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EA Engineering, Science, and Technology, Inc.

INJECTION COMPLETION REPORT
REVISION 1
CONOCO SERVICE STATION
3837 HIGHWAY 64, CHAMA, NEW MEXICO

PSTB FACILITY #: 27498
RELEASE ID #: 2316
WPID #: 4262
DELIVERABLE ID #: 4262-4
CONTRACT #: 22-667-3200-0007

Submitted to:
New Mexico Environment Department
Petroleum Storage Tank Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505

Submitted by:
EA Engineering, Science,
and Technology, Inc., PBC
320 Gold Avenue SW, Suite 1300
Albuquerque, NM 87102

Distribution:

1 Copy Mr. Corey Jarrett, Project Manager, NMED PSTB
1 Copy Ms. Katherine MacNeill, P.E., Engineer, NMED PSTB

September 30, 2022 EA Project No. 6380401

TABLE OF CONTENTS

DRAWING

TABLE

APPENDICES

1.0 INTRODUCTION

1.1. Contractual

EA Engineering, Science, and Technology, Inc. PBC (EA) has prepared this Injection Completion Report to document the injection of Regenesis® Oxygen Release Compound - Advanced (ORC-A®) (Appendix A) to mitigate residual groundwater contamination and to facilitate a No Further Action status at Conoco Service Station located at 3837 US Highway 64 in Chama, New Mexico. Google Maps identifies the site as 2455 US Highway 64, Chama, Mexico. The report has been prepared under Contract number 22 667 3200 0007, following the New Mexico Petroleum Storage Tank Regulations, New Mexico Administrative Code (NMAC) 20.5.119.1923, and work plan identification (WPID) number 4262, approved by the New Mexico Environment Department (NMED) Petroleum Storage Tank Bureau (PSTB) on February 24, 2022. The work was performed under the Final Remediation Plan (FRP) dated June 13, 2022, and the Underground Injection Control Discharge Permit (UIC DP) dated September 15, 2022 (Appendix B).

1.2. Background

- In well MW-7, a NAPL sheen was noted in April 2021. Before that, in 2017, total naphthalene concentrations exceeded the NMWQCC standard ranging between 180 and 277 micrograms per liter (µg/L).
- The depth to groundwater in recent years has varied between approximately 5 and 8 feet below the top of the well casing (btoc). Historically, the groundwater level was as high as 3.5 feet btoc.
- The groundwater flow direction is primarily to the southwest at a gradient of ranging between 0.02 and 0.10.
- Dissolved oxygen (DO) concentrations are slightly aerobic at approximately 1.0 milligrams per liter (mg/L). This indicates that aerobic biodegradation may be supported. Oxidation-reduction potential (ORP) was slightly positive at around 50 millivolts (mV).

- Total petroleum hydrocarbons (TPH) were below the laboratory detection levels indicating low contaminant mass.
- In 2005, during MW-7 well installation, soil to seven (7) feet below the ground surface (bgs) was logged as clay with sand and gravel of slight plasticity and medium stiffness. The soil between 7 and 12 feet bgs was described as fine to coarse well-graded sand with some gravel. Large cobbles were noted between 9 and 12.5 feet bgs.
- In 2022, during the injection of ORC-A®, cobbles were encountered between 5.0 and 7.5 feet bgs.
- In 2005, in SB-8/MW-7, high photoionization detector (PID) readings were observed at 5 feet bgs (3,480 parts per million by volume [ppmv]) and 9 feet bgs (2,470 ppmv).
- Well MW-7 extends to a depth of approximately 12.5 feet bgs, where refusal of the hollow stem auger was noted.

1.3. March 2022 Groundwater Field Data Results

Provided below is a table summarizing groundwater level gauging and geochemical parameters obtained during the purging of the wells in March of 2022.

Table 1. Summary of Field Measurements

Well ID	Depth to Water	Total Depth	Well Casing Elevation	Ground Water Elevation	Temperature	Specific Conductance	pH	Oxidation-Reduction Potential	Dissolved Oxygen
	feet TOC	feet TOC	feet AMSL	feet AMSL	degrees C	µS/cm	units	mV	mg/L
MW-6	Could not find the well								
MW-7	5.88	12.16	7,779.28	7,767.12	9.23	533	6.4	698	2.33
MW-8	6.57	15.04	7,779.64	7,764.60	9.73	1,294	5.76	1,103	1.29
MW-9	5.64	13.84	7,777.49	7,763.65	9.24	830	6.17	148	2.01
MW-11	5.64	12.70	7,778.53	7,765.83	8.96	764	6.13	123	2.22
MW-12	6.43	12.96	7,780.28	7,767.32	6.75	1,874	6.39	1,205	3.63
Average	6.0	13.34	7,779.04	7,765.70	8.8	1,059	6.2	655	2.3

Notes:
Dissolved oxygen concentrations are from the first bailer. All other parameters are before sampling.

feet TOC	feet below the top of the well casing
feet AMSL	feet above mean sea level
C	Celsius
µS/cm	micro-Siemens per centimeter
mV	millivolt
mg/L	milligram per liter

- The average depth to water was 6.0 feet below the top of the casing. The corresponding average groundwater elevation was 7,765.7 feet above the mean sea level.
- The groundwater flow direction was to the south-southwest at gradients varying between 0.04 and 0.09 (Drawing G-2).
- The average groundwater temperature was 8.8 degrees Celsius.
- The average DO was 2.5 milligrams per liter (mg/L) and the average ORP was 655 millivolts. Groundwater conditions were slightly aerobic and oxidizing.
- The average Specific Conductance (SpC) was 1,059 micro-Siemens per centimeter.

1.4. March 2022 Groundwater Analytical Results

Provided below is a table summarizing the March 2022 groundwater analytical results.

Table 2. Summary of Recent Laboratory Analytical Results

Well ID	Date	Benzene	Toluene	Ethyl Benzene	Total Xylenes	MTBE	EDC	EDB	Total Naphthalenes	Total Dissolved Solids
Standard		***5.0***	***1,000***	***700***	***620***	***100***	***5.0***	***0.05***	***30***	***1,000***
Units		*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*µg/L*	*mg/L*
MW-7	4/29/2019	Non-Aqueous Phase Liquid Sheen								
MW-7	4/22/2021	Non-Aqueous Phase Liquid Sheen								
MW-7	3/31/2022	<10	<20	140	210	<20	<20	<20	**55**	
MW-8	4/29/2019	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<10	
MW-8	4/22/2021	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<10	
MW-8	3/31/2022	<2.0	<2.0	<2.0	<3.0	<2.0	<2.0	<2.0	<20	**754**
MW-9	4/29/2019	<1.0	<1.0	1.4	<1.5	<1.0	<1.0	<1.0	<10	
MW-9	4/22/2021	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<10	
MW-9	3/31/2022	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<10	**473**
MW-11	4/29/2019	1.2	<1.0	2.6	27	<1.0	<1.0	<1.0	8.0	
MW-11	4/22/2021	1.7	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<10	
MW-11	3/31/2022	<2.0	<2.0	<2.0	<3.0	<2.0	<2.0	<2.0	<20	
MW-12	4/29/2019	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<1.0	
MW-12	4/22/2021	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<1.0	
MW-12	3/31/2022	<1.0	<1.0	<1.0	<1.5	<1.0	<1.0	<1.0	<1.0	

Notes:
Source of previous data: May 10, 2021, Groundwater Monitoring Report, Souder, Miller, & Associates.
Empty cells indicate that analysis was not conducted
Volatile Organic Compounds were analyzed using EPA Method 8260B.
Total Dissolved Solids were analyzed using Standard Method 2540C.

