Project:	STEP00202
Sample ID:	67560014	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	20-SEP-02 11:21		
Receive Date:	21-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 09/26/02	1942	203834	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	12WW13	Project:	STEP00202
Sample ID:	67560015	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	20-SEP-02 10:36		
Receive Date:	21-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Reason	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	u	1.45	4.00	ug/L	1	MAR1 09/26/02	1952	203834	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 12WW11
Sample ID: 67560016
Matrix: Ground Water
Collect Date: 20-SEP-02 16:36
Receive Date: 21-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR109/26/02	2002	203834	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by _____

038297

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17WW07	Project:	STEP00202
Sample ID:	67560017	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	20-SEP-02 08:40		
Receive Date:	21-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MARI 09/26/02	2012	203834	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: October 10, 2002

Project: Longhorn A.A.P.

Client Sample ID:	17WW08	Project:	STEP00202
Sample ID:	67560018	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	20-SEP-02 09:50		
Receive Date:	21-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev 2 Wd	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	LA	1.45	4.00	ug/L	1	MAR1	09/26/02	2023	203834	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038299

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17WW13	Project:	STEP00202
Sample ID:	67560019	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	20-SEP-02 11:00		
Receive Date:	21-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1	09/26/02	2053	203834	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17WW06	Project:	STEP00202
Sample ID:	67560020	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	20-SEP-02 12:10		
Receive Date:	21-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		247000	5810	16000	ug/L	4000	MAR1 10/08/02	1825	203834	3

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	
3	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038301

Reviewer: Kitchings Date: 10/15

Project: Longhorn AAP SDG: 67560 Matrix/No. Samples: W-20

I.	**Sample Management**			
A.	**Sample Preservation, Handling and Transport**			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 6°C.			
B.	**Chain of Custody**			
	1. Were all samples properly recorded on COCs? 17WW120D on C-O-C 17WW12D on container.	Yes	(No)	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
C.	**Holding Times**			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED

12WW18 - 46WW04 9/19

12WW05 - 17WW06 9/20

PREPPED/ANALYZED

12WW18 - 17WW11 10/3 batch 203833

17WW130 10/8

12WW05 9/26 batch 203834

17WW06 10/8

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)?	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%?	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)?	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

9/26

ICV @ 12:53 46.76/50 = 93.5

CCV @ 18:42 103%

@ 20:33 25.56/25 = 102.2

@ 22:37 77.19/75 = 102.9

@ 00:18 101%

10/8

ICV @ 51.47/50 = 102.9

CCV @ 17:27 27.31/25 = 109.2

CC @ 19:22 110%

10/3

ICV @ 14:31 100%

CCV @ 15:11 25.70/25 = 102.8

@ 17:12 106%

@ 19:13 99%

@ 20:54 75.30/75 = 100.4

@ 00:26 80.74/75 = 107.7

@ 01:21 103%

9/26 R^2 @ > 0.999

10/8 R^2 @ > 0.998

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038302

Reviewer: Kitchings Date: 10/15

Project: Longhorn AAP SDG: 67560 Matrix/No. Samples: W-20

III. Blanks			
1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	No	N/A
2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

306145 MB 10/3 @ nondet.

10/3 ICB @ zero.
CCBs - all nondetects

306146 MB 9/26 @ nondet.

10/8 ICB @ 0
CCBs - nondetects

9/26 ICB 9/26 @13:03 -0
all CCBs @ nondetect.

IV. Instrument Performance Check Sample (IPC)			
1. Was the ~~ICP~~ IPC sample run at the beginning and end of each sample analysis run?	Yes	No	N/A
2. Is the IPC %R within 80-120% acceptable control limits?	Yes	No	N/A
3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

IPC 9/26 $\frac{25.25}{25}$ = 101%

IPC 10/3 $\frac{25.24}{25}$ = 101%

IPC 10/8 $\frac{26.63}{25}$ = 106.5

V. Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	N/A
2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

LCS 306145 10/3 $\frac{52.2}{50}$ = 104.4

LCS 306153 9/26 $\frac{50.8}{50}$ = 101.6

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038303

Reviewer: Kitchings Date: 10/15

Project: Longhorn AAP SDG: 67560 Matrix/No. Samples: W-20

VI. Duplicates			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

306140 6756001 DUP both w's
10/3

306147 67560019 DUP both w's.
9/26

VII. Matrix Spike			
1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
2. Were spike recoveries within laboratory established limits ~~(56-149%)~~ 83-123; are RPDs within limits (20%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

6756001 10/3: 10.2/10 = 102%; 10.9/10 = 109%. RPD .7/10.55 = 6.6% ✓

67560019 9/26: 9.56/10 = 95.6; 11.00/10 = 110.0. RPD = 1.44/10.28 = 14.0% ✓

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038304

Reviewer: Kitchings Date: 10/15

Project: Longhorn AAP SDG: 67560 Matrix/No. Samples: W-20

VIII. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	(Yes)	No	N/A
2. Were correct calculations used to determine sample results?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

17WW130 67560009 18836(.001575)+.8726 30500
df 1000 = 30.539(1000) = 30539.3 ✓

17WW06 67560020 247000
df 4000 38636(.001575)+.8726
= 61.724(4000) = 246,897 ✓

IX. Field QC			
1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	(Yes)	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: ORIG FD
17WW128 ✓ 17WW120D
U U

X. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A

Comments/Qualifications:

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(divider page)

SDG: 67641 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water-18

Validation Samples: Validation Samples: 29WW11 16WW31 16WW34 16WW24
16WW28 LHSMW56 LHSMW60 (IX) 29WW16 16WW32 16WW27 16WW24D
105 47WW27 (IX) 18WMW120 29WW14 16WW33 16WW23 16WW37

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	X	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	A	
11.	Field QC Samples	A	
12.	Overall Assessment	X	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 67641 Method: Perchlorate EPA 314.0

Qualifications:

5b. Sample 16WW33 had the result qualified as "J" due to a high recovery in the CCV (10/12 @ 18:11).

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as qualified.

Date: 10/19/2002

Validator's Signature: J. Thomas Kellogg

Peer Reviewer: _____

Page: 3 of 4
Project #: LHAAP
GEL Quote #:
COC Number [1]:
LIMS Number:

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONGHORN ARMY AMMUNITION PLANT

Client Name: STEP, INC Phone #: (865) 481-7837 Fax #: (865) 481-0290

Address: 1006 FLOYD CULLER COURT, OAK RIDGE, TN 37830

Collected by: D. BLANK / R. SHERLES Send Results To: DOUG HAWN

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Field Sample ID 67641 %	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mmm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code [1]	Field Filtered [3]	Sample Matrix [4]	Total Number of Containers	PERCHLORATE											Remarks
105	NO	9-21-02	14:56	N/A	N	N	GW	1	1											
LHSMW56	"	"	13:49	N/A	N	N	GW	1	1											
47WW27	"	"	10:33	N/A	N	N	GW	1	1											
LHSMW60	"	"	11:22	N/A	N	N	GW	1	1											
18WWMW120	"	9-22-02	18:57	N/A	N	N	GW	1	1											
29WW11	"	"	10:40	N/A	N	N	GW	1	1											
29WW116	"	"	08:36	N/A	N	N	GW	1	1											
29WW14	"	"	15:35	N/A	N	N	GW	1	1											
16WW31	"	"	08:20	N/A	N	N	GW	1	1											
16WW32	"	"	09:45	N/A	N	N	GW	1	1											
16WW33	"	"	11:00	N/A	N	N	GW	1	1											

TAT Requested: X Normal: X Rush: _____ (Subject to Surcharge) Fax Results: (Yes) / No Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)

FEDEX # 8348 4005 5675

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
Robert Sherles	9-22-02	19:30	1.		
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab: _____ Shipped: _____
Method of Shipment: _____ Airbill #: _____
Analytical Lab: _____ Location: _____
Lab Recipient: [signature] Date: 9-24-02 Time: 0900

For Lab Receiving Use Only
Custody Seal Intact? (YES) NO
Cooler Temp: 21 °C

1.) Chain of Custody Number = Client Determined
2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
4.) Matrix Codes: DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

038508

Page: 4 of 4
Project #: LHAAP
GEL Quote #:
COC Number [1]:
LIMS Number

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONG HORN ARMY AMM. PLANT

Client Name: STEP, INC Phone #: (865) 481-7837 Fax #: (865) 481-0290

Address: 1006 FLOYD CULLER CT, OAK RIDGE, TN 37830

Collected by: R. SHERLES / D. BLANK Send Results To: DOUG HAWK

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Field Sample ID 67641 %	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Total Number of Containers	PERCHLORATE	Remarks
16WW34	NO	9-22-02	11:58	N/A	N	N	GW	1	1	
16WW27	"	"	14:30	N/A	N	N	GW	1	1	
16WW28	"	"	15:25	N/A	N	N	GW	1	1	
16WW28D	"	"	15:25	N/A	FD	N	GW	1	1	DUPLICATE SAMPLE
16WW28M	"	"	15:25	N/A	MS	N	GW	1	1	MATRIX SAMPLE
16WW23	"	"	16:25	N/A	N	N	GW	1	1	
16WW24	"	"	17:30	N/A	N	N	GW	1	1	
16WW24D	"	"	17:30	N/A	FD	N	GW	1	1	
16WW37	"	"	18:30	N/A	N	N	GW	1	1	
		Robert Sherles 9-22-02								

TAT Requested: X Normal: X Rush: _____ (Subject to Surcharge)

Fax Results: (Yes) / No

Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)

FEDEX # 8348 4005 5675

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
Robert Sherles	9-22-02	19:30	1.		
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab. _____ Shipped: _____

Method of Shipment: _____ Airbill #: _____

Analytical Lab: _____ Location: _____

Lab Recipient: Mike Sanders Date 9-24-02 Time: 0800

For Lab Receiving Use Only

Custody Seal Intact? (YES) NO

Cooler T 21

1) Chain of Custody Number = Client Determined

2) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered

4) Matrix Codes: DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste

5.) Sample Analysis Req: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3 6010B/7470A - 1)

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

038309

038310

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16WW28	Project:	STEP00202
Sample ID:	67641001	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	22-SEP-02 15:25		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00	29.0	80.0	ug/L	20	MAR1 10/12/02	1650	204634	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	105	Project:	STEP00202
Sample ID:	67641002	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 14:56		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR110/12/02	1730	204634	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

038312

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	LHSMW56	Project:	STEP00202
Sample ID:	67641003	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 13:49		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/12/02	1740	204634	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID:	47WW27	Project:	STEP00202
Sample ID:	67641004	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 10:33		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		368		29.0	80.0	ug/L	20	MAR1 10/14/02	1337	204634	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
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< Actual result is less than amount reported
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID:	LHSMW60	Project:	STEP00202
Sample ID:	67641005	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 11:22		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		72100		7260	20000	ug/L	5000	MAR1 10/14/02	1347	204634	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn

Project: Longhorn A.A.P.

Client Sample ID:	18WWMW120	Project:	STEP00202
Sample ID:	67641006	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	22-SEP-02 18:57		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/12/02	1831	204634	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29WW11	Project:	STEP00202
Sample ID:	67641007	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	22-SEP-02 10:40		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate	U	0.00 U	29.0	80.0	ug/L	20	MAR1 10/12/02	1841	204634	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29WW116	Project:	STEP00202
Sample ID:	67641008	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	22-SEP-02 08:36		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		1830	145	400	ug/L	100	MAR1 10/14/02	1357	204634	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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Reviewed by

038318

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29WW14	Project:	STEP00202
Sample ID:	67641009	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	22-SEP-02 15:35		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MARI 10/12/02	1901	204634	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longborn A.A.P.

Page 1 of 1

Client Sample ID:	16WW31	Project:	STEP00202
Sample ID:	67641010	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	22-SEP-02 08:20		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR110/12/02	1911	204634	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID:	16WW32	Project:	STEP00202
Sample ID:	67641011	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	22-SEP-02 09:45		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MARI 10/12/02	1921	204634	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
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H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038321

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16WW33	Project:	STEP00202
Sample ID:	67641012	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	22-SEP-02 11:00		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Revised	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	J	2.76	J 56	1.45	4.00	ug/L	1	MAR1	10/12/02	1931	204634	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16WW34	Project:	STEP00202
Sample ID:	67641013	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	22-SEP-02 11:58		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/12/02	1941	204634	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 16WW27
Sample ID: 67641014
Matrix: Ground Water
Collect Date: 22-SEP-02 14:30
Receive Date: 24-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR1 10/12/02	1952	204634	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16WW23	Project:	STEP00202
Sample ID:	67641015	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	22-SEP-02 16:25		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	M	29.0	80.0	ug/L	20	MAR1 10/12/02	2002	204634	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16WW24	Project:	STEP00202
Sample ID:	67641016	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	22-SEP-02 17:30		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MARI 10/12/02	2032	204634	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

038326

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16WW24D	Project:	STEP00202
Sample ID:	67641017	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	22-SEP-02 17:30		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR1 10/12/02	2042	204634	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16WW37	Project:	STEP00202
Sample ID:	67641018	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	22-SEP-02 18:30		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR110/12/02	2052	204634	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
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Reviewed by

038328

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/17

Project: Longhorn AAP SDG: 67641 Matrix/No. Samples: W-18

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 2.1 °C.			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED **PREPPED/ANALYZED**

9/21, 9/22 10/12 batch 204634

1004 47WW27 10/14
1005 LH SMW60 10/14
1008 24WW116 10/14

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)?	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%?	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)?	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: CCV 10/12 @ 16:10 82.52/75 = 110.0

1 CAL
R^2 @ 0.99
10/11 @ 12:59

@ 18:11 — high @ 130% →

16WW33 - J

@ 20:12 76.71/75 = 102.0

@ 21:32 25.2/25 = 100.8

CCV 10/14 @ 13:17 = 75.07/75 = 100.0

@ 14:07 = 26.08/25 = 104.3

038329

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/17

Project: Longhorn AAP SDG: 67641 Matrix/No. Samples: W-18

III. Blanks			
1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

308054 MB@10/12 @ u

IV. Instrument Performance Check Sample (IPC)			
1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: IPC 10/11 @ 1:19 $\frac{22.59}{25} = 90.4$.

V. Laboratory Control Sample (LCS)			
1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

308061 LCS $\frac{52.0}{50} = 104\%$

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038330

Reviewer: Kitchings Date: 10/17

Project: Longhorn AAP SDG: 67641 Matrix/No. Samples: W-18

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

641001 DUP - u / u
641018 DUP - u / u

ICB } all u's,
CCB }

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	Yes	(No)	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

641001 $\frac{10.0}{10.0} = 100\%$

RPD $\frac{.39}{9.805}$

$\frac{9.61}{10.0} = 96.1\%$

308058 23.2
641018 28.6 } high matrix interfer. Samp had to be diluted

LCS-ok - no qual.

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038331

Reviewer: Kitchings Date: 10/17

Project: Longhorn AAP SDG: 67641 Matrix/No. Samples: W48

VIII. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	(Yes)	No	N/A
2. Were correct calculations used to determine sample results?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

47WW27 JMD
641004 = ~~345278~~ / ~~130185~~ = 19117 = 368
df = 20
.0009458
+ .3078
= ~~123.437~~ 18.389(20) = 367.8

29WW116
641008
df 100
1830
19065
.0009458
+ .3078
18.339(100) = 1833.9

IX. Field QC			
1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	(Yes)	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	(No)	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: same as the Dupl.

16WW28 16WW28D 16WW24 16WW24D
U U's U U

X. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A

Comments/Qualifications:

038332

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(divider page)

038333

SDG: 67663 Project: Longhorn AAP

Method: Volatiles - 8260B Matrix/No. Samples: Water - 2

Validation Samples: 16SW01
18DW14

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	GC/MS Tune/Inst Perf	A	
5.	Calibrations	A	
6.	Blanks	A	
7.	Blank Spike/LCS	A	
8.	Matrix Spike	A	
9.	Surrogates	A	
10.	Internal Standards	A	
11.	Compound Identification	X	
12.	System Performance	A	
13.	Field QC Samples	A	
14.	Overall Assessment	X	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 67663 Method: Volatiles

Qualifications:

JM in 165W01

16 • 1,2-dichloroethylene (total) and trichloroethylene had results that exceeded the instrument calibration limit – a dilution was analyzed and the results were acceptable – the original values were rejected in favor of the dilution results.

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as qualified.

Validator's Signature: J. Thomas Kitchings Date: 10/20/2002

Peer Reviewer: _____ Date: _____

Page: 1 of 1
Project #: LHAAP
GEL Quote #:
COC Number [1]:
LIMS Number:

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONG HORN ARMY AMM. PLANT

Client Name: STEP, INC Phone #: (865)481-7837 Fax #: (865)481-0290

Address: 1006 FLOYD COLLIER COURT, OAK RIDGE, TN 37830

Collected by: D. BLANK / R. SHERLES Send Results To: DOUG HAWK

Sample Analysis Requested [5] (Fill in the number of containers for each test)

	Unique Sample ID	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mmm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Total Number of Containers	PERCHLORATE	CORROSIVITY	IGNITABILITY	REACTIVITY	TCLP METALS	H_2S REACTIVITY	TCLP VOA	VOA					Remarks
	~~16766~~ 16766																					
1	50DS01	NO	9-23-02	17:30	N/A	N	N	SO	7	1	1	1	1	1	1	1						
10	16SW01	"	"	18:53	N/A	N	N	SW	3					(2) 9-23-02		3	3					
2	18PW14	"	"	18:30	N/A	N	N	SW	3								3					
3	TB01	"	"	—	N/A	TB	N	*O	3								3					LAB PROVIDED

Robert Blank 9-23-02

TAT Requested: X Normal: X Rush: _____ (Subject to Surcharge) Fax Results: (Yes) / No Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested) * OTHER - TRIP BLANK

FEDEX # 8348 4005 5539

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
Robert Blank	9-23-02	19:15	1.		
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab: _____ Shipped: _____
Method of Shipment: _____ Airbill #: _____
Analytical Lab: _____ Location: _____
Lab Recipient: Mike Lambert Date: 9-24-02 Time: 0900

1.) Chain of Custody Number = Client Determined
2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
4.) Matrix Codes: DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

For Lab Receiving Use Only
Custody Seal Intact? (YES) NO
Cooler Temp: 4° C

038335

5

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
16SW01

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 67663

Matrix: (soil/water) WATER Lab Sample ID: 67663001

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2C521

Level: (low/med) LOW Date Received: 09/24/02

% Moisture: not dec. _____ Date Analyzed: 09/27/02

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	Rev Qual	
74-87-3	Chloromethane	1.0	U	U	
75-01-4	Vinyl chloride	2.3			
74-83-9	Bromomethane	1.0	U	U	
75-00-3	Chloroethane	1.0	U	U	
75-35-4	1,1-Dichloroethylene	2.7			
67-64-1	Acetone	5.0	U	U	
75-15-0	Carbon disulfide	5.0	U		
75-09-2	Methylene chloride	5.0	U		
75-34-3	1,1-Dichloroethane	1.0	U		
78-93-3	2-Butanone	5.0	U		
540-59-0	1,2-Dichloroethylene (total)	109	E	R	16
67-66-3	Chloroform	1.0	U	U	
71-55-6	1,1,1-Trichloroethane	1.0	U		
56-23-5	Carbon tetrachloride	1.0	U		
107-06-2	1,2-Dichloroethane	12.8			
71-43-2	Benzene	1.5			
79-01-6	Trichloroethylene	719	E	R	16
78-87-5	1,2-Dichloropropane	1.0	U	U	
75-27-4	Bromodichloromethane	1.0	U		
10061-01-5	cis-1,3-Dichloropropylene	1.0	U		
108-10-1	4-Methyl-2-pentanone	5.0	U		
108-88-3	Toluene	1.0	U		
10061-02-6	trans-1,3-Dichloropropylene	1.0	U		
79-00-5	1,1,2-Trichloroethane	1.0	U		
591-78-6	2-Hexanone	5.0	U		
127-18-4	Tetrachloroethylene	1.0	U		
124-48-1	Dibromochloromethane	1.0	U		
108-90-7	Chlorobenzene	1.0	U		
100-41-4	Ethylbenzene	1.0	U		
87-61-6	Xylenes (total)	1.0	U		
100-42-5	Styrene	1.0	U		
75-25-2	Bromoform	1.0	U		
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U		

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
16SW01DL

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 67663

Matrix: (soil/water) WATER Lab Sample ID: 67663001

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2D119

Level: (low/med) LOW Date Received: 09/24/02

% Moisture: not dec. _____ Date Analyzed: 09/30/02

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 20.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	Rev Qual
74-87-3	Chloromethane	20.0	U	R
75-01-4	Vinyl chloride	20.0	U	
74-83-9	Bromomethane	20.0	U	
75-00-3	Chloroethane	20.0	U	
75-35-4	1,1-Dichloroethylene	20.0	U	
67-64-1	Acetone	100	U	
75-15-0	Carbon disulfide	100	U	
75-09-2	Methylene chloride	100	U	
75-34-3	1,1-Dichloroethane	20.0	U	
78-93-3	2-Butanone	100	U	R
540-59-0	1,2-Dichloroethylene (total)	187	D	
67-66-3	Chloroform	20.0	U	R
71-55-6	1,1,1-Trichloroethane	20.0	U	
56-23-5	Carbon tetrachloride	20.0	U	
107-06-2	1,2-Dichloroethane	10.6	DJ	R
71-43-2	Benzene	20.0	U	
79-01-6	Trichloroethylene	1090	D	
78-87-5	1,2-Dichloropropane	20.0	U	R
75-27-4	Bromodichloromethane	20.0	U	
10061-01-5	cis-1,3-Dichloropropylene	20.0	U	
108-10-1	4-Methyl-2-pentanone	100	U	
108-88-3	Toluene	20.0	U	
10061-02-6	trans-1,3-Dichloropropylene	20.0	U	
79-00-5	1,1,2-Trichloroethane	20.0	U	
591-78-6	2-Hexanone	100	U	
127-18-4	Tetrachloroethylene	20.0	U	
124-48-1	Dibromochloromethane	20.0	U	
108-90-7	Chlorobenzene	20.0	U	
100-41-4	Ethylbenzene	20.0	U	
87-61-6	Xylenes (total)	20.0	U	
100-42-5	Styrene	20.0	U	
75-25-2	Bromoform	20.0	U	
79-34-5	1,1,2,2-Tetrachloroethane	20.0	U	

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
18PW14

Lab Name: GENERAL ENGINEERING LABOR Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: 67663

Matrix: (soil/water) WATER Lab Sample ID: 67663002

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 2D118

Level: (low/med) LOW Date Received: 09/24/02

% Moisture: not dec. _____ Date Analyzed: 09/30/02

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	RevQual
74-87-3	Chloromethane	1.0	U	U
75-01-4	Vinyl chloride	1.0	U	
74-83-9	Bromomethane	1.0	U	
75-00-3	Chloroethane	1.0	U	
75-35-4	1,1-Dichloroethylene	1.0	U	
67-64-1	Acetone	5.1		
75-15-0	Carbon disulfide	7.0		
75-09-2	Methylene chloride	5.0	U	U
75-34-3	1,1-Dichloroethane	1.0	U	
78-93-3	2-Butanone	5.0	U	
540-59-0	1,2-Dichloroethylene (total)	1.0	U	
67-66-3	Chloroform	1.0	U	
71-55-6	1,1,1-Trichloroethane	1.0	U	
56-23-5	Carbon tetrachloride	1.0	U	
107-06-2	1,2-Dichloroethane	1.0	U	
71-43-2	Benzene	1.0	U	
79-01-6	Trichloroethylene	1.0	U	
78-87-5	1,2-Dichloropropane	1.0	U	
75-27-4	Bromodichloromethane	1.0	U	
10061-01-5	cis-1,3-Dichloropropylene	1.0	U	
108-10-1	4-Methyl-2-pentanone	5.0	U	U
108-88-3	Toluene	0.40	J	J
10061-02-6	trans-1,3-Dichloropropylene	1.0	U	U
79-00-5	1,1,2-Trichloroethane	1.0	U	
591-78-6	2-Hexanone	5.0	U	
127-18-4	Tetrachloroethylene	1.0	U	
124-48-1	Dibromochloromethane	1.0	U	
108-90-7	Chlorobenzene	1.0	U	
100-41-4	Ethylbenzene	1.0	U	
87-61-6	Xylenes (total)	1.0	U	
100-42-5	Styrene	1.0	U	
75-25-2	Bromoform	1.0	U	
79-34-5	1,1,2,2-Tetrachloroethane	1.0	U	

038339

DATA VALIDATION WORKSHEETS
VOLATILE ORGANICS

Reviewer: Kitchings Date: 10/20

Project: Longhorn AAP SDG: 62663 Matrix/No. Samples: W-2

I.	**Technical Holding Times**			
	A. Sample Preservation, Handling and Transport			
	1. Have all samples been preserved correctly?	(Yes)	No	N/A
	2. Have sample temperatures been kept at 4° C (+ or - 2 °)?	(Yes)	No	N/A
	3. Were all samples received in proper condition?	(Yes)	No	N/A
	4. Were any qualifications required based on this information?	Yes	(No)	N/A
	Coolers @ $4^{0}C$.			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples extracted and analyzed within acceptable holding times?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED	PREPPED	ANALYZED
9/23	16SW01	9/27
	18PW14	9/30 dilution
	16SW01DL	

II.	**GC/MS Instrument Performance Check**			
	1. Were instrument performance check samples run for each analysis period?	(Yes)	No	N/A
	2. Were ion abundance criteria met for bromoflourobenzene (BFB) analysis?	(Yes)	No	N/A
	3. Do laboratory forms match raw data?	Yes	No	(N/A)
	4. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICAL 9/20 95 base.
$96 = \frac{6798}{93184} = 7.3\%$
5-9% of 95

