Carver, Andrew <andrew.carver@dnr.iowa.gov>

Re: Buckeye Council Bluffs, IA Terminal Proposed Scope of Work

1 message

Carver, Andrew <andrew.carver@dnr.iowa.gov> Mon, Oct 20, 2025 at 10:59 AM
To: Blake Ford <Blake.Ford@anteagroup.us>
Cc: Jason Phillips <Jason.Phillips@anteagroup.us>, "Brudereck, Jeff" <JBrudereck@buckeye.com>

Blake,

I have reviewed the Technical Memo outlining proposed corrective action at the Buckeye facility. The proposed pilot test utilizing the bioremediation product Micro-Blaze at selected recovery wells is acceptable to the Iowa DNR. Please proceed with obtaining injection permitting from the US EPA. In the past, email approval such as this has sufficed, but if they require something more formal please let me know.

Thanks and please keep me in the loop regarding the permitting process and implementation.

Andrew Carver, CGP
Environmental Specialist
Solid Waste and Contaminated Sites Section
Department of Natural Resources
6200 Park Ave, Ste 200
Des Moines, IA 50321
515-721-7024
andrew.carver@dnr.iowa.gov
www.iowadnr.gov

IOWA DEPARTMENT OF NATURAL RESOURCES

On Tue, Oct 14, 2025 at 2:00 PM Blake Ford <Blake.Ford@anteagroup.us> wrote:

> Andrew,
>
> Please see the proposed scope of work for application of surfactant free Micro-Blaze for in-situ treatment of historical LNAPL at Buckeye's Council Bluffs, IA terminal. Once reviewed, please provide us with feedback or necessary edits and we will work quickly to get it back to you. If you'd prefer to discuss this proposal over the phone, I can send a meeting request.
>
> We're aware that there's an EPA region 7 approval needed to necessitate this scope of work and it looks like the shutdown is going to continue to drag along indefinitely. Our goal is to get it into the formation before the weather gets too cold, so if there's a workaround you've identified, please let us know.
>
> We appreciate your support with this matter and look forward to seeing the results.
>
> Best regards,

Andrew Carver
Iowa Department of Natural Resources
October 14, 2025

In-situ LNAPL Remediation Technical Memorandum

To: Andrew Carver, Iowa Department of Natural Resources
Nick Laskares, United States Environmental Protection Agency, Region 7

From: Blake Ford, Antea Group

Date: October 14, 2025

Re: Council Bluffs, IA – Buckeye Council Bluffs Terminal

CC: Jeff Brudereck, Buckeye Terminals, LLC

Antea®Group (Antea) has prepared this Technical Memorandum on behalf of Buckeye Terminals, LLC to provide an overview of the proposed application of Micro-Blaze® Non-Formulated (Micro-Blaze) microbial product within specific groundwater monitoring wells at the Buckeye Council Bluffs Terminal located at 829 Tank Farm Road, Council Bluffs, Iowa (Site). The proposed monitoring wells exhibit the greatest historical and present-day thicknesses of light non-aqueous phase liquid (LNAPL).

The Micro-Blaze proposed is a surfactant free product and has been recognized by the United States Environmental Protection Agency (NCP Subpart J, Technical Notebook, August 2022) as an approved in-situ bioremediation product for use on organics and hydrocarbon materials. The strains of bacteria provide the capability of biodegrading various straight and branched-chained aromatic and polycyclic aromatic hydrocarbons found in diesel and other petroleum fuels. The LNAPL observed at the Site has been analyzed and characterized as an aged, weathered diesel fuel. The Safety Data Sheet for Micro-Blaze, Non-Formulated is included in **Appendix A**. Micro-Blaze is composed of water, nutrients and naturally-occurring microbes and does not contain chemicals which are otherwise subject to hazardous substance reporting requirements.

SITE OVERVIEW

The Site has been an active bulk oil storage and distribution terminal since approximately 1939. Environmental monitoring and assessment activities began in 1986. LNAPL has been observed within select monitoring wells, primarily located near a former loading/unloading area along the southern property boundary and predominantly within RW-100, RW-102 RW-103, and RW-205 (see **Figure 1**). From 1986 to present day, several LNAPL recovery methods have been performed including groundwater pump and treat, LNAPL recovery skimmers, vacuum extraction, and manual LNAPL recovery. The previous measures have resulted in significant reductions in observed LNAPL, however monitoring wells within the source area have continued to demonstrate measurable LNAPL. Site investigation measures implemented in 2020 included Laser-induced fluorescence (LIF) targeted at confirming the location of the residual impacts, primarily observed in the loading/unloading area. A total of five recovery wells (RW-100, RW-101, RW-102, RW-103, and RW-104) were installed in 2021 following the LIF investigation to more effectively target the residual source area.

