



**Subject: Final Minutes, Quarterly Restoration Advisory Board (RAB) Meeting
Longhorn Army Ammunition Plant (LHAAP)**

Location of Meeting: Karnack Community Center, Karnack, Texas

Date of Meeting: 16 November 2023, 2:30-2:45PM Central Standard Time (CST)

Meeting Participants:

USACE: Aaron Williams and Chelsea Montoya,
USAEC: Lena Sierocinski
PCI/Bhate JV: Kim Nemmers, Ike Eldridge, and Scott Beesinger
APTIM: William (Bill) Foss
USEPA: Brian Follin, Joel Reyes, and Janetta Coats
TCEQ: April Palmie and Midori Campbell
HDR: Anita Patel, Phil Werner, and Gregory Kelly
RAB: Present: Judy VanDeventer, Tom Walker, Margaret Roland, Eugene Byrd,
Deon Hall, and Sharon McAvoy
Absent: Nigel Shivers, Donna Burney, Jorn Fortune, Terry Britt and
Richard LeTourneau
Public: Jessica Harker (Marshall News), Meredith Shamburger (Marshall News),
Gloria Braud, Holley Noon, Patrick Noon, Laura-Ashley Overdyke
(Executive Director of the Caddo Lake Institute)

An agenda for the RAB meeting, a color copy of the Bhate Environmental Associates, Inc. (Bhate) slide presentation, and handouts (see list at end of meeting minutes) were provided for meeting attendees.

Welcome and Introduction

Ms. Judy VanDeventer called the RAB meeting to order at 2:30 pm CST.

Ms. Lena Sierocinski with the United States Army Environmental Command (USAEC) introduced herself as the new RAB co-chair and welcomed everyone to the meeting. She asked all attendees to introduce themselves. Each person listed above under meeting participants introduced themselves.

Opening Items

Ms. Sierocinski checked to make sure that all the RAB members were able to view the minutes from the previous RAB meeting in June 2023, in which the members responded “yes”. Ms. VanDeventer made a motion to approve the June 2023 RAB Meeting minutes. Mr. Deon Hall seconded the motion.

Ms. Sierocinski encouraged all attendees to join the RAB, which she explained can be done by completing the application found on the website, www.longhornaap.com. Ms. Sierocinski stated if there are any questions, she can be contacted through email to provide answers.



Overview of Sites

Ms. Nemmers stated that there are three environmental contractors including Poarch Band Creek Indians (PCI)/Bhate Joint Venture (JV), who is primarily maintaining and monitoring remedies at a number of sites. Ms. Nemmers stated that HDR, Inc. (HDR) is preparing the remedial design at three sites following approval of the Record of Decisions (RODs), which has progressed significantly under their leadership. Ms. Nemmers stated LHAAP-17 includes groundwater extraction for perchlorate managed by Munitions Management Group (MMG)/TLI Solutions (TLI) JV, with the assistance of Bhate.

Ms. Nemmers stated the meeting will focus on the groundwater treatment plant (GWTP) because of the tour following the meeting. She explained that the GWTP currently extracts groundwater from LHAAP-17 and LHAAP-18/24, and formerly extracted groundwater from LHAAP-16. However, Ms. Nemmers stated that LHAAP-16 now has a final remedy and explained that the extraction of groundwater from LHAAP-18/24 was established as an interim remedy.

Groundwater Treatment Plant

Ms. Nemmers provided the GWTP update for April through November 2023. Ms. Nemmers explained that the treatment plant was shut down in April 2023 due to the contract transition from Bhate to PCI/Bhate JV. Upon issuance of the contract, the GWTP was re-started on 3 May 2023. Ms. Nemmers stated that one of the initial tasks completed in May 2023 was the Fluidized Bed Reactor (FBR) start up and evaluation. She explained that the FBR followed by two ion exchange (IX) vessels provide further treatment of perchlorate, prior to discharge of groundwater to Harrison Bayou. Due to the system shut down in April 2023, Ms. Nemmers explained additional repairs were required. Furthermore, Ms. Nemmers stated many improvements were able to be completed under the PCI-Bhate JV contract, including the installation of pumps and lighting at the GWTP. She explained that although the system is successfully operating, as it is over 25 years old, there will likely continue to be repairs going forward. Ms. Nemmers stated that the GWTP began normal operation in July 2023 and planned repairs under the PCI/Bhate JV contract are near completion.