CCAL 9/27 @ 6:01 95 base
$50 = \frac{18880}{125768} = 15.0$
15-40 of 95

CCAL 9/30 @ 13:55 95 base.
$174 = \frac{327360}{390208} = 83.9\%$
50-100% of 95

038340

DATA VALIDATION WORKSHEETS
VOLATILE ORGANICS

Reviewer: Kitchings **Date:** 10/20

Project: Longhorn AAP **SDG:** G7663 **Matrix/No. Samples:** W-2

III.	Initial Calibration			
	1. Were correct concentrations of standards used for initial calibration? Were samples analyzed within 12 hours of associated instrument performance check?	Yes	No	N/A
	2. Were initial calibration RRFs for all volatile target compounds and system monitoring compounds >or = 0.05? Do recalculations for RRFs agree with reported values?	Yes	No	N/A
	3. Were %RSDs < or = 30% for all volatile target compounds? Do recalculations for RSDs agree with reported values?	Yes	No	N/A
	4. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

ICAL R^2 @ >0.99

RSDs @ <15% ✓

all RRFs @ >0.05 ✓

Bromomethane 0.153, 0.137, 0.155, 0.159, 0.159, 0.147 → 0.900 / 6 = .152

.00023, 1, 5, 5, 3 → $\sqrt{.00037}$ / 5 = .00860

.00860 / .152 = 5.7% ✓

IV.	Continuing Calibration			
	1. Were continuing calibration samples run at the required frequency, and compared to the correct initial calibration?	Yes	No	N/A
	2. Did calculations from raw data agree with laboratory reported values for RRF and %D?	Yes	No	N/A
	3. Were continuing calibration RRFs for volatile organic compounds and system monitoring compounds (surrogates) > or = 0.05?	Yes	No	N/A
	4. Were %D between initial calibration RRF and the continuing calibration RRFs within + or - 25%?	Yes	No	N/A
	5. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

CCAL 9/27

16SW01

all target %D's @ <20% ✓

Carbon disulf. $\frac{.593 - .576}{.593} = 2.9\%$ ✓

CCAL 9/30

18PW14 / 16SW01DL

all targets @ <

Benzene $\frac{.875 - .794}{.875} = 9.3\%$ ✓

Ethylb. $\frac{1.371 - 1.344}{1.371} = 2\%$ ✓

TCE $\frac{.234 - .216}{.234_2} = 7.7\%$ ✓

DATA VALIDATION WORKSHEETS
VOLATILE ORGANICS

Reviewer: Kitchings Date: 10/20

Project: Longhorn AAP SDG: 67663 Matrix/No. Samples: W-2

V.	Blanks			
	1. Were any target or non-target compounds reported in laboratory prep or calibration blanks?	Yes	No	N/A
	2. Were method blank analyses performed at required frequency, and for each GC/MS system used to analyze samples for each type of analysis (i.e., matrix)?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications: VBLK01 9/27 VBLK02 9/30
165W01 18PW14
165W01DL
U's. U's

VI.	System Monitoring Compounds (Surrogate Spikes)			
	1. Were laboratory surrogate recoveries calculated and reported correctly?	Yes	No	N/A
	2. Were surrogate recoveries within acceptable limits?	Yes	No	N/A
	3. Were any qualifications required based on surrogate spike QC information?	Yes	No	N/A

Comments/Qualifications:
165W01 132, 115, 126
18PW14 128, 113, 122
165W01DL 125, 114, 122

VII.	Matrix Spikes/Matrix Spike Duplicates			
	1. Were MS/MSD samples analyzed at required frequency for each ample matrix?	Yes	No	N/A
	2. Were MS/MSD results for recovery and RPD within advisory limits?	Yes	No	N/A
	3. Were Samples used for MS/MSD field blanks?	Yes	No	N/A
	4. Were laboratory reported results correctly calculated from raw data?	Yes	No	N/A
	5. Were any qualifications required, based on results of MS/MSD samples in conjunction with other QC information?	Yes	No	N/A

Comments/Qualifications:
18PW14 Toluene. $\frac{46.4 - 0.4}{50} = 92\%$

$\frac{46.6 - 0.4}{50} = 92.4\%$

RPD $\frac{.2}{46.1} = 0.4\%$

DATA VALIDATION WORKSHEETS
VOLATILE ORGANICS

Reviewer: Kitchings **Date:** 10/20

Project: Longhorn AAP **SDG:** 67463 **Matrix/No. Samples:** W-2

VIII. Laboratory Control Sample (LCS)			
1. Were LCS samples run at correct frequency for each matrix samples?	(Yes)	No	N/A
2. Were LCS calculations performed correctly, and did laboratory reported values match raw data? Were recoveries within laboratory QC limits?	(Yes)	No	N/A
4. Were any qualifications required based on LCS data in conjunction with other QC information?	Yes	(No)	N/A

Comments/Qualifications:

VBLK01 1,1-dcethene. 44.4/50 = 88.8 %

VBLK02 chlorob 48.9/50 = 97.8 %

IX. Internal Standards			
1. Were standard area counts within a factor of two (-50% to +100%) from associated calibration standard?	(Yes)	No	N/A
2. Were retention times of internal standard within + or - 30 seconds of retention time of associated calibration check?	(Yes)	No	N/A
3. Were any qualifications required based on internal standard results?	Yes	(No)	N/A

Comments/Qualifications:

16SW01

IS 1 = 2346266/2952487 = 81.2 % 10.80/10.80

2 = 1836108/2150916 = 85.4 % 14.11/14.11

3 = 986083/1111778 = 88.7 % 16.60/16.60

X. Target Compound Identification			
1. Are relative retention times (RRTs) within + or - 0.06 RRT units of standard RRT?	(Yes)	No	N/A
2. Do sample compound spectra meet specified criteria in relation to laboratory standard spectra?	(Yes)	No	N/A
3. Were all compounds accounted for on chromatogram?	(Yes)	No	N/A

Comments/Qualifications:

		SMP RT	STD
18PW14	Acet.	7.404	7.382
	Carb. disulf.	7.880	7.874
	Toluene	12.592	12.592

DATA VALIDATION WORKSHEETS
VOLATILE ORGANICS

Reviewer: Kitchings Date: 10/20

Project: Longhorn AAP SDG: 67663 Matrix/No. Samples: W-2

XI. Compound Quantitation and Reported Contract Required Quantitation Limits (CRQLs)			
1. Were sample results correctly calculated and reported by laboratory?	(Yes)	No	N/A
2. Were correct internal standard quantitation ion and RRF used to quantify all compounds for all samples?	(Yes)	No	N/A
3. Were CRQLs adjusted to reflect sample dilutions and dry weight factors not accounted for by the method?	(Yes)	No	N/A
4. Were any laboratory QA/QC sample results calculated from peaks derived using manual integration?	Yes	(No)	N/A
5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

18PW14 Acet. @ 5.095 – 5.1

Carbon disulf. @ 7.049 \ 7.0

Toluene @ 0.398 \ 0.4

XII. Field QC			
1. Were any Field Duplicates associated with this SDG?	Yes	(No)	N/A
a. If Yes, were RPDs acceptable (50% for water samples, 100% for soil samples)?	Yes	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	(Yes)	No	N/A
a. If yes, were any compounds reported in samples >IDL?	Yes	(No)	N/A
b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

TB01 9/27
– all nondetects

XIII. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A

Comments/Qualifications:

038344

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(divider page)

038345

SDG: 67725 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 11

Validation Samples: Validation Samples: 29WW08 16PW04
16PW10 16PW05 16PW06 18PW29 18PW27
16PW07 16PW11 29WW06 18PW30

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 67725 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Date: 10/16/2002

Validator's Signature: J. Thomas Kitchings

Peer Reviewer:

Page: 4 of 4
Project #: LHAAP
GEL Quote #:
COC Number [1]:
LIMS Number:

GEL Chain of Custody and Analytical Request

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2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONGHORN ARMY AMM PLANT

Client Name: STEP, INC Phone # (865) 481-7837 Fax (865) 481-0290

Address: 1006 FLOYD CULLER CT, OAK RIDGE, TN 37830

Collected by: D. BLANK / R. SHERLES Send Results To: DOUG HAWLEY

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Field Sample ID (67724 / 67725)	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mmm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Total Number of Containers	PERCHLORATE	Remarks
16PW09	NO	9-24-02	15:00	N/A	N	N	SW	1	1	
16PW08	"	"	15:11	N/A	N	N	SW	1	1	
16PW07	"	"	15:15	N/A	N	N	SW	1	1	
16PW05	"	"	15:22	N/A	N	N	SW	1	1	
16PW11	"	"	14:45	N/A	N	N	SW	1	1	
16PW10	"	"	14:50	N/A	N	N	SW	1	1	
16PW10M	"	"	14:50	N/A	MS	N	SW	1	1	MATRIX SAMPLE
16PW10D	"	"	14:50	N/A	FD	N	SW	1	1	DUPLICATE SAMPLE
16PW06	"	"	15:18	N/A	N	N	SW	1	1	
29WW06	"	"	17:20	N/A	N	N	GW	1	1	
29WW08	"	"	17:41	N/A	N	N	GW	1	1	

TAT Requested: X Normal: X Rush: _____ (Subject to Surcharge) Fax Results: (Yes) / No Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)

FEDEX # 8348 4005 5414

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1. Robert Sherles	9-24-02	19:15	1. J M Hawley	9/25/02	0930
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab.: _____ Shipped: _____
Method of Shipment: _____ Airbill #: _____
Analytical Lab: _____ Location: _____
Lab Recipient: _____ Date: _____ Time: _____

1.) Chain of Custody Number = Client Determined
2.) QC Codes N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3.) Field Filtered For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered
4.) Matrix Codes DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1)

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

For Lab Receiving Use Only
Custody Seal Intact? YES / NO
Cooler Temp: 5 °C

C38347

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Page: 4 of 4
Project #: LHAAP
GEL Quote #:
COC Number [1]:
LIMS Number:

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONGHORN ARMY AMM. PLANT

Client Name: STEP, INC Phone #(865) 481-7837 Fax #(865) 481-0290

Address: 1006 FLOYD CULLER CT, OAK RIDGE, TN 37830

Collected by: D. BLANK / R. SHERLES Send Results To: DOUGHAWN

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Field Sample ID 67725	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Total Number of Containers	PERCHLORATE										Remarks
18PW29	NO	9-24-02	17:29	N/A	N	N	SW	1	1										
18PW30	"	"	17:33	N/A	N	N	SW	1	1										
16PW04	"	"	16:55	N/A	N	N	SW	1	1										
18PW27	"	"	17:20	N/A	N	N	SW	1	1										

Robert Sherles 9-24-02

TAT Requested: X Normal: X Rush: _____ (Subject to Surcharge) Fax Results: (Yes) / No Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)

FEDEX # 8348 4005 5414

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
Robert Sherles	9-24-02	19:15	1.		
2			2.		
3			3		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab: _____ Shipped: _____

Method of Shipment: _____ Airbill #: _____

Analytical Lab: _____ Location: _____

Lab Recipient: J Mt Haley Date: 9/25/02 Time: 0930

For Lab Receiving Use Only

Custody Seal Intact? (YES) NO

Cooler Temp: 2C

1) Chain of Custody Number = Client Determined

2) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered

4) Matrix Codes: DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste

5) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1)

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

0383648

8

As reptd.

038349

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Page 1 of 1

Client Sample ID:	16PW10	Project:	STEP00202
Sample ID:	67725001	Client ID:	STEP001
Matrix:	Water		
Collect Date:	24-SEP-02 14:50		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	72.6	200	ug/L	50	MAR1 10/15/02	0251	206655	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID:	16PW07	Project:	STEP00202
Sample ID:	67725002	Client ID:	STEP001
Matrix:	Water		
Collect Date:	24-SEP-02 15:15		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	72.6	200	ug/L	50	MAR1 10/15/02	0352	206655	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038351

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 16PW05
Sample ID: 67725003
Matrix: Water
Collect Date: 24-SEP-02 15:22
Receive Date: 25-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	72.6	200	ug/L	50	MARI 10/15/02	0402	206655	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
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UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 16PW11
Sample ID: 67725004
Matrix: Water
Collect Date: 24-SEP-02 14:45
Receive Date: 25-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	72.6	200	ug/L	50	MAR1 10/15/02	0412	206655	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
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UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID:	16PW06	Project:	STEP00202
Sample ID:	67725005	Client ID:	STEP001
Matrix:	Water		
Collect Date:	24-SEP-02 15:18		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	72.6	200	ug/L	50	MAR1 10/15/02	0422	206655	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
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H Holding time exceeded
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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID:	29WW06	Project:	STEP00202
Sample ID:	67725006	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	24-SEP-02 17:20		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		2950		72.6	200	ug/L	50	MAR1 10/15/02	0432	206655	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
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UI Uncertain identification for gamma spectroscopy.
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Reviewed by A. f m. Byd

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID:	29WW08	Project:	STEP00202
Sample ID:	67725007	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	24-SEP-02 17:41		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	72.6	200	ug/L	50	MAR1 10/15/02	0442	206655	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
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X Lab-specific qualifier - must be fully described in case narrative and data summary package
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID: 18PW29
Sample ID: 67725008
Matrix: Water
Collect Date: 24-SEP-02 17:29
Receive Date: 25-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RwQual	DL	RL	Units	Df	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	72.6	200	ug/L	50	MAR1 10/15/02	0452	206655	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: October 15, 2002

Project: Longhorn A.A.P.

Client Sample ID:	18PW30	Project:	STEP00202
Sample ID:	67725009	Client ID:	STEP001
Matrix:	Water		
Collect Date:	24-SEP-02 17:33		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Q ual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	72.6	200	ug/L	50	MAR1 10/15/02	0502	206655	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
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U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038358

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn

Project: Longhorn A.A.P.

Client Sample ID:	16PW04	Project:	STEP00202
Sample ID:	67725010	Client ID:	STEP001
Matrix:	Water		
Collect Date:	24-SEP-02 16:55		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	72.6	200	ug/L	50	MAR1 10/15/02	0512	206655	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 18PW27
Sample ID: 67725011
Matrix: Water
Collect Date: 24-SEP-02 17:20
Receive Date: 25-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	72.6	200	ug/L	50	MAR1 10/15/02	0543	206655	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
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Reviewed by

038360

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/16

Project: Longhorn AAP SDG: 67725 Matrix/No. Samples: 10-11

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 2°C.			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED 9/24

PREPPED/ANALYZED 10/15

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)?	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%?	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)?	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICV 48.28/50 = 96.6

CCVS 1:31 94%

3:32 77.33/75 = 103.1

5:22 97%

6:23 101%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038361

Reviewer: Kitchings **Date:** 10/16

Project: Longhorn AAP **SDG:** 67725 **Matrix/No. Samples:** W-11

III.	**Blanks**			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	(No)	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICB @ zero MB @ U

CCB's @ zero 312726

IV.	**Instrument Performance Check Sample (IPC)**			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

10/14-15 ICP 20.18 $\frac{23.87}{25} = 95.5$

V.	**Laboratory Control Sample (LCS)**			
	1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
	2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

LCS 312733 $\frac{48.2}{50.0} = 96.4$

038362

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/16

Project: Longhorn AAP SDG: 67726 Matrix/No. Samples: W-11

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 312727 312728
U U

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

725001 81%
63%
RPD @ 25
- LCS w/in limits
- no quals.

725011
10.2/10.0 = 102%
RPD @ 3%.
10.2/10.0 = 102%

038363

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/16

Project: Longhorn AAP SDG: 67725 Matrix/No. Samples: 6-11

X.	**Sample Result Qualification** Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	(Yes)	No	N/A
	2. Were correct calculations used to determine sample results?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

29WW06

725006 df 50 61983 2950

.0009458+.3078

= 58.93 (50) = 2946.6

XI.	**Field QC**			
	1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	(Yes)	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	(No)	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: same as dupl. ← 16PW10 16PW10D

U U

XII.	**Overall Assessment of Data**			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A

Comments/Qualifications:

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(divider page)

038365

SDG: 67724 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 2

Validation Samples: Validation Samples: 16PW09
16PW08

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	A	
11.	Field QC Samples	N/A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 67724 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Date: 10/16/2002

Validator's Signature: J. Thomas Kitchens

Peer Reviewer:

As rpt

038367

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID:	16PW09	Project:	STEP00202
Sample ID:	67724001	Client ID:	STEP001
Matrix:	Water		
Collect Date:	24-SEP-02 15:00		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MARJ 10/14/02	1226	204641	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID: 16PW08
Sample ID: 67724002
Matrix: Ground Water
Collect Date: 24-SEP-02 15:11
Receive Date: 25-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR110/12/02	1338	204641	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038369

Reviewer: Kitchings Date: 10/16

Project: Longhorn AAP SDG: 67724 Matrix/No. Samples: W-2

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 2°C.			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

	SAMPLED	PREPPED/ANALYZED
16PW09	9/24	10/14
16PW08	9/24	10/12

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)?	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%?	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)?	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: ICV 10/11 @ 00:59 93%

CCV @ 1:49 73.41/75 = 97.5

10/12 @ 10:26 103%

12:27 79.98/75 = 106.6

14:29 26.47/25 = 105.9

038370

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 10/16

Project: Longhorn AAP **SDG:** 67724 **Matrix/No. Samples:** W-2

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	No	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications: ICB 10/11 @ 1:09 - zero.

10/12 12:37 - zero

14:39 - zero

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	Yes	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	Yes	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications: IPC 22.59/25 = 90.4

10/11 @ 1:19

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	Yes	No	N/A
	2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

308090 LCS $\frac{51.4}{50.0} = 102.8$

038371

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 10/16

Project: Longhorn AAP **SDG:** 67724 **Matrix/No. Samples:** W-2

VI.	**Duplicates**			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 650001 67001

24600 23500 U U

$-\frac{1100}{24050} = 4.6\%$

VII.	**Matrix Spike**			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

650001

226 12.3 = / 10.0 = 103%

24.3 12.3 / 10.0 120%

RPD @ ~~2810~~ $\frac{1.7}{11.15} = 15.2\%$

67787001

@ 39, 36%

LCS-bk

-no quals.

038372

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/16

Project: Longhorn AAP SDG: 67724 Matrix/No. Samples: W-2

X. Sample Result Qualification Not Required For Level III Data Validation			
1. Were sample results reported by laboratory supported by raw data?	Yes	No	N/A
2. Were correct calculations used to determine sample results?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A
Comments/Qualifications: both smps @ ND			
XI. Field QC			
1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
b. Were any qualifications required based on this information?	Yes	No	N/A
Comments/Qualifications:			
XII. Overall Assessment of Data			
1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A
Comments/Qualifications:			

038373

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SDG: 67720 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water-28

Validation Samples: Validation Samples: 29WW18 18WW17 46LHSMW03
18WW09 18WW07 29WW17 29WW15 18WW18 LHSMW57
C-02 18WW19 29WW19 18WW08 18WW18D LHSMW22
C-04 18WW20 LHSMW17 29WW21 29WW16

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 67720 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Date: 10/17/2002

Validator's Signature: James Hutchings

Peer Reviewer:

Page: 1 of 4
Project #: LHAAP
GEL Quote #:
COC Number [1]:
LIMS Number:

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONGHORN ARMY AMM. PLANT

Client Name: STEP, INC Phone #(865)481-7837 Fax #(865)481-0290

Address: 1006 FLOYD CULLER CT, OAK RIDGE, TN 37830

Collected by: D. BLANK/R SHERLES Send Results To: DOUG HAWN

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Field Sample ID 67720	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Total Number of Containers	PERCHLORATE											Remarks
LHSMW22	NO	9-23-02	17:23	N/A	N	N	GW	1	1											
C-02	"	9-24-02	08:45	N/A	N	N	GW	1	1											
C-04	"	"	10:28	N/A	N	N	GW	1	1											
18WW07	"	"	12:00	N/A	N	N	GW	1	1											
18WW19	"	"	15:48	N/A	N	N	GW	1	1											
18WW20	"	"	14:36	N/A	N	N	GW	1	1											
29WW17	"	"	10:59	N/A	N	N	GW	1	1											
29WW19	"	"	16:05	N/A	N	N	GW	1	1											
LHSMW17	"	"	07:44	N/A	N	N	GW	1	1											
29WW18	"	"	14:18	N/A	N	N	GW	1	1											
29WW15	"	"	13:10	N/A	N	N	GW	1	1											

TAT Requested: X Normal: X Rush: _____ (Subject to Surcharge) Fax Results: (Yes) / No Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)

FEDEX # 8348 4005 5444

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1. Robert Sherles	9-24-02	19:15	1. J M Hawley	9/25/02	0930
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab: _____ Shipped: _____
Method of Shipment: _____ Airbill #: _____
Analytical Lab: _____ Location: _____
Lab Recipient: _____ Date: _____ Time: _____

1) Chain of Custody Number = Client Determined
2) QC Codes N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
4) Matrix Codes DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

For Lab Receiving Use Only
Custody Seal Intact? YES NO
Cooler Temp: 2.3 C

038376

5

Page: 3 of 4
Project #: LITAAP
GEL Quote #:
COC Number [1]:
LIMS Number:

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONGHORN ARMY AMM. PLANT

Client Name: STEP, INC Phone #(865) 481-7837 Fax #(865) 481-0290

Address: 1006 FLOYD CULLER CT, OAK RIDGE, TN 37830

Collected by: D. BLANK / R. SHERRILL Send Results To: DOUG HAWN

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Field Sample ID 67720/	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Total Number of Containers	PERCHLORATE	Remarks
18WW08	NO	9-24-02	11:43	N/A	N	N	GW	1	1	
29WW21	"	"	17:25	N/A	N	N	GW	1	1	
18WW17	"	"	08:50	N/A	N	N	GW	1	1	
18WW18	"	"	10:15	N/A	N	N	GW	1	1	
18WW18D	"	"	10:15	N/A	FD	N	GW	1	1	DUPLICATE SAMPLE
18WW09	"	"	14:40	N/A	N	N	GW	1	1	
18WW09D	"	"	14:40	N/A	FD	N	GW	1	1	DUPLICATE SAMPLE
18WW09M	"	"	14:40	N/A	MS	N	GW	1	1	MATRIX SAMPLE
29WW16	"	"	18:57	N/A	N	N	GW	1	1	
460HSMW13	"	"	18:28	N/A	N	N	GW	1	1	
LHSMW57	"	"	18:45	N/A	N	N	GW	1	1	

TAT Requested: X Normal: X Rush: _____ (Subject to Surcharge) Fax Results: (Yes) / No Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)

FEDEX # 8348 4005 5414

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
Robert Blank	9-24-02	19:15	1.		
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab: _____ Shipped: _____
Method of Shipment: _____ Airbill #: _____
Analytical Lab: _____ Location: _____
Lab Recipient: [signature] Date 9/25/02 Time: 0930

For Lab Receiving Use Only
Custody Seal Intact? YES NO
Cooler Temp: 2

1.) Chain of Custody Number = Client Determined
2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered
4.) Matrix Codes: DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste
5.) Sample Analysis Requested. Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

0388171

As rcpt.

038378

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID: 18WW09
Sample ID: 67720001
Matrix: Ground Water
Collect Date: 24-SEP-02 14:40
Receive Date: 25-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rw Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	UA	29.0	80.0	ug/L	20	MARI 10/13/02	0356	206650	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	LHSMW22	Project:	STEP00202
Sample ID:	67720002	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	23-SEP-02 17:23		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/12/02	1318	204641	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: C-02
Sample ID: 67720003
Matrix: Ground Water
Collect Date: 24-SEP-02 08:45
Receive Date: 25-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR1 10/13/02	0436	206650	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	C-04	Project:	STEP00202
Sample ID:	67720004	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	24-SEP-02 10:28		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MARI 10/13/02	0447	206650	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18WW07	Project:	STEP00202
Sample ID:	67720005	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	24-SEP-02 12:00		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rejected	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/13/02	0457	206650	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038383

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18WW19	Project:	STEP00202
Sample ID:	67720006	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	24-SEP-02 15:48		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Reqd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR110/13/02	0507	206650	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID:	18WW20	Project:	STEP00202
Sample ID:	67720007	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	24-SEP-02 14:36		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR1 10/13/02	0537	206650	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID: 29WW17
Sample ID: 67720008
Matrix: Ground Water
Collect Date: 24-SEP-02 10:59
Receive Date: 25-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rejected	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/13/02	0547	206650	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID: 29WW19
Sample ID: 67720009
Matrix: Ground Water
Collect Date: 24-SEP-02 16:05
Receive Date: 25-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/13/02	0557	206650	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	LHSMW17	Project:	STEP00202
Sample ID:	67720010	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	24-SEP-02 07:44		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/13/02	0607	206650	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29WW18	Project:	STEP00202
Sample ID:	67720011	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	24-SEP-02 14:18		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/13/02	0617	206650	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29WW15	Project:	STEP00202
Sample ID:	67720012	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	24-SEP-02 13:10		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev 2 Unit	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		46400		7260	20000	ug/L	5000	MAR1 10/15/02	0151	206650	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038390

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18WW08	Project:	STEP00202
Sample ID:	67720013	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	24-SEP-02 11:43		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Reqmd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		36300		7260	20000	ug/L	5000	MARJ 10/15/02	0201	206650	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID:	29WW21	Project:	STEP00202
Sample ID:	67720014	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	24-SEP-02 17:25		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Revised	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/13/02	0648	206650	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID: 18WW17
Sample ID: 67720015
Matrix: Ground Water
Collect Date: 24-SEP-02 08:50
Receive Date: 25-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		64500		7260	20000	ug/L	5000	MARI 10/15/02	0211	206650	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18WW18	Project:	STEP00202
Sample ID:	67720016	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	24-SEP-02 10:15		
Receive Date:	25-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR1 10/15/02	0221	206650	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID: 18WW18D
Sample ID: 67720017
Matrix: Ground Water
Collect Date: 24-SEP-02 10:15
Receive Date: 25-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	UA	1.45	4.00	ug/L	1	MAR1	10/13/02	0738	206650	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 29WW16
Sample ID: 67720018
Matrix: Ground Water
Collect Date: 24-SEP-02 18:57
Receive Date: 25-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	ReQ'd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/13/02	0748	206650	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID: 46LHSMW13
Sample ID: 67720019
Matrix: Ground Water
Collect Date: 24-SEP-02 18:28
Receive Date: 25-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR110/13/02	0829	206650	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID: LHSMW57
Sample ID: 67720020
Matrix: Ground Water
Collect Date: 24-SEP-02 18:45
Receive Date: 25-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR1 10/13/02	0839	206650	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
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Reviewed by

038398

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/17

Project: Longhorn AAP SDG: 67720 Matrix/No. Samples: W-20

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 2.0°C.			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED

9/23, 9/24

PREPPED/ANALYZED

10/12
10/13
10/15

29WW15
~~18WW08~~
18WW17

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)?	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%?	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)?	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICAL

R^2 @ 0.999

10/11 @ 12:59 ff.