<	less than	mg/L	milligrams per liter
µg/L	micrograms per liter	MTBE	methyl tertiary butyl ether
EDB	ethylene dibromide		
EDC	ethylene dichloride		

- Groundwater concentrations were compared to the concentrations stated in the New Mexico Administrative Code 20.6.2.3103 "Standards for Ground Water of 10,000 mg/L TDS Concentration or less".
- Concentrations of benzene, toluene, ethylbenzene, total xylenes, methyl-tertiary butyl ether (MTBE), ethylene dichloride, and ethylene dibromide were below the standards.
- The concentration of total naphthalenes in MW-7 was 55 µg/L, above the standard of 30 µg/L. In 2019 and 2021, a NAPL sheen was present in the well.
- The Total Dissolved Solids concentration in MW-8 was 754 mg/L and in MW-9 was 473 mg/L.

2.0 REMEDIATION

2.1. Goals of Remediation

The goal of the remediation was to mitigate recalcitrant petroleum hydrocarbon concentrations in monitoring well MW-7 to facilitate a No Further Action at the site. In recent years, concentrations of benzene and total naphthalene in this well were above the New Mexico Administrative Code (NMAC) 20.6.2.3103 Standards for Ground Water and a NAPL sheen was observed in 2019 and 2021. The remediation goal is to decrease benzene concentrations to below 5 µg/L and total naphthalene concentrations to below 30 µg/L, which are the corresponding NMAC 20.6.2.3103 standards.

2.2. Underground Injection Control Discharge Permit

The injection was performed under the Underground Injection Control Discharge Permit (UIC DP) DP-1945 approved by the NMED Groundwater Quality Bureau on September 15, 2022, and valid through September 14, 2027 (Appendix B).

2.3. Final Remediation Plan

Per 20.5.119.1923 NMAC, EA prepared the Final Remediation Plan that was submitted to the NMED PSTB (EA, June 13, 2022). As part of the FRP, EA and PSTB provided public notice 20.5.119.1923.D.(10).

2.4. Injectate

The NMED PSTB Request for Quote specified a controlled-release oxidant as the preferred technology for site remediation. EA selected Regenesis ORC-A®, an engineered, oxygen-release compound designed specifically for enhanced, in situ aerobic bioremediation of petroleum hydrocarbons in groundwater and saturated soils. Upon contact with groundwater, calcium oxy-hydroxide-based material becomes hydrated producing a controlled release of molecular oxygen (17% by weight) for periods of up to 12 months on a single application. ORC-A®. Manufacturer specifications are provided in Appendix A.

2.5. Target Zone and Area

The target area was defined as the area around monitoring well MW-7, as shown in Drawing C-1. Ten (10) injection points were placed on a 7.5-foot grid around the wells. The target injection zone was defined as the capillary fringe and the impacted saturated zone between 4 feet bgs and 12 feet bgs. However, cobbles were encountered at all points between 5 and 7.5 feet bgs; therefore, most of the injection occurred near the refusal depth. A summary of the injection is provided in Table 1.

2.6. Dosage

TPH concentrations were below the detection limit; however, a sheen was observed in MW-7; therefore, an empirical application rate of 5 pounds of ORC-A per foot and 1.5 gallons of water per foot was applied. The application rate per point was 40 pounds of ORC-A and approximately 12 gallons of water. The 400 pounds of ORC-A will release 68 pounds of oxygen and mineralize up to 19 pounds of hydrocarbons in the target area.

2.7. Injection Contractor and Method

To perform the injection, EA contracted Enviro-Drill LLC, a New Mexico Licensed Drilling Company, License # WD-1186, used a direct-push Geoprobe® 7720DT rig to inject the remediation fluids using a top-down non-retractable tool.

2.8. Notifications

Before the injection, EA notified Mr. Corey Jarrett, NMED PSTB project manager.

2.9. NM 811 Clearance

Before the injection, EA marked the site with white paint in preparation for the underground utility clearance. Enviro-Drill LLC. requested the NM811 clearance and the utility companies marked the existing underground infrastructure.

2.10. Mixing and Injection

Potable clean water was poured into the mixing vessel, ORC-A® was added, and the solution was mixed using the integral vessel mechanical mixer. Once the solution was homogenized, it was injected using a progressive cavity Liberty 2LL4 pump located at the base of the mixing vessel and connected to the push rod using a high-pressure hose.

2.11. Injection Quantities, Pressures, Flowrates, and Surfacing

On September 24, 2022, 400 pounds of ORC-A® were injected at a rate of 40 pounds per injection point into ten (10) injection points. The majority of the injectate was delivered into the 5-7 feet bgs zone where refusal due to cobbles was encountered. The injection pressure ranged from 125 psig to 150 psig and the flow rates ranged from 3 gpm to 5 gpm. A summary of injection is provided in Table 1, photographs are included in Appendix C, and field records are included in Appendix D.

Surfacing was observed when injecting into CC-02 and CC-07A. To resolve surfacing, the push rod was pushed deeper to create a better seal and the injection flow rate was decreased to decrease the injection pressure.

2.12. Groundwater Levels

The groundwater level in MW-7 before the injection was 6.96 feet below the top of the well casing. After the injection, the groundwater level was 6.98 feet below the top of the well casing.

2.13. Plugging and Restoration

Upon completion, the injection boreholes were plugged with hydrated bentonite pellets, the site was restored, materials and equipment removed, and personnel demobilized.

2.14. Post-Injection Groundwater Monitoring

Provided below is the scope of work for the post-injection groundwater monitoring. This task was not part of the scope of the EA contract.

- Gauge six (6) monitoring wells (MW-6, MW-7, MW-8, MW-9, MW-11, and MW-12).
- Purge a minimum of three casing volumes of stagnant groundwater from the well.
- Collect groundwater samples from six wells (MW-6, MW-7, MW-8, MW-9, MW-11, and MW-12) for laboratory analysis.
- Submit samples for volatile organic compounds (VOCs) analysis by U.S. Environmental Protection Agency (EPA) Method 8260B and for total dissolved solids (TDS) analysis in MW-6 and MW-8 by SM 2540 C.
- Prepare and submit a groundwater monitoring report.

2.15. Annual Evaluation

Per 20.5.12.119.1927 NMAC, the effectiveness of the injection should be evaluated annually and an analysis of the trend of contaminant concentrations in groundwater, trends of contaminant concentration decline, the effectiveness of the remediation, an estimated time to achieve remediation goals, and recommendations for remediation enhancements be performed. The annual evaluation was not scoped within the EA's current contract.

2.16. Recommendations

EA recommends conducting quarterly groundwater monitoring at the site to evaluate concentrations of contaminants of concern after the injection.

3.0 REFERENCES

EA Engineering, Science, and Technology, Inc. PBC (EA), 2022. Chama Conoco Remediation Work Plan. February 17.

EA, 2022. Chama Conoco Pre-Injection Groundwater Monitoring Report. May 2.

EA, 2022. Chama Conoco Final Remediation Plan. June 13.

New Mexico Environment Department Groundwater Quality Ground Water Bureau. 2022. Underground Injection Control General Discharge Permit. September 15.

State of New Mexico. 2022. Professional Services Contract No. 22 667 3200 0007. January 18.

DRAWING

LEGEND:

- MONITORING WELL
- PLUGGED MONITORING WELL
- INJECTION POINTS 7.5' ON-CENTER SPACING BETWEEN POINTS.
- GROUNDWATER FLOW DIRECTION AND GRADIENT RANGE
- GAS — UNDERGROUND GAS UTILITY
- OHE — OVERHEAD ELECTRICAL UTILITY

10 5 0 10

SCALE IN FEET

REV	DATE	DRAWN	CHECKED	REMARKS
0	09/25/22	VM	VM	4262-4 INJECTION REPORT

REVISIONS

320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

CONOCO SERVICE STATION
3837 HIGHWAY 64, CHAMA, NEW MEXICO
FINAL REMEDIATION PLAN

LOCATION OF THE INJECTION POINTS

PROJECT NUMBER: 6380401

DRAWING NO.: C-1

TABLE

TABLE 1. A SUMMARY OF REGENESIS ORC-A INJECTION
CHAMA CONOCO, 2455 US HWY 64, CHAMA, NEW MEXICO

Injection Point	Associated Well	Date	Inveval *feet bgs*	Interval Length *feet*	Solution Volume *gallons*	Injected ORC-A Mass *pounds*	Injected ORC-A Volume *gallons*	Target ORC-A Mass *pounds*	ORC-A Mass Variance *pounds*	Water Volume *gallons*	Total Injectate Volume *gallons*	Pressure *psig*	Flowrate *gpm*	Refusal Hit? *Yes/No*	Refusal Depth *feet bgs*	Sufacing *Yes/No*
CC-01	MW-7	9/24/2022	5-7	2	12	40	1.8	40	0	12	14	125	3	Yes	7	No
CC-02	MW-7	9/24/2022	4-7.5	3.5	12	40	1.8	40	0	12	14	150	3-5	Yes	7.5	Yes
CC-03	MW-7	9/24/2022	5-7	2	12	40	1.8	40	0	12	14	125	3	Yes	7	No
CC-04	MW-7	9/24/2022	5-7	2	12	40	1.8	40	0	12	14	125	3	Yes	7	No
CC-05	MW-7	9/24/2022	4-7	3	12	40	1.8	40	0	12	14	150	5	Yes	7	No
CC-06	MW-7	9/24/2022	5-7	2	12	40	1.8	40	0	12	14	125	3	Yes	7	No
CC-07	MW-7	9/24/2022	4-5	1	1.5	8	0.3	8	0	1.5	1.8	150	5	Yes	5	No
CC-07A	MW-7	9/24/2022	5-6	1	10.5	33	1.5	33	0	10.5	12	125	5	Yes	6	Yes
CC-08	MW-7	9/24/2022	4-7	3	12	40	1.8	40	0	12	14	125	3	Yes	7	No
CC-09	MW-7	9/24/2022	4-6	2	3	16	0.7	16	0	3.0	3.7	125	3	Yes	6	No
CC-09A	MW-7	9/24/2022	5-7	2	9	24	1.1	24	0	9.0	10	125	3	Yes	7	No
CC-10	MW-7	9/24/2022	5-7	2	12	40	1.8	40	0	12	14	125	3	Yes	7	No
Total					**120**	**400**	**18.0**	**400**	**0**	**120**	**138**					

Notes:
Refusal was encountered in all boreholes between 5.0 and 7.5 feet bgs. Most of the injectate was injected in the bottom interval where refusal was encountered.
The driller indicated that in his evaluation a layer cobbles or large gravel caused the refusal, as fragments could be seen in the shoe of the rod. Multiple attempts to break through the layer were unsuccessful.
The initial depth to water was 6.96 feet below the top of casing (ft toc). The final depth to water was 6.98 ft toc.

bgs below ground surface
gpm gallons per minute
psig pounds per square inch by gauge

APPENDIX A – REGENESIS ORC-A®

MANUFACTURER SPECIFICATION SHEET

OXYGEN RELEASE COMPOUND

ORC Advanced® Technical Description

ORC Advanced® is an engineered, oxygen release compound designed specifically for enhanced, *in situ* aerobic bioremediation of petroleum hydrocarbons in groundwater and saturated soils. Upon contact with groundwater, this calcium oxyhydroxide-based material becomes hydrated producing a controlled release of molecular oxygen (17% by weight) for periods of up to 12 months on a single application.

Example of ORC Advanced

ORC Advanced decreases time to site closure and accelerates degradation rates up to 100 times faster than natural degradation rates. A single ORC Advanced application can support aerobic biodegradation for up to 12 months with minimal site disturbance, no permanent or emplaced above ground equipment, piping, tanks, power sources, etc are needed. There is no operation or maintenance required. ORC Advanced provides lower costs, greater efficiency and reliability compared to engineered mechanical systems, oxygen emitters and bubblers.

ORC Advanced provides remediation practitioners with a significantly faster and highly effective means of treating petroleum contaminated sites. Petroleum hydrocarbon contamination is often associated with retail petroleum service stations resulting from leaking underground storage tanks, piping and dispensers. As a result, ORC Advanced technology and applications have been tailored around the remediation needs of the retail petroleum industry and include: tank pit excavations, amending and mixing with backfill, direct-injection, bore-hole backfill, ORC Advanced Pellets for waterless and dustless application, combined ISCO and bioremediation applications, etc.

For a list of treatable contaminants with the use of ORC Advanced, view the Range of Treatable Contaminants Guide

Chemical Composition

- Calcium hydroxide oxide
- Calcium hydroxide
- Monopotassium phosphate
- Dipotassium phosphate

Properties

- Physical state: Solid
- Form: Powder
- Odor: Odorless
- Color: White to pale yellow
- pH: 12.5 (3% suspension/water)

OXYGEN RELEASE COMPOUND

ORC Advanced® Technical Description

Storage and Handling Guidelines

Storage
Store in a cool, dry place out of direct sunlight
Store in original tightly closed container
Store in a well-ventilated place
Do not store near combustible materials
Store away from incompatible materials
Provide appropriate exhaust ventilation in places where dust is formed

Handling
Minimize dust generation and accumulation
Keep away from heat
Routine housekeeping should be instituted to ensure that dust does not accumulate on surfaces
Observe good industrial hygiene practices
Take precaution to avoid mixing with combustibles
Keep away from clothing and other combustible materials
Avoid contact with water and moisture
Avoid contact with eyes, skin, and clothing
Avoid prolonged exposure
Wear appropriate personal protective equipment

Applications

- Slurry mixture direct-push injection through hollow rods or direct-placement into boreholes
- *In situ* or *ex situ* slurry mixture into contaminated backfill or contaminated soils in general
- Slurry mixture injections in conjunction with chemical oxidants like RegenOx or PersulfOx
- Filter sock applications in groundwater for highly localized treatment
- *Ex situ* biopiles

Health and Safety

Wash thoroughly after handling. Wear protective gloves, eye protection, and face protection. Please review the ORC Advanced Safety Data Sheet for additional storage, usage, and handling requirements.

REGENESIS®

www.regenesis.com
1011 Calle Sombra, San Clemente CA 92673
949.366.8000

APPENDIX B – UNDERGROUND INJECTION CONTROL DISCHARGE PERMIT

NEW MEXICO ENVIRONMENT DEPARTMENT GROUND WATER QUALITY BUREAU

UNDERGROUND INJECTION CONTROL

GENERAL DISCHARGE PERMIT

Certified Mail- Return Receipt Requested

Facility Name:	**Conoco Service Station**
Facility Location:	**3837 Highway 64, Chama, New Mexico** **Section 00 Township 32 North Range 2 East** **Rio Arriba County**
Legally Responsible Party:	**NMED Petroleum Storage Tank Bureau** **121 Tijeras Avenue NE Suite 1000** **Albuquerque, NM 87102** **(505) 372-8335**
Remediation Oversight Agency Contact:	**NMED Petroleum Storage Tank Bureau Corey Jarrett, Project Manager, Geoscientist 505-372-8335** **NM State Contract Number: 22-667-3200-0007**
Remediation or Injection Plan Identification:	**Chama Conoco Final Remediation Plan** **FID 27498 RID 2316 Work Plan ID 4262**
Permitting Action:	**New DP-1945**
PPS Contact	**Andrew Romero** **(505) 660-8624**
EFFECTIVE DATE: September 15, 2022	**TERM ENDS:** September 14, 2027

Justin D. Ball
Chief, Ground Water Quality Bureau
[Subsection H of 20.6.2.3109 NMAC, NMSA 1978, § 74-6-5.I]
Version updated December 5, 2018

I. UIC GENERAL DISCHARGE PERMIT

The New Mexico Environment Department (NMED) Ground Water Quality Bureau (GWQB) issues this Underground Injection Control General Discharge Permit (UIC Permit) for the subsurface emplacement of additive fluids through a Class V UIC injection well for the purpose of facilitating vadose zone or groundwater remediation. The GWQB issues this UIC Permit to New Mexico Environment Department Petroleum Storage Tank Bureau (Permittee) pursuant to the New Mexico Water Quality Act (WQA), NMSA 1978 §§74-6-1 through 74-6-17, and the New Mexico Water Quality Control Commission (WQCC) Ground and Surface Water Protection Regulations, 20.6.2 NMAC.

In issuing this UIC Permit, the GWQB has determined that the requirements of Subsection C of 20.6.2.3109 NMAC have been met. The activities authorized by this UIC Permit are principally governed by Work Plan for Site Remediation (Injection Plan), under the authority of NMED PSTB, with oversight by the NMED PSTB. Compliance with this UIC Permit requires compliance with the terms, requirements, and conditions of the Injection Plan. The term of this UIC Permit shall be no longer than five years from the effective date of this UIC Permit.

The injection activities, the location of the injection site, the type of injection and quantities of additives being used are briefly described as follows:

Injection Activities (summary: including injection well type, number of wells, and injection frequency)

Copy of the Injection Plan Attached (required): ☒
Summary of Injection Plan: Inject 400 pounds of ORC-A in a slurry mixed with 120 gallons of water into approximatley 10 direct push injection points. The target interval is between 4 feet bgs and 12 feet bgs around monitoring well MW-7.

Injection Site Information

Depth to most shallow groundwater (required): 6 ft

Existing concentration of total dissolved solids (TDS) in groundwater (required): 473 - 754 mg/L

Location (required): 3837 US Highway 64, Chama, New Mexico

County (required): Rio Arriba

Latitude: 36.89007

Longitude: -106.58196

Map Showing Area of Injection Sites Attached (required): ☒

Additives Being Used (including volumes, manufacturer, and mixing ratios)

Regenesis ORC-A 400 pounds mixed with 120 gallons of water and injected into approximately 10 injection points.

Anticipated Precipitation, Dissolution, Adsorption, and Desorption Products

None. Increased dissolved oxygen is expected for a period of up to 1 year.

Public Notice Posting Locations

2 inch by 3 inch Newspaper Ad required for Renewal applications.
Newspaper: Northern New Mexico Independent or another selected by the GWQB

3 inch by 4 inch Newspaper Ad required for New, Modification, and Renewal/Modification applications.
Newspaper: Northern New Mexico Independent or another selected by the GWQB

2 feet by 3 feet sign posted for 30 days in a location conspicuous to the public at or near the facility required for New, Modification, and Renewal/Modification applications.
Sign Location: Onsite at 3837 Highway 64, Chama, New Mexico

8.5 inch by 11 inch or larger posted off-site location conspicuous to the public (e.g. public library). Required for New, Modification, and Renewal/Modification applications.
Flyer Location: Eleanor Daggett Library, 299 4th Street, Chama, NM 87520

This UIC Permit consists of the complete and accurate completion of this UIC Permit form as determined by the GWQB. ☑
Issuance of this UIC Permit does not relieve the Permittee of the responsibility to comply with the WQA, WQCC Regulations, and any other applicable federal, state and/or local laws and regulations, such as zoning requirements and nuisance ordinances.

Signatures

Signature must be that of the person listed as the legally responsible party on this application.

I, the applicant, attest under penalty of law to the truth of the information and supporting documentation contained in this application for an Underground Injection Control General Discharge Permit.

Applicant's Signature

Signature: Lorena Goerger Digitally signed by Lorena Goerger Date: 2022.05.19 10:50:16 -06'00' Date: 5/19/2022

Printed Name: Lorena Goerger Title: Acting Bureau Chief

Applicant Note that Submissions Must Include:

1- One electronic copy of the application delivered to the GWQB via email or other format

2- Two hardcopies of the application delivered to: Ground Water Quality Bureau
Harold Runnels Building
1190 Saint Francis Drive
P.O. Box 5469
Santa Fe, NM 87502-5469

3- Payment by check or electronic transfer of one application fee of $100.00

II. FINDINGS

In issuing this UIC Permit, GWQB finds:

1. The Permittee is injecting fluids so that such injections will move directly or indirectly into groundwater within the meaning of Section 20.6.2.3104 NMAC.
2. The Permittee is injecting fluids so that such fluids will move into groundwater of the State of New Mexico which has an existing concentration of 10,000 mg/L or less of TDS within the meaning of Subsection A of 20.6.2.3101 NMAC.
3. The Permittee is using a Class V UIC well as described in 20.6.2.5002(B)(5)(d)(ii) NMAC for in situ groundwater remediation by injecting a fluid that facilitates vadose zone or groundwater remediation.
4. The Permittee is injecting fluids into groundwater in order to achieve the remediation goals identified in the Injection Plan.

III. AUTHORIZATION TO DISCHARGE

The Permittee is authorized to inject chemical additives into groundwater in accordance with this UIC Permit and the Injection Plan under the oversight of NMED PSTB.

[20.6.2.3104 NMAC, Subsection C of 20.6.2.3106 NMAC, Subsection C of 20.6.2.3109 NMAC]

IV. CONDITIONS

The conditions of this UIC Permit shall be complied with by the Permittee and are enforceable by GWQB.

1. The Permittee shall perform remediation activities in accordance with the Injection Plan and shall notify GWQB of any changes prior to making them.

   [20.6.2.3107 NMAC]

2. The Permittee shall monitor the injection activities and their effects on groundwater quality as required by the Injection Plan and shall provide GWQB with electronic copies of the required reporting and any pertinent documentation of activities at the site.

   [20.6.2.3107.A NMAC, 20.6.2.3109.A NMAC]

3. If the GWQB or the Permittee identifies any failure of the Injection Plan or this UIC Permit to comply with 20.6.2 NMAC not specifically noted herein, GWQB may require the Permittee to submit a corrective action plan and a schedule for completion of corrective actions to address the failure.

   Additionally, the GWQB may require the Permittee to submit a proposed modification to the Injection Plan, this UIC Permit, or both.

   [20.6.2.3107.A NMAC, 20.6.2.3109.E NMAC]

4. ADDITIONAL MONITORING REQUIREMENTS – (RESERVED) - Placeholder for any added monitoring and reporting requirements.

5. TERMINATION – Within 30 days of completion of activities authorized by this UIC Permit the Permittee shall submit a closure report and a request to terminate the UIC Permit to the GWQB for its approval. The closure report shall identify how the injection well(s) was (were) closed in accordance with the Injection Plan. The Permittee shall provide NMED GWQB with a copy of this closure report.

   [20.6.2.5005 NMAC, 19.27.4 NMAC]

6. INSPECTION and ENTRY – The Permittee shall allow a representative of the NMED to inspect the facility and its operations subject to this UIC Permit and the WQCC regulations. The GWQB representative may, upon presentation of proper credentials, enter at reasonable times upon or through any premises in which a water contaminant source is located or in which are located any records required to be maintained by regulations of the federal government or the WQCC.

   The Permittee shall allow the GWQB representative to have access to, and reproduce for their use, any copy of the records, and to perform assessments, sampling or monitoring during an inspection for the purpose of evaluating compliance with this UIC Permit and the WQCC regulations.

   Nothing in this UIC Permit shall be construed as limiting in any way the inspection and entry authority of GWQB under the WQA, the WQCC Regulations, or any other local, state, or federal regulations.

   [20.6.2.3107.D NMAC, NMSA 1978, §§ 74-6-9.B and 74-6-9.E]

7. MODIFICATIONS and/or AMENDMENTS – In the event the Permittee proposes a change to the injection plan that would result in a change in the volume injected; the location of the injections; or the concentration of the additives being injected by the facility, the Permittee shall notify GWQB prior to implementing such changes. The Permittee shall obtain approval (which may require modification of this UIC Permit) by GWQB prior to implementing such changes.

   [20.6.2.3107.C NMAC, 20.6.2.3109.E and G NMAC]

8. COMPLIANCE with OTHER LAWS – Nothing in this UIC Permit shall be construed in any way as relieving the Permittee of the obligation to comply with all applicable federal, state, and local laws, regulations, permits, or orders.

   [NMSA 1978, § 74-6-5.L]

9. PERMIT FEES – Payment of permit fees is due at the time of UIC Permit approval. Permit fees shall be paid in a single payment remitted to GWQB no later than 30 days after the UIC Permit effective date.

   Permit fees are associated with issuance of this UIC Permit. Nothing in this UIC Permit shall be construed as relieving the Permittee of the obligation to pay all permit fees assessed by GWQB. A Permittee that ceases injecting or does not commence injecting during the term of the UIC Permit shall pay all permit fees assessed by GWQB. An approved UIC Permit shall be suspended or terminated if the facility fails to remit a payment by its due date.

   [20.6.2.3114.F NMAC, NMSA 1978, § 74-6-5.K]

Work Plan for Site Remediation (Injection Plan)

EA Engineering, Science,
and Technology, Inc., PBC

320 Gold Avenue SW, Suite 1300
Albuquerque, NM 87102
Telephone: 505-224-9013
www.eaest.com

February 17, 2022

Mr. Corey Jarrett
Geoscientist, Project Manager
State of New Mexico Petroleum Storage Tank Bureau
121 Tijeras Avenue NE, Suite 1000
Albuquerque, NM 87102

Work Plan for Site Remediation
Conoco Service Station, 3837 US Highway 64, Chama, New Mexico
Release ID #: 2316 Contract #: 22 667 3200 0007

Dear Mr. Jarrett:

EA Engineering, Science, and Technology, Inc. PBC (EA) prepared this Work Plan for remediation activities at Conoco Service Station, 3837 US Highway 64, Chama New Mexico. Work will be performed under Contact No. 22 667 3200 0007. The objective is to inject a controlled release oxidant amendment to reduce recalcitrant petroleum hydrocarbon contaminant concentrations to below New Mexico Water Quality Control Commission (WQCC) to facilitate a No Further Action at the site.

The remediation activities will be performed in accordance with the requirements of the New Mexico Petroleum Storage Tank Regulations, NMAC 20.5.119. EA maintains the New Mexico Construction Division (CID) GS-29 license #359538 and New Mexico Professional Engineer licensure. All remediation activities will be conducted under the direct supervision of Vener Mustafin, New Mexico Professional Engineer License #17630.

BACKGROUND

Provided below is a summary of the site background.

- In well MW-7, a NAPL sheen was noted in April 2021. Before that, in 2017, total naphthalene concentrations exceeded the NMWQCC standard ranging between 180 and 277 micrograms per liter (µg/L).
- The depth to groundwater in recent years has varied between approximately 5 and 8 feet below the top of the well casing (ft btoc). Historically, the groundwater level was as high as 3.5 ft btoc.
- The groundwater flow direction is primarily to the Southwest at a gradient of approximately 0.02 foot per foot.
- Dissolved oxygen (DO) concentrations were slightly aerobic at approximately 1.0 milligrams per liter (mg/L), as estimated from the oxygen saturation of 15%, indicating that aerobic biodegradation may be supported. Oxidation-reduction potential (ORP) was slightly positive around 50 millivolts (mV).

- Total petroleum hydrocarbons (TPH) were below the laboratory detection levels indicating low contaminant mass.
- Soil to seven (7) feet below ground surface (ft bgs) is comprised of clay with sand and gravel of slight plasticity and medium stiffness. The soil between 7 and 12 ft bgs is comprised of fine to coarse well-graded sand with some gravel. Large cobbles were noted between 9 and 12.5 ft bgs.
- High photoionization detector (PID) readings were observed at 5 ft bgs (3,480 parts per million by volume [ppmv]) and 9 ft bgs (2,470 ppmv).
- Well MW-7 extends to a depth of approximately 12.5 ft bgs, where refusal of the hollow stem auger was noted during well installation.

GENERAL APPROACH

The remediation approach includes the following major elements: 1) conduct pre-injection (baseline) groundwater monitoring, 2) obtain an Underground Injection Control General Discharge Permit (UIC DP), 3) prepare a Final Remediation Plan (FRP), 4) perform injection of remediation fluids, and 5) optional task as budget allows (post-injection groundwater monitoring). Each of these elements is discussed below.

1. PRE-INJECTION (BASELINE) GROUNDWATER MONITORING

- Gauge six (6) monitoring wells (MW-6, MW-7, MW-8, MW-9, MW-11, and MW-12).
- Purge a minimum of three casing volumes of stagnant groundwater from the well.
- Collect groundwater samples from six wells (MW-6, MW-7, MW-8, MW-9, MW-11, and MW-12) for laboratory analysis.
- Submit samples for volatile organic compounds (VOCs) analysis by U.S. Environmental Protection Agency (EPA) Method 8260B and for total dissolved solids (TDS) analysis in MW-6 and MW-8 by SM 2540 C.
- Prepare and submit a one-page groundwater monitoring report, including the analytical laboratory report as an attachment.

The following activities will be completed as part of the pre-injection groundwater monitoring:

- Before conducting fieldwork, EA will prepare a site-specific Health and Safety Plan (HASP) describing activities, hazards, personal protective equipment, route to the hospital, emergency contacts, and other required elements.
- EA assumes that NMED PSTB has an agreement with the site owner to access the site.
- EA will notify the NMED PSTB project manager and site owner at least 96-hour before conducting field activities.
- EA personnel will review the Work Plan, HASP, order equipment, obtain supplies, and discuss the scope of work with the project manager.
- Before gauging, well caps will be removed to allow the groundwater in the well casing to equilibrate with atmospheric pressure.
- Gauging will be conducted using an electronic interface probe to the nearest 0.01 foot.
- Before sampling, purging will be performed to remove stagnant water using dedicated, clean, disposable bailers and twine or a variable speed peristaltic pump. Three casing

volumes will be purged before sample collection. If wells go dry, they will be allowed to recover until sufficient sample aliquot can be collected.
- During purging, DO, ORP, pH, temperature, and specific conductivity will be measured using a properly calibrated water quality meter.
- Samples will be collected in clean sealed containers supplied by Hall Environmental Analysis Laboratory (HEAL), labeled, placed into coolers packed with ice, entered into a chain of custody, and delivered to HEAL under direct custody.
- Upon receipt of laboratory analytical data, EA will prepare and submit a one-page analytical summary, including the analytical laboratory report as an attachment.

2. OBTAIN UNDERGROUND INJECTION CONTROL GENERAL DISCHARGE PERMITS

Before injection, EA will obtain a UIC DP from the NMED Ground Water Quality Bureau (NMED GWQB). As part of the UCI DP, the following will be completed:

- EA will prepare and submit a UIC DP application to the NMED GWQB on behalf of the NMED PSTB.
- Public notice will be published in the local newspaper.
- A 2' x 3' sign will be posted for 30 days in a location conspicuous to the public at or near the site.
- An 8.5" x 11" notice will be posted in a public library.
- A public notice flyer will be mailed by 1st Class mail to the property owners within 1/3 mile of the site.
- A public notice flyer will be mailed by certified mail to the owner of the site.
- An affidavit of posting of the public notice, a list of names and addresses to whom the public notice was mailed, a list and names and addresses of owners of discharge sites, certified mail receipts, and a copy of the newspaper ad will be submitted to the NMED GWQB.

Depending on the NMED GWQB instructions for the UIC DP, the final requirement may differ and will be followed.

3. PREPARE FINAL REMEDIATION PLAN

An FRP will be prepared in accordance with 20.5.119.1923 NMAC. The design and engineering of the FRP will be executed under the supervision of Vener Mustafin, P.E., Professional Engineer registered to practice engineering in the State of New Mexico. The FRP will minimally include the following:

- Goals of remediation and target concentrations.
- A site history summary, which includes current soil and groundwater conditions.
- Site maps identifying roads, buildings, utilities, existing monitoring wells, groundwater contours, dissolved-phase contaminant distribution, and planned injection locations.
- A discussion of the planned injection strategy, including a description of the planned injectate, rationale for the selected injectate, the injection process, target injection depth intervals, and calculations supporting planned injection point spacing and volumes.
- An implementation schedule.
- A discussion of planned observations and monitoring during the injection.
- Copies of required discharge permits and anticipated public and agency notifications.

- Copies of subcontractor/injection contractor's datasheets.
- A health and safety plan.

4. PERFORM INJECTION OF REMEDIATION FLUIDS

Objective. As specified in the Request for Quote (RFQ), the objective of remediation will be to address recalcitrant benzene and naphthalene concentrations in the monitoring well MW-7 through injection of a controlled-release oxidant injectate. In recent years, this has been the only well that has contained naphthalene concentrations above the applicable standard. The remediation goal is to decrease the total naphthalenes concentration to below 30 µg/L.

NMED PSTB-Specified Injectate. Regenesis ORC Advanced® (ORC-A), was selected as a controlled-release oxidant injectate based on NMED PSTB RFQ specification. ORC-A is an engineered, oxygen release compound designed specifically for enhanced, in situ aerobic bioremediation of petroleum hydrocarbons in groundwater and saturated soils. Upon contact with groundwater, this calcium oxyhydroxide-based material becomes hydrated producing a controlled release of molecular oxygen (17% by weight) for periods of up to 12 months on a single application.

Utilities and Notifications. Before intrusive activities, a utility locate will be requested through New Mexico One Call and marked by the respective utility entities. It is assumed in the cost estimate that a trip to mark the site boundaries will not be required. At least 96-hours before field activities, the NMED PSTB project manager and the site owner will be notified.

Injection Methodology. Direct push technology will be used to inject the remediation fluids using a top-down application.

Target Area. The area near well MW-7 is the target remediation area as shown in the attached Figure.

Target Interval. The capillary fringe and impacted saturated zone are the targets of the injection. The target interval will be an 8 foot-thick zone between 4 ft bgs and 12 ft bgs. Considering the presence of cobbles, if the refusal is consistent without reaching 12 ft bgs, boreholes will be advanced to the refusal depth and fluids injected within the achievable interval.

Injection Point Spacing. The injection interval is both clay and sand. As such, a spacing of 7.5-feet on center (5-foot ROI) was selected for the grid application based on professional judgment. This spacing will result in approximately 10 injection points to compensate for heterogeneity. This spacing is considered sufficient for the distribution of the injectate in the subsurface and is practical to fit the scope of the small procurement project. Additional points were placed upgradient of the well to provide a sustained oxygen supply for in-situ biodegradation.

Injection Pressure. Due to the cohesive nature of the soil in the upper injection zone at the site and ORC-A forming a high-solids slurry, a high injection pressure over 100-150 pounds per square inch (psi) will be likely required to adequately deliver the injectate. If surfacing occurs, the injection tool will be advanced deeper and injection will be attempted again. If that fails, the injection tool will be advanced in another location in the general vicinity. The injection will be staggered to allow for pressure dissipation.

Dosage. TPH concentrations were below the detection limit; however, a sheen was observed in MW-7; therefore, an empirical application rate of 5 pounds of ORC-A per foot and 1.5 gallons of water per foot were selected. The application rate per point for an 8-foot-thick injection interval will

be 40 pounds of ORC-A and approximately 12 gallons of water. The total quantities are 400 pounds of ORC-A and 120 gallons of water. For the 10 injection points, 17% by weight releasable oxygen, and 3.5 pounds oxygen to mineralize 1 pound of fuel hydrocarbons, this targeted injection of 400 pounds of ORC-A will release 68 pounds of oxygen and mineralize up to 19 pounds of hydrocarbons in the target area.

$$\frac{5\ \frac{\text{lb}}{\text{ft}} \cdot 8\ \text{ft} \cdot 10 \cdot 17\ \%}{3.5\ \frac{\text{lb}}{\text{lb}}} = 19\ \text{lb}$$

Mixing and Injection. ORC-A will be mixed with potable water using a mechanical mixer in a mixing vessel. An injection pump equipped with control valves and a pressure gauge will be used to inject fluids through the injection tool. A high-pressure hose will be run from the pump to the top of the drilling rod. The injection volume will be measured using a mixing vessel or a totalizing flow meter. The injection volume, pressure, and times will be recorded on the field data forms. Injection and field activities will be documented by photographs.

Monitoring. During injection, the following monitoring will be performed:

- Groundwater levels will be measured before and after injection in MW-7 and surrounding wells.
- Proportions of ORC-A® and water in each batch will be recorded.
- The injection interval, pressure, and volume for each borehole/interval will be recorded.

Plugging and Restoration. Upon completion of the injection, boreholes will be plugged with hydrated bentonite granules or grout. The surfaces in the injection area will be restored to match existing types and conditions, and material, supplies, and equipment will be removed.

Duration of Remediation. ORC-A persists for approximately 12 months releasing oxygen to enhance in-situ biodegradation. It is anticipated that concentrations of benzene and total naphthalenes will decrease to NMWQCC standards within one year. Additional monitoring will be required to verify concentration trends.

Prepare a Completion Report. Within 30 days after injection completion, EA will prepare a report, which will include the following:

- A discussion of the injection process;
- A site map showing injection point locations;
- Table(s) of injection depth intervals, pressures, volumes, and mass of ORC-A injected;
- Field notes and injection data forms; and
- Photographic documentation.

5. OPTIONAL TASK – PERFORM POST-INJECTION GROUNDWATER MONITORING

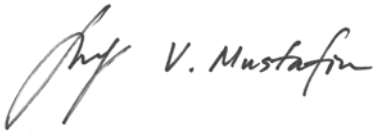
The optional post-injection monitoring will be identical in scope and execution to Task 1 – Perform Pre-Injection Groundwater Monitoring. The post-injection monitoring will be performed as budget allows and upon a directive to proceed by the NMED PSTB.

Tasks, costs, payment triggers, and schedule are provided in attached table.

Please feel free to contact me at (505) 296-1070 or vmustafin@eaest.com if you have questions or comments.

Sincerely,

EA Engineering, Science, and Technology, Inc., PBC



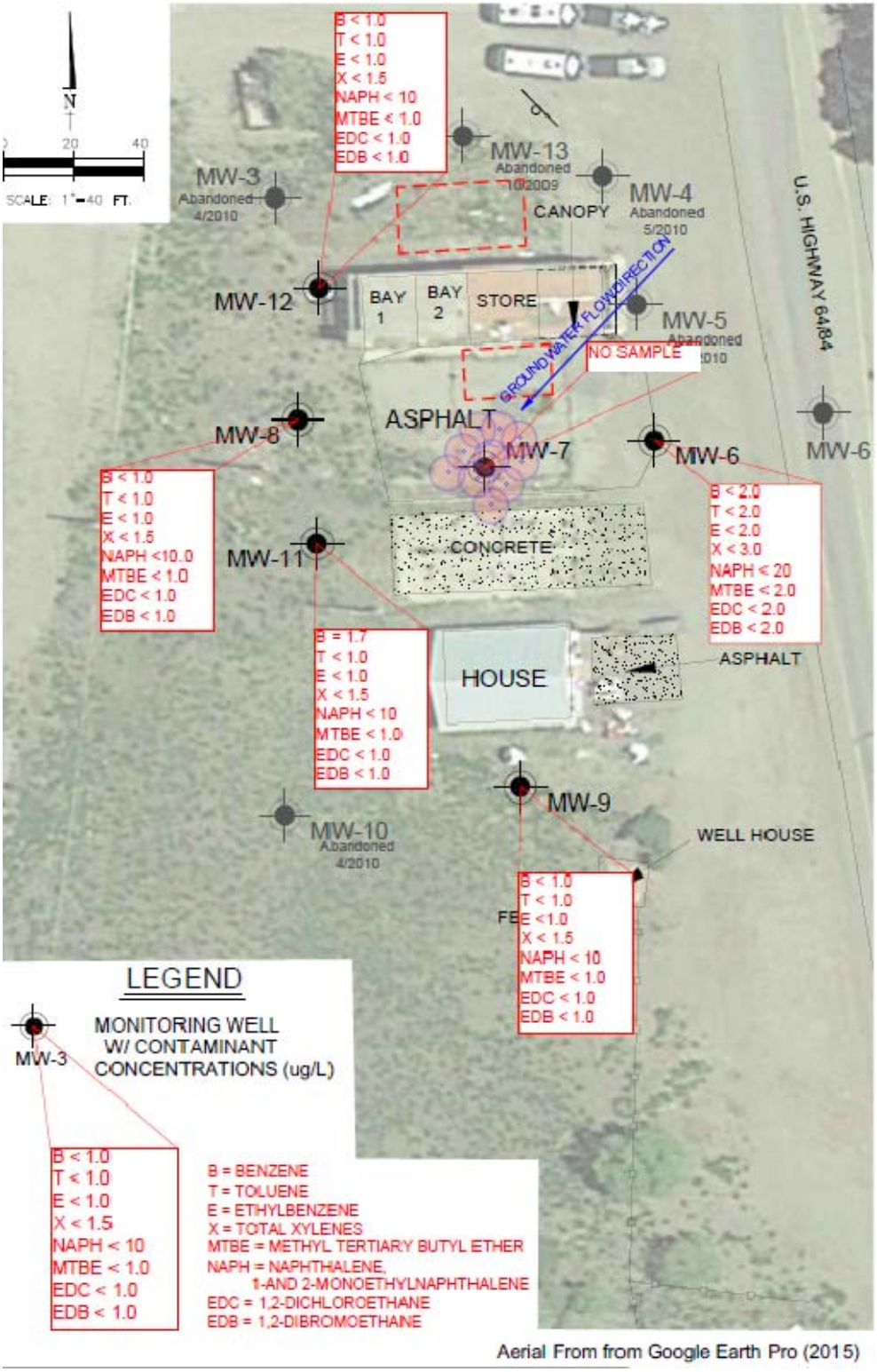
Vener Mustafin, P.E.
Project Manager/Engineer

Attachments:

Figure Contaminant Concentrations and Proposed Injection Grid Around MW-7
Table Tasks, Costs, Schedule, and Payment Triggers

FIGURE

Contaminant Concentrations and Proposed Injection Grid Around MW-7



Base map was adopted from SMA May 2021 Report.

APPENDIX C – PHOTOGRAPHS

Geoprobe 7720DT Direct Push Rig

Support Truck

Mixing Vessel, Pump, Pressure Gauge, Generator

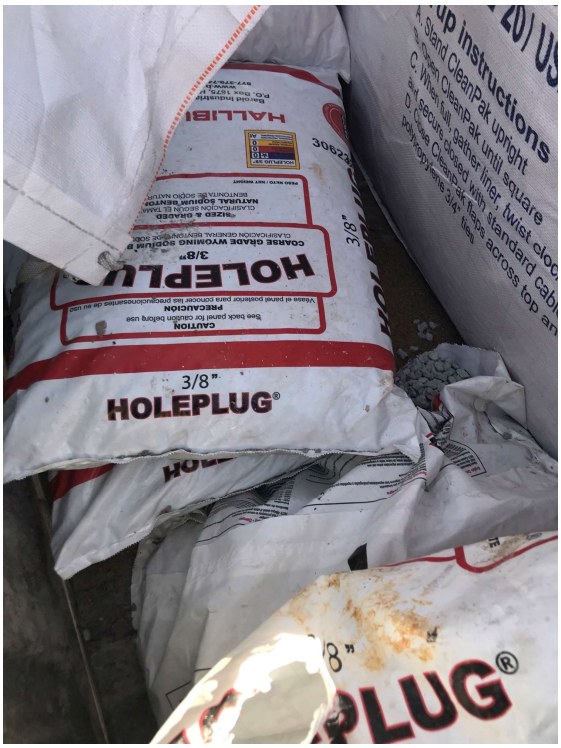
A 500-gallon Water Holding Tank

Injection Pump, Pressure Gauge, and Control Valve

Totalizing Flowmeter

Direct Push Non-Retractable Injection Tool

Regenesis ORC-A® Oxygen Release Compound



3/8" Baroid® HolePlug Bentonite

APPENDIX D – FIELD RECORDS

C:\Users\vmustafin\Desktop\Corona\PSTB State Lead\Conoco Svc Chama\Work Plan\Figures

LEGEND:

- MONITORING WELL
- PLUGGED MONITORING WELL
- INJECTION POINT WITH A RADIUS OF INFLUENCE OF 5 FEET. 7.5' ON-CENTER SPACING BETWEEN POINTS.
- GROUNDWATER FLOW DIRECTION AND GRADIENT RANGE
- UNDERGROUND GAS UTILITY
- OHE — OVERHEAD ELECTRICAL UTILITY

DOSAGE:

PER FOOT:	
ORC-A	5 POUNDS
WATER	1.5 GALLONS
PER BORING:	
ORC-A	40 POUNDS
WATER	12 GALLONS
TOTAL (10 BOREHOLES):	
ORC-A	400 POUNDS
WATER	120 GALLONS

VENER M. MUSTAFIN NEW MEXICO 17630 LICENSED PROFESSIONAL ENGINEER

Signed electronically
V. Mustafin
06/13/2022

REV	DATE	DRAWN	CHECKED	REMARKS
0	06/13/22	VM	JS	4262-3 FINAL REMEDIATION PLAN

REVISIONS

320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone (505) 224-6913
Fax (505) 224-6915

CONOCO SERVICE STATION
3837 HIGHWAY 64, CHAMA, NEW MEXICO
FINAL REMEDIATION PLAN

INJECTION PLAN

PROJECT NUMBER: 6380401

DRAWING NO.: P-1

Conoco, Chama, NM

Contractor (company): Enviro Drill

Contractor Personnel: Rigo martin

List of Contractor Equipment:

Before starting, take photos of pre-existing conditions of the site

Take photos of each piece of equipment, instrumentation, materials, overall setup and anything of importance

Drill Rig (manufacturer, model)	Geo Probe 7720 DT
Rods (diameter, run length)	1" x 5'
Injection Tool (diameter, length, injection interval length)	1" x 3' straigh screen tool
Support Truck (manufacturer, model)	Chevy 350
Injection Pump (manufacturer, model)	Grout pump
Mixer (volume, type)	grout mixer 30 gal
Water Tank (volume, type)	500 gal snyder
ORC-A (mass, bag weight)	40 LB X 10 bags
Water Source	Yard spiggot (potable)
Bentonite (type, mass, volume, container)	~~Bentonite~~ haliburton
Flowmeter (type, manufacturer, model, location)	Badger
Pressure (type, scale, resolution, location)	psi 0-300

INJECTION FORM
CONOCO, CHAMA, NEW MEXICO

Date and Time:	9-24-2022 0931
EA Personnel:	D. OBrien
Subcontractor Personnel and Equipment:	Enviro Drill Rig Geoprobe
Project Manager/PE: Vener Mustafin	505-296-1070 vmustafin@eaest.com

6380401

Batch Mix Recipe

Mass of ORC-A, pounds	40 Lbs
Volume of Water, gal	12

Injection

Borehole ID	Time - Start/End	Interval, ft bgs	Pressure, psi	Injected Volume, gal	flow	Notes
5	0952	4-5	150	1.5	5gpm	
5	0954	5-6	150	1.5	5gpm	hit refusal ↓ hole move
5	0959	6-7	150	1	5gpm	
5	-	7-6	-	-	-	1'
5	-	8-9	-	-	-	entire volume injected
5	-	9-10	-	-	-	after second refusal
5	-	10-11	-	-	-	
5	-	11-12	-	-	-	
7	1014	4-5	150	1.5	5gpm	hit refusal at 4'
7		~~5-6~~				
7A	1234	5-6	125	10.5	3gpm	refusal hit - remainder Pumped
7	-	-	-	-	-	
7	-	-	-	-	-	
7	-	-	-	-	-	
7	-	-	-	-	-	
7	-	-	-	-	-	

Notes: initial DTW 6.96
final DTW 6.98

INJECTION FORM
CONOCO, CHAMA, NEW MEXICO

Date and Time:	9-24-2022
EA Personnel:	D O'Brien
Subcontractor Personnel and Equipment:	Enviro Drill Rigo, Martin Geoprobe
Project Manager/PE: Vener Mustafin	505-296-1070 vmustafin@eaest.com

6380401

Batch Mix Recipe

Mass of ORC-A, pounds	40 Lb
Volume of Water, gal	12 g

Injection

Borehole ID	Time - Start/End	Interval, ft bgs	Pressure, psi	Injected Volume, gal	flow	Notes
2	1044	4-5	150	1.5	3gpm	
2	1047	5-6	150	1.5	3gpm	some surfacing
2	1051	6-7	150	1.5	3gpm	
2	1058	7-8	150	7.5	3gpm	refusal at 7.5' ie maintain pumping at this interval
9	1113	4-5	125	1.5	3gpm	
9	1119	5-6	125	1.5	3gpm	hit refusal
8	1140	4-5	125	1.5	3gpm	
8	1144	5-6	125	1.5	3gpm	
8	1147	6-7	125	~~9~~ ~~10.5~~	3gpm	
10	1202	5-6	125	1.5	3gpm	
10	1204	6-7	125	10.5	3gpm	Refusal hit
9A	1210	5-6	125	1.5	3gpm	1' SW of hole 9
9A	1213	6-7	125	10.5	3gpm	refusal hit

Notes:

INJECTION FORM
CONOCO, CHAMA, NEW MEXICO

Date and Time: 9-24-2022 6380401

EA Personnel: D. O'Brien

Subcontractor Personnel and Equipment: Enviro Drill Rigo GeoProBe

Project Manager/PE: Vener Mustafin 505-296-1070 vmustafin@eaest.com

Batch Mix Recipe

Mass of ORC-A, pounds	~~42~~ 40Lbs
Volume of Water, gal	125

Injection

Borehole ID	Time - Start/End	Interval, ft bgs	Pressure, psi	Injected Volume, gal	flow	Notes
6	1227	5-6	125	1.5	3gpm	
6	1231	6-7	125	10.5	3gpm	refusal hit. remain
						ORC Pumpin
1	1244	5-6	125	1.5	3gpm	
1	1248	6-7	125	10.5	3gpm	refusal hit
						remaining ORC Pumpin
3	1253	56	125	1.5	3gpm	
3	1259	6-7	129	10.5	3gpm	refusal hit
4	1309	5-6	125	1.5	3gpm	
4	1311	6-7	125	10.5	3gpm	refusal hit

Notes: