

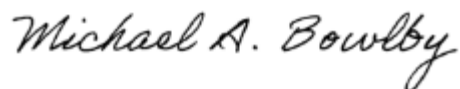
Former Longhorn Army Ammunition Plant Restoration Advisory Board Quarterly Update Quarter 1, Calendar Year 2025

March 27, 2025

Dear Restoration Advisory Board Members,

The Army is committed to protecting human health and the environment. Key to that commitment is engaging the community and increasing public participation in environmental restoration at the Former Longhorn Army Ammunition Plant (LHAAP). Please find the enclosed Quarterly Update documenting the ongoing remedial actions, monitoring, and reporting at each of the active LHAAP sites for the first quarter of calendar year 2025.

Sincerely,



Michael Bowlby
Team Lead, EPA Regions 6 and 8
U.S. Army Environmental Command

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Longhorn Army Ammunition Plant

1st Quarter 2025 Update

SITES WITH REMEDY IN PLACE

LHAAP-04 (Former Pilot Wastewater Treatment Plant)

Semiannual groundwater monitoring and annual reporting continues at this site. Preparation of the Year 5 Remedial Action-Operation (RA-O) Report documenting sampling completed in February and August 2024, is in progress. The first semiannual sampling event for Year 6 was completed in February 2025.

- Contaminants of Concern (COCs): Perchlorate in Groundwater
- Prior Remedial Activities: Excavation, In-Situ Enhanced Bioremediation (ISB)
- Current Remedial Activities: Post-ISB Groundwater monitoring
- Planned Future Remedial Activities: Post-ISB Groundwater monitoring, until determined to be no longer needed. Transfer site property to the U.S. Fish and Wildlife Service.
- Remediation Goal Status: Evaluation of the ISB remedy indicates that reductive degradation processes stimulated by the ISB injections have eliminated the perchlorate groundwater plume. Perchlorate concentrations have been below the protective contaminant level (PCL) since February 2020.

LHAAP-12 (Landfill 12)

Annual groundwater monitoring and annual reporting continues at this site. Preparation of the 2024 RA-O Report documenting sampling completed in December 2024, is in progress. The next sampling annual event is scheduled for December 2025.

- COCs: Trichloroethene (TCE) in Groundwater
- Prior Remedial Activities: Land Use Controls (LUCs) and monitored natural attenuation (MNA)
- Current Remedial Activities: MNA (sampling and reporting), Long-Term Monitoring (LTM) for groundwater, LUC documentation and reporting
- Planned Future Remedial Activities: LTM for groundwater, LUC documentation, and reporting
- Remediation Goal Status: The presence of cis 1,2-DCE indicates that reductive dechlorination is occurring at the site and the December 2024 TCE result at 12WW24 showed values below the MCL, therefore the MNA remedy is working as planned.

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LHAAP-16 (Old Landfill)

Semiannual groundwater monitoring and annual reporting continues at this site. Preparation of the Year 5 RA-O Report documenting sampling completed in June 2024 and January 2025, is in progress. The first semiannual sampling event for Year 6 is scheduled for June 2025.

- COCs: TCE, cis-1,2-dichloroethene (DCE), Vinyl Chloride (VC), and Perchlorate in Groundwater
- Prior Remedial Activities: MNA, ISB, and Groundwater extraction
- Current Remedial Activities: MNA and Post-ISB Groundwater monitoring
- Planned Future Remedial Activities: MNA and ISB
- Remediation Goal Status: Perchlorate and TCE concentrations continue to be reduced after ISB injections, though concentrations remain above MCLs/PCLs in many areas. Geochemical indicators continue to show reductive degradation processes within the treatment area. Additional ISB has been recommended.

LHAAP-35B (37) (Former Chemical Laboratory)

Annual groundwater monitoring and annual reporting continues at this site. Preparation of the Year 8 RA-O Report documenting sampling completed in November 2024, is in progress. The Year 9 annual sampling event is scheduled for November 2025.

- COCs: 1,1-DCE, TCE, and Tetrachloroethylene (PCE) in Groundwater
- Prior Remedial Activities: Enhanced ISB
- Current Remedial Activities: LUC, LTM and MNA (sampling and reporting)
- Planned Future Remedial Activities: LUC, LTM and MNA (sampling and reporting)
- Remediation Goal Status: PCE, TCE, cis 1,2-DCE, and vinyl chloride concentrations near the center of the plume have overall been declining over the seven years of RA-O. However, geochemical indicators show current geochemical conditions to be inadequate to support biological degradation through MNA processes.

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Longhorn Army Ammunition Plant

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LHAAP-46 (Plant 2 Area)

Annual groundwater monitoring and annual reporting continues at this site. Preparation of the Year 11 RA-O Report documenting the annual sampling event completed in February 2025, is in progress.

- COCs: TCE, cis-1,2-DCE, and VC in Groundwater
- Prior Remedial Activities: LUCs and MNA
- Current Remedial Activities: LUC documentation and reporting and MNA (sampling and reporting)
- Planned Future Remedial Activities: LUC documentation and reporting and MNA (sampling and reporting)
- Remediation Goal Status: Concentrations of COCs are decreasing in the majority of wells, with one well showing a recent increasing trend. MNA is still considered the appropriate remedy.

LHAAP-50 (Former Sump Water Tank)

Semiannual groundwater monitoring and annual reporting continues at this site. Preparation of the Year 10 RA-O Report documenting the October 2023 and May 2024 semiannual sampling events, is in progress. The Year 11 first semiannual sampling event was completed in October 2024, and the Year 11 second semiannual sampling event scheduled for May 2025.

- COCs: Perchlorate, PCE, TCE, 1,1-DCE, 1,2-Dichloroethane (DCA), cis-1,2-DCE, and VC in Groundwater
- Prior Remedial Activities: MNA, Excavation, ISB
- Current Remedial Activities: Post-ISB Groundwater monitoring
- Planned Future Remedial Activities: ISB
- Remediation Goal Status: The TCE and perchlorate plumes are stable. Geochemical indicators suggest geochemical conditions are only marginally conducive to biological degradation. Additional ISB injections have been recommended.

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LHAAP-35A (58) (Shops Area)

Annual groundwater monitoring and annual reporting continues at this site. Preparation of the Year 10 RA-O Report documenting the June 2024 sampling event, is in progress. The Year 11 annual sampling event is scheduled for June 2025.

- COCs: PCE, 1,1-DCE, TCE, and VC in Groundwater
- Prior Remedial Activities: Enhanced ISB
- Current Remedial Activities: MNA (sampling and reporting) and LUC documentation and reporting
- Planned Future Remedial Activities: ISB, MNA (sampling and reporting) and LUC documentation and reporting
- Remediation Goal Status: Concentrations of PCE and TCE within the eastern plume have increasing concentration trends and geochemical conditions which are unfavorable to reductive dichlorination. Some COCs within the western plume also show increasing trends. Additional ISB injections have been recommended. COC levels are not migrating beyond the original plume boundaries.

LHAAP-67 (Former Aboveground Storage Tank Farm)

Annual groundwater monitoring and annual reporting continues at this site. Preparation of the Year 11 RA-O Report documenting the November 2024 sampling event, is in progress. The Year 12 annual sampling event is scheduled for November 2025.

- COCs: 1,1-DCE, 1,2-DCA, 1,1,1-trichloroethane (TCA), 1,1,2,-TCA, and TCE in Groundwater
- Prior Remedial Activities: MNA and LUCs
- Current Remedial Activities: MNA (sampling and reporting) and LUC documentation and reporting
- Planned Future Remedial Activities: MNA (sampling and reporting) and LUC documentation and reporting
- Remediation Goal Status: Most wells in the upgradient part of the plume indicate decreasing concentrations with some limited biological degradation. Continued fluctuation along the eastern side of the plume will be monitored to evaluate potential COC increases.

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LHAAP-001-R-01/-003-R-01 (Site 27, South Test Area, Bomb Test Area/ Site 54, Ground Signal Test Area)

Annual LUC inspections and reporting are completed at these sites. The next LUC inspection is scheduled for April 2025.

- COCs: None
- Prior Remedial Activities: Removal of surface munition and explosives of concern
- Current Remedial Activities: Limited groundwater monitoring and LUCs
- Planned Future Remedial Activities: LUCs
- Remediation Goal Status: LUCs are being maintained and managed in accordance with the Remedial Design/Remedial Action Construction Report.

LHAAP-17 (Burning Ground No. 2 / Flashing Area)

Quarterly sampling and annual reporting is completed at this site. Preparation of the Year 2 RA-O Report documenting RA-O activities from August 2023 through August 2024, is in progress. The latest Year 3 quarterly sampling event was completed in March 2025.

- COCs: Perchlorate, TCE, 1,1-DCE, 1,1-DCA, 1,2-DCA, and VC in Groundwater; Perchlorate, 2,4,6-TNT, 2,4-DNT, and 2,6-DNT in Soil
- Prior Remedial Activities: Excavation, Munitions and Explosives of Concern (MEC) assessment, excavation, and disposal
- Current Remedial Activities: Groundwater Extraction and Performance Monitoring
- Planned Future Remedial Activities: Excavation, groundwater extraction, and MNA (sampling and reporting), MEC assessment, excavation, and disposal
- Remediation Goal Status: The extraction and treatment of perchlorate-contaminated groundwater has been effective in reducing groundwater perchlorate concentrations at the site. Groundwater extraction and treatment will continue. Planning for further soil excavation is underway.

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Longhorn Army Ammunition Plant

1st Quarter 2025 Update

SITES PENDING REMEDY IN PLACE

LHAAP-18/24 (Burning Ground No. 3 / Unlined Evaporation Pond)

The interim remedy for LHAAP-18/24 is extraction and treatment of groundwater via the groundwater treatment plant (GWTP). Semiannual sampling and semiannual reporting is completed at LHAAP-18/24 and quarterly surface water sampling is completed on nearby Goose Prairie Creek and Harrison Bayou. During the last quarter of operation the ion exchange resin was replacement for fresh resin on the GWTP in December 2024. See Attachment 5 for the treated volumes of groundwater discharged to Harrison Bayou. See Attached 6 for the quarterly surface water analytical results. Preparation of the July – December 2024 Semiannual GWTP Evaluation Report is in progress, with the next semiannual sampling event scheduled for June 2025.

- COCs: Methylene Chloride (MC), TCE, cis-1,2-DCE, PCE, Benzene, 1,1,2-TCA, VC, Bromodichloromethane, 1,3,5-trinitrobenzene (TNB), 1,4-dioxane, arsenic, barium, chromium, cobalt, nickel, and perchlorate in Groundwater; TCE, MC, and PCE in Soil
- Prior Remedial Activities: Excavation
- Current Remedial Activities: Groundwater Extraction/Treatment (Interim Remedy from 1996 to current)
- Planned Future Remedial Activities: Groundwater extraction and treatment, Enhanced ISB, In-Situ Thermal Desorption (ISTD) of Dense Non-aqueous Phase Liquid (DNAPL), Maintenance of the Unlined Evaporative Pond (UEP) cap, Excavation and off-site disposal, MNA, LTM, and LUCs (The Final Remedial Design was submitted on March 1, 2024)
- Remediation Goal Status: The interim remedy is in place and operating as intended. Planning for implementation of the Final remedy is underway.

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LHAAP-29 (Former TNT Production Area)

The Final Remedial Design was submitted 29 February 2024. No activities occurred at this site during the first Quarter 2025.

- COCs: TCE, 1,2-DCA, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, MC, VC, 2,4-dinitrotoluene (DNT), 4-nitrotoluene (NT), 2-NT, 3-NT, arsenic, mercury, selenium, nickel, and perchlorate in Groundwater; 2,4,6-trinitrotoluene (TNT), 2,4-DNT, 2,6-DNT, and perchlorate in Soil; 1,3-dinitrobenzene (DNB), 2,4,6-TNT, 2,4-DNT, 2-amino-4,6-DNT, and 4-amino-2,6-DNT in Transite TNT Wastewater Line and Cooling Water Drain Line.
- Prior Remedial Activities: None
- Current Remedial Activities: None
- Planned Future Remedial Activities: Flush, inspect, and plug TNT wastewater and cooling water lines, Excavation and off-site disposal, ISTD, MNA, and LUCs (Final Remedial Design submitted 29 February 2024)
- Remediation Goal Status: Planning for implementation of the Final remedy is underway..

LHAAP-47 (Plant 3 Area)

The Remedial Design for LHAAP-47 is in progress.

- COCs: Perchlorate, TCE, cis-1,2-DCE, VC, 1,1-DCE, PCE, 1,2-DCA, acetone, chloroform, trans-1,2-DCE, 2,4,6-TNT, 2,4-DNT, 2,6-DNT, bis(2-ethylhexyl) phthalate, pentachlorophenol, aluminum, antimony, arsenic, cadmium, chromium, cobalt, manganese, nickel, silver, strontium, thallium, tin, and vanadium in Groundwater; Perchlorate and TCE in Soil
- Prior Remedial Activities: Plastic Liner to prevent migration in soil
- Current Remedial Activities: None
- Planned Future Remedial Activities: LUCs, Excavation, ISTD, Enhanced ISB, Biobarriers (permeable reactive barrier), and MNA
- Remediation Goal Status: Planning for implementation of the Final remedy is underway.

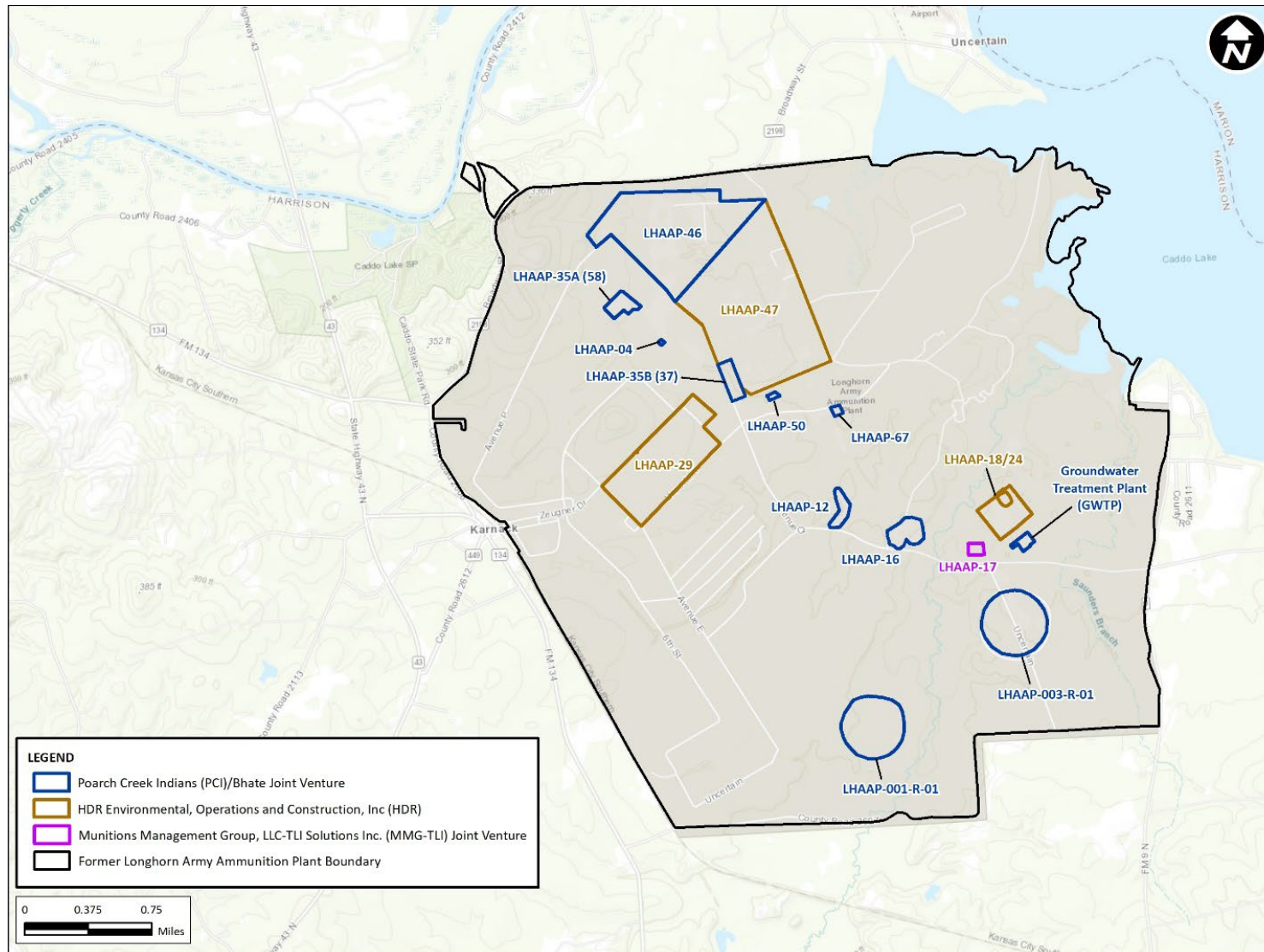
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Longhorn Army Ammunition Plant
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ADMINISTRATIVE UPDATES

November 2024 RAB Meeting

Motions to approve the November 2024 RAB Meeting minutes were received from Tom Walker on January 31, 2025 and from John Fortune on February 27, 2025. The final RAB meeting minutes will be posted to the LHAAP Website (www.longhornaap.com). The next RAB meeting is scheduled for Thursday November 13, 2025.

Longhorn Army Ammunition Plan Site Map



Attachment 3

Definitions

In Situ Bioremediation (ISB) of Groundwater - Bioremediation is an engineered technology that modifies environmental conditions (physical, chemical, biochemical, or microbiological) to encourage microorganisms to destroy or detoxify organic and inorganic contaminants in the environment. The process can be applied above ground in land farms, tanks, biopiles, or other treatment systems (referred to as ex situ) or below ground in the soil or groundwater, referred to as in situ.

More info at [Community Guide to Bioremediation \(epa.gov\)](https://www.epa.gov/bioremediation/community-guide-to-bioremediation)

In situ thermal desorption (ISTD) is an intensive thermally enhanced environmental remediation technology that uses thermal conductive heating (TCH) elements to directly transfer heat to environmental media. The ISTD/TCH process can be applied at low (<100 °C), moderate (~100 °C) and higher (>100 °C) temperature levels to accomplish the remediation of a wide variety of contaminants, both above and below the water table. ISTD/TCH is the only major in situ thermal remediation (ISTR) technology capable of achieving subsurface target treatment temperatures above the boiling point of water and is effective at virtually any depth in almost any media. TCH works in tight soils, clay layers, and soils with wide heterogeneity in permeability or moisture content that are impacted by a broad range of volatile and semi-volatile organic contaminants.

More info at [Community Guide to In Situ Thermal Treatment \(epa.gov\)](https://www.epa.gov/thermal-treatment/community-guide-to-in-situ-thermal-treatment)

Natural attenuation relies on natural processes to decrease or “attenuate” concentrations of contaminants in soil and groundwater. Monitoring typically involves collecting soil and groundwater samples to analyze them for the presence of contaminants and other site characteristics. The entire process is called “monitored natural attenuation” or “MNA.” Natural attenuation occurs at most contaminated sites. However, the right conditions must exist underground to clean sites properly and quickly enough. Regular monitoring must be conducted to ensure that MNA continues to work.

More info at [Community Guide to Monitored Natural Attenuation \(epa.gov\)](https://www.epa.gov/monitored-natural-attenuation/community-guide-to-monitored-natural-attenuation)

Groundwater extraction and treatment or pump and treat is a common method for cleaning up groundwater contaminated with dissolved chemicals, including industrial solvents, metals, and fuel oil. Groundwater is pumped from wells to an above-ground treatment system that removes the contaminants. Pump and treat methods may involve installing one or more wells to extract the contaminated groundwater. Groundwater is pumped from these “extraction wells” to the ground surface, either directly into a treatment system or into a holding tank until treatment can begin. The treatment system may consist of a single cleanup method, such as activated carbon or air stripping, to clean the water. However, treatment often requires several cleanup methods if the groundwater contains different types of contaminants or high concentrations of a single contaminant. The approach to treatment may be modified as contaminant concentrations decrease

More info at [Community Guide to Pump and Treat \(epa.gov\)](https://www.epa.gov/pump-and-treat/community-guide-to-pump-and-treat)

Bioremediation is the use of microbes to clean up contaminated soil and groundwater. Microbes are very small organisms, such as bacteria, that live naturally in the environment. Bioremediation stimulates

Attachment 3

Definitions

the growth of certain microbes that use contaminants as a source of food and energy. Contaminants treated using bioremediation include oil and other petroleum products, solvents and pesticides.

More info at [Community Guide to Bioremediation \(epa.gov\)](https://www.epa.gov/bioremediation)

Air stripping is the process of moving air through contaminated water in an aboveground treatment system to remove chemicals called “volatile organic compounds” or “VOCs.” VOCs are chemicals that easily evaporate, which means they can change from a liquid to a vapor (a gas). The air passed through contaminated water helps evaporate VOCs faster. The chemical vapors are collected, and either treated or vented outside if VOC levels are low enough. Air stripping is commonly used to treat groundwater as part of the pump and treat cleanup method.

More info at [Community Guide to Air Stripping \(epa.gov\)](https://www.epa.gov/airstripping)

A permeable reactive barrier, or “PRB,” is a wall created below ground to clean up contaminated groundwater. The wall is “permeable,” which means that groundwater can flow through it. Water must flow through the PRB to be treated. The “reactive” materials that make up the wall either trap harmful contaminants or make them less harmful. The treated groundwater flows out the other side of the wall.

More info at [Community Guide to Permeable Reactive Barriers \(epa.gov\)](https://www.epa.gov/permeable-reactive-barriers)

Attachment 4

Acronyms and Abbreviations

COC	Contaminant of Concern
DCA	Dichloroethane
DCE	Dichloroethene
DNAPL	Dense Non-aqueous Phase Liquid
DNB	Dinitrobenzene
DNT	Dinitrotoluene
ISB	In-Situ Bioremediation
ISTD	In-Situ Thermal Desorption
LHAAP	Longhorn Army Ammunition Plant
LTM	Long Term Monitoring
LUC	Land Use Control
MC	Methylene Chloride
MNA	Monitored Natural Attenuation
NT	Nitrotoluene
PCE	Tetrachloroethene
RA-O	Remedial Action Operation
TCA	Trichloroethane
TCE	Trichloroethene
TNB	Trinitrobenzene
TNT	Trinitrotoluene
UEP	Unlined Evaporative Pond
VC	Vinyl Chloride

Attachment 5

Groundwater Treatment Plant - Processed Groundwater Volumes

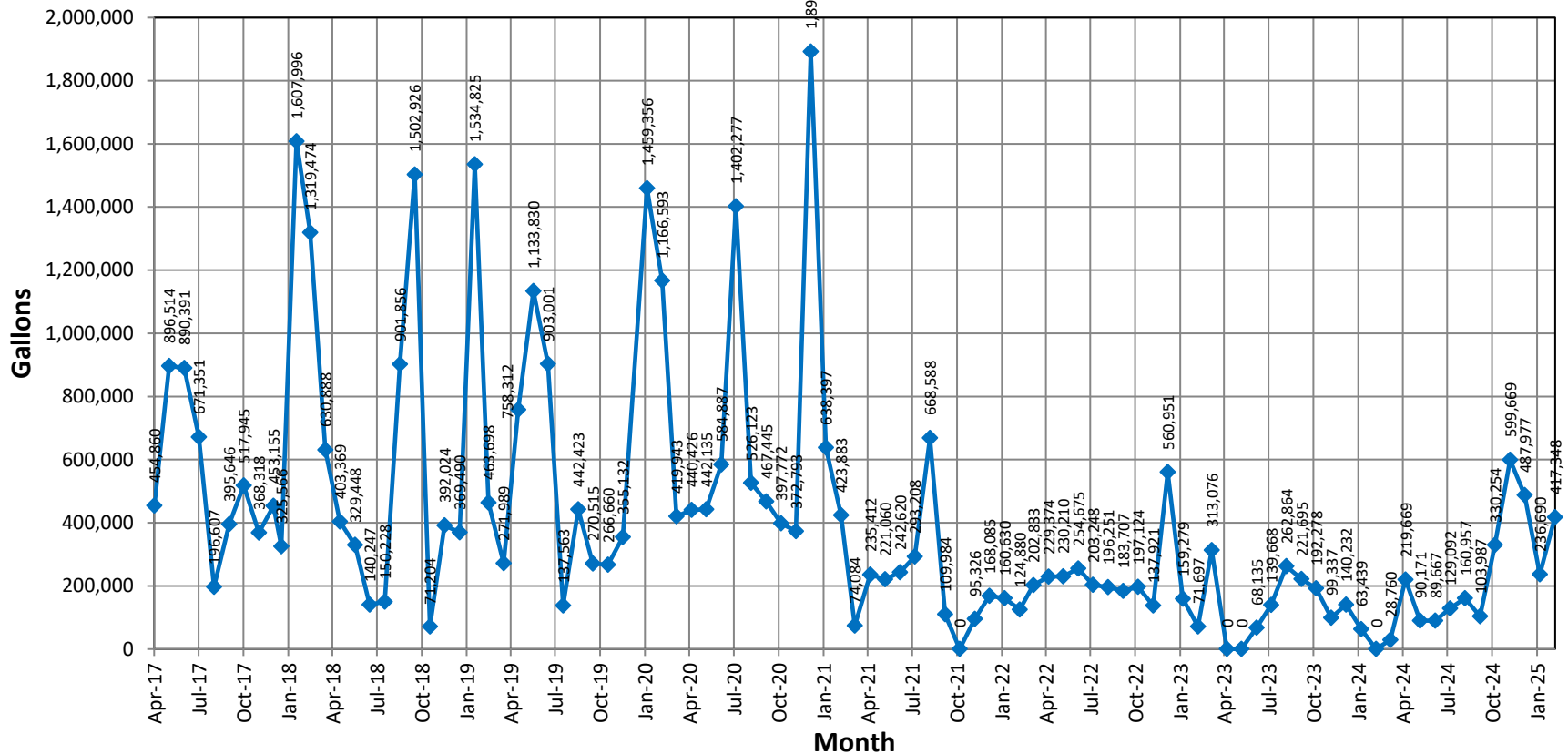
The amount of groundwater treated is determined by measuring the number of gallons of processed water discharged.

Processed Water Data (in gallons)

Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
454,860	896,514	890,391	528,538	195,198	961,324	517,945	368,318	453,155	325,566	1,607,996	1,319,474
Apr-18	May-18	Jun-18	Jul - 18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19
630,888	403,369	329,448	140,247	150,228	901,856	1,502,926	71,204	392,024	369,490	1,534,825	463,698
Apr-19	May-19	Jun-19	Jul - 19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20
271,989	758,312	1,133,830	1,415,203	493,063	442,423	270,515	288,683	355,132	1,459,356	1,166,593	419,943
Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21
440,426	442,135	584,887	1,402,277	539,526	467,445	397,772	372,793	1,832,274	638,397	423,883	74,084
Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22
235,412	1,121,060	242,620	293,208	668,588	109,984	0	95,326	439,585	322,130	124,880	202,833
Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23
229,374	230,210	254,675	203,248	196,251	183,707	197,124	137,921	560,951	159,279	71,697	313,076
Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24
0	0	68,135	110,535	262,864	221,695	192,278	99,337	140,232	63,439	0	28,760
Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	
219,669	90,171	89,667	129,092	160,957	103,987	330,254	599,669	487,977	236,690	417,348	

Attachment 5 Groundwater Treatment Plant - Processed Groundwater Volumes

Treated Groundwater Discharged Monthly from April 2017 through February 2025



Notes:

No groundwater discharged in October 2021 due to a power disruption to the GWTP.

No groundwater discharged in April-May 2023 during contract transition.

No groundwater discharged in February 2024 due to freezing temperatures.

Attachment 5

Groundwater Treatment Plant - Processed Groundwater Volumes

Water Discharge Location and Volume (Gallons)					
Month	Total Combined to Harrison Bayou	LHAAP-18/24 Sprinklers	GWTP To INF Pond	INF Pond to Harrison Bayou	Contract Hauled Off-Site
Apr-17	113,038	0	236,821	0	0
May-17	0	0	534,155	0	0
Jun-17	958,404	0	294,550	490,574	0
Jul-17	0	0	528,538	0	0
Aug-17	0	0	195,197	0	0
Sep-17	651,434	0	309,980	651,434	0
Oct-17	0	0	517,945	0	0
Nov-17	0	0	368,318	0	0
Dec-17	560,350	0	453,155	560,350	0
Jan-18	325,566	0	253,177	325,566	0
Feb-18	1,607,996	0	62,017	1,430,634	0
Mar-18	1,319,474	0	0	870,816	0
Apr-18	630,888	0	0	630,888	0
May-18	403,369	0	0	403,369	0
Jun-18	193,669	0	135,779	0	0
Jul -18	0	0	140,247	0	0
Aug -18	49,409	0	100,819	0	0
Sep-18	585,397	0	316,459	524,484	0
Oct-18	1,409,106	0	93,820	1,016,285	0
Nov-18	71,204	0	0	0	0
Dec-18	392,024	0	0	0	0
Jan-19	369,490	0	0	369,490	0
Feb-19	1,534,825	0	0	1,326,485	0
Mar-19	463,698	0	0	83,250	0
Apr-19	271,989	0	0	0	0
May-19	758,312	0	0	253,817	0
Jun-19	1,133,830	0	0	847,918	0
Jul-19	1,415,203	0	0	903,001	0
Aug-19	374,629	0	118,434	0	0
Sep-19	0	0	442,423	0	0
Oct-19	0	0	270,515	0	0
Nov-19	115,503	0	173,180	0	0
Dec-19	318,248	0	36,884	0	0
Jan-20	1,459,396	0	0	1,115,183	0

Attachment 5

Groundwater Treatment Plant - Processed Groundwater Volumes

Water Discharge Location and Volume (Gallons)					
Month	Total Combined to Harrison Bayou	LHAAP-18/24 Sprinklers	GWTP To INF Pond	INF Pond to Harrison Bayou	Contract Hauled Off-Site
Feb-20	1,166,593	0	0	741,954	0
Mar-20	419,943	0	0	0	0
Apr-20	440,426	0	0	0	0
May-20	442,135	0	0	0	0
June-20	584,887	0	0	0	0
July-20	1,402,277	0	0	984,393	0
Aug-20	216,197	0	323,359	0	0
Sep-20	0	0	467,445	0	0
Oct-20	0	0	397,772	0	0
Nov-20	0	0	372,793	0	0
Dec-20	1,832,274	0	60,199	1,571,432	0
Jan-21	638,397	0	0	383,318	0
Feb-21	423,883	0	0	259,875	0
Mar-21	74,084	0	0	74,084	0
Apr-21	235,412	0	0	0	0
May-21	1,121,060	0	0	900,000	0
Jun-21	242,620	0	0	0	0
Jul-21	293,208	0	0	243,675	0
Aug-21	668,588	0	0	561,527	0
Sep-21	0	0	109,984	0	0
Oct-21	0	0	0	0	0
Nov-21	0	0	95,326	0	0
Dec-21	271,500	0	168,085	271,500	0
Jan-22	161,500	0	160,630	161,500	0
Feb-22	0	0	124,880	0	0
Mar-22	190,898	0	11,935	0	0
Apr-22	229,374	0	0	0	0
May-22	230,210	0	0	0	0
June-22	254,675	0	0	0	0
July-22	0	0	203,248	0	0
Aug-22	34,115	0	162,136	0	0
Sept-22	83,312	0	100,395	0	0
Oct-22	0	0	197,124	0	0
Nov-22	0	0	137,921	0	0
Dec-22	560,951	0	0	514,515	0

Attachment 5

Groundwater Treatment Plant - Processed Groundwater Volumes

Water Discharge Location and Volume (Gallons)					
Month	Total Combined to Harrison Bayou	LHAAP-18/24 Sprinklers	GWTP To INF Pond	INF Pond to Harrison Bayou	Contract Hauled Off-Site
Jan-23	159,279	0	0	145,321	0
Feb-23	71,697	0	0	71,697	0
Mar-23	313,076	0	0	313,076	0
Apr-23	0	0	0	0	0
May-23	0	0	0	0	0
June-23	68,135	0	0	0	0
July-23	29,133	0	110,535	0	0
Aug-23	0	0	262,864	0	0
Sept-23	0	0	221,695	0	0
Oct-23	0	0	192,278	0	0
Nov-23	0	0	99,337	0	0
Dec-23	0	0	140,232	0	0
Jan-24	187,463	0	63,439	175,500	0
Feb-24	0	0	0	0	0
Mar-24	28,760	0	0	0	0
Apr-24	219,669	0	0	0	0
May-24	90,171	0	0	0	0
Jun-24	89,667	0	0	0	0
Jul-24	129,092	0	0	0	0
Aug-24	160,957	0	0	0	0
Sept-24	103,987	0	0	0	0
Oct-24	330,254	0	0	0	0
Nov-24	599,669	0	0	0	0
Dec-24	487,977	0	0	0	0
Jan-25	236,690	0	0	0	0
Feb-25	417,348	0	0	0	0

Notes: GWTP – Groundwater Treatment Plant; INF - Intermediate-Range Nuclear Force

Attachment 6

Harrison Bayou and Goose Prairie Creek – Perchlorate Data

Surface water samples are collected quarterly from each location in Harrison Bayou and Goose Prairie Creek, unless the sampling location is dry.

Surface Water Sample Data (in micrograms per liter)

Quarter	1 st	2 nd	3 rd	4 th	1 st	2 nd	3 rd
Creek Sample ID	Feb 2017	May 2017	Aug 2017	Dec 2017	Mar 2018	Jun 2018	Aug 2018
GPW-1	<1 U	0.263	Dry	<2.0 U	<2.0 U	Dry	<2.0 U
GPW-3	<1 U	0.274	Dry	<2.0 U	<2.0 U	Dry	<2.0 U
HBW-1	<1 U	<0.2 U	<0.2 U	1.1 J	<2.0 U	Dry	<2.0 U
HBW-7	<1 U	0.155	<0.2 U	<2.0 U	<2.0 U	Dry	<2.0 U
HBW-10	<1 U	<0.2 U	0.111 J	<2.0 U	<2.0 U	Dry	<2.0 U

Quarter	4 th	1 st	2 nd	3 rd	4 th	1 st	2 nd	3 rd	4 th	1 st
Creek Sample ID	Oct 2018	Jan 2019	Apr 2019	Jul 2019	Oct 2019	Jan 2020	Apr 2020	Jul 2020	Dec 2020	Feb 2021
GPW-1	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	0.163	0.0589 J	<0.05 U	0.110	<0.05 U
GPW-3	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	0.156	0.0662 J	0.0326 J	0.108	<0.05 U
HBW-1	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	0.0600 J	<0.05 U	<0.05 U	0.0374 J	<0.05 U
HBW-7	<2.0 U	<2.0 U	<2.0 U	27 (initial)/ 1.2 J (resample)	1.6 J	0.0761 J	<0.05 U	0.0318 J	0.0265 J	<0.05 U
HBW-10	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	0.0782 J	<0.05 U	<0.05 U	<0.05 U	<0.05 U

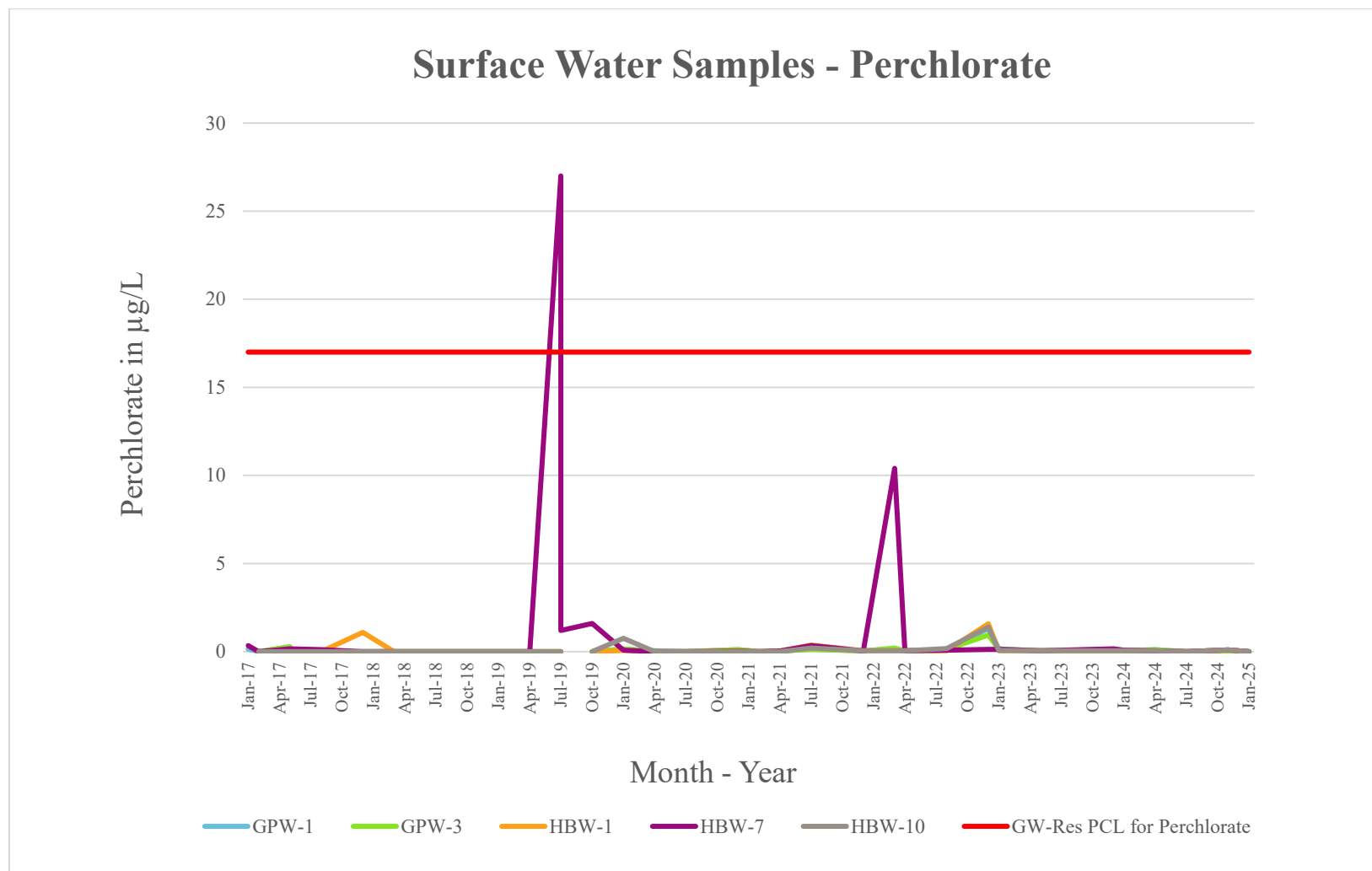
Quarter	2 nd	3 rd	4 th	1 st	2 nd	3 rd	4 th	1 st	2 nd	3 rd	4 th
Creek Sample ID	Apr 2021	Jul 2021	Dec 2021	Mar 2022	Apr 2022	Aug 2022	Dec 2022	Jan 2023	May 2023	Jul-Sep 2023	Dec 2023
GPW-1	0.0268 J	0.154	0.0394 J	0.162	0.042 J	0.104	1.30	0.153	0.0286 J	Dry	0.0973 J
GPW-3	0.0321 J	0.122	0.0344 J	0.198	0.0384 J	0.132	0.938	0.137	< 0.05 U	Dry	0.0382 J
HBW-1	0.0410 J	0.369	0.050 U	0.052 J	<0.05 U	0.0540 J	1.58	0.0568 J	< 0.05 U	Dry	< 0.05 U
HBW-7	0.0373 J	0.348	0.0359 J	10.4	0.0493 J	0.0880 J	0.125	0.133	< 0.05 U	Dry	0.163
HBW-10	<0.05 U	0.207	0.0464 J	<0.05 U	<0.05 U	0.171	1.39	0.0654 J	< 0.05 U	Dry	0.0546 J

Quarter	1 st	2 nd	3 rd	4 th	1 st
Creek Sample ID	Jan 2024	Apr 2024	Jul 2024	Nov 2024	Jan 2025
GPW-1	0.0671 J	0.0907 J	0.0253 J	< 0.10	0.069 J
GPW-3	0.0490 J	0.106	0.0419 J	0.095 J	0.050 J
HBW-1	0.0693 J	0.0368 J	0.0342 J	< 0.10	0.064 J
HBW-7	0.0772 J	< 0.05 U	0.0338 J	< 0.10	0.14 J
HBW-10	0.0565 J	< 0.05 U	0.0306 J	< 0.10	0.057 J

U – non-detect J – Estimated Dry – no surface water

Attachment 6

Harrison Bayou and Goose Prairie Creek – Perchlorate Data



Note: Surface water at HBW-7 had a detection of 27 $\mu\text{g/L}$ from a sample collected on 11 July 2019. Surface water at HBW-7 was resampled 19 days later (30 July 2019) with a detection of 1.2 J (estimated result) $\mu\text{g/L}$. GPW – Goose Prairie Creek sample location; HBW – Harrison Bayou sample location. GW Res – Groundwater residential limit; PCL – Protective Concentration Level; $\mu\text{g/L}$ – micrograms per liter. No surface water sampling was conducted in the 3rd Quarter 2023 due to dry conditions.

Attachment 6

Harrison Bayou and Goose Prairie Creek – Perchlorate Data

Longhorn Army Ammunition Plant Creek Sampling Locations