ICV 10/11 @ 00:59 93%

CCV 03:16 109%
5:17 95%
10/13 7:18 = 80.79/75 = 107.7
8:49 99%

10/14-15
48.28/50 = 96.6

10/12 @ 12:27 79.98/75 = 106.6
@ 14:29 - 26.47/25 = 105.9

10/15 @ 1:31 23.62/25 = 94.5
3:32 103%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 10/17

Project: Longhorn AAP **SDG:** 67720 **Matrix/No. Samples:** W-20

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

8083 MB U
2708 MB U

ICB 10/11 @ 1:09] - zero.
10/12 CCBs
10/13 CCBs — zero.

ICB 10/14 @ 20:08] zero
CCBs

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: IPC 10/11 @ 1:19 22.59/25 = 90.4

10/14-15 @ 20:18 23.87/25 = 95.5

10/11 22.59/25 = 90.4

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
	2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

87001 $\frac{51.4}{50.0} = 102.8$

312715 $\frac{54.3}{50} = 108.6$

038400

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/17

Project: Longhorn AAP SDG: 67720 Matrix/No. Samples: W-20

VI. Duplicates			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

6772001 312710
u / u u / u

VII. Matrix Spike			
1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

8086 Same as 67724

720001 11.7 / 10.0 = 117 % RPD = 0
11.7 / 10.0 = 117 %

~~VIII~~ DUPLICATE

720018 11.4 / 10.0 = 114 % RP 1.0 / 10.9 = 9.2 %
10.4 / 10.0 = 104 %

038401

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/17

Project: Longhorn AAP SDG: 67720 Matrix/No. Samples: W-20

~~X.~~ IX. **Sample Result Qualification**
VIII. Not Required For Level III Data Validation

1. Were sample results reported by laboratory supported by raw data?	(Yes)	No	N/A
2. Were correct calculations used to determine sample results?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

67720012 29WW15 9484 46400
df 5000 .0009458+.3078
= 9.2778(5000) = 46,388.8 ↘

67720015 18WW17 13310 64500
df 5000 .0009458+.3078
= 12.896 (5000) = 64,482 ↘

~~XI.~~ **Field QC**

1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
a. If Yes, were RPDs acceptable (+ or – 15%)?	(Yes)	No	N/A
2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	(No)	N/A
a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 18WW18 18WW18D 18WW09 18WW09D
U U U U

~~XII.~~ **Overall Assessment of Data**

1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A

Comments/Qualifications:

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(divider page)

038403

SDG: 67650 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water-8

Validation Samples: Validation Samples: 18MW08 18C-08 29WW10
18WW11 18C-08D 29WW20
18WW17 29WW22

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 67650 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported

Date: 10/17/2002

Validator's Signature: J. Thomas Hodges

Peer Reviewer: _____

Page: 3 of 3
Project #: LHAAP
GEL Quote #:
QC Number [1]:
MS Number:

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONGHORN ARMY AMM. PLANT

Client Name: STEP, INC Phone #: (865) 481-7837 Fax #: (865) 481-0290

Address: 1006 FLOYD CULLER COURT, OAK RIDGE, TN 37830

Collected by: D. BLANK/R. SHERROD Send Results To: DOUG HAWN

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Field Sample ID	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Total Number of Containers	PERCHLORATE	FORMONITY	VOLATILITY	REACTIVITY	TCL/PP METALS	HE'S REMOVAL	PCB/PEST	Remarks
18WW10M	NO	9-23-02	14:30	N/A	MS	N	GW	1	1							MATRIX SAMPLE
18WW11	"	"	15:35	N/A	N	N	GW	1	1							
18WW17	"	"	16:45	N/A	N	N	GW	1	1							
18C-08	"	"	18:15	N/A	N	N	GW	1	1							
18C-08D	"	"	18:15	N/A	FD	N	GW	1	1							DUPLICATE SAMPLE
29WW22	"	"	16:37	N/A	N	N	GW	1	1							
29WW10	"	"	12:29	N/A	N	N	GW	1	1							
29WW20	"	"	15:20	N/A	N	N	GW	1	1							
~~SD8501~~	~~"~~	~~"~~	~~17:30~~	~~N/A~~	~~N~~	~~N~~	~~SO~~	~~7~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	~~1~~	
16SW01	"	"	18:53	N/A												
18PW14	"	"	18:30	N/A												

TAT Requested: X Normal: X Rush: _____ (Subject to Surcharge) Fax Results: (Yes) / No Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)

FEDEX # 8348 4005 5550

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
Rohit Shukla	9-23-02	19:10	1.		
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab: _____ Shipped: _____

Method of Shipment: _____ Airbill #: _____

Analytical Lab: _____ Location: _____

Lab Recipient: Mike Hankins Date: 9-24-02 Time: 0900

For Lab Receiving Use Only

Custody Seal Intact? (YES) NO

Cooler Temp: 2.0 °C

1.) Chain of Custody Number = Client Determined

2.) QC Codes N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.

4.) Matrix Codes: DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste

5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

0384405

2 of 3

t #: LHAAP
Quote #:
Number [1]:
Number:

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

t Name / Site Name: LONG HORN ARMY AMM. PLANT

Name: STEP, INC Phone #(865) 481-7837 Fax #(865) 481-0290

ss: 1086 FLOYD CULLER CT, OAK RIDGE, TN 37830

led by: D. BLANK/R. STEEGES Send Results To: DOUG HAWK

Sample Analysis Requested [4] (Fill in the number of containers for each test)

Field Sample ID 7649/	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mm-yy)	Time Collected (Military) (Hmm)	Sample Depth (beginning - ending)	QC Code [3]	Field Filtered [5]	Sample Matrix [6]	Total Number of Containers	PERCHLORATE	Remarks
GWW03	NO	9-23-02	13:48	N/A	N	N	GW	1	1	
HFB01	"	"	13:08	N/A	*FB	N	① O	1	1	* (SOURCE WATER) FIELD BLANK
GW12	"	"	15:46	N/A	N	N	GW	1	1	
GW07	"	"	16:10	N/A	N	N	GW	1	1	
GW13	"	"	17:10	N/A	N	N	GW	1	1	
GW25	"	"	08:30	N/A	N	N	GW	1	1	
GW30	"	"	09:40	N/A	N	N	GW	1	1	
GW29	"	"	10:45	N/A	N	N	GW	1	1	
MW-08-7650/	"	"	12:05	N/A	N	N	GW	1	1	
GW10-7[illegible]/	"	"	14:30	N/A	N	N	GW	1	1	
GW10D	"	"	14:30	N/A	FD	N	GW	1	1	DUPLICATE SAMPLE

AT Requested: X Normal: X Rush: _____ (Subject to Surcharge) Fax Results: (Yes) / No Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

nents: (attach compound and/or element list requested)

① OTHER = SOURCE WATER

FEDEX # 8348 4005 5550

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
[signature]	9-23-02	19:10	1		
			2		
			3		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab. _____ Shipped: _____

Method of Shipment: _____ Airbill #: _____

Analytical Lab: _____ Location: _____

Lab Recipient: [signature] Date: 9-24-02 Time: 0900

For Lab Receiving Use Only

Custody Seal Intact? (YES) NO

Cooler Temp: 20 °C

n of Custody Number = Client Determined

Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

d Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered

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ple Analysis Requested: nalytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

0338406

dlr as rptd

038407

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18MW-08	Project:	STEP00202
Sample ID:	67650001	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	23-SEP-02 12:05		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate		24600		2900	8000	ug/L	2000	MAR1	10/14/02	1136	204641	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn

Project: Longhorn A.A.P.

Client Sample ID:	18WW11	Project:	STEP00202
Sample ID:	67650002	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	23-SEP-02 15:35		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR1 10/12/02	1147	204641	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID:	18WW17	Project:	STEP00202
Sample ID:	67650003	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	23-SEP-02 16:45		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate		178		14.5	40.0	ug/L	10	MAR1	10/14/02	1216	204641	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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P The response between the confirmation column and the primary column is >40%D
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X Lab-specific qualifier - must be fully described in case narrative and data summary package
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID:	18C-08	Project:	STEP00202
Sample ID:	67650004	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	23-SEP-02 18:15		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/12/02	1207	204641	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID:	18C-08D	Project:	STEP00202
Sample ID:	67650005	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	23-SEP-02 18:15		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1	10/12/02	1217	204641	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 29WW22
Sample ID: 67650006
Matrix: Ground Water
Collect Date: 23-SEP-02 16:37
Receive Date: 24-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/12/02	1248	204641	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID: 29WW10
Sample ID: 67650007
Matrix: Ground Water
Collect Date: 23-SEP-02 12:29
Receive Date: 24-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Req'd	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	u	1.45	4.00	ug/L	1	MAR1	10/12/02	1258	204641	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 29WW20
Sample ID: 67650008
Matrix: Ground Water
Collect Date: 23-SEP-02 15:20
Receive Date: 24-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/12/02	1308	204641	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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Reviewed by

038415

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/17

Project: Longhorn AAP SDG: 67650 Matrix/No. Samples: W-8

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 20C.			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED	PREPPED/ANALYZED
9/23	10/12
	10/14 18MW-08 18WW17

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)?	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%?	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)?	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	(N/A)
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICV – 10/11@00:59 93%

10/11@12:54ff.

R^2@ >0.999

CCV 10/12@12:27 79.98/75 = 106.6

@ 14:29 26.47/25 = 105.9

10/14 @ 11:15 95%

@ 13:17 75.01/75 = 100%

038416

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 10/17

Project: Longhorn AAP **SDG:** 67656 **Matrix/No. Samples:** W-8

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: ICB 10/11@1:09] zero 308083 -MB - U
CCB's

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: IPC 10/11 @ 1:19 90% ✓

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
	2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

8090 $\frac{51.4}{50}$ = 102.8

038417

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/17

Project: Longhorn AAP SDG: 67656 Matrix/No. Samples: W-8

VI. Duplicates			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

87001 u/u

~~10/12 787001 - low recoveries~~

VII. Matrix Spike			
1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	Yes	(No)	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

10/12 787001 - low recoveries @ 39 & 36%.
LCS ok - no quals required.

038418

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 10/17

Project: Longhorn AAP **SDG:** 67656 **Matrix/No. Samples:** W-8

X.	**Sample Result Qualification** Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	(Yes)	No	N/A
	2. Were correct calculations used to determine sample results?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

18MW-08

650001

10/14

df 2000

12680

(.0009458)+.3078

= 12.3005 (2000) = 24601

24600

XI.	**Field QC**			
	1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	(Yes)	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	(No)	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: ORIG 18C-08 → U's ← FD 18C-08D

XII.	**Overall Assessment of Data**			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A

Comments/Qualifications:

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(divider page)

038420

SDG: 67649 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 19

Validation Samples: Validation Samples: LHSMW42 LHSMW47 46WW03 29WW13 16WW29
18WW10 47WW20 47WW19 17WW25 LHSMW53 29WW12 16WW25
47WW23 47WW21 47WW18 LHSMW46 LHSMW55 29WW07 16WW30

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	A	
11.	Field QC Samples	A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 67649 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Date: 10/16/2002

Validator's Signature: J. Thomas Kitchens

Peer Reviewer:

Page: 1 of 3
Project #: LHAAP
GEL Quote #:
COC Number [1]:
LIMS Number:

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONG HORN ARMY AMMO. PLANT

Client Name: STEP, INC Phone #: (865) 481-7837 Fax #: (865) 481-0290

Address: 1006 FLOYD CULLER COURT, OAK RIDGE, TN 37830

Collected by: D. BLANK / R. SHERLES Send Results To: DOUG HAWN

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Field Sample ID 67649 %	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Total Number of Containers	LEACH DATE											Remarks
47WW23	NO	9-22-02	15:23	N/A	N	N	GW	1	1											
47WW20	NO	"	12:13	N/A	N	N	GW	1	1											
47WW21	"	"	14:49	N/A	N	N	GW	1	1											
47WW19	"	"	11:40	N/A	N	N	GW	1	1											
47WW18	"	"	10:34	N/A	N	N	GW	1	1											
LHSMW42	"	"	12:38	N/A	N	N	GW	1	1											
17WW05	"	9-23-02	10:21	N/A	N	N	GW	1	1											
LHSMW46	"	"	08:05	N/A	N	N	GW	1	1											
LHSMW47	"	"	07:52	N/A	N	N	GW	1	1											
LHSMW53	"	"	10:31	N/A	N	N	GW	1	1											
LHSMW55	"	"	10:40	N/A	N	N	GW	1	1											

TAT Requested: X Normal: X Rush: _____ (Subject to Surcharge) Fax Results: (Yes) / No Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)

FEDEX # 8348 4005 5550

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1. Robert Blank	9-23-02	19:10	1.		
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab: _____ Shipped: _____
Method of Shipment: _____ Airbill #: _____
Analytical Lab: _____ Location: _____
Lab Recipient: Mike Lawler Date: 9-24-02 Time: 0900

1.) Chain of Custody Number = Client Determined
2.) QC Codes N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
4.) Matrix Codes: DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste
5.) Sample Analyses Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1)

For Lab Receiving Use Only
Custody Seal Intact? (YES) NO
Cooler Temp: 4.0 C

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

0384422

Page: 2 of 3
Project #: LHAAP
GEL Quote #:
COC Number [1]:
LIMS Number:

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONG HORN ARMY AMM. PLANT

Client Name: STEP, INC Phone #(865) 481-7837 Fax #(865) 481-0290

Address: 1006 FLOYD CULLER CT, OAK RIDGE, TN 37830

Collected by: D. BLANK/R. SHEELEY Send Results To: DOUG HAWK

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Field Sample ID 67649/	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mmm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Total Number of Containers	PERCHLORATE	Remarks
46WW03	NO	9-23-02	13:48	N/A	N	N	GW	1	1	
LHFB01	"	"	13:08	N/A	*FB	N	① O	1	1	* (SOURCE WATER) FIELD BLANK
29WW12	"	"	15:46	N/A	N	N	GW	1	1	
29WW07	"	"	16:10	N/A	N	N	GW	1	1	
29WW13	"	"	17:10	N/A	N	N	GW	1	1	
16WW25	"	"	08:30	N/A	N	N	GW	1	1	
16WW30	"	"	09:40	N/A	N	N	GW	1	1	
16WW29	"	"	10:45	N/A	N	N	GW	1	1	
18MW-08-67650/	"	"	12:05	N/A	N	N	GW	1	1	
18WW10-67[illegible]/	"	"	14:30	N/A	N	N	GW	1	1	
18WW10D	"	"	14:30	N/A	FD	N	GW	1	1	DUPLICATE SAMPLE

TAT Requested: X Normal: X Rush: _____ (Subject to Surcharge)

Fax Results: (Yes) / No

Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)

① OTHER = SOURCE WATER

FEDEX # 8348 4005 5550

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1. [signature]	9-23-02	19:10	1.		
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab.: _____ Shipped: _____

Method of Shipment: _____ Airbill #: _____

Analytical Lab: _____ Location: _____

Lab Recipient: [signature] Date: 9-24-02 Time: 0900

For Lab Receiving Use Only

Custody Seal Intact? (YES) NO

Cooler Te 2°

1.) Chain of Custody Number = Client Determined

2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered

4.) Matrix Codes: DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste

5.) Sample Analysis Requ: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, [illegible]7470A - 1).

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

9

038423

038424

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 18WW10
Sample ID: 67649001
Matrix: Ground Water
Collect Date: 23-SEP-02 14:30
Receive Date: 24-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR110/12/02	2213	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 47WW23
Sample ID: 67649002
Matrix: Ground Water
Collect Date: 22-SEP-02 15:23
Receive Date: 24-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Requal	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/12/02	2253	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
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J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID:	47WW20	Project:	STEP00202
Sample ID:	67649003	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	22-SEP-02 12:13		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	UA	1.45	4.00	ug/L	1	MAR1 10/12/02	2303	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	47WW21	Project:	STEP00202
Sample ID:	67649004	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	22-SEP-02 14:49		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQud	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1	10/12/02	2313	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID: 47WW19
Sample ID: 67649005
Matrix: Ground Water
Collect Date: 22-SEP-02 11:40
Receive Date: 24-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Requal	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR110/12/02	2323	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D .
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID:	47WW18	Project:	STEP00202
Sample ID:	67649006	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	22-SEP-02 10:34		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Re Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	UI	1.45	4.00	ug/L	1	MAR1 10/12/02	2354	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID:	LHSMW42	Project:	STEP00202
Sample ID:	67649007	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	22-SEP-02 12:38		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rwjwd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR110/13/02	0004	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	17WW05	Project:	STEP00202
Sample ID:	67649008	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	23-SEP-02 10:21		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Reqd DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		65.0	1.45	4.00	ug/L	1	MAR1	10/13/02	0014	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: LHSMW46
Sample ID: 67649009
Matrix: Ground Water
Collect Date: 23-SEP-02 08:05
Receive Date: 24-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR1	10/13/02	0024	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	LHSMW47	Project:	STEP00202
Sample ID:	67649010	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	23-SEP-02 07:52		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Re Qual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1	10/13/02	0034	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038434

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	LHSMW53	Project:	STEP00202
Sample ID:	67649011	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	23-SEP-02 10:31		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR1 10/13/02	0044	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	LHSMW55	Project:	STEP00202
Sample ID:	67649012	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	23-SEP-02 10:40		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/13/02	0054	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 46WW03
Sample ID: 67649013
Matrix: Ground Water
Collect Date: 23-SEP-02 13:48
Receive Date: 24-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rejual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/13/02	0104	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 29WW12
Sample ID: 67649015
Matrix: Ground Water
Collect Date: 23-SEP-02 15:06
Receive Date: 24-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/13/02	0215	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038438

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29WW07	Project:	STEP00202
Sample ID:	67649016	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	23-SEP-02 16:10		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev'd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/13/02	0225	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 29WW13
Sample ID: 67649017
Matrix: Ground Water
Collect Date: 23-SEP-02 17:10
Receive Date: 24-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MARI 10/13/02	0235	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 16WW25
Sample ID: 67649018
Matrix: Ground Water
Collect Date: 23-SEP-02 08:30
Receive Date: 24-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR1 10/13/02	0245	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16WW30	Project:	STEP00202
Sample ID:	67649019	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	23-SEP-02 09:40		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Ion Chromatography Federal												
EPA 314.0 Perchlorate by IC												
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MARI	10/13/02	0255	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16WW29	Project:	STEP00202
Sample ID:	67649020	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	23-SEP-02 10:45		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR1 10/13/02	0306	204640	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038443

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/16

Project: Longhorn AAP SDG: 67649 Matrix/No. Samples: W-19

I. Sample Management			
A. Sample Preservation, Handling and Transport			
1. Have sample temperatures been kept at ambient temperature?	Yes	No	N/A
2. Were all samples received in proper condition?	Yes	No	N/A
3. Were any qualifications required based on this information?	Yes	No	N/A
Cooler @ 20°C.			
B. Chain of Custody			
1. Were all samples properly recorded on COCs?	Yes	No	N/A
2. Were correct analyses performed on samples?	Yes	No	N/A
C. Holding Times			
1. Were samples analyzed within acceptable holding times (28 days)?	Yes	No	N/A
2. Were any qualifications required based on this information?	Yes	No	N/A

SAMPLED	PREPPED/ANALYZED
9/22, 9/23	10/12, 10/13

II. Calibrations			
1. Were proper number of calibration standards used (5: range 4-400 ug/l)?	Yes	No	N/A
2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%?	Yes	No	N/A
3. Are the continuing calibration verification %R within the acceptance window (85-115%)?	Yes	No	N/A
4. Was there an ending calibration standard (ECCS)?	Yes	No	N/A
5. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

ICAL
R² @ >0.999
10/11 @ 12:54ff

ICV 10/11 @ 00:54 93%
10/11 1:49 97%
10/12 21:32 101%
10/12 23:34 80.39/75 = 107.2
10/13 1:14 −104
10/13 3:16 − 82.03/75 = 109.4%

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038444

Reviewer: Kitchings **Date:** 10/16

Project: Longhorn AAP **SDG:** 67649 **Matrix/No. Samples:** W-19

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: ICB 10/11 @ 1:09 8063 MB @ U
CCBs Info.

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: IPC 10/11 @ 1:19 $22.59/25 = 90.4$

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
	2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

8070 $53.7/50.0 = 107.4$

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 10/16

Project: Longhorn AAP **SDG:** 67649 **Matrix/No. Samples:** W-19

VI.	Duplicates			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

9001 u/u

9014 u/u

VII.	Matrix Spike			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

9001 MS 11.3 / 10.0 = 113%

MSD 9.95 / 10.0 = 99.5%

RPD = 1.35 / 10.675 = 12.6% ✓

9014 9.13 / 10.00 = 91.3%

9.19 / 10.00 = 91.6%

RPD = 0.7% ✓

038446

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 10/16

Project: Longhorn AAP **SDG:** 67649 **Matrix/No. Samples:** W 19

X.	**Sample Result Qualification** Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	N/A
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

649008 17WW05

10/13 (68437) Rpt. As.

.0009458 + .3078 65.0 \

= 65.04 \ \

XI.	**Field QC**			
	1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

Field blk. 18WW10 18WW10D

LHFB01 U U

@ U\

XII.	**Overall Assessment of Data**			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A

Comments/Qualifications:

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(divider page)

SDG: 67630 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water- 2

Validation Samples: Validation Samples: 295W01
295W02

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	A	
11.	Field QC Samples	~~JMK~~ A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 67630 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Date: 10/16/2002

Validator's Signature: J. Thomas Hodges

Peer Reviewer: _____

Page: 1 of 1
Project #. CHAAP
GEL Quote #:
COC Number [1]:
LIMS Number

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONGHORN ARMY AMMUNITION PLANT

Client Name: STEP, INC Phone #(865)481-7837 Fax #(865)481-0290

Address: 1006 FLOYD CULLER CT., OAK RIDGE, TN 37830

Collected by: D. BLANK/R. SHERLES Send Results To: DOUG HAWN

Sample Analysis Requested [5] (Fill in the number of containers for each test)

Field Sample ID 67630%	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code [2]	Field Filtered [3]	Sample Matrix [4]	Total Number of Containers	LEACHOZATE	Remarks
29SW01	N	21-09-02	1700		N	N	SW		X	Chain of Custody 181333
29SW01 DUP	N	21-09-02	1700		FD	N	SW		X	Chain of Custody 181334
29SW01 M	N	21-09-02	1700		MS	N	SW		X	Chain of Custody 181335
29SW02	N	21-09-02	1728		N	N	SW		X	Chain of Custody 181336

Robert Blank 9-22-02

TAT Requested: X Normal: X Rush: (Subject to Surcharge)

Fax Results: (Yes) / No

Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)

FEDEX # 8348 4005 5675

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
Robert Blank	9-22-02	19:30	1.		
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab:
Shipped:
Method of Shipment:
Airbill #:
Analytical Lab:
Location:
Lab Recipient: Jake Bowlow
Date: 9-24-02 Time: 0900

For Lab Receiving Use Only
Custody Seal Intact? YES NO
Cooler Temp: 21 C

1.) Chain of Custody Number = Client Determined

2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.

4.) Matrix Codes: DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste

5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

038450

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID: 29SW01
Sample ID: 67630001
Matrix: Water
Collect Date: 21-SEP-02 17:00
Receive Date: 24-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	UL	1.45	4.00	ug/L	1	MAR1 09/26/02	2328	203834	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID:	29SW02	Project:	STEP00202
Sample ID:	67630002	Client ID:	STEP001
Matrix:	Water		
Collect Date:	21-SEP-02 17:28		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR109/27/02	0008	203834	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

038453

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/16

Project: Longhorn AAP SDG: 67630 Matrix/No. Samples: 6-2

I.	**Sample Management**			
	A. Sample Preservation, Handling and Transport			
	1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
	2. Were all samples received in proper condition?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A
	Cooler @ 21°C.			
	B. Chain of Custody			
	1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
	2. Were correct analyses performed on samples?	(Yes)	No	N/A
	C. Holding Times			
	1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
	2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED	PREPPED/ANALYZED
9/21	295001 9/24
	295002 9/27

II.	**Calibrations**			
	1. Were proper number of calibration standards used (5: range 4-400 ug/l)?	(Yes)	No	N/A
	2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%?	(Yes)	No	N/A
	3. Are the continuing calibration verification %R within the acceptance window (85-115%)?	(Yes)	No	N/A
	4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
	5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICV @ 46.76/50 = 93.5

CCV @ 18:42 77.52/75 = 103.4

CCV @ 20:33 102%

@ 22:37 103%

@ 00:18 25.18/25 = 100.7

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038454

Reviewer: Kitchings Date: 10/16

Project: Longhorn AAP SDG: 67630 Matrix/No. Samples: 6-2

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

6146 MB@9/26 @ u ICB, CCB's } all u's.

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: IPC $\frac{25.25}{25.00} = 101\%$

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
	2. Are all solid LCS %R within control limits established by the laboratory? ±10%	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

6153 LCS $\frac{50.8}{50.0} = 101.6$

038455

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 10/16

Project: Longhorn AAP **SDG:** 67630 **Matrix/No. Samples:** W-2

VI.	**Duplicates**			
	1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
	2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

630001 ORIG - u

dupl - u

VII.	**Matrix Spike**			
	1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
	2. Were spike recoveries within laboratory established limits ~~(56-149%)~~ 83-123; are RPDs within limits (20%)?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

9/26 60019 $\frac{9.56}{10.00} = 95.6\%$

$\frac{11.00}{10.00} = 110\%$

RPD $\frac{1.44}{10.28} = 14.0\%$

9/26 630001

$\frac{9.17}{10.00} = 91.7\%$

$\frac{9.15}{10.00} = 91.5\%$

RPD $\frac{.02}{9.16} = 0.2\%$

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038456

Reviewer: Kitchings **Date:** 10/16

Project: Longhorn AAP **SDG:** 67630 **Matrix/No. Samples:** W-2

X.	**Sample Result Qualification** Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	N/A
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

both smps @ nondetect.

XI.	**Field QC**			
	1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

f.d same as dupl.

OPIG	FD
630001	630001
U	U

XII.	**Overall Assessment of Data**			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A

Comments/Qualifications:

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(divider page)

038458

SDG: 67638 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water - 20

Validation Samples: Validation Samples: 29WW117 17WW03 16EW05 16WZZD 47WW26
16EW08 50WW03 50WW02 29WW09 16WW12 16EW01 47WW11 LHSMW54
50WW05 50WW01 50WW04 29WW05 16WW38 16WW22 LHSMW43

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	A	
11.	Field QC Samples	X	
12.	Overall Assessment	X	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 67638 Method: Perchlorate EPA 314.0

Qualifications:

17. A high RPD in the field duplicate analysis resulted in a "J" qualifier for 16WW22 and 16WW22D.

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as ~~rejected~~ qualified.

Date: 10/16

Validator's Signature: J. Thomas Kitchings

Peer Reviewer: _____

038460

Page: 1 of 4
Project #: LHAAP
GEL Quote #:
COC Number (1):
LIMS Number:

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONGHORN ARMY AMMUNITION PLANT

Client Name: STEP, INC Phone #: (865) 481-7837 Fax #: (865) 481-0290

Address: 1006 FLOYD CULLER CT, OAK RIDGE, TN 37830

Collected by: D. BLANK / R. SHERLES Send Results To: DOUG HAWN

Sample Analysis Requested (5) (Fill in the number of containers for each test)

	Field Sample ID 67638%	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Total Number of Containers	PERCHLORATE												Remarks
2	50WW05	NO	9-21-02	11:28	N/A	N	N	GW	1	1												
3	50WW03	"	"	11:13	N/A	N	N	GW	1	1												
4	50WW01	"	"	08:42	N/A	N	N	GW	1	1												
5	50WW02	"	"	10:00	N/A	N	N	GW	1	1												
6	50WW04	"	"	14:04	N/A	N	N	GW	1	1												
7	29WW117	"	"	15:35	N/A	N	N	GW	1	1												
8	29WW09	"	"	16:53	N/A	N	N	GW	1	1												
9	29WW05	"	"	18:13	N/A	N	N	GW	1	1												
10	17WW03	"	"	08:25	N/A	N	N	GW	1	1												
11	16WW12	"	"	11:00	N/A	N	N	GW	1	1												
12	16WW38	"	"	11:52	N/A	N	N	GW	1	1												

TAT Requested: X Normal: X Rush: _____ (Subject to Surcharge)

Fax Results: (Yes) / No

Deliverable: C of A / QC Summary / Level 1 / Level 2 / (Level 3) / Level 4

Comments: (attach compound and/or element list requested)

FEDEX # 8348 4005 5675

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1. Robert Blank	9-22-02	19:30	1.		
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab: _____ Shipped: _____

Method of Shipment: _____ Airbill #: _____

Analytical Lab: _____ Location: _____

Lab Recipient: Mike Kenslow Date: 9-24-02 Time: 0900

1.) Chain of Custody Number = Client Determined

2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.

4.) Matrix Codes: DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste

5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

WHITE = LABORATORY YELLOW = F PINK = CLIENT

For Lab Receiving Use Only

Custody Seal Intact? (YES) NO

Cool Temp: 0 C

038461

Page: 2 of 4
Project #: LHAAP
GEL Quote #:
COC Number (1):
LIMS Number:

GEL Chain of Custody and Analytical Request

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Project Name / Site Name: LONGHORN ARMY AMMUNITION PLANT

Client Name: STEP, INC Phone #(865)481-7837 Fax #(865)481-0290

Address: 1006 FLOYD CULLER COURT, OAK RIDGE, TN 37830

Collected by: D. BLANK / R. SHERES Send Results To: DOUG HAWN

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Field Sample ID 67638%	Should this sample be considered radioactive? (Yes or No)	Date Collected (dd-mm-yy)	Time Collected (Military) (hhmm)	Sample Depth (beginning - ending)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Total Number of Containers	PERCHLORATE	Remarks
16EW08	ND	9-21-02	14:55	N/A	N	N	GW	1	1	
16EW08D	"	"	14:55	N/A	FD	N	GW	1	1	DUPLICATE SAMPLE
16EW08M	"	"	14:55	N/A	MS	N	GW	1	1	MATRIX SAMPLE
16EW05	"	"	16:20	N/A	N	N	GW	1	1	
16EW01	"	"	17:23	N/A	N	N	GW	1	1	
16WW22	"	"	18:28	N/A	N	N	GW	1	1	
16WW22D	"	"	18:28	N/A	FD	N	GW	1	1	DUPLICATE SAMPLE
47WW11	"	"	18:21	N/A	N	N	GW	1	1	
LHSMW43	"	"	17:37	N/A	N	N	GW	1	1	
47WW26	"	"	09:27	N/A	N	N	GW	1	1	
LHSMW54	"	"	12:56	N/A	N	N	GW	1	1	

TAT Requested: X Normal: X Rush: _____ (Subject to Surcharge) Fax Results: (Yes) / No Deliverable: C of A / QC Summary / Level 1 / Level 2 (Level 3) Level 4

Comments: (attach compound and/or element list requested)

FEDEX # 8348 4005 5675

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1. [signature]	9-22-02	19:30	1.		
2.			2.		
3.			3.		

Sample Delivery Details / Laboratory Receipt

Delivered Directly to Lab: _____ Shipped: _____
Method of Shipment: _____ Airbill #: _____
Analytical Lab: _____ Location: _____
Lab Recipient: [signature] Date: 9-24-02 Time: 0900

For Lab Receiving Use Only
Custody Seal Intact? (YES) NO
Cooler Temp: 2 °C

1.) Chain of Custody Number = Client Determined
2.) QC Codes. N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3.) Field Filtered For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
4.) Matrix Codes. DW = Drinking Water, GW = Groundwater, SW = Surface Water, WW = Waste Water, SO = Soil, SD = Sediment, SL = Sludge, SS = Solid Waste
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

038462

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16EW08	Project:	STEP00202
Sample ID:	67638001	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 14:55		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR1 10/03/02	2134	204171	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID:	50WW05	Project:	STEP00202
Sample ID:	67638002	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 11:28		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		5850		290	800	ug/L	200	MAR1 10/03/02	2215	204171	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
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P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

038464

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	50WW03	Project:	STEP00202
Sample ID:	67638003	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 11:13		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/03/02	2225	204171	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
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P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	50WW01	Project:	STEP00202
Sample ID:	67638004	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 08:42		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/03/02	2235	204171	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
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H Holding time exceeded
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P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: October 10, 2002

Project: Longhorn A.A.P.

Client Sample ID:	50WW02	Project:	STEP00202
Sample ID:	67638005	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 10:00		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		7600		290	800	ug/L	200	MAR1 10/03/02	2245	204171	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID:	50WW04	Project:	STEP00202
Sample ID:	67638006	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 14:04		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 09/27/02	0916	204171	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID:	29WW117	Project:	STEP00202
Sample ID:	67638007	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 15:35		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR109/27/02	0926	204171	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID:	29WW09	Project:	STEP00202
Sample ID:	67638008	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 16:53		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Requal	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR109/27/02	0936	204171	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
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B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

038470

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	29WW05	Project:	STEP00202
Sample ID:	67638009	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 18:13		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		65.7		1.45	4.00	ug/L	1	MAR109/27/02	0946	204171	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID:	17WW03	Project:	STEP00202
Sample ID:	67638010	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 08:25		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		22.8		1.45	4.00	ug/L	1	MAR1 09/27/02	0956	204171	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

038472

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16WW12	Project:	STEP00202
Sample ID:	67638011	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 11:00		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	RevQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		747		29.0	80.0	ug/L	20	MAR1 10/08/02	1805	204171	3

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	
3	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	16WW38	Project:	STEP00202
Sample ID:	67638012	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 11:52		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 09/27/02	1016	204171	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Certificate of Analysis

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID:	16EW05	Project:	STEP00202
Sample ID:	67638013	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 16:20		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		1950		29.0	80.0	ug/L	20	MAR1 10/08/02	1815	204171	3

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	
3	EPA 314.0	

Notes:
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Certificate of Analysis

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Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID:	16EW01	Project:	STEP00202
Sample ID:	67638014	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 17:23		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal										
EPA 314.0 Perchlorate by IC										
Perchlorate		550	72.6	200	ug/L	50	MAR1 10/03/02	2336	204171	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID: 16WW22
Sample ID: 67638015
Matrix: Ground Water
Collect Date: 21-SEP-02 18:28
Receive Date: 24-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		750	J	17	145	400	ug/L	100	MAR1 10/03/02	2346	204171	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

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> Actual result is greater than amount reported
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID: 16W22D
Sample ID: 67638016
Matrix: Ground Water
Collect Date: 21-SEP-02 18:28
Receive Date: 24-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RW Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		599	J 17	72.6	200	ug/L	50	MAR1 10/03/02	2356	204171	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn

Report Date: October 10, 2002

Project: Longhorn A.A.P.

Client Sample ID:	47WW11	Project:	STEP00202
Sample ID:	67638017	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 18:21		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	ReQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		387		29.0	80.0	ug/L	20	MAR1 10/04/02	0006	204171	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
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Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 10, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	LHSMW43	Project:	STEP00202
Sample ID:	67638018	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 17:37		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR109/27/02	1147	204171	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID:	47WW26	Project:	STEP00202
Sample ID:	67638019	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 09:27		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate		840		72.6	200	ug/L	50	MAR110/04/02	0016	204171	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
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UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 10, 2002

Client Sample ID:	LHSMW54	Project:	STEP00202
Sample ID:	67638020	Client ID:	STEP001
Matrix:	Ground Water		
Collect Date:	21-SEP-02 12:56		
Receive Date:	24-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR109/27/02	1207	204171	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
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Reviewed by _____

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038482

Reviewer: Kitchings Date: 10/16

Project: Longhorn AAP SDG: 67638 Matrix/No. Samples: W-20

I. Sample Management			
A. Sample Preservation, Handling and Transport			
1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	N/A
2. Were all samples received in proper condition?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A
Cooler @ 21°C.			
B. Chain of Custody			
1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
2. Were correct analyses performed on samples?	(Yes)	No	N/A
C. Holding Times			
1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED	PREPPED/ANALYZED
9/21	9/27
	10/3
	10/8

II. Calibrations			
1. Were proper number of calibration standards used (5: range 4-400 ug/l)?	(Yes)	No	N/A
2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%?	(Yes)	No	N/A
3. Are the continuing calibration verification %R within the acceptance window (85-115%)?	(Yes)	No	N/A
4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

9/26 ICV @ 12:53 46.76/50 = 97.5

CCV @ 6:01 @ 77.19/75 = 102.9

8:02 @ 118%

8:56 @ 107%

10:57 79.54/75 = 106.1

12:48 26.34/25 = 105.4

10/3 ICV 14:31 @ 100%

20:54 75.3/75 = 100.4

22:55 27.12/25 = 108.5

00:26 @ 108%

10/8 all w/in limits.

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 10/16

Project: Longhorn AAP **SDG:** 67638 **Matrix/No. Samples:** W-25

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

9/26 ICB } zeros.
CCBs

MB 10/3 @ U

10/8 all @ zeros

10/3 ICB
CCBs @ zeros.

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: IPC 9/26 @ 13:14 $\frac{25.25}{25} = 101\%$

IPC, 10/3 $\frac{25.24}{25} = 101\%$

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
	2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

10/3 @ 21:24 $\frac{51.7}{50.0} = 103.4$

038484

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/16

Project: Longhorn AAP SDG: 67638 Matrix/No. Samples: W-20

VI. Duplicates			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

	ORIG	DUPL.
38001	U	U
38020	U	U

VII. Matrix Spike			
1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

9/27 38020

$\frac{9.79}{10.00} = 97.9$

$\frac{10.70}{10.00} = 107.0$

RPD $\frac{.91}{10.245} = 8.926$

10/3 38001

$\frac{9.47}{10.00} = 94.7$

$\frac{10.60}{10.00} = 106.0$

RPD $= \frac{1.13}{10.035} = 11.3\%$

038485

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 10/16

Project: Longhorn AAP **SDG:** 67638 **Matrix/No. Samples:** W-20

X.	**Sample Result Qualification** Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	(Yes)	No	N/A
	2. Were correct calculations used to determine sample results?	(Yes)	No	N/A
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

Rpt As.

50WW05 30,601 5850

df. 200 (.0009458) + .3078 = 29.247(200) = 5859.4

29WW05 ~~(.0009458) .3078 = .3295(200) =~~ 65.7 → 69140 (.0009458) + .3078 = 65,70 ~

XI.	**Field QC**			
	1. Were any Field Duplicates associated with this SDG?	(Yes)	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	(No)	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	(No)	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	(Yes)	No	N/A

Comments/Qualifications:

16WW22 16WW22D 16EW08 — W08D Same as dupl.

750 599 U U

(J) 151/674.5 = 22.4% ✓

XII.	**Overall Assessment of Data**			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	(No)	N/A

Comments/Qualifications:

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(divider page)

SDG: 67787 Project: Longhorn AAP

Method: Perchlorate EPA 314.0 Matrix/No.of Samples: Water-9

Validation Samples: Validation Samples: 16PW03 18PW24 18PW28
16PW02 18PW22 18PW25
16PW01 18PW23 18PW26

Data Validation Report Summary

		Status Code	Comments
1.	Sample Preservation, Handling, and Transport	A	
2.	Chain of Custody	A	
3.	Holding Times	A	
4.	Calibrations	A	
5.	Blanks	A	
6.	IPC	A	
7.	Blank Spike/LCS	A	
8.	Duplicates	A	
9.	Matrix Spike	A	
10.	Sample Result Verification	A	
11.	Field QC Samples	N/A	
12.	Overall Assessment	A	

Status Codes:
A = Acceptable
R = Data Rejected
X = Data acceptable but qualified due to problems

SDG: 67787 Method: Perchlorate EPA 314.0

Qualifications:

Significant Findings/Recommendations:

Overall Data Quality:

Acceptable as reported.

Date: 10/15/2002

Validator's Signature: J. Thomas Kitchings

Peer Reviewer:

Jeff Carter / Koy Hoekstra 865-48 7837
STEP, Inc.
1006 Floyd Culler Ct
Oak Ridge, TN 37830

Page 1 of 1

CHAIN OF CUSTODY RECORD

67787

General Engineering Laboratories, Inc.
2040 Savage Road
Charleston, South Carolina 29407
P.O. Box 30712
Charleston, South Carolina 29417
(843) 556-8171

Client Name/Facility Name: USACE Longhorn Army AMMO
Collected by/Company: SB/DC STEP, Inc.

	SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# OF CONTAINERS	pH, conductivity	TOC/DOC	TOX	Chloride, Fluoride, Sulfide	Nitrate/Nitrate	VOC - Specify Method Required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	Perchlorate	Remarks
001	16PW02	9/25/02	1515				X	1																X	
	16PW02QC		1515				X	1																X	
002	16PW01		1523				X	1																X	
003	16PW03		1535				X	1																X	
004	18PW22		1708				X	1																X	
005	18PW23		1615				X	1																X	
006	18PW24		1628				X	1																X	
007	18PW25		1633				X	1																X	
008	18PW26		1640				X	1																X	
009	18PW28	↓	1647				X	1																X	

SAMPLE ANALYSIS REQUIRED (x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date:	Time:	Received by:
[signature]	9/25/02	1800					
Relinquished by:	Date:	Time:	Received by lab by:	Date:	Time:	Remarks:	
			[signature]	9/26/02	0945		

White = sample collector Yellow = file Pink = with report

0384489

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID: 16PW02
Sample ID: 67787001
Matrix: Misc Liquid
Collect Date: 25-SEP-02 15:15
Receive Date: 26-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/12/02	1348	204641	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID: 16PW01
Sample ID: 67787002
Matrix: Misc Liquid
Collect Date: 25-SEP-02 15:23
Receive Date: 26-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR110/14/02	1236	204641	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

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Reviewed by _____

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID: 16PW03
Sample ID: 67787003
Matrix: Misc Liquid
Collect Date: 25-SEP-02 15:35
Receive Date: 26-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Re Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MARI 10/14/02	1246	204641	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
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< Actual result is less than amount reported
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UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

The above sample is reported on an "as received" basis.

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This data report has been prepared and reviewed in accordance with General Engineering Laboratories, Inc. standard operating procedures. Please direct any questions to your Project Manager, Sarah Bashaw.

Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID: 18PW22
Sample ID: 67787004
Matrix: Misc Liquid
Collect Date: 25-SEP-02 17:08
Receive Date: 26-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	29.0	80.0	ug/L	20	MAR1 10/14/02	1256	204641	2

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	
2	EPA 314.0	

Notes:
The Qualifiers in this report are defined as follows :

< Actual result is less than amount reported
> Actual result is greater than amount reported
B Analyte found in the sample as well as the associated blank.
E Concentration exceeds instrument calibration range
H Holding time exceeded
J Indicates an estimated value. The result was greater than the detection limit, but less than the reporting limit.
P The response between the confirmation column and the primary column is >40%D
U Indicates the compound was analyzed for but not detected above the detection limit
UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID: 18PW23
Sample ID: 67787005
Matrix: Misc Liquid
Collect Date: 25-SEP-02 16:15
Receive Date: 26-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/12/02	1519	204641	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

038495

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID:	18PW24	Project:	STEP00202
Sample ID:	67787006	Client ID:	STEP001
Matrix:	Misc Liquid		
Collect Date:	25-SEP-02 16:28		
Receive Date:	26-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR110/12/02	1529	204641	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID: 18PW25
Sample ID: 67787007
Matrix: Misc Liquid
Collect Date: 25-SEP-02 16:33
Receive Date: 26-SEP-02
Collector: Client

Project: STEP00202
Client ID: STEP001

Parameter	Qualifier	Result	Rev Qual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MARI 10/12/02	1539	204641	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

038497

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Report Date: October 15, 2002

Contact: Doug Hawn
Project: Longhorn A.A.P.

Client Sample ID:	18PW26	Project:	STEP00202
Sample ID:	67787008	Client ID:	STEP001
Matrix:	Misc Liquid		
Collect Date:	25-SEP-02 16:40		
Receive Date:	26-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	RwQual	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/12/02	1549	204641	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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> Actual result is greater than amount reported
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UI Uncertain identification for gamma spectroscopy.
X Lab-specific qualifier - must be fully described in case narrative and data summary package
Y QC Samples were not spiked with this compound.

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Reviewed by

Certificate of Analysis

Company : Step, Inc.
Address : 1006 Floyd Culler Ct.
Oak Ridge, Tennessee 37830

Contact: Doug Hawn
Project: Longhorn A.A.P.

Report Date: October 15, 2002

Client Sample ID:	18PW28	Project:	STEP00202
Sample ID:	67787009	Client ID:	STEP001
Matrix:	Misc Liquid		
Collect Date:	25-SEP-02 16:47		
Receive Date:	26-SEP-02		
Collector:	Client		

Parameter	Qualifier	Result	Rev 2nd	DL	RL	Units	DF	AnalystDate	Time	Batch	Method
Ion Chromatography Federal											
EPA 314.0 Perchlorate by IC											
Perchlorate	U	0.00	U	1.45	4.00	ug/L	1	MAR1 10/12/02	1559	204641	1

The following Analytical Methods were performed

Method	Description	Analyst Comments
1	EPA 314.0	

Notes:
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Reviewed by

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038499

Reviewer: Kitchings Date: 10/15

Project: Longhorn AAP SDG: 67867 Matrix/No. Samples: 4-9

I. Sample Management			
A. Sample Preservation, Handling and Transport			
1. Have sample temperatures been kept at ambient temperature?	(Yes)	No	(N/A)
2. Were all samples received in proper condition?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A
Cooler @ ~~4°~~ No temp. requirement			
B. Chain of Custody			
1. Were all samples properly recorded on COCs?	(Yes)	No	N/A
2. Were correct analyses performed on samples?	(Yes)	No	N/A
C. Holding Times			
1. Were samples analyzed within acceptable holding times (28 days)?	(Yes)	No	N/A
2. Were any qualifications required based on this information?	Yes	(No)	N/A

SAMPLED	PREPPED/ANALYZED
9/25	10/12 , 10/14

II. Calibrations			
1. Were proper number of calibration standards used (5: range 4-400 ug/l)?	(Yes)	No	N/A
2. Is the %R for the ICCS within 75-125%; RSDs @ + or – 10%?	(Yes)	No	N/A
3. Are the continuing calibration verification %R within the acceptance window (85-115%)?	(Yes)	No	N/A
4. Was there an ending calibration standard (ECCS)?	(Yes)	No	N/A
5. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

ICV 10/11 @ 00:59 93%

10/12 @ 10:26 25.78/25 =

@ 16:10 110%

10/14 @ 11:45 95%

@ 13:17 75.01/75

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings Date: 10/15

Project: Longhorn AAP SDG: 67787 Matrix/No. Samples: W-1

III.	Blanks			
	1. Are any analytes reported in the method or calibration blanks above the RDL?	Yes	(No)	N/A
	2. Was a laboratory fortified blank analyzed; %R @ 85-115?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: ICB 10/11 @ 1:09 8083 MB @ u
ECB @ 340.

IV.	Instrument Performance Check Sample (IPC)			
	1. Was the IPC sample run at the beginning and end of each sample analysis run?	(Yes)	No	N/A
	2. Is the IPC %R within 80-120% acceptable control limits?	(Yes)	No	N/A
	3. Is the RT for the IPC within acceptable tolerance (<5% shift)?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: IPC 10/11 @ 1:19 @ 90%

V.	Laboratory Control Sample (LCS)			
	1. Are all aqueous LCS %R within 90-110% control limits?	(Yes)	No	N/A
	2. Are all solid LCS %R within control limits established by the laboratory?	Yes	No	(N/A)
	3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications:

8090 $51.4/50 = 102.8\%$

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

038501

Reviewer: Kitchings Date: 10/15

Project: Longhorn AAP SDG: 67787 Matrix/No. Samples: W-9

VI. Duplicates			
1. Were samples used for duplicate sample analysis identified as field blanks?	Yes	(No)	N/A
2. For duplicate samples were the RPDs within control limits (+ or - 15%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 65001 <15%.

87001 u/u

VII. Matrix Spike			
1. Were samples used for matrix spike sample analysis identified as field blanks?	Yes	(No)	N/A
2. Were spike recoveries within laboratory established limits (56-149%); are RPDs within limits (20%)?	(Yes)	No	N/A
3. Were any qualifications required based on this information?	Yes	(No)	N/A

Comments/Qualifications: 65001 22.6 - 12.3 / 10.0 = 103%

24.3 - 12.3 / 10.0 = 120%

RPD = 1.7 / 11.15 = 15.2%

87001 Low R's LCS Okay no qual.

038502

DATA VALIDATION WORKSHEET
PERCHLORATE EPA 314.0

Reviewer: Kitchings **Date:** 10/15

Project: Longhorn AAP **SDG:** 67787 **Matrix/No. Samples:** W, 9

X.	**Sample Result Qualification** Not Required For Level III Data Validation			
	1. Were sample results reported by laboratory supported by raw data?	Yes	No	N/A
	2. Were correct calculations used to determine sample results?	Yes	No	N/A
	3. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

- no detects in any samples.

XI.	**Field QC**			
	1. Were any Field Duplicates associated with this SDG?	Yes	No	N/A
	a. If Yes, were RPDs acceptable (+ or – 15%)?	Yes	No	N/A
	2. Were any field blanks or equipment rinsates associated with this SDG?	Yes	No	N/A
	a. If yes, were any analytes reported in samples >IDL?	Yes	No	N/A
	b. Were any qualifications required based on this information?	Yes	No	N/A

Comments/Qualifications:

XII.	**Overall Assessment of Data**			
	1. Are there any specific concerns or limitations regarding the data in this SDG?	Yes	No	N/A

Comments/Qualifications: