W9128F-18-D-0020 (Delivery Order (DO) F0041) – Meeting Minutes

Cornhusker Army Ammunition Plant (CHAAP)

Proposed Rebound Study

Meeting Host: EPA Region 7, Lenexa, KS
Date and Time: April 11, 2019 at 2:00 pm CDT
Location: EPA Region 7, RO 1.A-K33-18 (aka "Marketplace B")

Meeting Attendees

Name	Organization	Location
Jean Chytil	USACE	Lenexa, in person
Patti Thomason	USACE	Lenexa, in person
Jim Bond	USACE	Lenexa, in person
Linda Albrecht	USAEC	Lenexa, in person
Stephanie Harris-Carr	ERG CS	Lenexa, in person
Corey Schwabenlander	Brice	Lenexa, in person
Jamie Oakley	Brice	Anchorage, teleconference
Scotty Mann	Brice	Grand Junction, teleconference
Kimi Lloyd	Brice	Anchorage, teleconference
Dean Converse	AECOM	Lenexa, in person
Corey Anderson	AECOM	Lenexa, in person
Terry Thonen	AECOM	Omaha, teleconference
Bill Gresham	EPA, Region 7	Lenexa, in person
Susan Fisher	EPA	Lenexa, in person
Lynn Juett	EPA	Lenexa, in person
Jesse Kidwell	EPA	Lenexa, in person
Nancy Harris	NDEQ	Lenexa, in person
Ed Southwick	NDEQ	Lenexa, in person

Meeting Agenda

1) Meeting Attendee/Project Team Introductions
2) Presentation (*.ppt slides attached*)
    a. History of CHAAP Groundwater Remediation
    b. 2018 Groundwater Remediation Overview
    c. 2018 Groundwater Monitoring Summary
    d. 2018 OU1 On-post Explosives Plumes
    e. 2018 OU1 Modeling Scenarios
    f. 2019 Proposed Rebound Study
    g. Proposed Activities Schedule (2019-2021)
    h. 2019 Proposed OU1/OU3 LTM Activities
3) Questions/Discussion
4) Path Forward/Action Items

Summary of Presentation

1) **CHAAP History and Background** (*Slides 3-7*). A summary of the CHAAP groundwater remediation and monitoring program and the content of the Rebound Study Technical Memorandum (TM).

2) **Groundwater Modeling Scenarios** (Slide 8). The three modeling scenarios detailed were presented:
    a. No change, in which EW7 continues to operate at 300 gpm until attenuation is achieved (predicted concentrations <HALs in 20 years)
    b. Scenario 1, in which EW7 ceases operation in 2019 (predicted concentrations <HALs in 17 years)
    c. Scenario 2, in which EW7 ceases operation in 2019 and two additional injection events are administered in 2019 and 2020 (predicted concentrations <HALs in 10 years)

    The CHAAP project delivery team (PDT) described alignment between 2001 modeled plume forecasts and actual observations during LTM activities, supporting confidence in the modeled projections for each alternative.

3) **Rebound Study** (*Slides 9-15*). Details of the proposed rebound study were provided. The rebound study includes the following components:
    a. Temporary shutdown of EW7 and the GWTF (November 2019)
    b. Rebound Study Monitoring (8 sampling events: 1 event- baseline [October 2019], 7 subsequent quarterly events) with data reporting)
    c. Subsurface Injections (November 2019/2020)

    A detailed schedule of the proposed activities is included on *Slide 15*.

4) **Proposed 2019 OU1 and OU3 LTM Activities** (*Slides 16-17*). A summary of the planned OU1 and OU3 LTM activities were presented. Includes OU1/OU3 LTM events (May 2019), OU1 well installations and abandonments (Summer/Fall 2019), and associated reporting.

Questions/Discussion

1) **Contingencies/Triggers/Decision Points**. EPA and NDEQ inquired about a contingency plan to comply with the selected remedy and maintain protectiveness of human health and the environment should off-site contaminant migration occur during the rebound study. The PDT expressed confidence that off-site migration is a minimal risk based on (1) the results of previous injections, (2) the chemical properties of TNT (i.e., it's relatively immobile), (3) the presence of the adjacent feedlot with reducing conditions, and (4) the modeling scenarios run that incorporate this information. The PDT explained that the 2019 injections have been designed to be aggressive since turning EW7 back on following injections is very undesirable because of known issues with metal precipitation in the treatment facility when anaerobic groundwater is processed. NDEQ stated that a contingency could include a delayed turn-on of EW7, if needed.

ACTION: the PDT will outline the red flags, triggers, contingencies, and decision points in a work plan (i.e., UFP-QAPP Addendum) prior to commencing the rebound study.

2) **Post-injection study/monitoring**. NDEQ stated that a plan will be needed to monitor the aquifer following the rebound study. The PDT agreed, stating that additional LTM is planned to follow the study.

   ACTION: the PDT will state that a post-rebound study "aquifer stabilization monitoring program" will be performed in forthcoming the rebound study work plan.

3) **Injection Details**.
   a. *Effects and of previous injections*. EPA asked about the results of previous injections, specifically regarding the resulting geochemical conditions and the amount of time needed to achieve anaerobic conditions. The PDT explained that performance monitoring includes analysis of the full suite of explosives including degradation products and MNA parameters. During previous injections, anaerobic conditions have been established and the denitrification process has started within 2-3 months. TOC persists at concentrations suitable to drive degradation for 2-3 years, and anaerobic conditions favorable for denitrification can occur for longer than that.

   b. *Injection Timing*. EPA inquired for the rationale behind two injection events (November 2019 and November 2020). Why not one large event. The PDT explained that the primary rationale is the contract has been set up to break-up the injections into two years. The two events also provide flexibility for additional injections in the EW7 area if performance monitoring data indicate that they would be helpful (i.e., polishing).

4) **CERCLA Process**. EPA stressed that the team remain cognizant of compliance with the CERCLA process and associated lead times involved in document preparation. Specifically, if the rebound study produces the expected results and the extraction wells are not turned back on, a Decision Document revision would be necessary. The EPA noted that it is a likely that a Focused Feasibility Study, updated Proposed Plan, and a ROD amendment will be needed.

   The PDT and agencies discussed the timing of the CERCLA document revisions. The team agreed that no changes to primary CERCLA documents would be required to initiate the rebound study. However, the EPA requested that the PDT begin preparing a path forward for CERCLA document revisions during the 6 months prior to and during the study (in parallel).

   ACTION: The agencies agreed that, when their comments on the Rebound Study TM are addressed, they will approve the TM and request the PDT begin working on a plan for CERCLA compliance. At that point, the PDT will provide the agencies with a plan.

5) **Institutional Controls**. NDEQ noted some observed lapses in ICs at the site. EPA stated that, if necessary, these could be addressed in the next five-year review. The PDT confirmed that CHAAP is still regularly providing the city with plume maps to support their overlay zones/restrictions.

6) **Regular Project Meetings**. EPA requested reinstatement of regular project meetings and suggested setting up monthly teleconferences.

   ACTION: the PDT will set up monthly teleconferences.

7) **Annual Report Review**. NDEQ asked about when they will receive the 2018 Annual LTM Report for review. The PDT stated that the report is currently with USACE for review and that we expect to have the report to the agencies by the end of April. The PDT also clarified that the 2018 monitoring results were included in the Rebound Study TM.

   NOTE: As presented in the proposed schedule (*Slide 15*), the 2019 OU1/OU3 LTM is currently planned for May. As in previous years, the 2019 LTM plan is provided as a recommendation in the Annual Report (as summarized on *Slide 16*). The PDT requests expedited approval of the 2019 LTM plan (2018 Annual Report) so sampling can begin in May. The PDT will provide the necessary information/data to support the agencies.

   ACTION: PDT to submit Annual Report to regulators, with a target date of the end of April.

8) **Work Plan**. The agencies stated that the Rebound Study TM provided a more of a conceptual plan and a work plan or other documentation should be prepared to (1) provide the details of the rebound study (i.e., sample locations/methods) and (2) outline the specific red flags, decision points, and contingencies to be used during the rebound study.

   ACTION: PDT concurred that a rebound study work plan (i.e., UFP-QAPP Addendum) would be developed and submitted ASAP.

Action Items

ACTION ITEM	OWNER
1. **WORK PLAN**. Prepare Rebound Study work plan **(i.e., UFP-QAPP Addendum)** to (1) provide details of sampling locations/methods, (2) outline the red flags, triggers, contingencies, and decision points in a work plan prior to commencing the rebound study, and (3) state that post-rebound monitoring will occur.	CHAAP PDT
2. **CERCLA PROCESS**. Begin planning path forward for revised CERCLA documentation that will be needed based on the anticipated change in remedy. The agencies will make a request in their approval of the Rebound Study TM after which the PDT will provide a proposed path forward.	Agencies and PDT
3. **RECURRING PROJECT MEETINGS**. The PDT will set up monthly project calls.	CHAAP PDT
4. **2018 ANNUAL REPORT REVIEW**. The PDT will submit the 2018 LTM Report to the agencies ASAP.	CHAAP PDT
5. **AGENCY APPROVAL OF THE 2019 LTM PLAN**. The 2019 OU1/OU3 LTM is currently planned for May. The PDT requests expedited approval of the plan. The PDT will provide the necessary information/data to support the agencies.	Agencies and PDT

CHAAP Status and Program Recommendations Meeting
11 April 2019
Sign In Sheet

Name	Organization	Email	Address	Phone
Jim Bond	USACE	james.r.bond@usace.army.mil	1616 N. Capitol Ave Omaha NE 68102	402-995-2299
Bill Gresham	USEPA Region 7	gresham.bill@epa.gov	11201 Renner Blvd. Lenexa, KS ~~66101~~ 66219	913-551-7804
Jean Chytil	USACE	jean.m.chytil@usace.army.mil	1616 Capitol Ave Omaha NE 68102	402-995-2264
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CHAAP Status and Program Recommendations Meeting
11 April 2019
Sign In Sheet

Name	Organization	Email	Address	Phone
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PHONE:				
Scotty Mann Jamie Oakley Kimi Lloyd Terry Thonen	Brice Brice Brice AECOM			

OU1 2018 Groundwater Monitoring Results and Program Recommendations

Cornhusker Army Ammunition Plant
Grand Island, NE

April 11, 2019

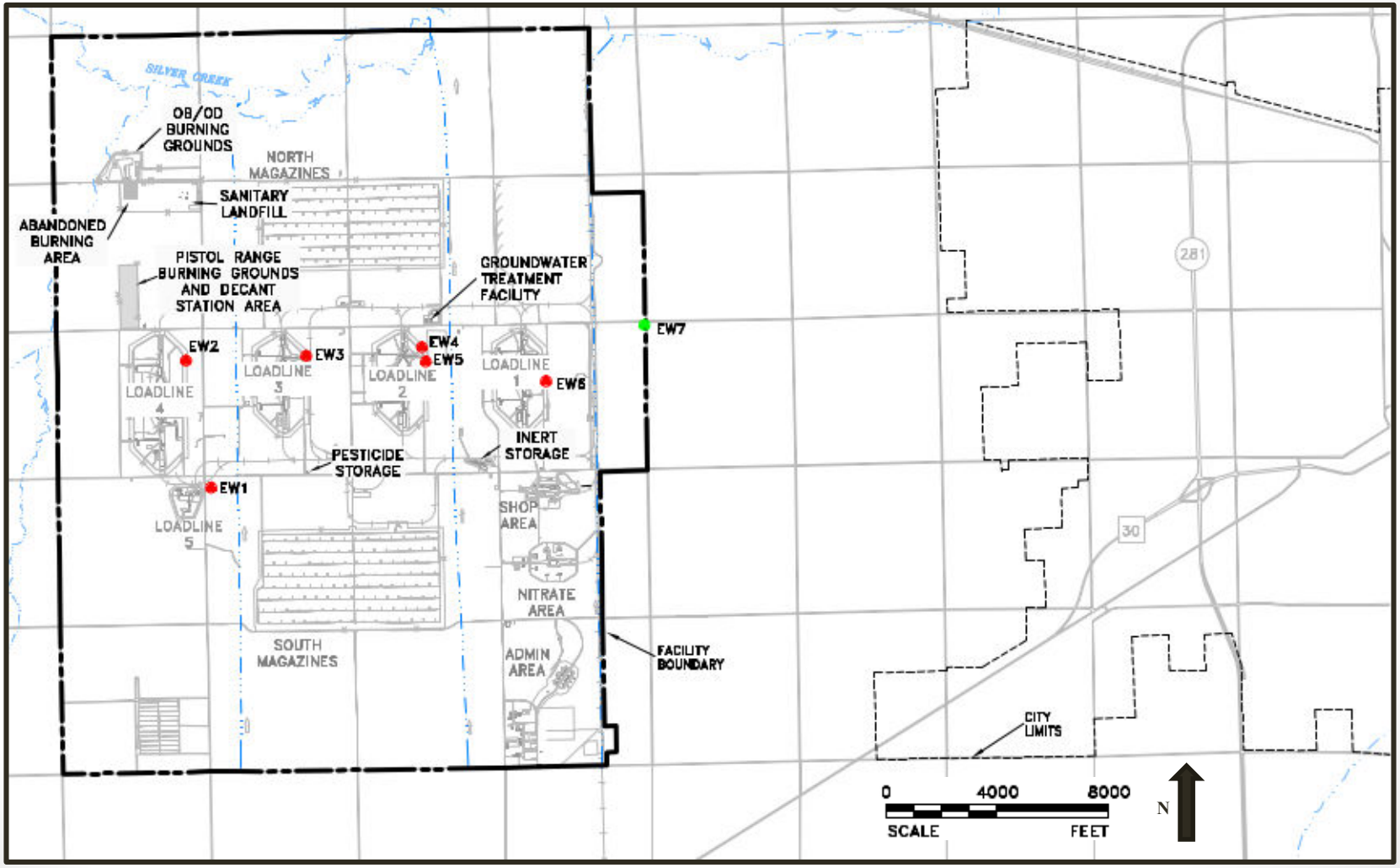
ANC 8(a) Brice ENGINEERING

AECOM

CHAAP Meeting Agenda

- History of CHAAP Groundwater Remediation
- 2018 Groundwater Remediation Overview
- 2018 Groundwater Monitoring Summary
- 2018 OU1 On-post Explosives Plumes
- 2018 OU1 Modeling Scenarios
- 2019 Proposed Rebound Study
- Proposed Activities Schedule (2019-2021)
- 2019 Proposed OU1/OU3 LTM Activities

History of CHAAP Groundwater Remediation

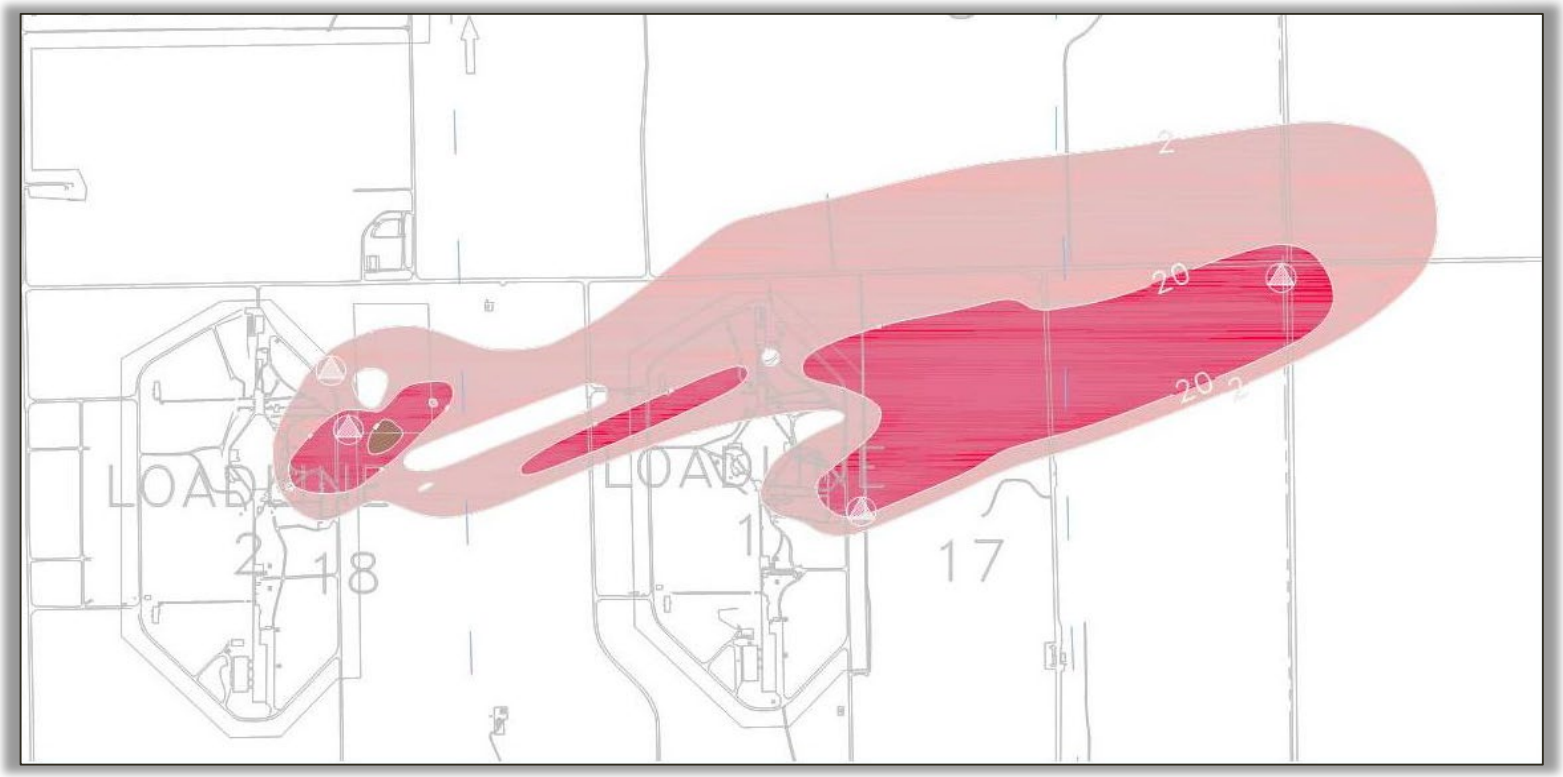


History of CHAAP Groundwater Remediation

Notable Historical Activities for CHAAP and OU1

- Soil excavation/incineration (unlined leach pits and cesspools) (mid '80s)
- OU1 Interim Record of Decision (1994) and OU1 ROD Amendment (2001)
- GWTF and pump and treat system (began in 1998, EW7 added in 2000)
  - Reduction of Pumping Rates
    - EW1, 2, 3 (discontinued in 2000), EW4, 5 (discontinued in 2008), EW6 (discontinued in 2009)
    - EW7 (pumping increased to 500 gpm [2009], reduced to 450 gpm [2015], and reduced to 300 gpm [2017])
- Subsurface Injections
  - Voluntary action completed by USACE to expedite RAO (2007 to 2016)
    - RDX and TNT reductions (1000s µg/L to 10s µg/L and nondetect)
    - Direct Push sampling identified areas for injection treatments, evaluated injection performances, and areas needing permanent well locations
- Annual OU1 LTM program (on- and off-post wells); institutional controls

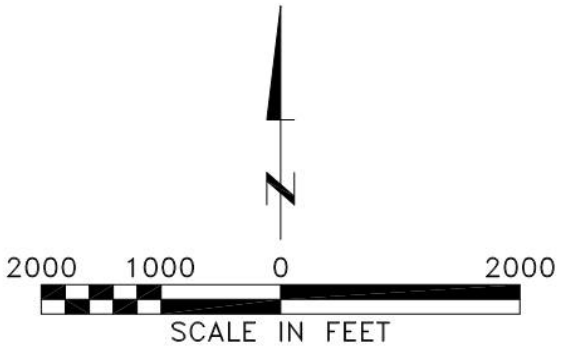
March 2007 – Plume Extent



RDX+TNT >2 µg/L

RDX+TNT >20 µg/L

RDX+TNT >200 µg/L



2018 Groundwater Remediation Overview

2018 OU1 Tasks Completed

- GWTF (year-round)
  - Extraction and treatment of explosives-contaminated groundwater (OU1) at one active extraction well (EW7). Quarterly NPDES sampling events.
- Groundwater Monitoring Program (March 2018)
  - Monitoring explosives plume concentrations and migration trends over time
    - Direct Push Groundwater Investigation Sampling Event (20 samples)
    - Annual OU1 LTM Sampling Event (73 on-post wells, 19 off-post wells)
- Annual Reporting (February 2019)
  - Draft Annual Report
    - Presented results of GWTF, groundwater monitoring activities, Groundwater Flow and Contaminant Fate and Transport modeling and explosives mass estimates, and provides conclusions and recommendations for 2019.
  - Draft Final Technical Memorandum
    - Presented results of 2018 OU1 groundwater monitoring events and the program recommendations (i.e., temporary discontinuation of EW7, Rebound Study, Subsurface Injection treatments).

2018 OU1 Groundwater Monitoring Summary

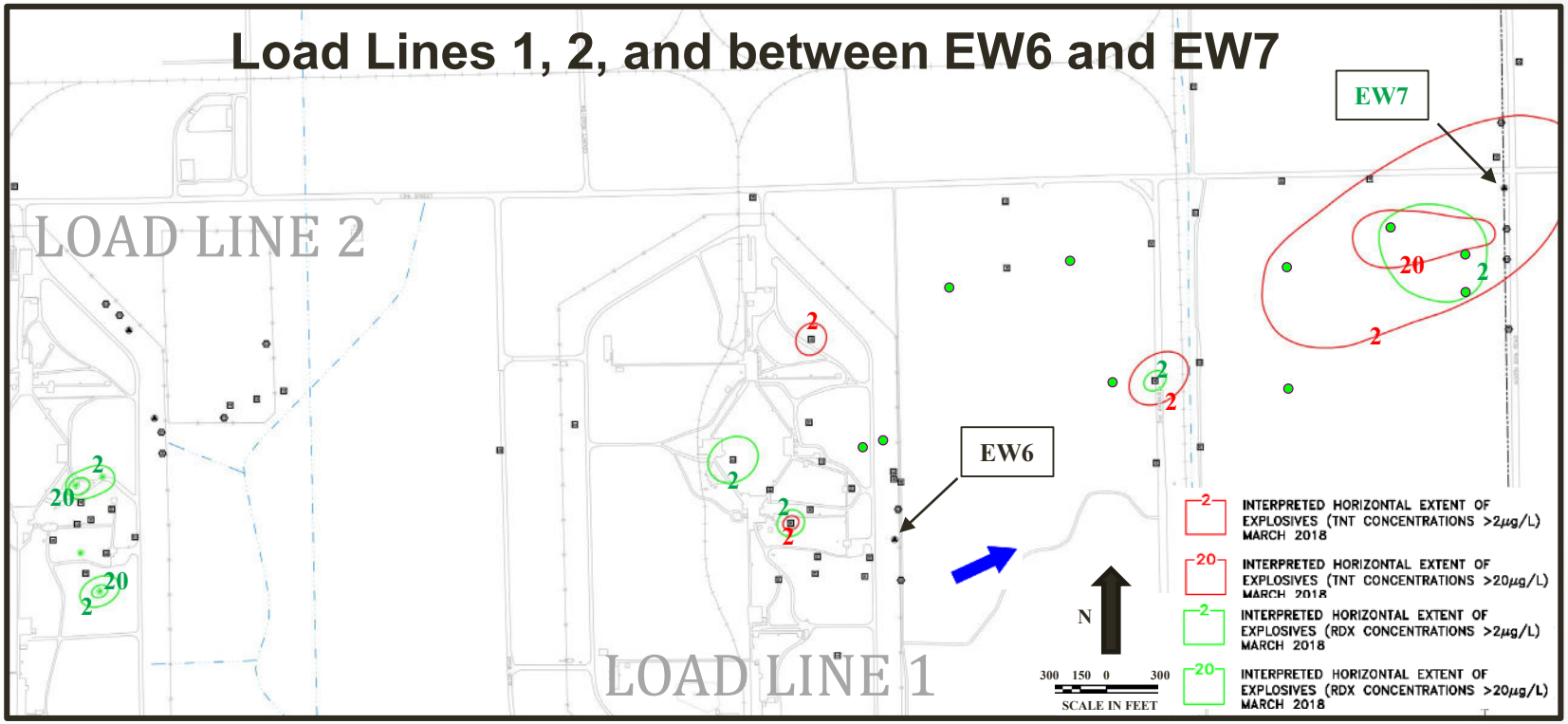
- RDX and TNT concentrations continue to decrease steadily over time
- Groundwater extraction system continues to contain the on-post groundwater explosives plume
- Significant denitrification is occurring in the feedlot area and in subsurface injection treatment areas (explosives degradation products present)

Explosives Mass Estimations: 2007 / 2018

Explosives Parameter(s)	March 2007			March 2018		
	Load Line Treatment Areas (mass in pounds)	Area Between EW6 and EW7 (mass in pounds)	Total Area (mass in pounds)	Load Line Treatment Areas (mass in pounds)	Area Between EW6 and EW7 (mass in pounds)	Total Area (mass in pounds)
RDX	28.28	156.66	184.94	1.09	0.69	1.78
TNT	157.19	419.69	576.88	0.20	39.87	40.06
RDX+TNT	185.47	576.35	761.82	1.29	40.56	41.85

- Since 2014, all off-post wells remain below the explosives cleanup goals (< 2 µg/L)
- Water levels show increasing trend in past 4 years. In 2018, no rebounding effects identified in source area treatment locations completed in 2014 through 2016 (LL1 and LL2).
- Since 2014, annual Contaminant Fate & Transport modeling scenarios continue to show no off-site plume migration (if EW7 turned off in 2019)
  - Concentrations of RDX (max of 1.8 µg/L) and TNT (max of 17 µg/L) low at facility boundary

OU1 On-Post Explosives Plume March 2018



- Explosives concentrations in 2018 continued to show decreasing trends and remain low due to RAO (pump and treat system) and past subsurface injections.
- Direct Push and Annual LTM sampling verified 2018 explosives plume extent.

2018 OU1 Modeling Scenarios

2018 model used to predict long-term contaminant transport conditions

No change:

- Years 1-20 (2018-2037): treatment effects from 2016 injections, EW7 on @ 300 gpm

Scenario 1:

- Year 1 (2018): treatment effects from 2016 injections, EW7 on @ 300 gpm
- Years 2-17 (2019-2034): no further injection effects and EW7 off

Scenario 2 (Proposed Rebound Study):

- Year 1 (2018): treatment effects from 2016 injections, EW7 on @ 300 gpm
- Years 2-5 (2019-2022): treatment effects from 2019 and 2020 injections, EW7 off
- Years 6-10 (2023-2027): no further injection effects and EW7 off

	EW7 Pumping at 300 gpm (Years)	Treatment Effects (Years)	Concentrations below HALs at EW7 (Years)	Concentrations below HALs Site-wide (Years)	Off-site Migration
	Based on 2018 conditions				
No change	20	1	7	20	No
Scenario 1	1	1	12	17	No
Scenario 2	1	5	6	10	No

2019 Proposed Rebound Study

Based on current explosives concentrations and modeling results, USACE recommends a 'temporary' shutdown of EW7, performing a Rebound Study, and completing subsurface injections near the former facility boundary (upgradient of EW7).

1. Temporary Shutdown of GWTF and EW7 (November 2019)
2. Rebound Study Monitoring (Baseline October 2019 through 2021)
3. Subsurface Injections (November 2019 / November 2020)

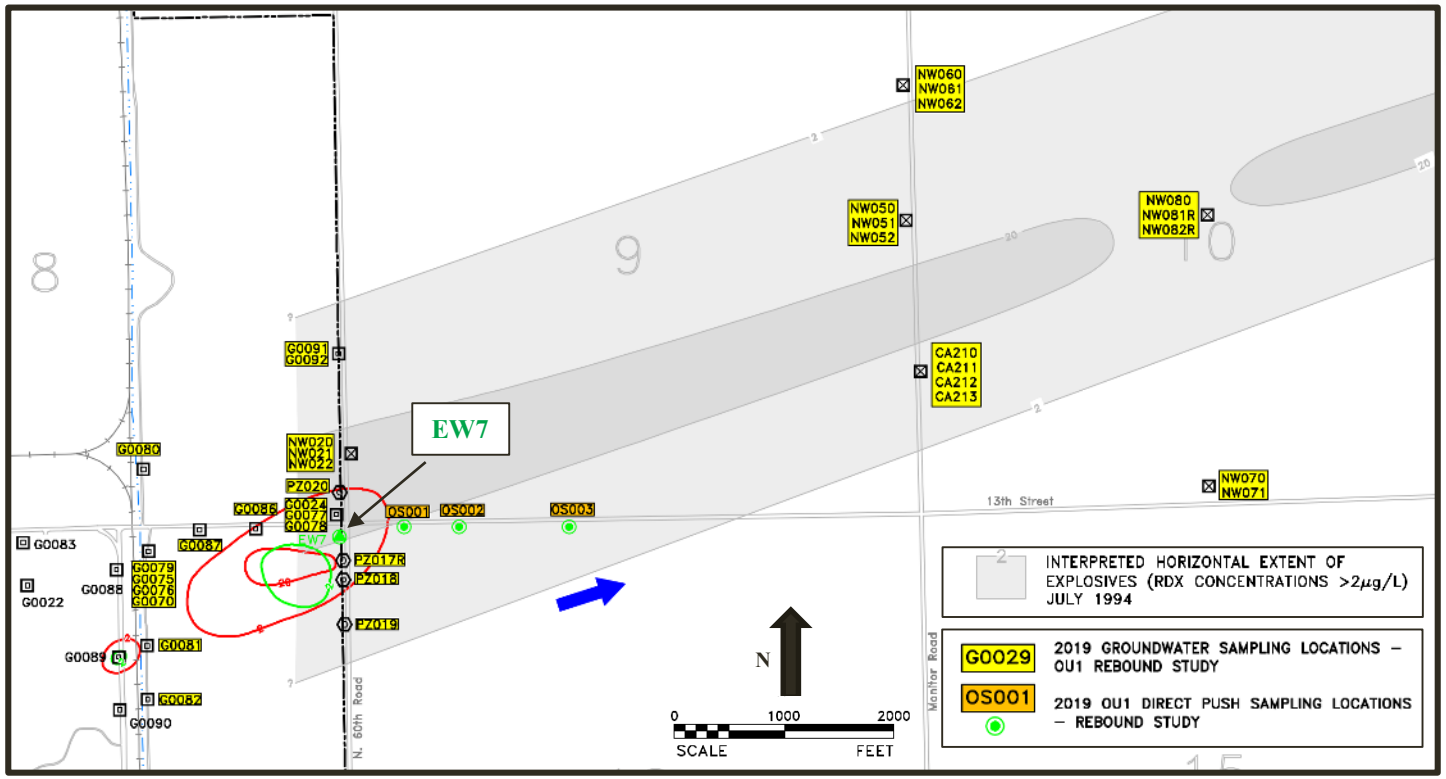
<u>Rebound Study Benefits</u>

- Subsurface injections will establish reducing conditions for explosives degradation (EW7 off);
- Verify if off-post explosives migration occurs with evaluation of injection performance and nature and extent of concentrations;
- On- and off-post Institutional Controls and drilling restrictions continue;
- EW7 and GWTF will remain in 'standby' status for resuming, if necessary.

2019 Proposed Rebound Study

1. **Temporary Shutdown of GWTF and EW7 (November 2019)**
   - Pump and treat system set to 0 gpm in 'stand-by' condition
     - Winterize GWTF and EWs, maintain routine O&M (i.e., mowing/snow removal, pest control, inspections and security)
2. **Rebound Study Monitoring (October 2019 through 2021)**
   - Monitoring Events (8 sampling events: 1- baseline event prior to EW7 shutdown, 7- subsequent quarterly events)
     - Baseline (prior to EW7 shutdown)
       - 36 select wells (Explosives and MNA analysis)
         - Add 15 off-post wells back to LTM program (removed in 2013, 2016)
       - Direct push sampling (Explosives analysis only)
         - Off-post sample locations to verify clean zone off-site
         - Vertical profile sampling
     - Data Reporting
       - Summarize field activities, present data analysis and extent of explosives and migration, and analysis of statistical trends

2019 Proposed Rebound Study

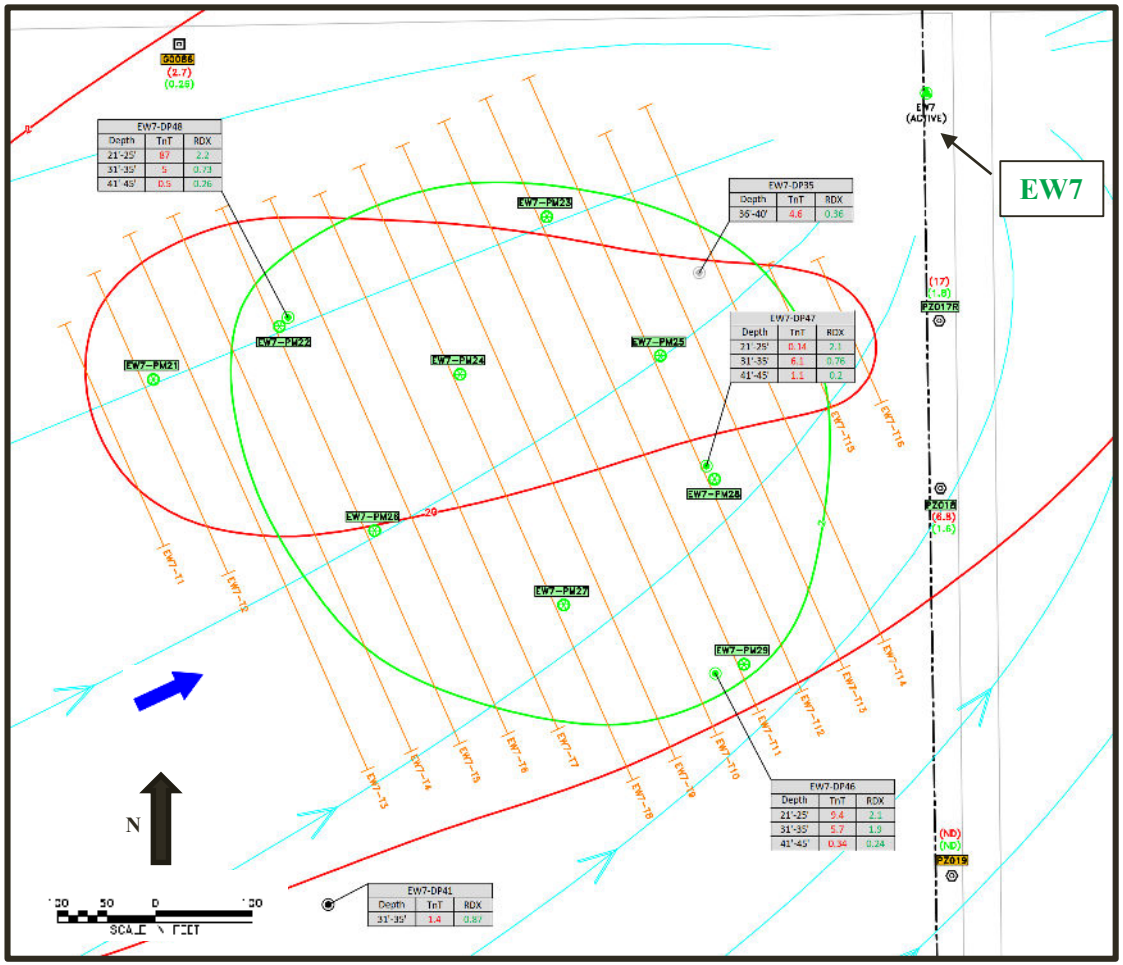


- Baseline monitoring well sampling: Determine baseline conditions and verify plume extent prior to EW7 shutdown.
- Direct push locations: Define plume extent directly downgradient from EW7 where no wells exist. Locations will be directly south of feedlot (due to access restrictions).

2019 Proposed Rebound Study

3. **Subsurface Injections (November 2019 / November 2020)**
   - Two events of subsurface injections (600 points each)
     - Complete outside of crop season (November – April)
     - 2019 Subsurface Injections focus upgradient of EW7/facility boundary (with EW7 off)
     - 2020 Subsurface Injections focus on LL1 and LL2 areas and retreatment of EW7/facility boundary area, if necessary
       - Similar injection designs successful in past (direct push, horizontal spacing, vertical intervals, amendment and mixture, low injection pressures)
       - Use food-grade carbon amendment (custom blend Wesblend® 66-10) successful in past years
       - Performance Monitoring (including baseline)

2019 Proposed Rebound Study



- Proposed Injection and Performance Monitoring Locations 2019:
  Focus on RDX plume >2 μg/L and TNT plume >20 μg/L. Injection depths between 17 and 37 feet bgs

Proposed Activities Schedule 2019 through 2021

Annual OU1 and OU3 LTM (May 2019-2021)

- Conduct annual sampling (coinciding with Rebound Study activities)
- Annual Reporting and Stakeholder Meetings

GWTF and EW7 (November 2019)

- Continue Pump and Treat operations through October (EW7 @ 300 gpm), NPDES sampling, O&M activities, CIH inspection, reporting
- Prepare GWTF/EWs for 'standby' status and continue necessary O&M

Rebound Study (October 2019-2021)

- Conduct 8 monitoring events (including baseline) with event reporting

Subsurface Injections (November 2019 / November 2021)

- 2019- Complete 600 injection points upgradient of EW7 (off)
- 2020- Complete 600 injection points at LL1, LL2, near EW7 (if needed)
- Quarterly Performance Monitoring for both events
- Summary and recommendations provided in Annual Reporting

Proposed Activities Schedule 2019 through 2021

Date	GWTF LTO	Rebound Study	LTM	Injection
Jan-19	Operation			
Feb-19	Operation			
Mar-19	Operation			
Apr-19	Operation			
May-19	Operation		Complete LTM	
Jun-19	Operation			
Jul-19	Operation			
Aug-19	Operation			
Sep-19	Operation			
Oct-19	Operation	Q-1 (baseline)		PM-1 (baseline)
Nov-19	Standby O&M			Complete Injections (600 points)
Dec-19	Standby O&M			
Jan-20	Standby O&M			
Feb-20	Standby O&M	Q-2		PM-2
Mar-20	Standby O&M			
Apr-20	Standby O&M			
May-20	Standby O&M	Q-3	Complete LTM	PM-3
Jun-20	Standby O&M			
Jul-20	Standby O&M			
Aug-20	Standby O&M	Q-4		PM-4
Sep-20	Standby O&M			
Oct-20	Standby O&M			PM-1 (baseline)
Nov-20	Standby O&M	Q-5		Complete Injections (600 points)
Dec-20	Standby O&M			
Jan-21	Standby O&M			
Feb-21	Standby O&M	Q-6		PM-2
Mar-21	Standby O&M			
Apr-21	Standby O&M			
May-21	Standby O&M	Q-7	Complete LTM	PM-3
Jun-21	Standby O&M			
Jul-21	Standby O&M			
Aug-21	Standby O&M	Q-8		PM-4

Notes:

-Meeting with EPA presenting Rebound Study = April 11, 2019

-Anticipated Funding: LTM 2019 = May 2019, Rebound Study and Injections = October 2019

-Rebound Study (8 events) includes using 2 LTM events

2019 Proposed OU1/OU3 LTM Activities

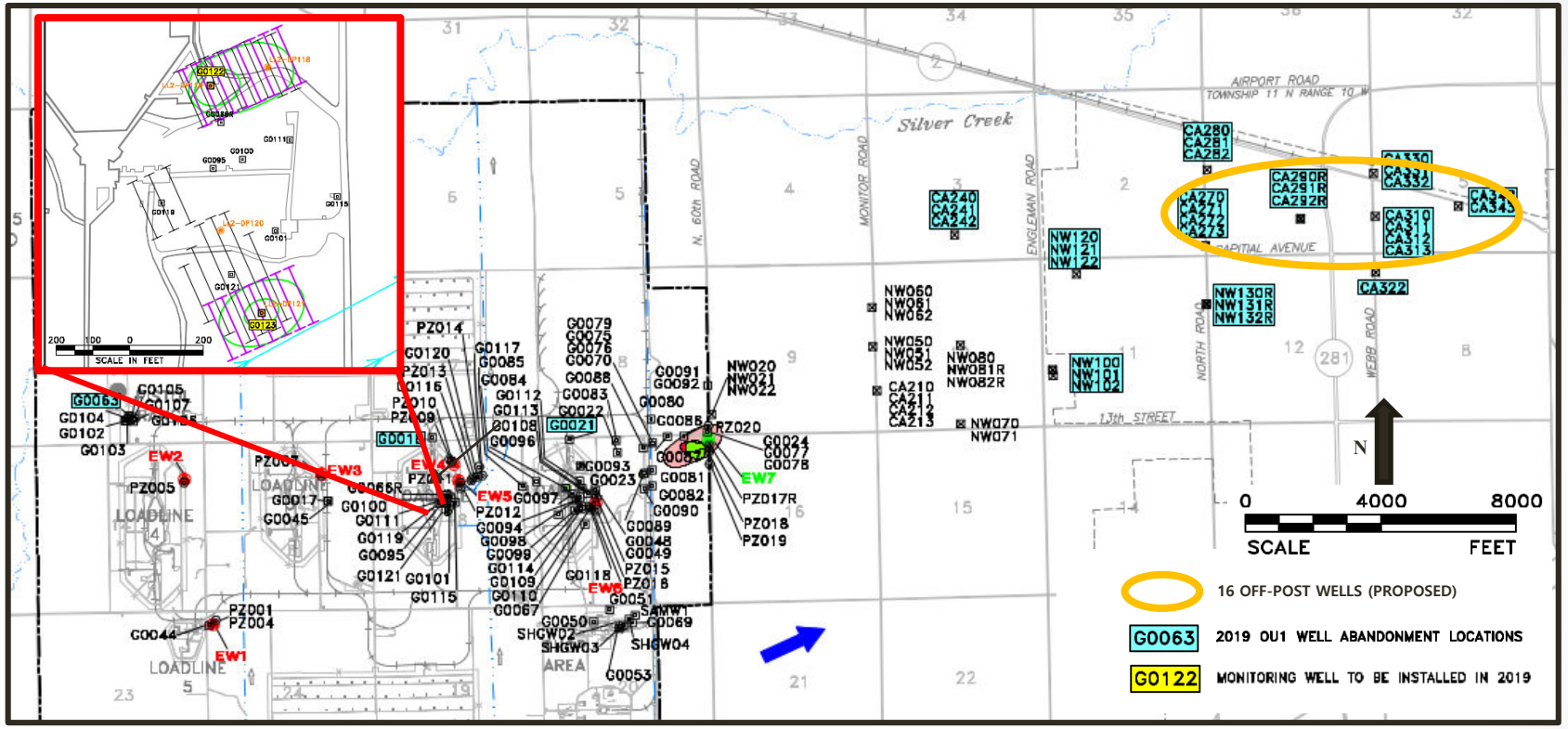
Annual OU1 and OU3 LTM (May 2019)

- Complete site-wide groundwater level measurement round
- OU1 – Sample 3 off-post monitoring wells (for explosives only) and 74 on-post monitoring wells and piezometers for explosives and natural attenuation parameters
- OU3 – Sample 6 Shop Area monitoring wells for VOCs and natural attenuation parameters (VOC plume observed in March 2018)
- Annual Report: Evaluate plume concentrations, migration trends, institutional controls, EW7 capture zone analysis, model predicted remediation timeframes, and recommendations.
- Continue Groundwater Monitoring Program optimization efforts
  - In 2018, recommending removal of remaining 16 off-post wells (distal end) from OU1 LTM Program (< HALs 5 years or longer)

OU1 Well Installations and Abandonments (Summer/Fall 2019)

- Complete two (2) well installations (at LL2) based on 2018 Direct Push sampling results and proposed subsurface injections (November 2020)
- Complete 35 well abandonments (3 on-post, 32 off-post). Of the 35 wells, 19 are part of remaining OU1 wells removed from program in 2013.

2019 Proposed OU1/OU3 LTM Activities



- 2019 Annual OU1/OU3 Report: Summarizing all 2019 OU1/OU3 activities, data results, statistical evaluation of OU1 observed trends, groundwater modeling, and providing conclusions and recommendation for subsequent year activities
- 2019 Monitoring Well Installation and Abandonment Letter Report: Summarizing all 2019 well installation and abandonment activities and required NDNR forms

Questions?