Ms. Nemmers proceeded to address the graphs presented. She stated the numbers shown represent discharge from the GWTP in addition to any discharge from the Intermediate-Range Nuclear Forces (INF) pond. Ms. Nemmers explained the INF pond is where groundwater treated by the GWTP is stored when it cannot be discharged to the bayou when there is not sufficient flow. She stated the difference in the quantity of groundwater discharge, when comparing recent data to the 2020 data, is due to the large amount of rain observed in 2020 versus the minimal rain observed in 2023. Ms. Nemmers explained that the amount of water extracted is also influenced by rainfall as more water is able to be extracted when rainfall percolates into the ground, and therefore, greater amounts are able to be pumped out. Ms. Nemmers stated the graph also reflects the downtime in 2023, previously discussed, due to the GWTP closure and that the discharge volume increases in June and July 2023. She proceeded to explain that



no surface water sampling of Harrison Bayou or Goose Prairie Creek has occurred this quarter due to the lack of rainfall and subsequently no flow in the creeks; however, sampling will take place as soon as flow is present. Ms. Nemmers stated that there are five surface water sampling locations; two of which are along Gooseberry Creek and three of which are along the Harrison Bayou.

Other RAB Items Discussed

Ms. Nemmers explained that in May 2023, a one-year contract with a one-year option was established between Bhate and PCI as a JV. She stated that PCI is considered an 8A, which is a special designation as it is a Native American company based in Alabama. She stated as an 8A, there is an ability for tasks to be more easily directed to the company. Ms. Nemmers explained that while PCI is a large organization involved in a wide range of sectors, it is new to the environmental industry. Therefore, the mission of the JV is for Bhate to mentor PCI in environmental remediation.

Next RAB Meeting Schedule and Closing Remarks

Ms. Nemmers stated that Mr. Beesinger would lead the RAB tour and that a map of the tour route and site information was included in the slide package. Ms. Nemmers stated that site-specific questions would be answered on the tour.

Ms. Sierocinski then discussed the next meeting with the RAB members. It was decided that the next RAB Meeting will be held on Thursday, 22 February 2023, with the meeting starting at 6:00 pm CST at the Karnack Community Center.

Adjourn

Ms. VanDeventer motioned to adjourn. Mr. Hall seconded the motion. The meeting adjourned at 2:45 pm CST. The RAB tour then commenced and was completed at 4:50 pm CST.

November 2023 Meeting Attachments and Handouts:

- Meeting Agenda
- Color Copy of Bhate Presentation Slides
- GWTP- Flow handout
- Harrison Bayou and Goose Prairie Creek hand out



LONGHORN ARMY AMMUNITION PLANT (LHAAP)

Restoration Advisory Board Meeting

16 NOVEMBER 2023

AGENDA

Welcome and Introduction

Open Items

- Ongoing Outreach/Website
- Restoration Advisory Board (RAB) Administrative Items
- Minutes (June 2023 RAB Meeting)

Defense Environmental Restoration Program (DERP) Update

- Groundwater Treatment Plant Update

Next RAB Meeting Schedule and Closing Remarks

Begin Site Tour

THE ARMY WANTS YOU TO BE INFORMED

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 Longhorn Army Ammunition Plant (LHAAP)

You are encouraged to:

- Attend Restoration Advisory Board (RAB) Meetings and/or become a member of the RAB.
- Visit the Longhorn environmental website, which is regularly updated, at <http://longhornaap.com/>.
- Make suggestions for improving communication – the Army welcomes and appreciates community feedback.

ADMINISTRATIVE ITEMS

Restoration Advisory Board (RAB) Membership Update

- Persons interested in being new members.

Minutes (June 2023 RAB Meeting)

LHAAP ENVIRONMENTAL CONTRACTORS

Poarch Creek Indians (PCI)/Bhate Joint Venture:

- LHAAP-04, LHAAP-12, LHAAP-16, LHAAP-19, LHAAP-37, LHAAP-46, LHAAP-50, LHAAP-58, LHAAP-67, LHAAP-001-R-01, LHAAP-003-R-01, and LHAAP-18/24 (interim remedy).

HDR Environmental, Operations and Construction, Inc (HDR)

- LHAAP-18/24, LHAAP-29, and LHAAP-47.

Munitions Management Group, LLC-TLI Solutions Inc. (MMG-TLI) Joint Venture:

- LHAAP-17.

LEGEND

- LHAAP Site
- Former Longhorn Army Ammunition Plant Boundary

LHAAP-18/24

LHAAP-17

Groundwater Treatment Plant (GWTP)

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

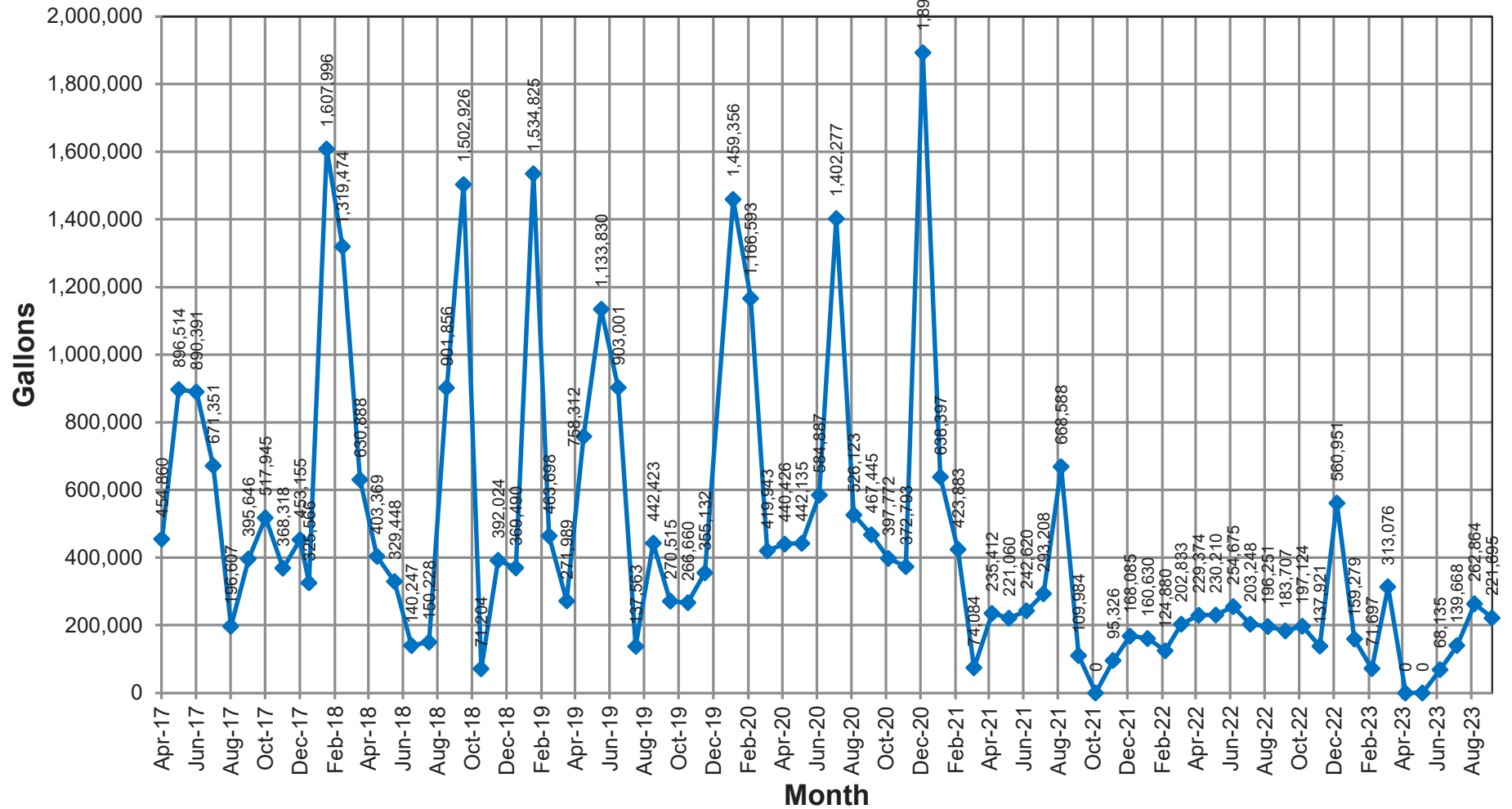
GWTP UPDATE

Groundwater Treatment Plant (GWTP) Operations (April – November 2023):

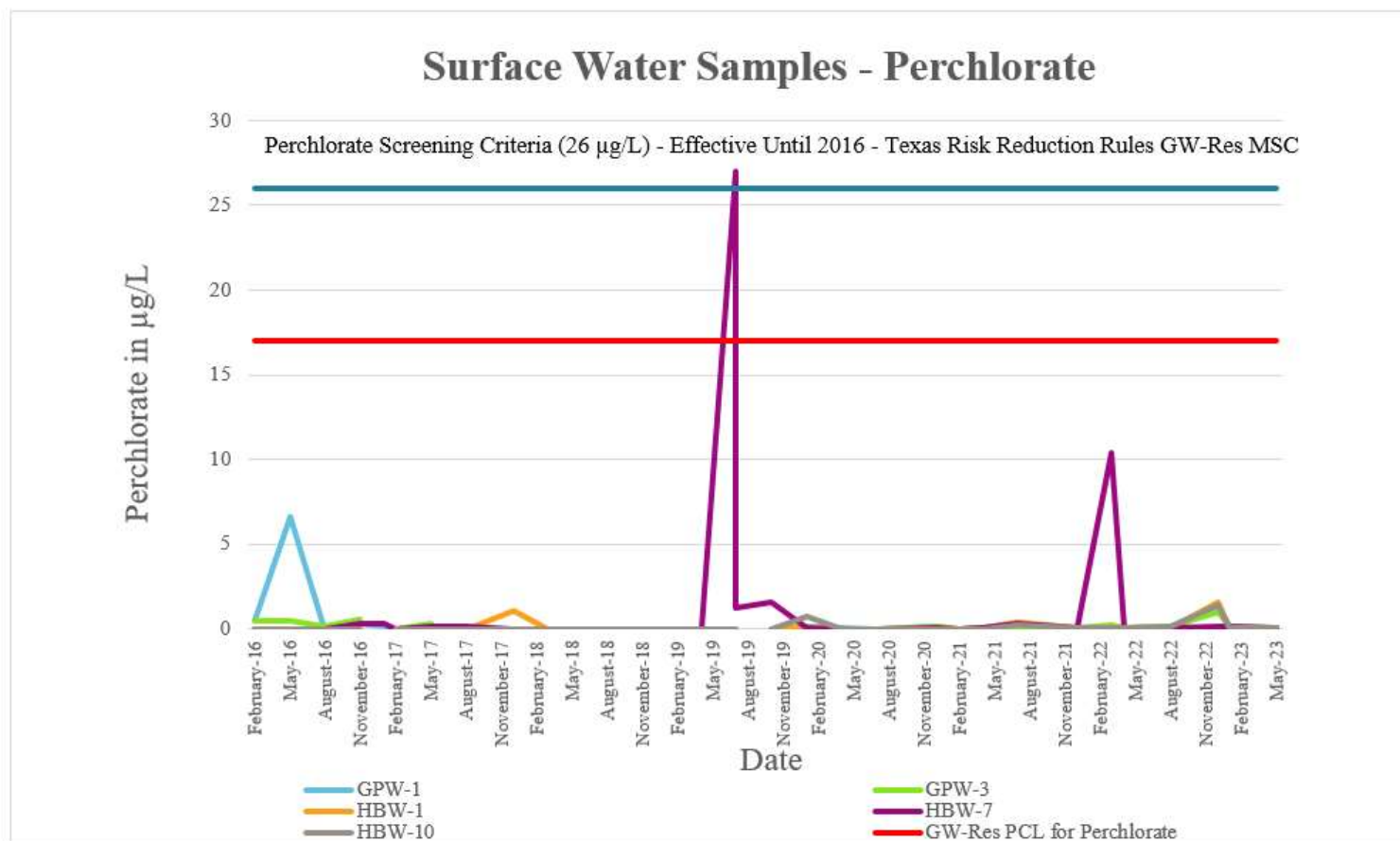
- April 2023 – GWTP shutdown during contract transition.
- May 2023 – GWTP operations restarted 3 May 2023 after PCI/Bhate Joint Venture contract award.
 - Fluidized Bed Reactor startup/evaluation
- May/June 2023 – GWTP repairs
- July 2023 – GWTP returned to full operation.
- October/November 2023 – Additional repairs planned including installation of exterior lighting.

GWTP DISCHARGE UPDATE

Treated Groundwater Discharged Monthly from April 2017 through September 2023

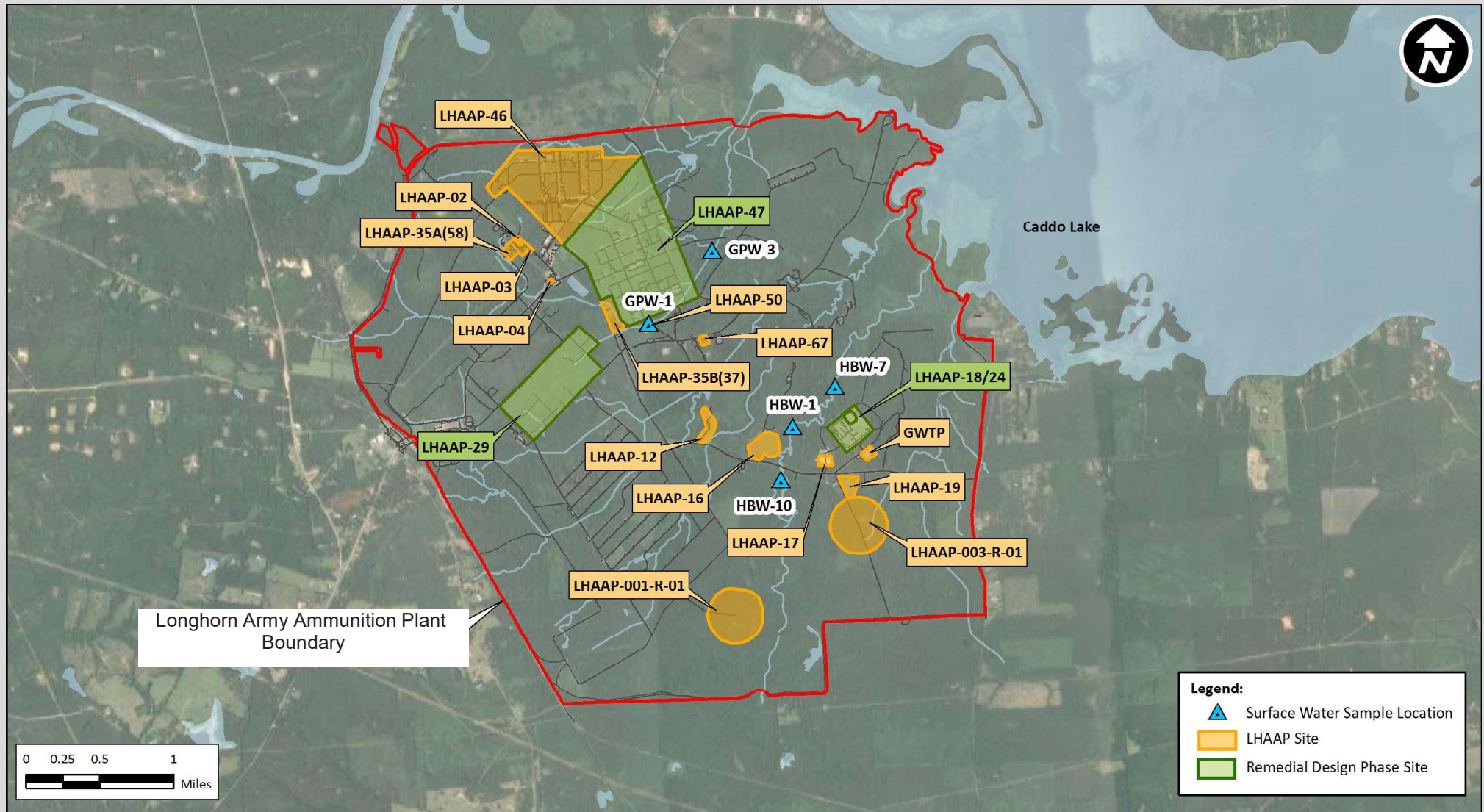


SURFACE WATER SAMPLE RESULTS



Note: Surface water at HBW-7 had a detection of 27 µg/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) µg/L. GPW – Goose Prairie Creek sample location; HBW – Harrison Bayou sample location. GW Res – Groundwater residential limit; MSC – Medium Specific Concentration; PCL – Protective Concentration Level; µg/L – micrograms per liter. No surface water sampling was conducted in the 3rd Quarter 2023 due to dry conditions.

SURFACE WATER SAMPLE LOCATIONS



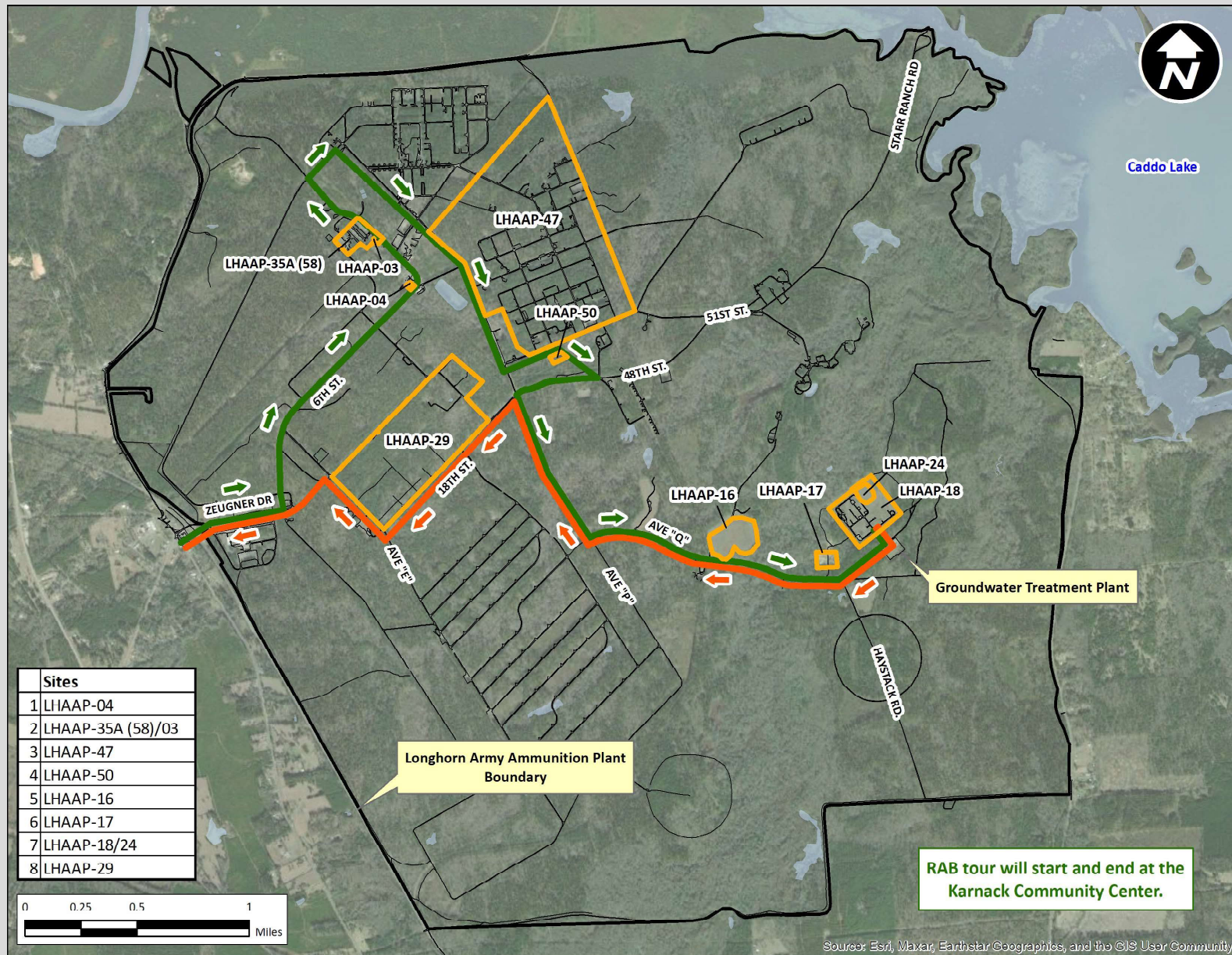
NEXT MEETING SCHEDULE AND CLOSING REMARKS

Schedule Next Restoration Advisory Board Meeting

Other Items/Remarks

Begin Site Tour at Community Center

SITE TOUR ROUTE



SITE TOUR

LHAAP-04 (Former Pilot Wastewater Treatment Plant):

- Groundwater Contaminant of concern (COC): Perchlorate
- Prior remedy: Excavation
- Current remedy: In-situ-Enhanced Bioremediation

LHAAP-35A (58)/LHAAP-03 (Shops Area/Formal Waste Collection Pad):

- Groundwater COCs: Chlorinated volatile organic compounds (CVOCs)
- Current remedy: In-situ-Enhanced Bioremediation

LHAAP-47 (Plant 3 Area):

- Soil COCs: Perchlorate and trichloroethene (TCE)
- Groundwater COCs: Perchlorate, CVOCs, explosives, metals
- Planned soil remedy: Excavation
- Planned groundwater remedy: In-situ thermal desorption (ISTD), enhanced in-situ bioremediation (ISB) in target areas; biobarriers, monitored natural attenuation (MNA) and land use controls (LUCs).

SITE TOUR

LHAAP-50 (Former Sump Water Tank):

- Groundwater COCs: Perchlorate and CVOCs
- Soil COC: Perchlorate
- Current remedy: In-situ-Enhanced Bioremediation

LHAAP-16 (Old Landfill):

- Groundwater COCs: Perchlorate and CVOCs
- Current remedy: In-situ-Enhanced Bioremediation

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

- Groundwater COCs: Perchlorate and CVOCs
- Soil COCs: Perchlorate and explosives
- Current remedy: Soil Excavation/Munitions Response/Groundwater Extraction

SITE TOUR

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

- Shallow zone groundwater COCs: Volatile Organic Compounds (VOCs), metals (arsenic, barium, chromium, cobalt, and nickel), and perchlorate
- Wilcox Formation groundwater COCs: VOCs, metals (arsenic and barium), and perchlorate
- Soil COCs: VOCs and perchlorate
- Interim remedy: Groundwater extraction and treatment
- Planned remedy: Enhanced groundwater extraction and treatment, land use controls (LUCs), enhanced in-situ bioremediation (EISB) for Shallow Zone and Wilcox formation groundwater inside and outside the containment area, in-situ thermal desorption (ITSD) for dense non-aqueous phase liquid (DNAPL) removal, maintenance of the existing cap over the Unlined Evaporation Pond (UEP), unsaturated soil excavation and off-site disposal, Monitored Natural Attenuation (MNA), and long-term monitoring.

SITE TOUR

LHAAP-29 (Former TNT Production Area):

- Shallow zone groundwater COCs: VOCs, explosives, metals and perchlorate
- Intermediate zone groundwater: VOCs and arsenic
- Soil COCs: Explosives and perchlorate
- Transite TNT wastewater line and cooling water drain line COCs: Explosives
- Planned remedy: In-situ thermal desorption followed by monitored natural attenuation (MNA)/land use controls (LUCs), excavation/disposal for soil, sediments, and solid residue, flushing and plugging pipelines, and targeted pipeline excavation.

End Tour at Community Center

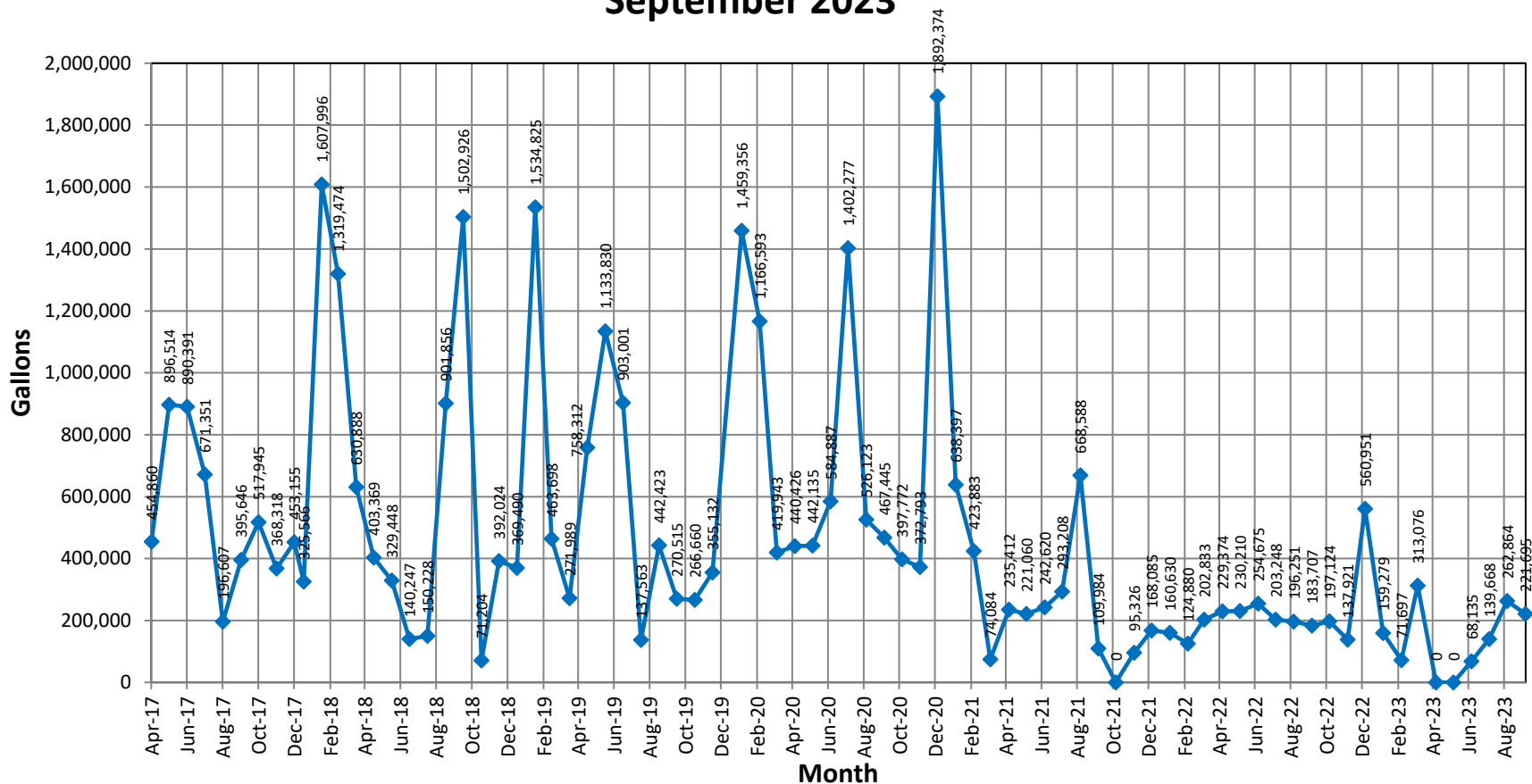
Groundwater Treatment Plant - Processed Groundwater Volumes

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	164,963	541,371
Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23						
0	0	90,833	173,635	363,998	343,831						

Treated Groundwater Discharged Monthly from April 2017 through September 2023



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.

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

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

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

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

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	4 th	1 st	2 nd	3 rd
Creek Sample ID	Feb 2016	May 2016	Aug 2016	Nov 2016	Feb 2017	May 2017	Aug 2017	Dec 2017	Mar 2018	Jun 2018	Aug 2018
GPW-1	0.447	6.59	<0.2 U	0.301 J	<1 U	0.263	Dry	<2.0 U	<2.0 U	Dry	<2.0 U
GPW-3	0.474	0.457	0.141	0.563	<1 U	0.274	Dry	<2.0 U	<2.0 U	Dry	<2.0 U
HBW-1	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<1 U	<0.2 U	<0.2 U	1.1 J	<2.0 U	Dry	<2.0 U
HBW-7	<0.2 U	<0.2 U	<0.2 U	0.318 J	<1 U	0.155	<0.2 U	<2.0 U	<2.0 U	Dry	<2.0 U
HBW-10	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<1 U	<0.2 U	0.111 J	<2.0 U	<2.0 U	Dry	<2.0 U

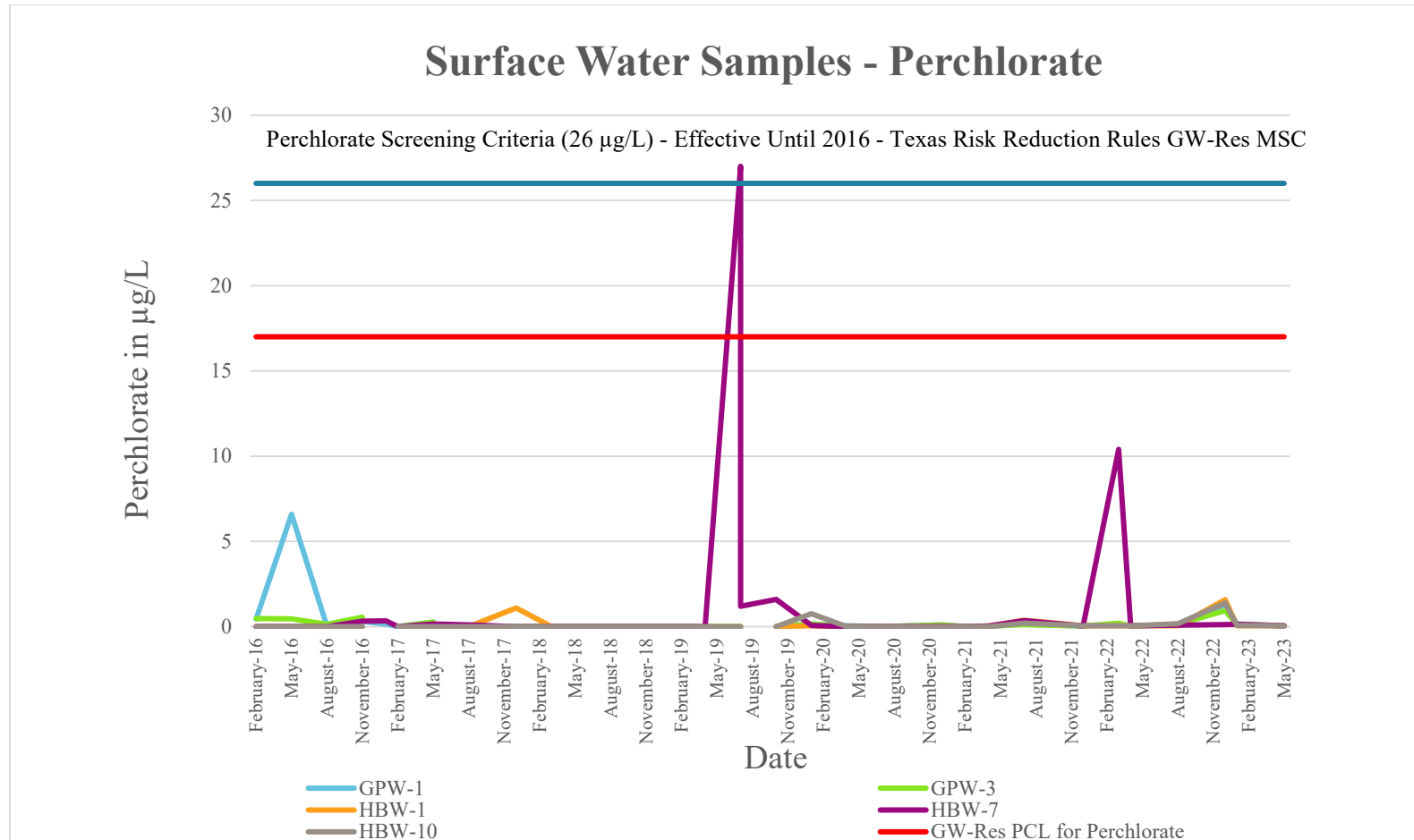
Quarter	4 th	1 st	2 nd	3 rd	4 th	1 st	2 nd	3 rd	4 th	1 st
Creek Sample ID	Oct 2018	Jan 2019	Apr 2019	Jul 2019	Oct 2019	Jan 2020	Apr 2020	Jul 2020	Dec 2020	Feb 2021
GPW-1	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	0.163	0.0589 J	<0.05 U	0.110	<0.05 U
GPW-3	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	0.156	0.0662 J	0.0326 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
Creek Sample ID	Apr 2021	Jul 2021	Dec 2021	Mar 2022	Apr 2022	Aug 2022	Dec 2022	Jan 2023	May 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
GPW-3	0.0321 J	0.122	0.0344 J	0.198	0.0384 J	0.132	0.938	0.137	< 0.05 U
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
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
HBW-10	<0.05 U	0.207	0.0464 J	<0.05 U	<0.05 U	0.171	1.39	0.0654J	< 0.05 U

U – non-detect

J – Estimated

Dry – no surface water



Note: Surface water at HBW-7 had a detection of 27 µg/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) µg/L. GPW – Goose Prairie Creek sample location; HBW – Harrison Bayou sample location. GW Res – Groundwater residential limit; MSC – Medium Specific Concentration; PCL – Protective Concentration Level; µg/L – micrograms per liter. No surface water sampling was conducted in the 3rd Quarter 2023 due to dry conditions.

Longhorn Army Ammunition Plant Creek Sampling Locations