From 2022 to 2025, LNAPL recovery was performed in varying frequencies from the new recovery wells via vacuum truck and manual techniques. The average volume of LNAPL per recovery event has remained stable during that time, and repeated gauging of the affected wells has also indicated stability.

LNAPL is confined to shallow, fine grained (clay) soils within the upper 25 feet and LNAPL transmissivity rates are low. The intent of the Micro-Blaze application is to further degrade the residual LNAPL, thereby enhancing future recovery rates and reductions in measurable LNAPL through increased biodegradation.

A detailed description of the proposed activities is provided within the next section of this Technical Memorandum.

PROPOSED ACTIVITES

Antea is requesting authorization for the application of the non-formulated (surfactant free) microbial product (Micro-Blaze) within specific recovery wells located near the loading area. Identified recovery wells are those exhibiting the greatest thicknesses of LNAPL and include RW-100, 102, 103, and 205.

The proposed Micro-Blaze application will be performed as a pilot test to confirm the ability of the subsurface to accept the product and evaluate the resulting effects to residual LNAPL in the recovery wells. An estimated treatment area surrounding each recovery well of 5-feet in diameter was utilized with a targeted thickness of approximately four (4) feet. An estimated porosity of 40% (based on the predominant silty-clays, with alluvial deposits present at and surrounding the site) was assumed to calculate the maximum volume of water or LNAPL within the pores in the area surrounding each recovery well. The volume of Micro-Blaze was determined to be 5-gallons per well. The application volume was calculated by estimating 500 gallons of liquid within the well annulus and inferred radial influence around each well, while applying the manufacturer's recommended Micro-Blaze volume, which is 1% of the assumed treatment volume.

Antea Group will perform the Micro-Blaze application via gravity flow at each of the referenced recovery wells, following the monthly LNAPL recovery. In the event that application via gravity flow is determined to not be an effective method of introduction, a well surge-block or mechanical pump may be used to apply the product. Infiltration rates will be monitored via gauging measurements collected from each recovery well during the application and for a period of approximately one (1) hour after each well is completed. Depth to LNAPL and groundwater measurements will subsequently be collected from the referenced recovery wells and RW-101 on the day following the Micro-Blaze application.

The eleven (11) wells that are gauged monthly (MW-21, MW-25, RW-100, RW-101, RW-102, RW-103, RW-104, RW-205, RW-305, SV-1, and SV-2) will continue to be monitored on a monthly basis following the Micro-Blaze application. Depth to LNAPL and groundwater measurements will be recorded and observed LNAPL will be manually recovered, containerized and transported offsite for disposal and/or recycling. Enhanced LNAPL recovery via vacuum truck may be considered based on the recovery well network gauging data and as a mechanism for further evaluating the Micro-Blaze effectiveness.

Antea will obtain approval from the Iowa Department of Natural Resources and the United States Environmental Protection Agency, Region 7 prior to performing any work pertaining to the Micro-Blaze application. This approval will also include the submittal of Shallow Injection Well Registration Forms for each recovery well to be used in this authorization. The initial application is anticipated to take place in Q4 of 2025 and subsequent

applications may be subsequently conducted in 2026. LNAPL thicknesses and recovery rates will be closely monitored and detailed in the 2025 Annual Groundwater Report submitted to IDNR.

The following recovery wells are proposed to serve as the initial test wells due to their position within the source area and measurable LNAPL:

- RW-100: (1.17 to 3.42 feet in 2025)
- RW-102: (1.97 to 4.19 feet in 2025)
- RW-103: (2.57 to 4.33 feet in 2025)
- RW-205: (0.73 to 3.49 feet in 2025)
- *RW-101: Well to be gauged and monitored following Micro-Blaze application.

The depth to LNAPL and groundwater gauging data collected during routine monitoring and LNAPL recovery activities in 2025 is presented in **Attachment 2** and the estimated 2024 LNAPL extent is depicted in **Figure 1**.

The recommendations contained in this tech memo represent Antea USA, Inc.'s professional opinions based upon the currently available information and are arrived at in accordance with currently accepted professional standards. This memo is based upon a specific scope of work requested by the client. The contract between Antea USA, Inc. and its client outlines the scope of work, and only those tasks specifically authorized by that contract or outlined in this memo will be performed. This report is intended only for the use of Antea USA, Inc.'s client and anyone else specifically identified in writing by Antea as a user of this report. Antea will not and cannot be liable for unauthorized reliance by any other third party. Other than as contained in this paragraph, Antea makes no express or implied warranty as to the contents of this memo.

Blake Ford
Manager
314 240-1468
Blake.Ford@AnteaGroup.us

Attachments:

Attachment 1 – Safety Data Sheet for Micro-Blaze, Non-Formulated
Attachment 2 – LNAPL Gauging Data (Jan 2025 to July 2025)
Figure 1 – Estimated LNAPL Extent - 2024

Safety Data Sheet
Micro-Blaze® Non-Formulated

1. IDENTIFICATION OF THE SUBSTANCE

Product identifier

Product Name:	Micro-Blaze® Non-Formulated
Product Code:	MBNF

Recommended use of the chemical and restrictions on use

Recommended Use:	Bioremediation/cleaning
Uses advised against:	Please refer to Product Data Sheet

Details of the supplier of the Safety Data Sheet

Contact Manufacturer:	Verde Environmental, Inc. 9223 Eastex Freeway Houston, TX USA 77093
Information Telephone Number:	1-713-691-6468
Emergency Telephone Number:	1-800-424-9300 (Chemtrec) 24 hours every day

2. HAZARDS IDENTIFICATION

Classification

Classification of the product is in accordance with 29CFR 1910.1200

Serious eye damage/eye irritation	Category 2A
Skin sensitization	Category 1

Label elements

Emergency Overview

Warning

Hazard statements
May cause an allergic skin reaction
Causes serious eye irritation

Appearance: Opaque **Physical State:** Liquid **Odor:** Slight fermentation odor

Precautionary Statements – Prevention
Wear eye/face protection. Wear protective gloves. Avoid breathing dust/fume/gas/mist/vapors/spray.

Precautionary Statements – Response

Eyes	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Skin	IF ON SKIN: Gently wash with plenty of soap and water
Inhalation	IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing
Ingestion	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell

Precautionary Statements – Storage
Protect from sunlight. Do not expose to temperatures exceeding 50°C/122°F

Precautionary Statements – Disposal
Dispose of unused product and container in accordance with all applicable local and regional requirements

Hazards not otherwise classified (HNOC)
Not applicable

Other information

Health Hazard	1
Fire Hazard	0
Reactivity	0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Name	Weight - %
Water and Proprietary Viable Spore Forming Cultures	> 99

4. FIRST AID MEASURES

First aid measures

Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes
Skin Contact	Wash off immediately with soap and plenty of water

Inhalation Move to fresh air

Ingestion Clean mouth with water and afterwards drink plenty of water

Most important symptoms and effects, both acute and delayed

Main symptoms No information available

Indication of any immediate medical attention and special treatment needed

Notes to physician Treat symptomatically

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment

Specific Hazards Arising from the Chemical
No information available

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal Precautions Ensure adequate ventilation

Environmental precautions

Environmental Precautions It is not anticipated to be hazardous for the environment

Methods and material for containment and cleaning up

Methods for Clean-up Pick up and transfer to properly labeled containers

7. HANDLING AND STORAGE

Precautions for safe handling

Handling Handle in accordance with good industrial hygiene and safety practice

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place

Packaging Material	There could be many packaging types for the product. The details are given in other Verde Environmental, Inc. documents
Incompatible Materials	Strong acids or alkali compounds and strong oxidizing agents may inactivate biological cultures

8. EXPOSURE CONTROL/PERSONAL PROTECTION

Individual protection measures, such as personal protective equipment

Eye Protection	Avoid contact with eyes
Skin and body protection	No special technical protective measures are necessary
Respiratory protection	In case of insufficient ventilation, wear suitable respiratory equipment
General Hygiene Considerations	Handle in accordance with good industrial hygiene and safety practices

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid
Appearance	Tan, Opaque
Odor	Slight fermentation odor
Odor Threshold	No information available

Property	**Values**
pH	7.0 – 8.0
Melting/freezing point	freeze at 0°C/32°F
Evaporation rate VALUE	No information available
Flammability (solid, gas)	Not flammable
Burning rate 100mm VALUE	No information available
Vapor pressure	No information available
Vapor density	No information available
Specific gravity	No information available
Water solubility	99%
Solubility in other solvents	No information available
Partition Coefficient (n-octanol/water)	No information available
Autoignition temperature	No information available
Decomposition temperature	No information available
Viscosity of product	No information available
Viscosity	No information available
Explosive properties	No information available
Oxidizing properties	No information available

Other Information

Softening Point	No information available
VOC Content	No information available

Density	No information available

10. STABILITY AND REACTIVITY

Reactivity
No data available

Chemical stability
Stable under recommended storage conditions

Possibility of Hazardous Reactions
None under normal processing

Conditions to avoid
Extremes of temperature and direct sunlight

Incompatible materials
Strong acids or alkali compounds and strong oxidizing agents may inactivate biological cultures

Hazardous Decomposition Products
No information available

11. Toxicological Information

Information on likely routes of exposure

Inhalation	There is no data available for this product
Eye contact	Contact with eyes may cause irritation
Skin contact	Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.
Ingestion	Ingestion may cause stomach discomfort

Information on toxicological effects

Symptoms	No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization	No information available
Mutagenic Effects	No information available
Reproductive Effects	No information available
Specific target organ systemic toxicity	No information available
Aspiration hazard	No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity
None known

Persistence/Degradability
The organic components of the product are biodegradable.

Bioaccumulation/Accumulation
No information available

Other adverse effects
No known effect

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste Disposal Method	Dispose of contents/container in accordance with local regulation
Contaminated Packaging	Empty containers should be taken for local recycling, recovery or waste disposal

14. TRANSPORT INFORMATION

Transport regulations:	No dangerous goods according to transport regulations No special precautions required
Transport hazard class(es):	N/A
Packing group:	N/A
Environmental hazards:	N/A

15. REGULATORY INFORMATION

International Inventories
Legend:
TSCA – United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL – Canadian Domestic Substances List/Non-Domestic Substances List

Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and 40 CFR Part 372.

SARA 311/312 Hazardous

Categorization

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals

State Right-to-Know

U.S. EPA Label Information

EPA Pesticide Registration Number Not Applicable

Canada

WHMIS Statement This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the CPR.

16. OTHER INFORMATION

Revision date: 01.01.2025

Revision Summary

No information available

Disclaimer

The information provided on this SDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text. Furthermore, as the conditions of use are beyond the control of Verde Environmental, Inc., it is the responsibility of the customer to determine the conditions of safe use of this preparation.

Council Bluffs - LNAPL Table

Date

1/1/2025 7/24/2025

Well ID

RW-100

Well ID	Date	Top of Casing	Water Depth (ft)	LNAPL Depth (ft)	LNAPL Thickness (ft)	LNAPL Recovered
RW-100	1/15/2025	978.75	13.29	9.87	3.42	2.50
RW-100	1/16/2025	978.75	12.09	10.08	2.01	1.25
RW-100	2/19/2025	978.75	13.36	10.57	2.79	1.75
RW-100	2/20/2025	978.75	12.58	10.76	1.82	1.25
RW-100	3/27/2025	978.75	13.31	9.97	3.34	3.34
RW-100	3/28/2025	978.75	12.04	10.01	2.03	2.03
RW-100	4/24/2025	978.75	13.70	11.31	2.39	1.25
RW-100	4/25/2025	978.75	12.57	11.34	1.23	0.75
RW-100	5/28/2025	978.75	13.10	11.93	1.17	0.75
RW-100	6/11/2025	978.75	13.37	11.38	1.99	1.75
RW-100	6/12/2025	978.75	12.72	11.38	1.34	1.00
RW-100	7/16/2025	978.75	13.33	10.34	2.99	2.25
RW-100	7/17/2025	978.75	11.98	10.45	1.53	1.00

Notes:

LNAPL = Light Non-Aqueous Phase Liquid

Council Bluffs - LNAPL Table

Date

1/1/2025 7/24/2025

Well ID

RW-102

Well ID	Date	Top of Casing	Water Depth (ft)	LNAPL Depth (ft)	LNAPL Thickness (ft)	LNAPL Recovered
RW-102	1/15/2025	978.75	13.22	9.45	3.77	2.50
RW-102	1/16/2025	978.75	12.35	9.59	2.76	2.00
RW-102	2/19/2025	978.75	13.24	10.15	3.09	2.00
RW-102	2/20/2025	978.75	12.49	10.33	2.16	1.50
RW-102	3/27/2025	978.75	13.57	9.38	4.19	4.19
RW-102	3/28/2025	978.75	12.39	9.48	2.91	2.91
RW-102	4/24/2025	978.75	13.42	10.03	3.39	2.75
RW-102	4/25/2025	978.75	12.50	10.19	2.31	1.25
RW-102	5/28/2025	978.75	13.38	10.85	2.53	2.50
RW-102	6/11/2025	978.75	13.46	10.54	2.92	2.25
RW-102	6/12/2025	978.75	12.73	10.76	1.97	1.00
RW-102	7/16/2025	978.75	13.59	8.91	4.68	3.25
RW-102	7/17/2025	978.75	12.12	9.27	2.85	1.75

Notes:

LNAPL = Light Non-Aqueous Phase Liquid

Council Bluffs - LNAPL Table

Date

1/1/2025 7/24/2025

Well ID

RW-103

Well ID	Date	Top of Casing	Water Depth (ft)	LNAPL Depth (ft)	LNAPL Thickness (ft)	LNAPL Recovered
RW-103	1/15/2025	978.75	13.04	9.24	3.80	2.50
RW-103	1/16/2025	978.75	12.97	9.19	3.78	2.50
RW-103	2/19/2025	978.75	13.02	9.96	3.06	2.50
RW-103	2/20/2025	978.75	12.97	9.98	2.99	2.00
RW-103	3/27/2025	978.75	13.47	9.14	4.33	4.33
RW-103	3/28/2025	978.75	13.23	9.04	4.19	4.19
RW-103	4/24/2025	978.75	13.14	9.85	3.29	2.25
RW-103	4/25/2025	978.75	13.03	9.86	3.17	2.00
RW-103	5/28/2025	978.75	13.21	10.64	2.57	2.50
RW-103	6/11/2025	978.75	13.20	10.36	2.84	2.00
RW-103	6/12/2025	978.75	13.14	10.44	2.70	1.25
RW-103	7/16/2025	978.75	13.39	8.68	4.71	3.75
RW-103	7/17/2025	978.75	13.01	8.86	4.15	3.75

Notes:

LNAPL = Light Non-Aqueous Phase Liquid

Council Bluffs - LNAPL Table

Date

1/1/2025 7/24/2025

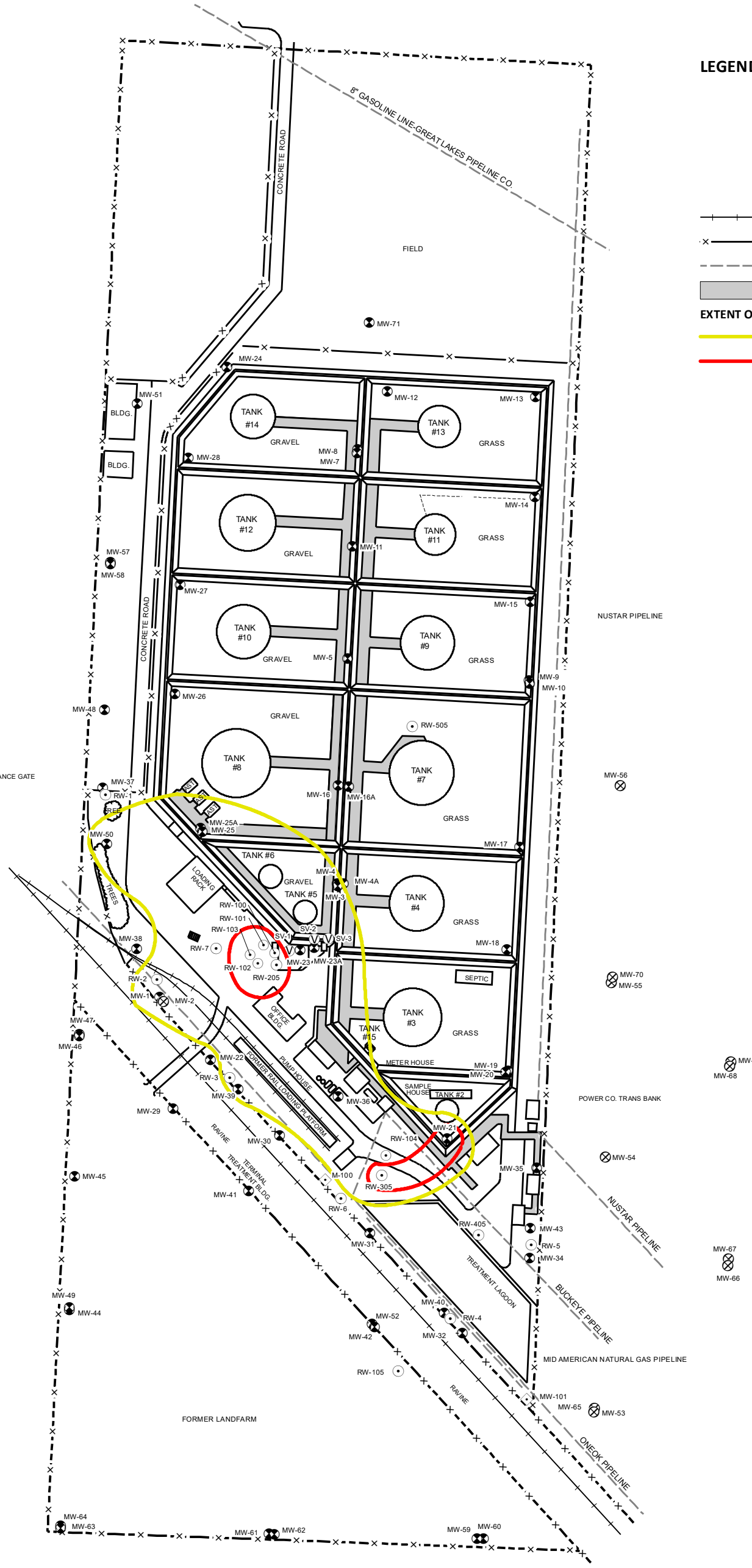
Well ID

RW-205

Well ID	Date	Top of Casing	Water Depth (ft)	LNAPL Depth (ft)	LNAPL Thickness (ft)	LNAPL Recovered
RW-205	1/15/2025	978.75	13.06	9.57	3.49	5.00
RW-205	1/16/2025	978.75	11.91	9.74	2.17	2.75
RW-205	2/19/2025	978.75	13.06	10.27	2.79	3.50
RW-205	2/20/2025	978.75	17.15	16.42	0.73	1.25
RW-205	3/27/2025	978.75	13.27	9.56	3.71	3.71
RW-205	3/28/2025	978.75	11.72	9.65	2.07	2.07
RW-205	4/24/2025	978.75	13.47	10.03	3.44	4.75
RW-205	4/25/2025	978.75	11.65	10.41	1.24	1.00
RW-205	5/28/2025	978.75	13.29	10.92	2.37	3.50
RW-205	6/11/2025	978.75	13.09	10.66	2.43	3.25
RW-205	6/12/2025	978.75	12.37	10.91	1.46	2.50
RW-205	7/16/2025	978.75	13.01	9.07	3.94	6.00
RW-205	7/17/2025	978.75	11.48	9.47	2.01	2.00

Notes:

LNAPL = Light Non-Aqueous Phase Liquid



LEGEND

- RECOVERY WELL
- MONITORING WELL
- ABANDONED MONITORING WELL
- SVE WELL
- FORMER REMEDIATION SYSTEM WELL
- RAILROAD TRACKS
- FENCE
- PETROLEUM PIPELINE
- ABOVE GROUND PRODUCT PIPING

EXTENT OF LNAPL THICKNESS

- < 0.5 FOOT
- > 0.5 FOOT

LNAPL = LIGHT NON-AQUEOUS PHASE LIQUID

FIGURE 1

LNAPL EXTENT
UPPER DEEP ZONE - MAY 21, 2024
BUCKEYE TERMINALS, LLC
COUNCIL BLUFFS TERMINAL
829 TANK FARM ROAD
COUNCIL BLUFFS, IOWA

PROJECT NO.	PREPARED BY	REF SCALE
BUCKCBT21	MB/JH	1:2,400
DATE	REVIEWED BY	MAP SCALE
4/15/2025	AS/BF	1 INCH = 200 FEET

antea group | data management + analytics

Z:\!GIS Projects\Buckeye\Buckeye Council Bluffs\Project Number\Layout\CBT_LPH0524.mxd