



Response to Invitation to Bid BP# 25-06 Project
Number MW23-444

Proposal for design and implementation for In-situ
Remediation Services at the Former Cliffs-Dow Site in
Marquette, Michigan

Prepared for:

City of Marquette
1100 Wright St.
Marquette, MI 49855

ORIN Technologies, LLC. (ORIN)

A handwritten signature in black ink, appearing to read "Larry Kinsman", with a large, stylized flourish at the end.

Larry Kinsman, Geologist
Principal
ORIN Technologies, LLC



August 19th, 2025

City of Marquette
1100 Wright St.
Marquette, MI 49855

Subject: Proposal for In-situ Remediation Services at the Former Cliffs-Dow Site Located in Marquette, Michigan.

Attn: City of Marquette,

ORIN Technologies, LLC. (ORIN) is pleased to submit this proposal to the City of Marquette (City) for in-situ remediation services at the former Cliffs-Dow site located along North Lakeshore Blvd. in Marquette, MI 49855 (site).

Summary of Site Conditions

ORIN is responding to the invitation to bid for treatability, pilot scale, and full-scale remediation targeting contaminants of concern (COCs) in groundwater. COCs include ethylbenzene, trimethylbenzene, xylene, methylphenol(s), and other heavy hydrocarbons derived from wood tar. Historical activities at the site include pyrolysis, charcoal production for pig iron smelting, and methyl distillation. There is no DNAPL in the target wells, but residual free product material may remain in the source area at unknown depths west of the road. The source of contamination is believed to be from a tar like substance at former settling pits and former processing locations. The lithology within the targeted vertical interval is fine to medium sands. The average depth of groundwater is approximately 6 feet below ground surface (ft-bgs) with groundwater flowing East toward the Lake Superior shoreline. Groundwater flux is approximately 1-2 ft/day.

The following contaminant concentrations are based on 2023 and 2024 sampling data. On the north end of the shoreline, COCs in GSI-1100 include approximately 4 mg/l (2,4 methylphenol), 1 mg/l (2 methylphenol), and 0.5 mg/l (3,4 methylphenol) with notably higher impacts at depth of 39-44 feet-below-grade surface (ft bgs). On the south end of the shoreline, COCs in GSI-1400 include approximately 1 mg/l (xylenes) and 0.4 mg/l (ethylbenzene). Low levels of naphthalene <0.2 mg/l is noted along the shoreline wells. COC concentrations of



methylphenol(s) generally increases upgradient toward GSI-100 and GSI-1200. GSI-100B concentrations increased sharply in year 2022 to approximately 3 mg/l (2,4 methylphenol) and 4 mg/l (3,4 methylphenol). GSI-1200 concentrations remain elevated around 3.5 mg/l (3,4 methylphenol) and 2.5 mg/l (2,4 methylphenol). The higher impacts of trimethylbenzene, ethylbenzene, and xylenes are located along the southern half of the mapped plume and towards the south-central area of the source area (UPG-400 and UPG-600). These volatile organic compounds (VOCs) are generally shallower to intermediate in depth approximately residing between 5 and 28 ft-bgs. Higher impacts of methylphenol(s) are predominantly found in the central to north half of the mapped plume, as well as being deeper. All COCs have been detected in the shallow (0-15 ft bgs), intermediate (15-30 ft bgs), and deep (>30 ft bgs) zones.

The goal of remediation is to target the groundwater contaminant plume migrating to Lake Superior in addition to targeting the source area COCs around UPG-400 and UPG-600. The groundwater well clusters of interest include UPG-400, UPG-600, GSI-100, GSI-200, GSI-600, GSI-1000, GSI-1200, GSI-1300, and GSI-1400, including impacted screened intervals at each cluster.

1.8.0 Technical Submittal

1.8.1 Agreement Exceptions

AN ITEMIZED LIST OF ANY AND ALL EXCEPTIONS, ASSUMPTIONS, OR CORRECTIONS NECESSARY TO ALLOW SUBMISSION OF THIS PROPOSAL.

- At this time, ORIN has no exceptions, assumptions, or corrections to the terms and conditions outlined in the proposed Professional Services Contract.

Technical Assumptions:

- All water used for remedial activities described within this proposal will be available from onsite fire hydrants or another source capable of providing 15 gpm designated and available through the City. ORIN will contract with city for fire hydrant use.
- ORIN will maintain site cleanliness by properly disposing refuse, including used PPE.
- Information supplied to ORIN from TriMedia and City is accurate and representative regarding the site contaminants and concentrations, area and volume of materials to treat, and the geology of the site.

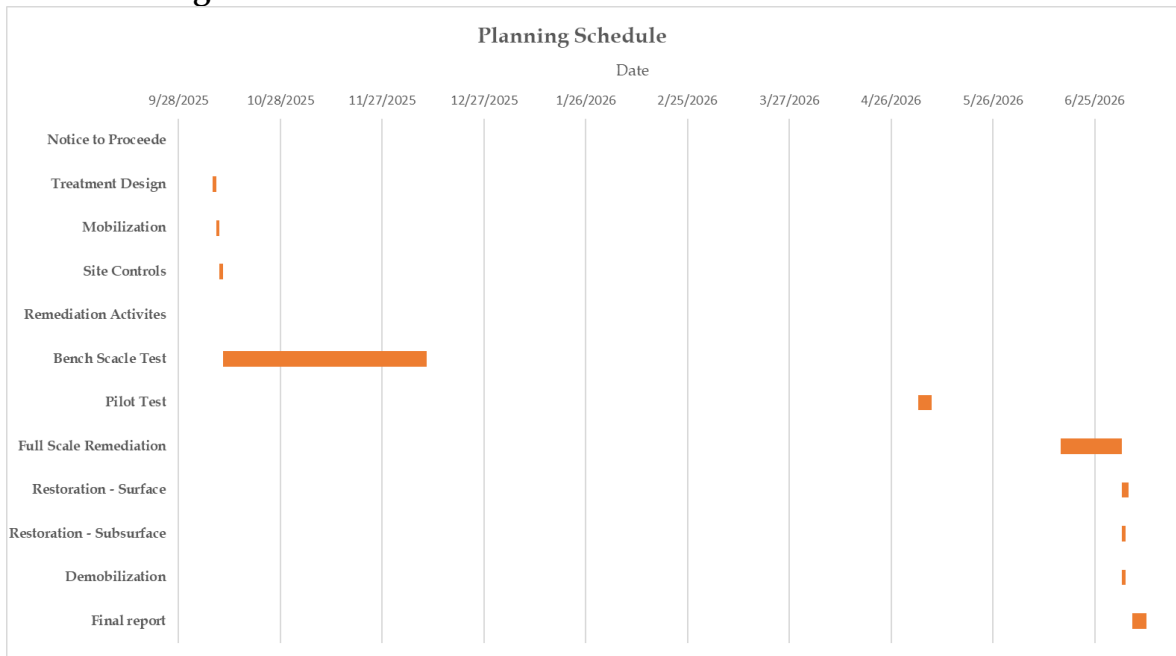


- Office staff, sample collection, TOD/treatability testing, pilot scale, full scale, treatment chemical, injection equipment, (2) geoprobe rigs, telehandler and ORIN injection personnel are included in the proposed remedial approach. Includes utility locate and drilling subcontractor(s) personnel.
- ORIN will prepare and implement a site-specific health and safety plan upon award of this project, including Work Plan and SESC plan submittal/approval.
- ORIN is not responsible for signing any manifest for disposal of extracted fluids. ORIN is not responsible for disposal of any generated waste.
- ORIN is not responsible for any disposal, damage, or repair of asphalt and/or concrete necessary to complete in-situ remediation.
- TriMedia and ORIN will work cooperatively to acquire the proper permits no later than the beginning of the scheduled remediation start dates. ORIN is responsible for obtaining groundwater discharge permits from EGLE.
- ORIN is responsible for marking all public and private utility lines in or near the area of concern.
- ORIN is responsible for traffic control, if necessary. ORIN does not anticipate temporary closure or traffic detour of the public road North Lakeshore Blvd.
- No power source is required.
- ORIN will not be responsible for any treatment chemistry infiltration into nearby utility trenches, sewer systems, basements, catch basins, etc.
- The site is accessible to ORIN and ORIN's subcontractor's equipment.

1.8.2 Design Document Clarifications

ORIN has reviewed and understands the Drawings, Specifications, and all performance-related documents outlined in the Invitation to Bid, enabling us to submit a proposal without excessive contingencies.

1.8.3 Planning Schedule



All Phases – Work Task Items

1. Treatment Design: 90 labor hours
2. Mobilization: 120 labor hours
3. Site Controls: 12 labor hours
4. Remediation Activities: 928 labor hours (bench test, pilot, & full scale)
5. Restoration Surface: 15 labor hours
6. Restoration Subsurface: 0 labor hours, Not Applicable.
7. Demobilization: 120 labor hours

1.8.4 Work Plan Summary

The following is a summary of ORIN's preferred technical design, approach, and methods to implement in-situ remediation at the Site. Implementation will be divided into 4 phases of work.

BAM is assumed to be the preferred treatment chemistry within the proposed remedial design. Utilizing BAM will provide an advantage over sole oxidative treatments that will dissipate over time or exacerbate groundwater concentrations. In-situ chemical oxidation (ISCO) alone may elevate the desorption potential of wood tar derivatives and residual lignin precursors bound to soil, increasing the risk of mobilization into groundwater. Based on remediation goals, ORIN is recommending sorptive and/or biodegradation



technologies within permeable reactive barrier walls nearest the shoreline and within source area treatment zones. Treatability testing will compare treatment with hydrogen peroxide or calcium peroxide as the only ISCO technology used. Due to proximity to Lake Superior and EGLE concerns, sodium persulfate, sulfate, colloidal/surfactant products will not be considered. These products carry risks of sulfates or surfactants migrating to nearby surface water. Whereas BAM does not contain any additional ingredients. A total oxidant demand test will be conducted to inform oxidizer loading rates. Treatment results and all data, including lab analytical, will be entered into a report and made available to both the City and TriMedia.

BAM will absorb contaminants, while a low concentration of calcium peroxide generates dissolved oxygen for enhanced bioremediation. Specialized degrading microbes (Hydrocarbon Degrading Trichoderma or Site Specific) can be added to the BAM solution for tentative aerobic or anaerobic metabolic breakdown and secondary oxidation of hydrocarbon compounds. In addition, the use of BAM versus chemical oxidation may mitigate vapor release.

Phase 1: Sample Collection

A subcontracted driller or Geoprobe operator will acquire direct push soil samples. Groundwater samples will be collected from existing wells using a peristaltic pump and HDPE tubing. Tubing materials will be disposed of in one 50-gallon trash bag. HDPE or amber glass liter containers will be utilized to collect site water. Low flow sampling methods or approximately 2.5 gallons of groundwater will be purged before collecting samples. 5-10 gallons of waste groundwater is expected.

- Samples will be collected near GSI-1200 and UPG-600, or other impacted wells with representative COCs.
- Macro core soil samples will be collected from approximately 20-24 and 39-43 ft-bgs near GSI-1200 and 7-12 and 18-22 ft-bgs near UPG-600.
- Approximately 4kg of soil is required to conduct TOD and soil/groundwater treatability testing.
- Approximately 5 gallons of site groundwater is required for soil/groundwater treatability testing.
- Samples will be collected in a manner to minimize volatilization.
- Samples shall be placed in a cooler chilled with ice.



- **Samples and ice will be placed in separate heavy duty plastic bags (e.g. garbage bags) to prevent dilution and cross contamination.**
- Samples shall be shipped overnight under proper chain of custody protocol.

There are no electricity requirements for onsite activities. One 55-gallon drum of soil and groundwater waste are expected. Small quantities of material garbage (ie. PPE, plastic sheeting, plastic pipe) are expected in two 50-gallon trash bags. Less than 80 decibels of noise are anticipated within 100ft of the proposed activities. Phase 1 activities anticipate 3 personnel, between ORIN Staff and subcontractors, to be onsite for 1 day at 10 hours each day. Weekend work and overtime will not be required.

Phase 2: Total Oxidant Demand and Treatability Testing

The preferred treatment chemistry and loading rate will be validated and identified following treatability testing. The appropriate treatment chemistries selected for treatability testing, based on prior treatment performance and Site goals, include BAM and combinations thereof using calcium peroxide, site-specific anaerobic/aerobic microbes, hydrocarbon degrading *Trichoderma* microbe, or other. Treatability testing will include using either hydrogen peroxide or calcium peroxide as alternative ISCO technologies within the designated Hot Spot areas. Treatability testing will include site-specific microbe isolation testing. Trimedia or City may choose to forgo microbe isolation testing as a cost savings.

TOD Testing

Total oxidant demand (TOD) testing reveals the amount of chemical needed to fully oxidize both the contaminant and naturally occurring organic matter in the soil matrix. TOD testing involves dosing soils with a known amount of oxidant and then measuring the residual concentration of the oxidant over a period of several days. The ratio of the amount of oxidant consumed to the amount of soil it was in contact with provides the total oxidant demand, often given in units of grams/kilogram (g/kg). TOD will take approximately 5 days to complete at ORIN's lab.

- Soil samples will be homogenized to create representative composite samples for TOD testing. ORIN will perform TOD testing with sodium persulfate on composite soil samples from downgradient and upgradient areas. Persulfate TOD samples will be dosed at a rate of 5 g/L. The persulfate will be activated by using alkaline activation for the TOD test. The oxidant demand for each dosage will be tested at 24-, 48-, and 96-



hours for persulfate samples. Data obtained in the TOD tests will be used as a guide for setting the oxidant dosing rates for hydrogen peroxide or calcium peroxide for ISCO treated samples as part of ORIN's comprehensive treatability study.

Treatability Testing

Treatability testing utilizes the TOD information to set a loading rate for soil and groundwater dosing. The treatability testing will be conducted at ORIN's laboratory in conjunction with a commercial analytical laboratory. After the study ORIN will provide recommendations for the chemistry that is the most suitable for the site. ORIN will combine the site soil and groundwater to create a representative sample. The representative sample will be divided into smaller composite samples. These samples will be dosed with a variety of treatment chemistries and loading rates to determine the most cost-effective and successful treatment chemistry.

- Soil and groundwater samples will be homogenized into a composite soil and groundwater mixture. A representative groundwater control sample will be collected for comparison against treated results. Any control samples will be sent for lab analysis alongside other treated samples. ORIN will perform treatability testing on the soil and groundwater composite using a variety of treatment technologies, such as BAM, calcium peroxide, microbes, hydrogen peroxide, or combinations thereof.
- Samples of combined soil and groundwater will be homogenized with each selected chemistry on a high and low dosing rate. Only groundwater from the mixture will be sampled for analysis.
- **Soil and Groundwater Mixture: 10-11 treated samples + 1 control sample**
- Samples will be allowed to react for 1-2 weeks following the treatment chemistry application. Groundwater from each mixture will be analyzed under EPA Methods 8260 for VOC totals and 8270 for SVOC totals.
(Anticipate 24 total laboratory samples)
- If any contaminants that are important to the site are not specifically listed, Trimedia or the City should contact ORIN before the start of the treatability study to ensure they are included in the analyte list. Analytical testing will be performed on a standard turn-around time by a commercial analytical laboratory.
- Once the data is received and reviewed, ORIN will prepare a report outlining the findings of the TOD & treatability test. ORIN will complete a treatability report with all treatment results, chain of custody, lab report,



and identification of the preferred treatment chemistry based on the most effective treatment option. Requires 15-30 days to wait on lab data.

There are no onsite activities for Phase 2. There are no onsite electricity requirements. No waste will be generated on-site. No noise level onsite. Phase 2 activities will have no personnel onsite. No weekend work and no overtime will be required.

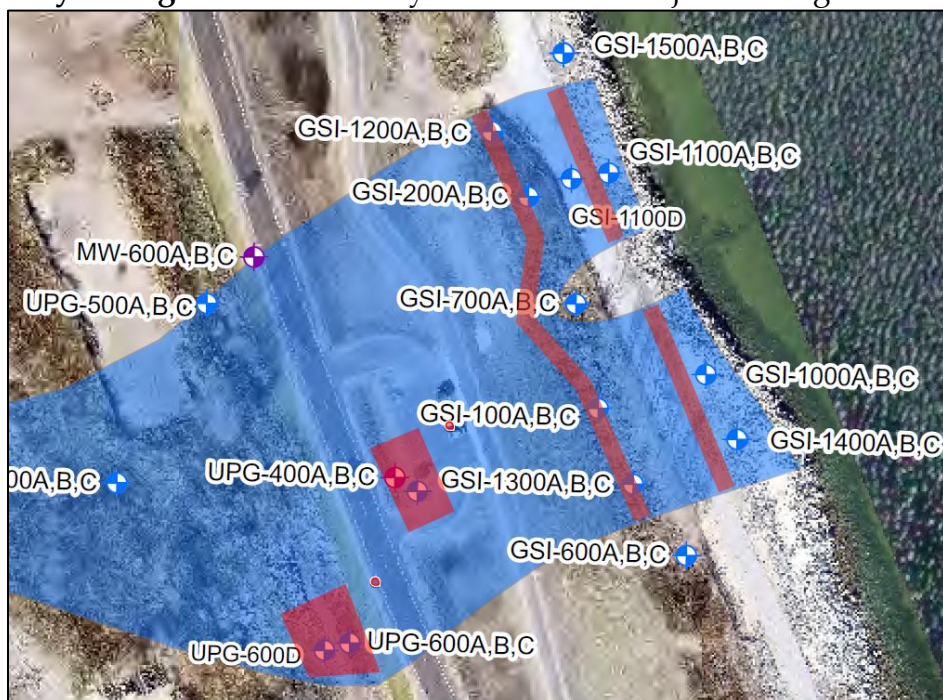
Phase 3: Pilot Scale

Pilot scale will complete approximately 18 of the total planned injection locations of the Full Scale – PRB(s). **Layout Figure 1** shows the full-scale remedial areas.

The anticipated treatment chemistry loading is 11% BAM with/without 1% calcium peroxide or microbe blend at 15.5 gallons per foot of treatment interval. Install 50 linear feet of the Northeast PRB and 50 ft of the Southeast PRB. The Northeast PRB has a treatment thickness of 20 ft with target intervals of 19-29 ft-bgs and 35-45 ft-bgs. The Southeast PRB has a treatment thickness of 21 ft with target intervals of 5-13 ft-bgs and 15-28 ft-bgs. A total of 18 DPT injection locations will be utilized between both areas assuming 10-ft centers. Pilot injections within these areas will determine feasibility using DPT as the preferred drilling method or if sonic drilling will be required for injection. A larger Geoprobe 8040 and 7822 will be onsite to more efficiently reach target intervals. Sonic will be substituted, and the scope will be adjusted accordingly if DPT cannot reach approximately 40-45 ft-bgs. If sonic is substituted, the number of injection locations and volumes will be modified at 16-ft centers. If large subsurface boulders prevent DPT injections nearest the shoreline, the Pilot event will be modified during same mobilization by relocating the barrier walls to **Layout Figure 2** locations. The City and the city's professional representative Trimedia may request preference for either **Layout Figure 1** or **Layout Figure 2** during planning. ORIN may adjust volumes and treatment intervals for any change to the preferred **Layout Figure 1** to better allocate treatment chemistry for the impacted intervals.

ORIN anticipates using 2 Geoprobe drilling rigs for simultaneous injections. There are no electricity requirements for onsite activities. One 55-gallon drum of decontamination wastewater is expected. Small quantities of material garbage (ie. PPE, plastic sheeting, plastic pipe) are expected in five 50-gallon trash bags. Less than 80 decibels of noise are anticipated within 100ft of the proposed activities. Phase 3 activities anticipate 4 personnel, between ORIN staff and subcontractors, to be onsite for 2.5 days at 10 hours each day. Weekend work and overtime will not be required. ORIN anticipates requiring 6,000 gallons of water to complete Pilot Scale activities.

Layout Figure 1. General layout for all DPT injection target areas



Layout Figure 2. Alternative remedial layout.



Phase 4: Full Scale

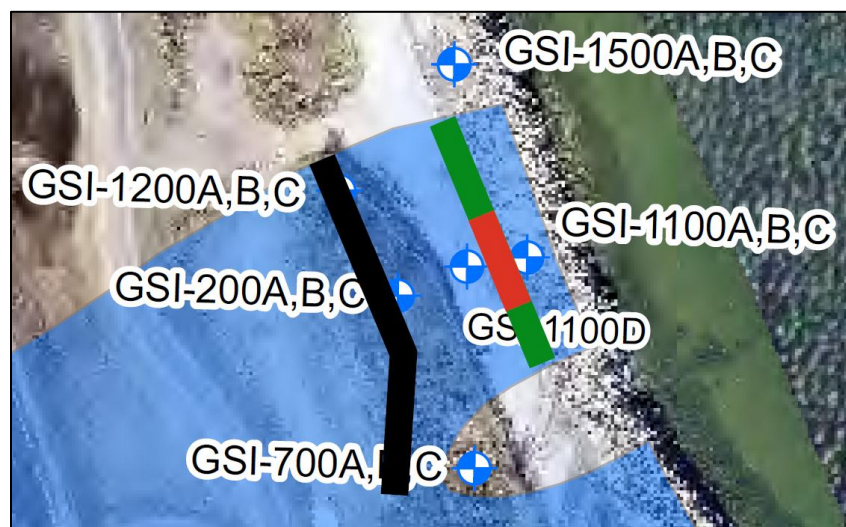
Permeable Reactive Barrier Wall – PRB(s)

ORIN is proposing DPT injection of Permeable Reactive Barrier Walls (PRBs) using BAM, or a combination thereof, as the preferred treatment chemistry. Four rows of injection points will be utilized to treat migrating groundwater with COCs impacting Lake Superior. These PRBs are identified as the “Northeast PRB”, “Northwest PRB”, “Southeast PRB”, and “Southwest PRB”. Each of these PRBs have target specific vertical treatment intervals informed by the GSI well network COCs and expected impact intervals.

Northeast PRB

- 28 total DPT injection locations via 2 offset rows using 10ft center spacing
- 11% BAM Treatment Chemistry with or without 1% calcium peroxide or microbe blend
- 50 ft of **red marked**, or 9 injection points will receive 310 gallons of treatment chemistry (treatment interval of 19-29 ft-bgs and 35-45 ft-bgs)
- 95 ft of **green marked**, or 19 injection points will receive 155 gallons of treatment chemistry (treatment interval of 35-45 ft-bgs)
- See **Injection Figure 1**

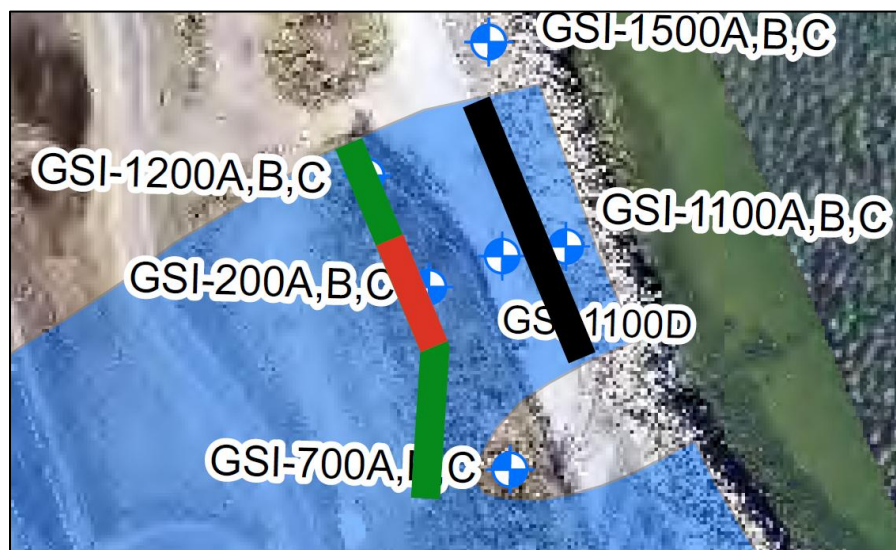
Injection Figure 1. Northeast PRB with “green” and “red” locations for depth specific treatment intervals.



Northwest PRB

- 39 total DPT injection locations via 2 offset rows using 10ft center spacing
- 11% BAM Treatment Chemistry with or without 1% calcium peroxide or microbe blend
- 60 ft of **red marked**, or 12 injection points will receive 310 gallons of treatment chemistry (treatment interval of 11-21 ft-bgs and 37-47 ft-bgs)
- 135 ft of **green marked**, or 27 injection points will receive 155 gallons of treatment chemistry (treatment interval of 35-45 ft-bgs)
- See **Injection Figure 2**

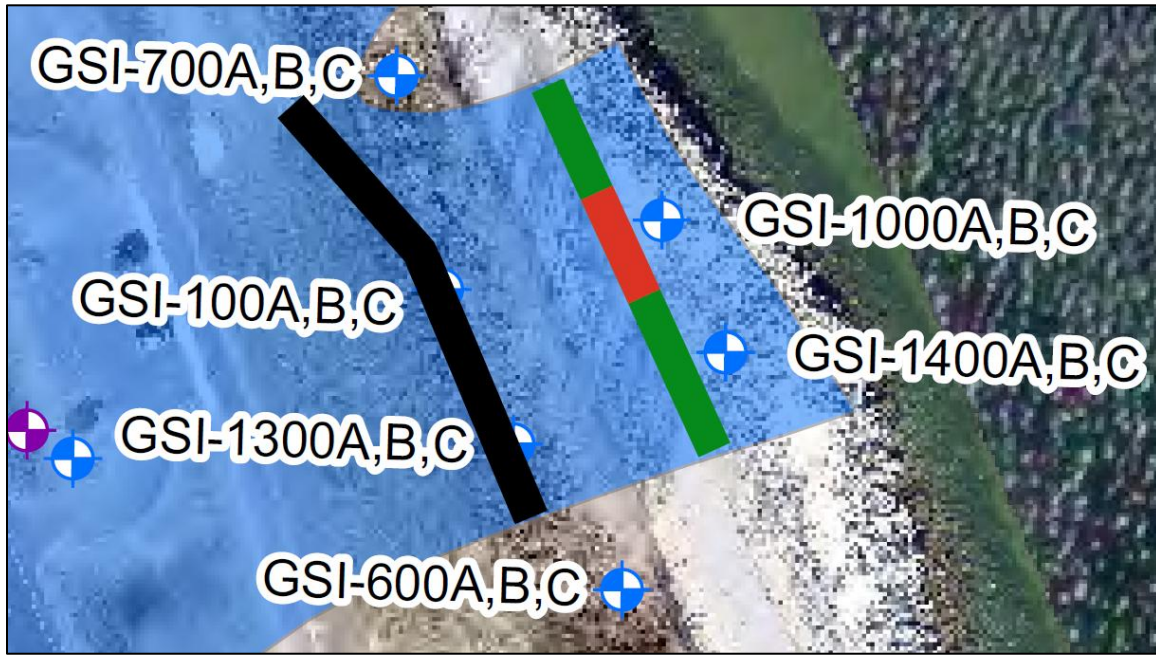
Injection Figure 2. Northwest PRB with "green" and "red" locations for depth specific treatment intervals.



Southeast PRB

- 34 total DPT injection locations via 2 offset rows using 10ft center spacing
- 11% BAM Treatment Chemistry with or without 1% calcium peroxide or microbe blend
- 50 ft of **red marked**, or 9 injection points will receive 325 gallons of treatment chemistry (treatment interval of 5-13 ft-bgs and 15-28 ft-bgs)
- 125 ft of **green marked**, or 25 injection points will receive 155 gallons of treatment chemistry (treatment interval of 18-28 ft-bgs)
- See **Injection Figure 3**

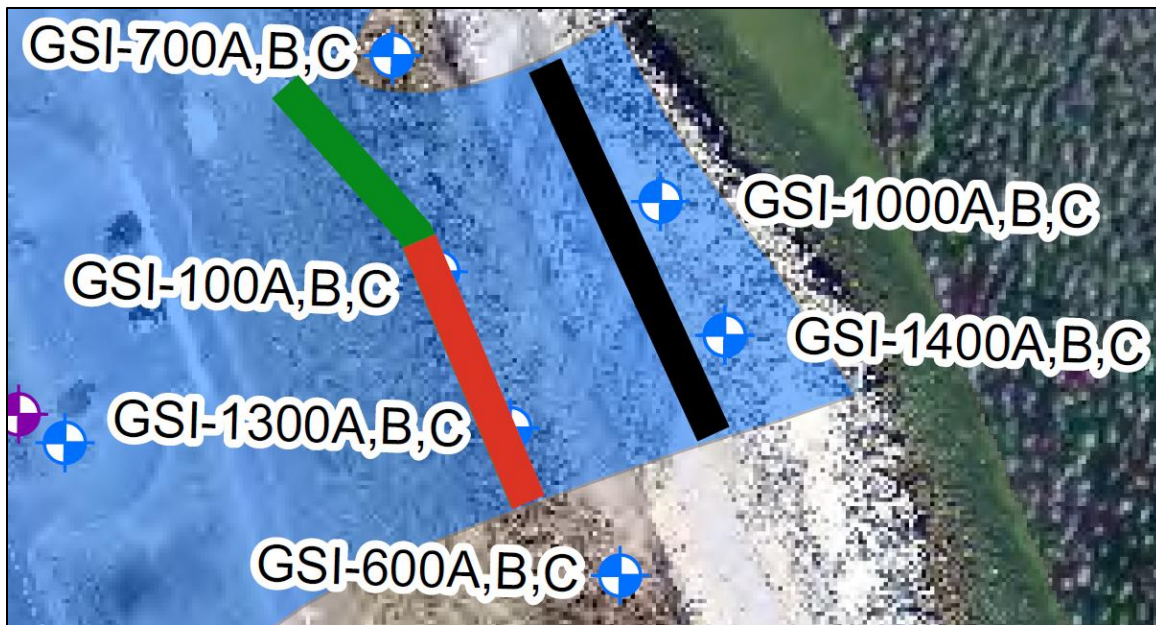
Injection Figure 3. Southeast PRB with “green” and “red” locations for depth specific treatment intervals.



Southwest PRB

- 42 total DPT injection locations via 2 offset rows using 10ft center spacing
- 11% BAM Treatment Chemistry with or without 1% calcium peroxide or microbe blend
- 120 ft of **red marked**, or 24 injection points will receive 325 gallons of treatment chemistry (treatment interval of 5-13 ft-bgs and 15-28 ft-bgs)
- 90 ft of **green marked**, or 18 injection points will receive 155 gallons of treatment chemistry (treatment interval of 18-28 ft-bgs)
- See **Injection Figure 4**

Injection Figure 4. Southwest PRB with “green” and “red” locations for depth specific treatment intervals.



Source Area Hotspot Treatment Areas

In addition to PRB(s), ORIN is proposing DPT injections within the known Hot Spot areas of UPG-400 and UPG-600. The remedial objective for these areas is to reduce known COCs of highest concentrations within the upgradient source area. ISCO or BAM will be considered for both Hot Spot areas as identified in **Hotspot Layout Figure 1**. Treatability testing will decide the most effective treatment remedy. For this design consideration, ORIN is assuming that BAM with calcium peroxide is the preferred treatment chemistry for each area. Based on the treatability findings, hydrogen peroxide may be considered as an alternative ISCO treatment for the Hot Spot area. TOD testing is required to determine the appropriate oxidizer loading rate. UPG-400 Hot Spot and UPG-600 Hot Spot Area treatments shall commence following completion of the PRB(s).

UPG-400 Hot Spot Area

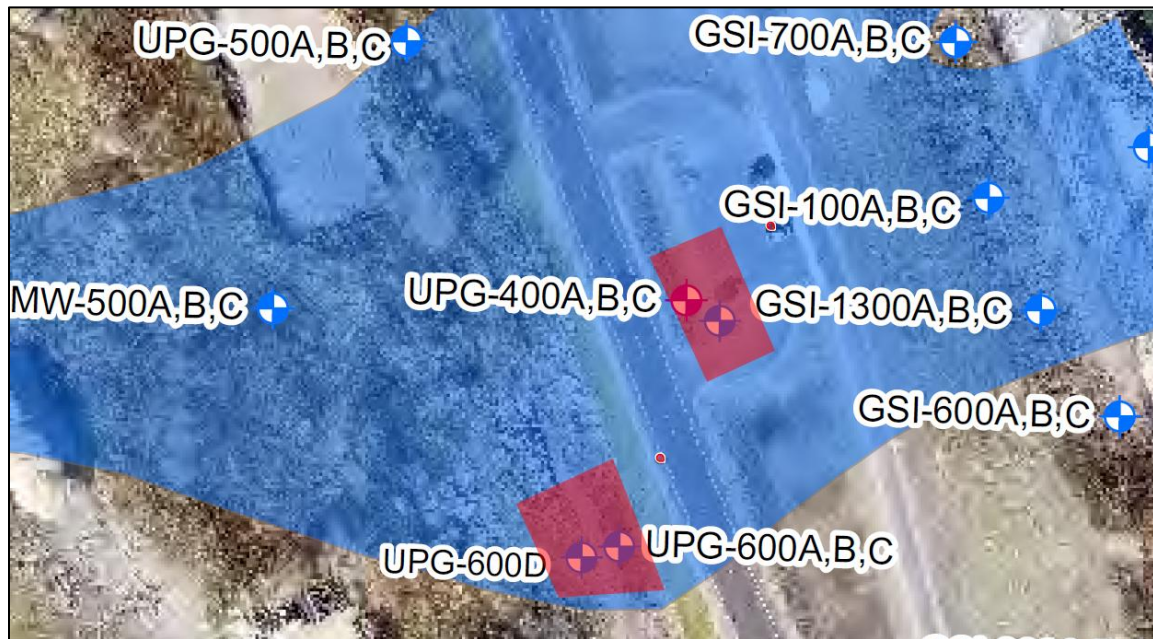
- 33 total DPT injection locations into a rectangular grid using 11ft center spacings
- 11% BAM Treatment Chemistry and 1% calcium peroxide, with or without the addition of microbes
- Target treatment area is approximately 3,100 square feet
- 33 injection points will receive 100 gallons of treatment chemistry (treatment interval of 18-28 ft-bgs)

- See **Injection Figure 5**

UPG-600 Hotspot Area

- 41 total DPT injection locations into a rectangular grid using 11ft center spacings
- 11% BAM Treatment Chemistry and 1% calcium peroxide, with or without the addition of microbes
- Target treatment area is approximately 3,900 square feet
- 41 DPT injection points will receive 210 gallons of treatment chemistry (treatment interval of 4-25 ft-bgs)
- See **Injection Figure 5**

Injection Figure 5. UPG-400 and UPG-500 Hotspot Area(s) shown in “red”.



Phase 4 Clarifications - ORIN anticipates using 2 Geoprobe drilling rigs for simultaneous injections. There are no electricity requirements for onsite activities. One 55-gallon drum of decontamination wastewater is expected. Small quantities of material garbage (ie. PPE, plastic sheeting, plastic pipe) are expected in twenty-five 50-gallon trash bags. Less than 80 decibels of noise are anticipated within 100ft of the proposed activities. Phase 4 activities anticipate 5 personnel, between ORIN staff and subcontractors to be onsite for 16.5 days at 10 hours each day. Weekend work and overtime will not be required. ORIN anticipates requiring 42,000 gallons of water to complete Full Scale activities.



The implemented treatment chemistry materials will be delivered from ORIN's warehouse or supplier by third party transportation carriers. Transportation carriers will follow appropriate DOT regulations. ORIN will be transporting the injection trailer and equipment to the Site along with personnel during the same travel time. Subcontracted drilling rigs will be transported along with personnel by the subcontractor.

Response to Potential Upset Conditions

- Due to unforeseen weather conditions or equipment failures, Saturdays are contingent workdays to ensure completion within the expected time onsite.
- ORIN personnel and drilling subcontractors will remain in-town overnight during the duration of onsite work. Personnel will remain 30-45 minutes from the site for urgent responsiveness.
- One ORIN personnel has an office 45 minutes from the site for any urgent conditions that arise at any time, including weekends and holidays.
- Proposed work has no electrical requirements and will not have upset power outage conditions.
- An equipment rental facility near Marquette will transport by truck and trailer any necessary rental equipment, including air compressor, telehandler, and contingent water truck. The local rental facility can replace malfunctioning rental equipment for timeliness consideration.
- Extra pumps, injection lines, injection heads, and mixers are mobilized to accommodate any injection equipment failures to eliminate downtime.
- The preferred subcontracted driller has multiple Geoprobe rigs and technical expertise to repair or replace down drilling equipment. Alternative licensed subcontractors can be utilized. Response time to replace Geoprobe rigs is approximately 1-2 days.
- There is an alternative fire hydrant located at the southern entrance to the fenced property where a water truck may be utilized to shuttle water.
- The southern public parking lot located within the COC plume may be utilized as a contingency staging area. If used, the parking lot will remain closed for the duration of the work area. All deliveries will be received at the Site's southern gate or contingent parking lot. Note that if the contingent parking lot is used for staging equipment, the public pedestrian path will need to be closed for the affected work area duration.
- If the 8040 Geoprobe rig cannot reach target depth, a sonic 8140 rig will be utilized as the contingency drilling method during full scale activities. A 2-4-week duration between pilot scale and full scale will accommodate



- required time. No downtime is expected during full-scale activities to acquire the alternative drilling equipment.
- Minimize project days by utilizing two subcontracted drilling personnel with two DPT Geoprobe rigs to work in tandem for simultaneous injections.
 - The Northwest PRB and Southwest PRB may be utilized as alternative injection areas for pilot scale activities if injections nearest the shoreline experience drilling issues.
 - ORIN's injection trailer has available vacuum equipment, pads, and socks to contain and clean up possible daylight of injection solution. Absorbent socks will be utilized along the shoreline to prevent spills from reaching surface waters.

Remedial Methodologies

The following includes the expected technologies and remedial implementation methodologies to describe field activities. These methods will be utilized to implement and complete the technical design as described above.

DPT Injection

The proposed remedial approach is the injection of the preferred treatment chemistry through a series of borings spaced in a grid-like or off-set pattern. The borings would be advanced to the appropriate depth using Direct Push Technology (DPT). The treatment chemistry will be injected into the rods to create minimal positive pressure before commencing injection into the surrounding formation. The rods will then be raised through the vertical treatment zone while simultaneously injecting the treatment chemistry into the formation.

ORIN will use approximately one-to-two-foot lift intervals (depending on the injection rod) throughout each vertical treatment location and inject the appropriate amount of treatment chemistry into each interval. The proper amount of treatment chemistry will be administered according to the subsurface and known contamination characteristics. The total volume, pressure, and rate of treatment chemistry injected will be monitored by ORIN and amended according to field conditions in order to ensure maximum injection effectiveness.

Two drilling rigs, a larger 8040 and 7822 Geoprobe track rigs, will be utilized for injecting at two injection locations simultaneously. Injecting at multiple locations simultaneously is intended to reduce project time. ORIN's injection equipment is designed to inject at one to four injection locations simultaneously. The larger



8040 Geoprobe rig is expected to reach the deeper treatment intervals. Screened injection tooling and bottom-out injection tooling will be utilized, whichever is more effective. Bottom-up or top-down injection methods will be utilized, whichever is more effective.

Immediately after the completion of each injection point, boreholes will be grouted to prevent subsequent treatment chemistry short circuiting.

Sonic Injection (Contingent)

The borings would be advanced to the appropriate depth using Sonic Technology. The treatment chemistry will be injected into the rods to create minimal positive pressure before commencing injection into the surrounding formation. The rods will then be raised through the vertical treatment zone while simultaneously injecting the treatment chemistry into the formation.

ORIN will use approximately four to five-foot lift intervals throughout the targeted zone and inject the appropriate amount of treatment chemistry into each interval. The proper amount of treatment chemistry will be administered according to the subsurface and known contamination characteristics in each injection area. The total volume and pressure of treatment chemistry injected will be monitored by ORIN and amended according to field conditions to ensure maximum injection effectiveness.

Immediately after the completion of each injection point, boreholes will be grouted to prevent subsequent treatment chemistry short circuiting.

Chemical Mixing and Delivery

The remedial injection treatment chemistry will be prepared using ORINs specialized injection equipment. The treatment chemistry will be mixed and temporarily staged prior to injection in 200-gallon tanks located inside ORINs enclosed injection trailer. The tank will first be filled with the proper amount of water to achieve the appropriate treatment chemistry solution concentration. Multiple tanks will be mixed and used during the injection, which enables work to proceed steadily and efficiently. The treatment chemistry will be pumped into the formation using ORINs air-driven, chemically resistant pumps. The rate, pressure, and volume will be monitored using chemically resistant inline equipment. Shut-off valves are present at numerous locations throughout the delivery system for health and safety purposes.

Spill Containment



To mitigate accidental spills and/or leaks, ORIN uses a variety of catch basins and sorbent pads/socks. ORIN's injection trailer has available vacuum equipment, pads, and socks to contain and clean up possible daylight of injection solution. Absorbent socks will be utilized along the shoreline to prevent spills from reaching surface waters.

Erosion Control and Site Restoration

The SESC plan will incorporate the use of best management practices for earth-disturbing activities associated with the work and procedures to control soil erosion and potential spills. The SESC plan will also detail erosion control inspections that will be performed during Phase 3 and Phase 4 activities. This document will be submitted for approval prior to starting work onsite. ORIN anticipates that a SESC plan will not be required for Phase 1. ORIN will implement erosion controls during DPT injections by installing wattles along the shoreline and slopes within the work areas. A silt fence may substitute for wattles in softer ground areas. A SESC plan will be completed for pilot and full scale activities.

Final site restoration is expected during completion of full-scale activities. Site restoration will commence during the same mobilization. ORIN will ensure that disturbed areas are flattened out and pose no erosion risk. ORIN will ensure that material and equipment is cleaned up from the site, including any residual treatment material. The remedial design has limited expected surface and soil disturbance. The two Geoprobe track rigs, and one telehandler pose the greatest risk of soil disturbance due to rutting. ORIN will practice site cleanliness. ORIN will lay down TSM or equivalent approved seed with mulch blankets over the work areas that observe disturbance. Topsoil may be utilized in areas with barren sands limited only to the affected work areas. Emphasis is placed on returning the site to pre-existing conditions as observed before mobilization.

Mobilization/ Demobilization

Mobilization includes equipment loading and travel times. Treatment chemistry materials will be delivered from ORIN's warehouse or supplier by third-party transportation carriers following appropriate regulations. A telehandler will be used for offloading procedures. ORIN will be transporting the injection trailer and equipment to the Site along with personnel during the same travel time. Subcontracted drilling rigs will be transported along with personnel by the subcontractor. A local equipment rental facility will transport by truck and trailer any necessary rental equipment, including air compressor, telehandler, and contingent water truck.



ORIN staff will demobilize last only when all rental equipment, materials, and subcontractors have been removed from the site. Demobilization includes expected travel and unloading equipment. Unused treatment materials will be removed from site.

Staging Areas and Controls

Stage site controls, including traffic markings, contingent water truck, and treatment chemistry materials. Each staging area will be located within or near the proposed injection work area: PRB, UPG-400, and UPG-600 Staging Area. Staging areas will be relocated sequentially after work area completion, ending at UPG-600. An additional staging area will be utilized inside the southern gate of the fenced Site property. The southern public parking lot located within the COC plume may be utilized as a contingency staging area to reach both the PRB(s) and UPG-400. If used, the parking lot will remain closed for the duration of the work area. ORIN expects to stage treatment material within the work area. All deliveries will be received at the Site's southern gate or contingent parking lot. Utilize traffic markings, orange cones, and caution tape as soft barriers to isolate the work areas, staging area entrances, fire hose crossings, and public paths.

ORIN will receive a water meter and backflow preventer from the city water department. Fire hydrants located along the west side of North Lakeshore Blvd will be utilized. To reach eastern work areas, ORIN will drag fire hose through a city identified culvert. There is an alternative fire hydrant located at the southern entrance to the fenced property where a water truck may be utilized to shuttle water. Note that if the contingent parking lot is used for staging equipment, the public pedestrian path may need to be closed for the affected work area duration. Soft barriers can be utilized to redirect pedestrian traffic to the west side of the parking lot. The UPG-400 work area will not require closing the pedestrian path but will require that the parking lot remain closed. Injection equipment will be secured inside of ORIN's injection trailer overnight. Locking enclosed trailers and soft barriers will be utilized to secure the site. Hard barrier fencing will not be required. ORIN does not anticipate closure of the nearby public road.

Decontamination and Waste Management

Prior to mobilization from the shop, all ORIN's equipment including pumps, tanks, hoses, application heads and rig will be properly decontaminated using best practice procedures. Drilling equipment will be properly decontaminated using decontamination pads prior to demobilization from Site. ORIN will decontaminate any field, testing, laboratory, or other equipment that becomes contaminated by known or suspected hazardous materials or other regulated



contaminants at the site. Decontamination water will be containerized into procured 55-gallon drums and labeled.

All waste will be properly disposed of according to standard regulatory protocol. ORIN will properly containerize for third party disposal all waste materials, empty chemical containers and spent personal protective equipment (PPE). Trash bags are expected to contain non-hazardous or inert waste materials (no groundwater or soil permitted) and containers. Trash bags can be stowed in dumpsters to maintain site cleanliness. Disposal of general trash will be minimized to the extent practicable through Contractor sorting and diversion of all materials that can be recycled or reused. Any material, soil or groundwater waste generated will be properly disposed of by the City or other designated third party.

Submittals and Permits

Includes: Project Work Plan, Contractor Quality Control Plan, Site-Specific HASP, SESC Plan, and Schedule. TriMedia will lead the effort to obtain permits. ORIN will support TriMedia in identification, preparation, and submittal of all related permits required (or permit equivalencies) to complete the work. ORIN will support TriMedia with coordinating the review of permit applications and for allocating sufficient time for such review and approval by TriMedia, EPA, City of Marquette, and other relevant stakeholders.

Reporting

ORIN will prepare a final report for each phase documenting time onsite, activities, observations, and the injection log. Digital copies of the injection logs will be reported on a weekly basis. The injection log will have start and end times, injection pressure, flow rates, injected volumes, and injected concentrations. ORIN will submit a report to the City within 60 days after demobilization. Reports will include a narrative describing the completed remediation activities and provide figures of the injection locations and collected site data.

Preferred Treatment Chemistry Descriptions

The following only includes the assumed treatment chemistry that is expected to be utilized for full scale and pilot scale activities. Additional treatment chemistries will be tested in treatability testing, and those chemistries will be further elaborated in the approved Work Plan for site implementation. EGLE has expressed concern about use of sulfate or surfactant-based materials near surface waters. The following are materials that do not have sulfates or surfactants and will not pose a risk to surface water from subsurface water intrusion. ORIN



recommends BAM for PRB injection, because it will remain stationary in the subsurface and will not migrate with groundwater flow to nearby surface water. *Colloidal activated carbon often contains surfactants or sulfates and the risks must be considered if used.*

Bioavailable Absorbent Media

BAM is a sustainable, pyrolyzed, recycled cellulosic bio-mass product (>80% fixed carbon) derived from a proprietary blend of recycled organic materials with a high cation exchange. BAM has diverse pore sizes with a minimum total surface area of up to 1,133 square meters per gram.

BAM's absorption ability or sponge-like effect comes from its honeycomb-structure. The shape creates pores or openings within the structure that allows for contaminants to be drawn in and retained. This quality allows for stabilization of soils and groundwater, preventing desorption or leaching from the structure. BAM's ample surface area also promotes microbial colonization and growth. Due to its ultra porous structure, it has the ability to support various strains of microbes. BAM's affinity for organic and inorganic compounds supports contact with microbes allowing for complete contaminant degradation.

The unique absorption capability of BAM prevents exterior surface microfilm buildup providing long term remediation capabilities. This allows BAM to absorb contaminants for more productive bio-attenuation of contaminants over a longer period of time. Granular Activated Carbon (GAC) primarily adsorbs contamination to the surface of the media, which then is subject to bio-film development, preventing further adsorption.

As a result, BAM has been proven to supply long term maintenance free remedial abilities over GAC. Laboratory tests have also shown that BAM has a significantly higher absorptive capacity than commercially available GAC products. BAM has numerous synergistic qualities and is relatively affordable in large quantities for remediation purposes.

Advantages include:

- Rapid absorption of contaminants.
- Pores provides extremely high surface area creating a high cation exchange capacity.
- Promotes microbial colonization's that biodegrade contaminants.
- Prevents leaching of contaminants.

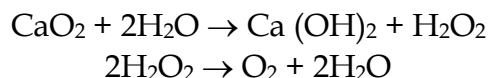


Calcium Peroxide

Calcium peroxide releases oxygen over an extended time period to enhance the biodegradation of petroleum hydrocarbons and other biodegradable contaminants in soil and groundwater.

It is well documented that the release of oxygen in the subsurface environment enhances the biodegradation of contaminants. Based on extensive laboratory studies, the releases of oxygen can provide a useful and cost-effective mechanism for enhancing aerobic bioremediation.

Successful bioremediation of contamination via aerobic microbial respiration depends on several factors including the presence of appropriate microbes, nutrients, electron donors and terminal electron acceptors. In the aerobic metabolism of contaminants, oxygen acts as a terminal electron acceptor and contaminants act as electron donors, which are oxidized. Often, the limiting factor in aerobic bioremediation of contaminants is oxygen. Calcium peroxide provides oxygen by reacting with water. The reaction is:



Microbe Blend (Optional)

Microbial isolates capable of degrading aromatic hydrocarbons are combined with BAM for destruction of sorbed contaminants. By using fungal and/or bacterial isolates with BAM we can achieve better contact with soil and groundwater. Fungal isolates are capable of growth through fine grained soils and are not limited by open soil pore spaces.

Prepared Microbe Blend

We maintain a large collection of aromatic hydrocarbon-degrading microbes collected from a variety of sites and are native to North America. A prepared blend of non-pathogenic, microscopic soil fungi, from the *Trichoderma* genus, have successfully been utilized on over 30 in-situ remediation sites across western Canada. Treatment efficacy includes both impacted vadose and saturated zones. *Trichoderma* is a naturally occurring and globally ubiquitous genus of fungi. Current research supports that *Trichoderma* has symbiotic beneficial qualities to plant rhizosphere health. *Trichoderma* isolates from barren waste oil sands have unique adaptations for biodegradation of hydrocarbons. These isolates were found supporting the viability of native plant species in corrosive and NAPL impacted soil. *Trichoderma* produces oxidase and peroxidase enzymes (reactive oxygen species), including other enzymes and



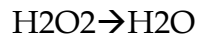
metabolites, that oxidize and consume aromatic hydrocarbons. Biodegradation occurs via both oxidation and secondary aerobic metabolism. The end-product is carbon dioxide. The microbe blend includes concentrated isolates in a dry powder with nutrients for use in aerobic and slightly aerobic poor vadose, smear, and saturated horizons.

Oxidase Catalytic Oxidation – Enzyme catalyzes oxidation by creating hydrogen peroxide



Hydrocarbon (ie. Benzene) + $\text{O}_2 \rightarrow$ Phenols + $\text{O}_2 \rightarrow$ Organic Acids + $\text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$

Peroxidase Catalytic Oxidation – Enzyme catalyzes oxidation by reducing hydrogen peroxide



Hydrocarbon (ie. Benzene) + $\text{H}_2\text{O}_2 \rightarrow$ Phenols + $\text{H}_2\text{O}_2 \rightarrow$ Organic Acids + $\text{H}_2\text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$

Site-Specific Microbes

A collection of site groundwater is used to culture site-specific microbial isolates. Fungal or bacterial isolates may undergo further treatability testing for site contaminants of concern. Any fungi isolated for site-specific use will be identified to the genus by morphology and growth habits. Any genus known for plant, human, or animal disease (I.e. Fusarium) will be not considered for field application. It will be shown in the lab that the site-specific microbes can survive on the hydrocarbons of interest as a sole carbon source and a lab study using soil spiked with the hydrocarbons of interest will be done. In this, samples will be spiked with hydrocarbons and split into an untreated control, a sample that is treated with the microbes, and a sample that is treated with BAM as well as microbes. A sample will be taken from the untreated control at the start and completion of the study to show losses by volatilization. Prior to application at sites with specific types of petroleum hydrocarbons, technicians will complete a forced evolution of each microbial isolate that is utilized to enhance their ability to degrade the contaminants of concern. Successful isolates are reinoculated to the target geology. Site specific microbes are packaged with nutrients either dry or in solution depending on the isolate's environmental affinity. *Identification of site-specific microbes capable of sufficient COC breakdown is not guaranteed as they may be absent from the native geology.*

1.8.5 Key Onsite Personnel



Team Members

Larry Kinsman is the co-owner of ORIN Technologies, a contractor specializing in ex-situ and in-situ chemical treatments. Larry has several years of experience as a geologist and hydrogeologist in project design, cost estimation, field supervision, and technical support of environmental remediation projects.

Larry has also been involved in training regulatory agencies and foreign governments on numerous subjects including remediation technologies and treatment chemistries. Larry was part of the Interstate Technology and Regulatory Work Group (ITRC) that developed the original technology/regulatory guidance documents for the *in-situ* chemical oxidation of soil and groundwater. ITRC is a state-led coalition that works together with industry and stakeholders to achieve regulatory acceptance of environmental technologies.

Scott Craig joined ORIN Technologies in September of 2002 as a field manager and has over 24 years of experience in the environmental consulting and contracting field. Now co-owner of ORIN, Scott's expertise includes site evaluation, chemical remediation design and implementation (*in-situ* and *ex-situ*), construction oversight, system startup, operation, and maintenance. Scott has supervised and implemented many different remediation chemistries in the field including Bioavailable Absorbent Media (BAM), permanganates, hydrogen peroxide, sodium persulfate, biological reductive dechlorination, PermeOx® Plus (Oxygen release compounds), metal stabilization chemistries, ZVI, and calcium polysulfide.

Tyler Emerson's project management experience includes site evaluation and remedial treatment design. He has been involved with numerous in-situ and ex-situ remediation sites as well as working with clients, consultants, and associated personnel. In addition, Tyler has supervised the implementation of several different treatment chemistries consisting of calcium polysulfide, BAM, permanganates, peroxides, persulfates, emulsified oils, bio-augmentation, and ZVI.

Jacob Mirfield's field work experience includes involvement with in-situ and ex-situ remediation sites as well as working with clients, consultants, and associated personnel. In addition, Jacob has implemented several different treatment chemistries consisting of: BAM, peroxides, persulfates, permanganates, emulsified oils, bio-augmentation, and ZVI.



Ben Polchowski's field work experience includes involvement with in-situ and ex-situ remediation sites as well as working with clients, consultants, and associated personnel. In addition, Ben has implemented several different treatment chemistries consisting of: BAM, peroxides, persulfates, permanganates, emulsified oils, bio-augmentation, and ZVI.

Rob Clarks's field work experience includes involvement with in-situ and ex-situ remediation sites as well as working with clients, consultants, and associated personnel. In addition, Rob has implemented several different treatment chemistries consisting of: BAM, peroxides, persulfates, permanganates, emulsified oils, bio-augmentation, and ZVI.

Patrick Regan's field work experience includes involvement with in-situ and ex-situ remediation sites as well as working with clients, consultants, and associated personnel. In addition, Patrick has implemented several different treatment chemistries consisting of: BAM, peroxides, persulfates, permanganates, emulsified oils, bio-augmentation, and ZVI.

1.8.6 Labor Rate Breakdown Schedule

Item	Rate
Project Manager (hourly)	\$130
Injection Supervisor (hourly)	\$130
Injection Specialist (hourly)	\$105

1.8.7 Equipment Rates

Item	Rate
Injection trailer/equipment (daily)	\$5,070
Mobilization - Inj equip	\$4,800
Air compressor (daily)	\$170
Off-road forklift (daily)	\$400
Mobilization - Equip	\$800
Geoprobos (daily)	\$9,400
Mobilization - Geoprobe	\$9,100

1.8.8 Markups for Other Direct Costs

Item	Rate
BAM (lbs)	\$8.10



Calcium Peroxide (lbs)	\$4.55
Microbial concentrate (lbs)	\$5.85
Shipping (lbs)	\$0.40

1.8.9 Work to Be Performed by Others

ORIN will partner with Redox Tech, who will provide Geoprobe equipment and operators. ORIN will supply all major other major aspects required to complete the scope of service. Redox Tech will provide Geoprobe rigs and in-ground tooling (rods) needed for in-situ injections.

1.9.1 Qualifications

Past Project Experience

ORIN has provided fast, effective, and reliable environmental services at over 320 sites since 2002 where in-situ injections or soil mixing techniques have been completed. The following are just a few project examples demonstrating our depth and breadth, coupled with the fact what we have been involved in several RCRA and CERCLA sites across the United States.

<u>RCRA Sites</u>		
<u>Handler Name</u>	<u>Handler ID</u>	<u>Location</u>
<u>FMC Corporation</u>	<u>FLD000645481</u>	<u>Jacksonville, FL</u>
<u>Sonoco Products CO NO Vernon</u>	<u>IND006068084</u>	<u>North Vernon, IN</u>
<u>Master Lock CO</u>	<u>WID054105218</u>	<u>Milwaukee, WI</u>
<u>City of Athens PWD</u>	<u>OHD987002052</u>	<u>Athens, OH</u>
<u>Ohio Department of Transportation District</u>	<u>OHD981782816</u>	<u>Newark, OH</u>
<u>Koppers Inc</u>	<u>COD007077175</u>	<u>Denver, CO</u>

<u>CERCLA Sites</u>		
<u>Site Name</u>	<u>EPA ID #</u>	<u>Location</u>
<u>Long Prairie Ground Water Contamination</u>	<u>MND980904072</u>	<u>Long Prairie, MN</u>



<u>Baytown Township Groundwater Plume</u>	<u>MND98245209</u>	<u>Lake Elmo, MN</u>
<u>Ashland/Northern States Power Lakefront</u>	<u>WISFN0507952</u>	<u>Ashland, WI</u>

References

Reference and Project No 1.

Subject: Summary of Chemical Injection Activities Performed at the Former Hydro Aluminum Site Located in Moultrie, GA.

The site is a former industrial facility where, in 2006, tetrachloroethene (PCE) and various breakdown products were discovered in site soil and groundwater. Between December 2010 and March 2011, approximately 1,412 tons of soil containing the highest concentrations of PCE above the risk standards were removed and disposed of at an offsite disposal facility. Since then, ORIN has been tasked with treating the migrating groundwater plume as well as source area groundwater. ORIN began addressing the source area groundwater plume in 2014 by utilizing in-situ chemical reduction (ISCR). In 2014, ORIN injected approximately 46,775 gallons of ABC+ in the source area. In 2015 & 2016 ORIN utilized the ISCR approach across the site addressing the north and southward migration of the PCE plume by installing multiple permeable reactive barrier walls (PRB's). The 2015 north and south PRB's received a combined total of 68,800 gallons of ABC+. In 2016 ORIN implemented the far north and far south PRB's where the combined total of ABC+ injected was 54,863 gallons. Following the ISCR injection, when geochemical conditions were adjusted to a suitable range, bioaugmentation was implemented by injecting dehalogenating bacteria such as *dehalococcoides*. Since the completion of the northern and southern PRB's, no further remedial efforts have been necessary in those areas of the site.

Alongside the 2015 & 2016 ISCR injections, ORIN pilot tested Bioavailable Absorbent Media (BAM). In 2015 ORIN injected 710 gallons of BAM around MW-25R and contaminant concentrations were reduced by 80%. In 2016 & 2017 ORIN injected BAM around MW-3 and MW-4 at the site. Baseline concentrations at MW-3 PCE were 4,590 ppb, following the injection of BAM, concentrations were reduced to <1 ppb. Approximately 700 gallons of BAM were injected, targeting MW-3. Similarly, the concentration before injection at MW-4 was 22,500 ppb PCE and post-injection monitoring had shown detections of <1 ppb PCE. Approximately 1,200 gallons of BAM were injected targeting MW-4. Over time



back diffusion from persistent pockets of impacts from within the source area has caused rebounds in MW-4.

The PRB injections were deemed successful in eliminating the offsite migration of contaminants, however the source area treatment is still ongoing. Overall site wide impacts have been significantly reduced and the phased approach to the large-scale site has allowed for adaptations to the treatment remedy to meet long term goals.

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Reference and Project No 2.

Subject: Summary of Chemical Injection Activities Performed at the Former Bulk Oil Site Located in Central, MS.

The approach utilized Geoprobe Direct Push Technology (DPT) to inject Bioavailable Absorbent Media (BAM) with calcium peroxide. The approach incorporated Inject-and-Extract technology utilizing vacuum extraction simultaneously to DPT injections. Impacts include TPH-GRO & DRO, Benzene, and MTBE in soil and groundwater. Subsurface geology is primarily fine sands within the targeted treatment interval.

Approximately 61 DPT injection points were scheduled to receive 250 gallons of remedial chemistry consisting of BAM and calcium peroxide. The treatment interval extended from 14 to 22 ft bgs. Vacuum extraction was utilized simultaneously with injection activities to maintain control of the groundwater as well as draw the treatment chemistry to the targeted monitoring well.

A total of 10,118 gallons of the treatment solution was injected across the targeted area. Injection work was completed over a span of four days with two Geoprobe drilling rigs. Post-injection groundwater sampling displayed reduced concentrations in the targeted performance wells. Calcium peroxide is a slow-release oxygen source that works together with BAM. This allows for long-term oxygen to support enhanced bioremediation.

Keith Cole
Ramboll



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Reference and Project No 3.

Subject: Summary of Chemical Injection Activities Performed at the Ashland/Norther States Power Lakefront Superfund Site in Ashland, WI.

This property included the former Manufactured Gas Plant (MGP) facility; a portion of Kreher Park, a City owned property fronting on the bay that included the former municipal wastewater treatment plant (WWTP); an inlet of Chequamegon Bay containing contaminated sediment directly offshore from the former WWTP.

The primary contaminants at the Site are derived from manufactured gas plant wastes in the form of coal tars, including volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbon (PAH) compounds. Additionally, some free-phase hydrocarbon product (free product) derived from the coal tar is present as non-aqueous phase liquid (NAPL), and has impacted soils, groundwater, and sediments. The NAPL referenced includes both light non-aqueous phase liquid (LNAPL) and dense nonaqueous phase liquid (DNAPL).



- Risk Assessment: Lake Superior
- Impacts: Saturated soil and groundwater (approximately 8 – 60 ft-bgs)
- COCs: DNAPL Coal Tar (remedial driver), Benzenes (remedial driver > 5ug/L), Methylnaphthalene, Naphthalene, and Phenols.

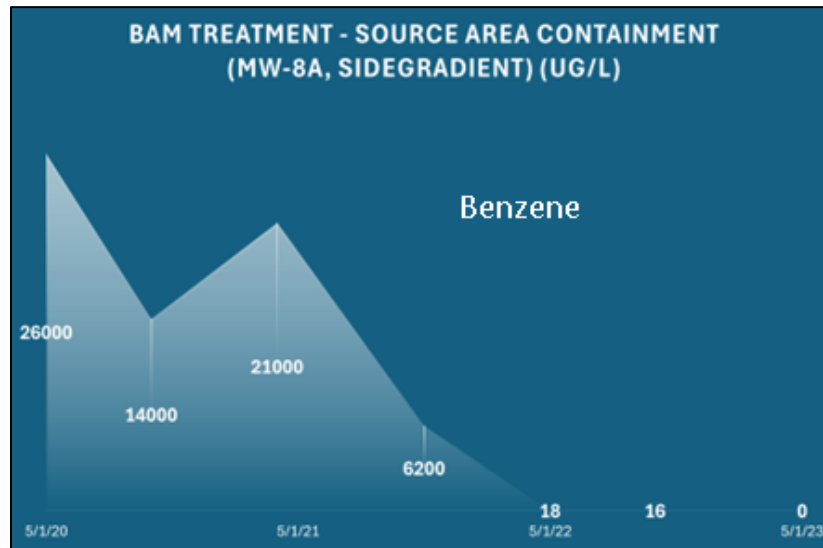
Previous site remediation activities included soil removal and sediment dredging. Currently an active recovery system is operating to collect DNAPL and highly impacted groundwater. ORIN has completed four injection events to deliver chemical oxidants and BAM at various locations on the site to; (i) degrade contaminants and improve NAPL recovery; (ii) use Bioavailable absorbent Media



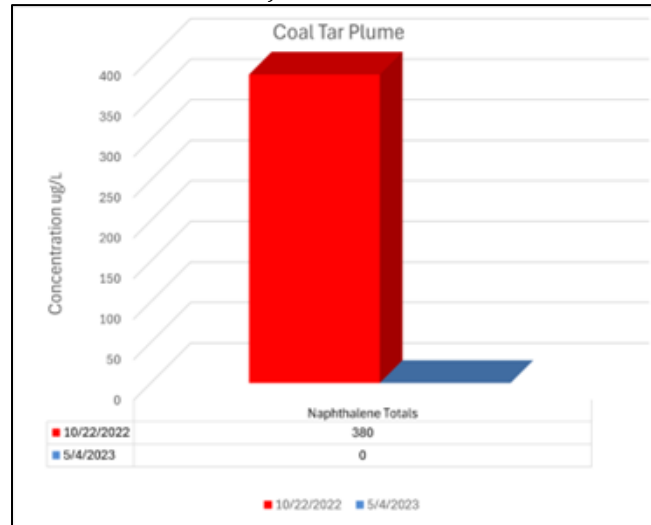
(BAM) to reduce ground water contaminants in strategic locations within the groundwater flow path.

Across four implementation phases, approximately 46,100 gallons of sodium persulfate treatment chemistry was injected through both a series of injection wells and Direct Sonic borings. Also, 7,370 gallons of BAM have been administered through Direct Push Technology and Direct Sonic injections. The combination has proven to be effective at improving the NAPL recovery system while reducing dissolved phase contamination.

BAM Sonic Injection Treatment Data



BAM DPT Injection Treatment Data



BAM was injected using DPT and Sonic drilling methods. DPT was utilized in the shallower, 8-18 ft-bgs, impacted plume margins approximately 35ft from the Lake Superior lakeshore. The shallow nearshore geology is gravel and coarse sand. Heavy hydrocarbons such as Naphthalene were reduced from 380 ug/L to non-detection with criterion of <5 ug/L. Sonic injection was utilized proximally to the source in areas without recovery systems to assist in containment. While DPT could reach target depths at the site, sonic improved injectability within the deeper interbedded lean clay layers at 35-45 ft-bgs. Benzene concentrations were reduced from 26,000 ug/L to non-detection during the next sampling event with criterion of <5ug/L. BAM was used by itself in each of these areas.



The active recovery system for this site supports using sodium persulfate ISCO for reducing the surface tension of DNAPL and assisting in desorption. After multiple rounds, ISCO has improved recovery of DNAPL levels from as much as 6ft to less than 1ft in target wells. DNAPL is the remedial driver within the source area. All recharge water is being contained within the source to mitigate migration of reaction byproducts, including sulfates. Much of the plume area remains capped with impermeable groundwater barriers and continued monitoring.

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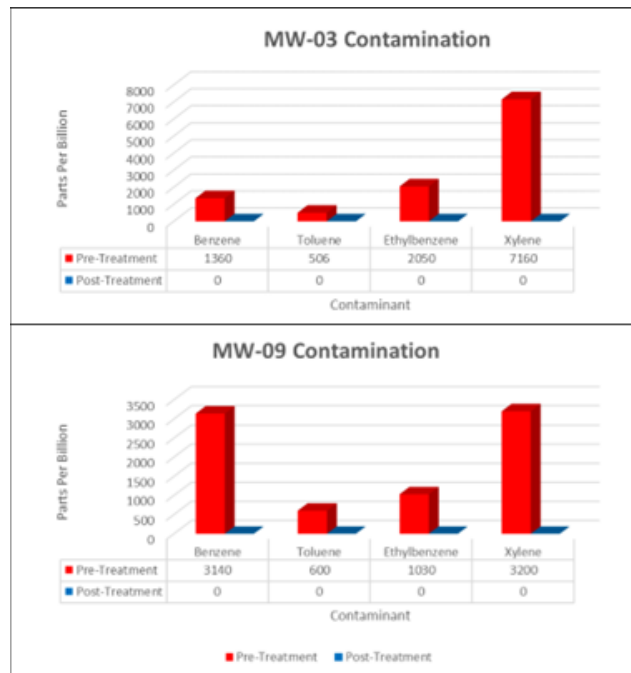
Additional Case Study Data

Former Mechanic's Garage – Chadron, Nebraska

- Risk Assessment: Residential
- Impacts: Shallow groundwater
- COCs: Benzene (remedial driver >5 ug/L), Toluene, Ethylbenzene, and Xylenes
- Remedial Method: DPT Injection
- Remedial Chemistry: BAM

ORIN successfully treated BTEX contaminated groundwater utilizing ORIN's patented Bioavailable Absorbent Media (BAM). The primary contaminants, Benzene and Xylene, were prevalent in the two monitoring wells on site. ORIN utilized DPT to pinpoint the targeted areas with higher Benzene and Xylene concentrations. A vacuum truck was utilized during injections to remove highly contaminated groundwater and to provide hydraulic control. Thirty-one injection points received a combined total of 3,300 gallons of treatment chemistry. The COCs were reduced to non-detect in target wells MW-03 and MW-09 following the injection event.

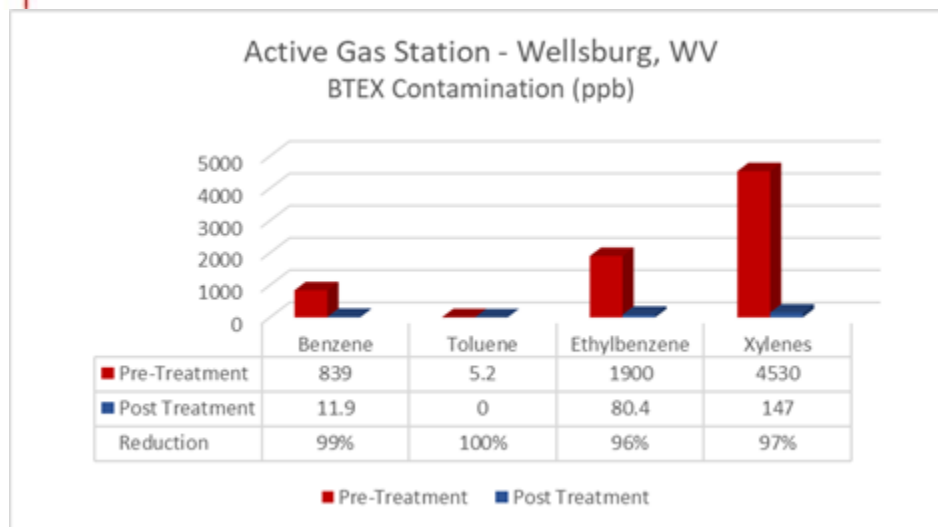
*A zero value indicates that the results were below detection limits



Active Gas Station – Wellsburg, West Virginia

- Risk Assessment: Residential
- Impacts: Shallow groundwater
- COCs: Benzene (remedial driver > 5 ug/L), Toluene, Ethylbenzene, and Xylenes
- Remedial Method: DPT Injection
- Remedial Chemistry: BAM

ORIN successfully reduced BTEX contaminated groundwater utilizing in-situ DPT injection of BAM combined with calcium peroxide. Approximately 100 gallons of treatment chemistry was injected into each of 9 injection points at depth-specific intervals. The injection points were spaced to target the remnant hot spot area of a contaminant plume.



Hydrocarbon Degrading Microbe Data

Hydrocarbon degrading microbes were successfully utilized to breakdown lignins and aromatic hydrocarbons, including heavier PAHs such as naphthalene. Microbes observe healthy symbiotic relation with plant rhizosphere.

- Risk Assessment: Forests – Oil Fields in Canada
- Impacts: Vadose soil and shallow groundwater
- COCs: VOCs and SVOC PAHs
- Remedial Method: Well Injection
- Remedial Chemistry: Microbes

Site 1. Total reduction exceeds 99% following 7 days post treatment. Impacted matrix: surface soil. No additional treatment or oxygen source during monitoring period. One-time treatment event.

Site 1. Natural Gas Condensate Spill - Forested Area - Surface			
Parameter	Unit	Max Initial Conc	Max Post Bioremediation
Benzene	ppm	811	6.16
Toluene	ppm	2330	18.9
Ethylbenzene	ppm	177	1.4

Xylenes	ppm	2440	22.4
C6-C10	ppm	51100	311
C10-C19	ppm	9650	20
C19-C32	ppm	2340	20
Naphthalene	ppm	1.89	0.03
2-Methylnaphthalene	ppm	4.03	0.04

Site 2. Total reduction exceeds 91% following 1 year post treatment. Impacted matrix: groundwater. No additional treatment or oxygen source during monitoring period. One-time treatment event.

Site 2. Gas Station Groundwater Treatment - 1 Year			
Parameter	Unit	Max Initial Conc	Max Post Bioremediation
Benzene	ppb	3410	17.3
Toluene	ppb	28	<0.3
Ethylbenzene	ppb	783	<0.5
Xylenes	ppb	1160	<0.5
C6-C10	ppb	7040	<100
C10-C19	ppb	1500	500
Naphthalene	ppb	64.2	0.12
2-Methylnaphthalene	ppb	3.68	0.02

Client Services & Communications

Prior to daily commencement of injection activities, ORIN will conduct tailgate meetings with all applicable onsite personnel. The meetings will include but will not be limited to: discussion of the work planned for the day, potential hazards, changes in work assignments, any problems encountered during past operations, and any other pertinent health and safety issues. The schedule will be addressed to assure the projected timetable for completion is achieved. If a proper schedule



is not being maintained, ORIN may bring in additional resources, such as but not limited to, additional ORIN personnel, supplementary equipment, or additional injection trailers. ORIN has a reputation for finishing projects ahead of schedule and adhering to the original budget.

The Project Manager (PM) shall be the primary point of contact for correspondence related to cost, schedule, and scope, as well as for providing all required submittals.

The Site Safety and Health Manager (SSHM) will be responsible for development and implementation of the health and safety plan. The SSHM will also lead the daily tailgate meeting in conjunction with Trimedia.

The Site Manager (SM) will be responsible for field execution and safety of all work being conducted. The SM will be responsible for ORIN's quality control plan and perform field testing in accordance with industry standards to ensure compliance with project specifications, technical requirements, and manufacturer instructions.

The Injection Specialist (IS) will work with the SM to implement the injection plan. Injection specialists will be responsible for ensuring the daily injection reports submitted to Trimedia are accurate and reflect the day's work.

The team will be managed in a consultative style, allowing the manager and employees to take part in decision-making. The manager will take into consideration the majority but ultimately the decision is up to him/her. The communication is extensive in both directions (from employees to leaders and vice-versa). ORIN's office staff is capable of any support the site team requires. Additionally, ORIN's site team is strong and creative who share the same vision throughout the remediation process. During the daily tailgate meetings, these visions are shared and agreed upon by the entire team.

Health & Safety

To ORIN, health and safety is not just a priority, it's a value. By being proactive instead of reactive, ORIN has learned to identify and listen to health and safety triggers, such as fatigue, emotion and rushing. ORIN reports near misses and lessons learned to help facilitate open discussions with clients and vendors alike about health and safety on our projects.

ORIN is ISNet certified. ISN is a certification that ensures all members are up to date and compliant with safety standards and training in some of the most safety



conscious industries. We pursued ISN certification to show our commitment to health and safety, and to ensure we meet even the most stringent requirements for companies we work with.

ORIN subscribes to Occupational Safety and Health Administration (OSHA)- and United States Environmental Protection Agency (USEPA)-mandated Health and Safety standards for protection of hazardous waste workers. Because of the wide range of potential exposures for our employees, ORIN must make conservative judgments as to potential health risks. The services outlined in this proposal are offered on the basis of providing modified Level D health and safety protection. ORIN personnel will abide by the applicable OSHA guidelines for personal safety outlined in 29 CFR 1910.

Prior to daily commencement of injection activities, ORIN will conduct health and safety tailgate meetings with all applicable onsite personnel. The meetings will include but will not be limited to discussion of the work planned for the day and any potential hazards, changes in work assignments, any problems encountered during past operations, and any other pertinent health and safety issues.

1.9.2 Additional Technical Questions

Describe the purpose of fluid injection.

An in-situ injection is proposed to address the contamination for both source area treatment and establishment of a Permeable Reactive Barrier (PRB) within the affected aquifer. This method is designed to reduce contaminant concentrations in the source zone while simultaneously preventing the migration of residual contaminants via the installation of a subsurface reactive barrier downgradient of the source area.

Injection for Source Area Treatment will be performed within the delineated source zones to promote in-situ degradation of contaminants around UPG-400 and UPG-600. This phase targets areas with the highest contaminant concentrations to reduce the overall mass flux from the source.

PRB's downgradient of the source area will be aligned to create a continuous subsurface PRB. The reactive zone will be strategically placed within the natural flow path of the groundwater plume to maximize contact between the contaminated groundwater and reactive media. Two PRB's will run in a transect



approximately from GSI-1200 south to GSI-600. The second will run from approximately GSI-1500 to GSI-1400.

The use of in-situ injection for treatment offers several advantages at this site because it is a minimally invasive approach. This results in limited surface disturbance to the sensitive area and limited infrastructure. Additionally, in-situ injections enhance natural attenuation processes and support long-term sustainability. The treatment can also be repeated or adjusted based on performance and observations, allowing for a flexible and adaptive remediation strategy.

Describe types of fluid that would be considered for injections.

Bioavailable Absorbent Media (BAM), a cutting-edge environmental treatment product designed for in-situ remediation of contaminated groundwater and soil. BAM, a carbon-based material derived from recycled biomass, features a unique honeycomb structure that acts as a highly effective "contaminant sponge." This structure creates pores that rapidly absorb and retain a wide range of contaminants, including per- and polyfluoroalkyl substances (PFAS), chlorinated solvents, petroleum hydrocarbons, heavy metals, and pesticides, while preventing surface microfilm buildup that could hinder performance. The high surface area and cation exchange capacity (CEC) of BAM promote microbial colonization, enabling biodegradation of contaminants, which rejuvenates the material's absorption capacity. When combined with calcium peroxide, chemical oxidants or reductants, such as ABC+ BAM enhances treatment efficiency by increasing contact time between contaminants and reactive chemistries.

Describe past experiences with fluid injections.

ORIN has 12 years of experience with BAM. It is a proprietary product that ORIN has developed in house, tested, and now offers as an environmental treatment product. BAM has been extensively tested and deployed at numerous sites worldwide, demonstrating its versatility across diverse geological settings, including sandy aquifers, clay-rich formations, and fractured bedrock. These applications highlight BAM's adaptability to various contaminants and subsurface conditions, from industrial facilities to residential and commercial

Developed in-house by ORIN, BAM is a peer-tested, sustainable solution that aligns with environmental, social, and governance (ESG) principles, utilizing recyclable materials and requiring minimal infrastructure changes. It can be applied via in-situ injections, soil blending, or direct application of dry material,



making it suitable for both PRB construction and source area treatment. BAM's low-viscosity slurry allows delivery through traditional low-pressure injection methods. The product's proven track record, combined with ORIN's expertise in oxidation, reduction, bioremediation, and advanced oxidation processes, positions BAM as a safe, cost-effective, and innovative tool for tackling complex environmental contamination challenges globally.

Describe past permitting experiences with EGLE required for fluid injection.

BAM has been widely approved and accepted by EGLE, due to its proven effectiveness and compliance with state and federal environmental standards. It has been safely and successfully applied at numerous sites in Michigan. ORIN's rigorous testing, peer-reviewed validations, and collaborative approach with regulators ensure that BAM remains a safe, innovative, and regulator-endorsed solution for addressing complex environmental contamination challenges.

We look forward to working with you on this project. If you have additional questions or comments, please feel free to call our office at (608) 838-6699 or my cell phone at 715-697-8377.

Sincerely,

Benjamin Polchowski
Project Manager
ORIN Technologies, LLC.

Disclaimer

Unauthorized duplication of any section or design concept contained within this document without the express written or verbal consent of ORIN is strictly prohibited.

ADDENDUM NO. 1

PROJECT: MQ23-444 - Cliffs-Dow Brownfield Site - In-Situ Remediation Services

FROM: City of Marquette

DATE: July 21, 2025

The bidder shall acknowledge receipt of all addenda by listing the addendum number where indicated on the Bid Express solicitation.

Drawings, specifications, and/or proposal are herein clarified, amended, expanded, and/or modified, as hereinafter described, and become a part of the Contract Documents with the same effect as if incorporated, therein, on the original documents. Any contrary provisions contained, or referred to, in Drawings and/or Specifications, shall remain applicable unless overridden by this addendum. Revisions herein shall include all labor, materials, methods, modifications, etc., required for completion of the Work.

-
- 1) The attached list of subcontractors must be fully completed and included with the project proposal.**

In-Situ Remediation Services
Cliffs-Dow Brownfield Site
City of Marquette, Michigan

LIST OF SUBCONTRACTORS

No subcontract, whether listed herein or later proposed, may be entered into without the written consent of the OWNER and CONSULTANT.

To OWNER/CONSULTANT:

The Bidder, ORIN Technologies, LLC., proposes to subcontract the following work items to the following parties (if no subcontracted work is proposed check NO SUBCONTRACT WORK below):

☐

NO SUBCONTRACT WORK

- 1) PORTION OF WORK: 25 %
Amount of Subcontract: \$ 178,600
SUBCONTRACTOR Name: Redox Tech

SUBCONTRACTOR Representative: Kyle Clark

Full Address: 10S123 Normantown Rd Unit C
Naperville, IL 60564

- 2) PORTION OF WORK: <1 %
Amount of Subcontract: \$ 3,890
SUBCONTRACTOR Name: BLOOD HOUND, LLC

SUBCONTRACTOR Representative: James Capps

Full Address: 6500 Technology Center Drive, Suite 200
Indianapolis, IN 46278

- 3) PORTION OF WORK: %
Amount of Subcontract: \$
SUBCONTRACTOR Name:

SUBCONTRACTOR Representative:

Full Address:



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

8/14/2025

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an **ADDITIONAL INSURED**, the policy(ies) must have **ADDITIONAL INSURED** provisions or be endorsed. If **SUBROGATION** IS **WAIVED**, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Marsh & McLennan Agency LLC 1751 Pinnacle Drive Suite 1800 Mc Lean VA 22102	CONTACT NAME: PHONE (A/C, No, Ext): 703-354-1616 FAX (A/C, No): E-MAIL ADDRESS: macertificates@MarshMMA.com
INSURED Orin Technologies, LLC 405 Investment Court Verona WI 53593	INSURER(S) AFFORDING COVERAGE INSURER A: Zurich American Ins Co of Illinois INSURER B: At-Bay Specialty Insurance Company INSURER C: INSURER D: INSURER E: INSURER F:

COVERAGES**CERTIFICATE NUMBER:** 225749548**REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	☒ COMMERCIAL GENERAL LIABILITY ☐ CLAIMS-MADE ☒ OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: ☐ POLICY ☒ PRO-JECT ☒ LOC OTHER:	Y	Y	GPL3468414	6/1/2025	6/1/2026	EACH OCCURRENCE \$2,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$100,000 MED EXP (Any one person) \$5,000 PERSONAL & ADV INJURY \$1,000,000 GENERAL AGGREGATE \$4,000,000 PRODUCTS - COMP/OP AGG \$1,000,000 \$
A	☒ AUTOMOBILE LIABILITY ☒ ANY AUTO ☐ OWNED AUTOS ONLY ☐ SCHEDULED AUTOS ☒ HIRED AUTOS ONLY ☒ NON-OWNED AUTOS ONLY	Y	Y	BAP3468416	6/1/2025	6/1/2026	COMBINED SINGLE LIMIT (Ea accident) \$2,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
A	☐ UMBRELLA LIAB ☒ OCCUR ☒ EXCESS LIAB ☐ CLAIMS-MADE DED RETENTION \$			SXS3468420	6/1/2025	6/1/2026	EACH OCCURRENCE \$9,000,000 AGGREGATE \$9,000,000 \$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N N	Y	WC3469967	6/1/2025	6/1/2026	☒ PER STATUTE ☐ OTH-ER E.L. EACH ACCIDENT \$1,000,000 E.L. DISEASE - EA EMPLOYEE \$1,000,000 E.L. DISEASE - POLICY LIMIT \$1,000,000
A B	Pollution and Professional Liab Cyber Liability			GPL3468414 AB675755701	6/1/2025 5/9/2025	6/1/2026 5/9/2026	4,000,000 Limit 2,000,000 50,000 Deductible Cyber Limit

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER**CANCELLATION**

For Informational Purposes Only

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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Liberty Mutual Insurance

Business Service Center
PO Box 188065
Fairfield, OH 45018-8065
(800) 845-3666 Fax

December 1, 2021

ORIN Technologies LLC
405 Investment Ct
Verona, WI 53593

Starting: 12/31/21 Ending: 12/31/22
Policy: XWA60762031
Carrier: Liberty Mutual

Policy Number: XWA (22) 60762031

RE: Ineligibility for Workers' Compensation Experience Modification Factor

ORIN Technologies LLC is not eligible for an experience modification factor as its Workers' Compensation Premium does not meet the minimum threshold required to qualify for experience rating.

Sincerely,

Your Service Center Team
Phone: 1-800-962-7132
Fax: 800-845-3666
Email: BusinessService@LibertyMutual.com

WISCONSIN WORKERS' COMPENSATION EXPERIENCE RATING

COMBO GROUP ID: 970081562

RATING DATE: 12/31/2022 to 12/31/2023

COVERAGE GROUP ID: 0376385 ORIN TECHNOLOGIES LLC

Experience Rating Summary Information

Pol. Year	Actual Incurred Losses	Primary Actual Losses	Expected Losses	Primary Expected Losses
18	0	0	1,815	617
19	0	0	846	288
19	0	0	3,021	970
20	0	0	3,380	1,089
EXPERIENCE TOTALS: A=				
	0	B=	0	C=
			9,062	D=
				2,964

Actual Excess	E = (A - B) =	0
Expected Excess	F = (C - D) =	6098
Weighting Value	G =	0.06
Ballast Value	H =	25,750

Experience Mod Formula	Actual Calculation								TOTAL
B + (ExG) + (1-G)x F + H	0	+	0	+	5,732	+	25,750	=	31,482
D + (FxG) + (1-G)x F + H	2,964	+	366	+	5,732	+	25,750	=	34,812

Experience Modification 0.90

Date Printed: 09/11/2022

WISCONSIN WORKERS' COMPENSATION EXPERIENCE RATING

COMBO GROUP ID: 970081562

RATING DATE: 12/31/2022 to 12/31/2023

COVERAGE GROUP ID: 0376385 ORIN TECHNOLOGIES LLC

CARRIER: 11266 AMERICAN FIRE & CASUALTY CO

POLICY: XWA2260762031

Policy Period 2018 to 2019

Claim Number or # claims	Inj Typ	Open = 0 Close = 1	Actual Incurred Losses	Primary Actual Losses	Class Code	Payroll	Exp. Loss Rate	Expected Losses	D Ratio	Primary Expected Losses
					4511	533,682	0.34	1,815	0.34	617
POLICY TOTALS:			0	0		533,682		1,815		617

Policy Period 2019 to 2020

Claim Number or # claims	Inj Typ	Open = 0 Close = 1	Actual Incurred Losses	Primary Actual Losses	Class Code	Payroll	Exp. Loss Rate	Expected Losses	D Ratio	Primary Expected Losses
					4511	248,950	0.34	846	0.34	288
POLICY TOTALS:			0	0		248,950		846		288

Policy Period 2019 to 2020

Claim Number or # claims	Inj Typ	Open = 0 Close = 1	Actual Incurred Losses	Primary Actual Losses	Class Code	Payroll	Exp. Loss Rate	Expected Losses	D Ratio	Primary Expected Losses
					4511	702,725	0.34	2,389	0.34	812
					5606	103,664	0.61	632	0.25	158
POLICY TOTALS:			0	0		806,389		3,021		970

Policy Period 2020 to 2021

Claim Number or # claims	Inj Typ	Open = 0 Close = 1	Actual Incurred Losses	Primary Actual Losses	Class Code	Payroll	Exp. Loss Rate	Expected Losses	D Ratio	Primary Expected Losses
					4511	795,364	0.34	2,704	0.34	919
					5606	109,304	0.61	667	0.25	167
					9014	540	1.65	9	0.35	3

POLICY TOTALS:	0	0	905,208	3,380	1,089
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Date Printed: 09/11/2022

WCRB Experience Modification Lookup

Primary Risk Name: **ORIN TECHNOLOGIES LLC**

Address: **405 INVESTMENT CT VERONA , WI 53593**

Risk Combo ID: **970081562**

Risk Coverage ID: **0376385**

Last Inspection: **None**

Effective Year	Experience Modification	Status (1)	Revision Number	Rating Type (2)	Release Date	WCPAP Factor (3)
2022	0.90	Released	000	N	09/11/2022	None

(1) Status shown as "DNQ" means that the Risk does not meet the minimum premium eligibility requirements (Does Not Qualify) for experience rating. The DNQ status remains effective until the minimum premium eligibility requirements are met. When consecutive DNQs occur, a gap in the effective year will result.

(2) Rating Type:

N = "Normal"

This means that payroll and loss data from all applicable policies and report levels have been included in the rating, and no rate change is pending.

C = "Contingent"

This means that the Bureau is missing one unit statistical report from the experience rating calculation, however, a rating has been released in accordance with the rules of the Experience Rating Plan.

(3) WCPAP Factor:

If a WCPAP factor is available, the Factor will appear only when an experience modification factor is available for that effective year. In the event there is no experience modification listed for a year, go to [WCPAP Lookup](#) to retrieve any available WCPAP factor.

DNQ = "Does Not Qualify"

This indicates the Risk does not meet the minimum eligibility requirements for a WCPAP credit.

None

This indicates there are no WCPAP Credit/DNQ results available.

WISCONSIN WORKERS' COMPENSATION EXPERIENCE RATING

COMBO GROUP ID: 970081562

RATING DATE: 12/31/2023 to 12/31/2024

COVERAGE GROUP ID: 0376385 ORIN TECHNOLOGIES LLC

Experience Rating Summary Information

Pol. Year	Actual Incurred Losses	Primary Actual Losses	Expected Losses	Primary Expected Losses			
19	0	0	772	262			
19	0	0	2,717	881			
20	0	0	3,042	989			
21	0	0	2,456	788			
EXPERIENCE TOTALS: A=	0	B=	0	C=	8,987	D=	2,920

Actual Excess	E = (A - B) =	0
Expected Excess	F = (C - D) =	6067
Weighting Value	G =	0.05
Ballast Value	H =	26,875

Experience Mod Formula	Actual Calculation								TOTAL
B + (ExG) + (1-G)xF + H	0	+	0	+	5,764	+	26,875	=	32,639
D + (FxG) + (1-G)xF + H	2,920	+	303	+	5,764	+	26,875	=	35,862

Experience Modification 0.91

Date Printed: 07/30/2023

WISCONSIN WORKERS' COMPENSATION EXPERIENCE RATING

COMBO GROUP ID: 970081562

RATING DATE: 12/31/2023 to 12/31/2024

COVERAGE GROUP ID: 0376385 ORIN TECHNOLOGIES LLC

CARRIER: 20583 SELECTIVE INS. CO. OF THE SE

POLICY: WC9135061

Policy Period 2019 to 2020

Claim Number or # claims	Inj Typ	Open = 0 Close = 1	Actual Incurred Losses	Primary Actual Losses	Class Code	Payroll	Exp. Loss Rate	Expected Losses	D Ratio	Primary Expected Losses
					4511	248,950	0.31	772	0.34	262
POLICY TOTALS:			0	0		248,950		772		262

Policy Period 2019 to 2020

Claim Number or # claims	Inj Typ	Open = 0 Close = 1	Actual Incurred Losses	Primary Actual Losses	Class Code	Payroll	Exp. Loss Rate	Expected Losses	D Ratio	Primary Expected Losses
					4511	702,725	0.31	2,178	0.34	741
					5606	103,664	0.52	539	0.26	140
POLICY TOTALS:			0	0		806,389		2,717		881

Policy Period 2020 to 2021

Claim Number or # claims	Inj Typ	Open = 0 Close = 1	Actual Incurred Losses	Primary Actual Losses	Class Code	Payroll	Exp. Loss Rate	Expected Losses	D Ratio	Primary Expected Losses
					4511	795,364	0.31	2,466	0.34	838
					5606	109,304	0.52	568	0.26	148
					9014	540	1.4	8	0.35	3
POLICY TOTALS:			0	0		905,208		3,042		989

Policy Period 2021 to 2022

Claim Number or # claims	Inj Typ	Open = 0 Close = 1	Actual Incurred Losses	Primary Actual Losses	Class Code	Payroll	Exp. Loss Rate	Expected Losses	D Ratio	Primary Expected Losses
					4511	595,859	0.31	1,847	0.34	628
					5606	113,776	0.52	592	0.26	154

		8810	21,450	0.08	17	0.35	6
POLICY TOTALS:	0	0	731,085		2,456		788

Date Printed: 07/30/2023

Site Specific Health And Safety Plan

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OSHA's Form 300A (Rev. 04/2004)

Summary of Work-Related Injuries and Illnesses

Note: You can type input into this form and save it.
Because the forms in this recordkeeping package are "fillable/writable" PDF documents, you can type into the input form fields and then save your inputs using the free Adobe PDF Reader.

Year 20 22

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no work-related injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete and accurate before completing this summary.

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the Log. If you had no cases, write "0."

Employees, former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR Part 1904.35, in OSHA's recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	0	0	0
(G)	(H)	(I)	(J)

Number of Days

Total number of days away from work	Total number of days of job transfer or restriction
0	0
(K)	(L)

Injury and Illness Types

Total number of (M)	
(1) Injuries	0
(2) Skin disorders	0
(3) Respiratory conditions	0
(4) Poisonings	0
(5) Hearing loss	0
(6) All other illnesses	0

Post this Summary page from February 1 to April 30 of the year following the year covered by the form.

Public reporting burden for this collection of information is estimated to average 18 minutes per response, including time to review the instructions, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any other aspect of this data collection, contact: US Department of Labor, OSHA Office of Statistical Analysis, Room N-3644, 200 Constitution Avenue, NW, Washington, DC 20210. Do not send the completed forms to this office.

Establishment information

Your establishment name ORIN Technologies, LLC
Street 405 Investment Court
City Verona State WI Zip 53593

Industry description (e.g., Manufacture /molv /ruck /railers)

Soil and Groundwater Remediation

Nonh American Industrial Classification (NAICS), if known (e.g., 336212)

562910

Employment information (If you don't have the figure, see the Worksheet on the next page to estimate.)

Annual average number of employees 9
Total hours worked by all employees last year 18,694

Sign here

Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

[Signature] Title Principal
Company executive
Phone 608-838-6699 Date 1/9/2023

Reset

OSHA's Form 300 (Rev. 04/2004) Log of Work-Related Injuries and Illnesses

Note: You can type input into this form and save it.
Because the forms in this recordkeeping package are "fillable/writable" PDF documents, you can type into the input form fields and then save your inputs using the free Adobe PDF Reader. In addition, the forms are programmed to auto-calculate as appropriate.

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

Year 20 22
U.S. Department of Labor
Occupational Safety and Health Administration



Please Record:

- Information about every work-related death and about every work-related injury or illness that involves loss of consciousness, restricted work activity or job transfer, days away from work, or medical treatment beyond first aid.
- Significant work-related injuries and illnesses that are diagnosed by a physician or licensed health care professional.
- Work-related injuries and illnesses that meet any of the specific recording criteria listed in 29 CFR Part 1904.8 through 1904.12.

Reminders:

- Complete an Injury and Illness Incident Report (OSHA Form 301) or equivalent form for each injury or illness recorded on this form. If you're not sure whether a case is recordable, call your local OSHA office for help.
- Feel free to use two lines for a single case if you need to.
- Complete the 5 steps for each case.

Establishment name

ORIN Technologies, LLC

City

Verona

State

WI

Form approved OMB no. 1218-0176

Step 1. Identify the person

(A) Case no. (B) Employer's name (C) Job title (e.g., Welder) (D) Date of injury or onset of illness (e.g., 2/10)

Step 2. Describe the case

(E) Where the event occurred (e.g., Loading dock north end)

(F) Describe injury or illness, parts of body affected, and object/substance that directly injured or made person ill (e.g., Second degree burns on right forearm from acetylene torch)

Step 3. Classify the case

SELECT ONLY ONE circle based on the most serious outcome:

Death (G) Days away from work or restriction (H) Job transfer from work or restriction (I) Other recordable cases (J)

Step 4.

Enter the number of days the injured or ill worker was:

Away from work (K) On job transfer or restriction (L)

Step 5.

Select one column:

Injury (1) Skin disorder (2) Respiratory condition (3) Poisoning (4) Hearing loss (5) All other illnesses (6)

(A) Case no.	(B) Employer's name	(C) Job title (e.g., Welder)	(D) Date of injury or onset of illness (e.g., 2/10)	(E) Where the event occurred (e.g., Loading dock north end)	(F) Describe injury or illness, parts of body affected, and object/substance that directly injured or made person ill (e.g., Second degree burns on right forearm from acetylene torch)	(G) Death	(H) Days away from work or restriction	(I) Job transfer from work or restriction	(J) Other record- able cases	(K) Away from work	(L) On job transfer or restriction	(M) Injury	(1) Skin disorder	(2) Respiratory condition	(3) Poisoning	(4) Hearing loss	(5) All other illnesses	(6)
Reset			month / day			☐	☐	☐	☐	days	days	☐	☐	☐	☐	☐	☐	☐
Reset			month / day			☐	☐	☐	☐	days	days	☐	☐	☐	☐	☐	☐	☐
Reset			month / day			☐	☐	☐	☐	days	days	☐	☐	☐	☐	☐	☐	☐
Reset			month / day			☐	☐	☐	☐	days	days	☐	☐	☐	☐	☐	☐	☐
Reset			month / day			☐	☐	☐	☐	days	days	☐	☐	☐	☐	☐	☐	☐
Reset			month / day			☐	☐	☐	☐	days	days	☐	☐	☐	☐	☐	☐	☐
Reset			month / day			☐	☐	☐	☐	days	days	☐	☐	☐	☐	☐	☐	☐
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Reset			month / day			☐	☐	☐	☐	days	days	☐	☐	☐	☐	☐	☐	☐
Reset			month / day			☐	☐	☐	☐	days	days	☐	☐	☐	☐	☐	☐	☐

Page totals

Be sure to transfer these totals to the Summary page (Form 300A) before you post it.

Add a Form Page

Public reporting burden for this collection of information is estimated to average 14 minutes per response, including time to review the instructions, search existing data sources, gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any other aspect of this data collection, contact: US Department of Labor, OSHA Office of Statistical Analysis, Room N-3644, 200 Constitution Avenue, NW, Washington, DC 20210. Do not send the completed forms to this office.

OSHA's Form 300A (Rev. 04/2004)

Summary of Work-Related Injuries and Illnesses

Note: You can type input into this form and save it.
Because the forms in this recordkeeping package are "fillable/writable" PDF documents, you can type into the input form fields and then save your inputs using the free Adobe PDF Reader.

Year 20 23

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no work-related injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete and accurate before completing this summary.

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the Log. If you had no cases, write "0."

Employees, former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR Part 1904.35, in OSHA's recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	0	0	0
(G)	(H)	(I)	(J)

Number of Days

Total number of days away from work	Total number of days of job transfer or restriction
0	0
(K)	(L)

Injury and Illness Types

Total number of (M)	
(1) Injuries	0
(2) Skin disorders	0
(3) Respiratory conditions	0
(4) Poisonings	0
(5) Hearing loss	0
(6) All other illnesses	0

Post this Summary page from February 1 to April 30 of the year following the year covered by the form.

Public reporting burden for this collection of information is estimated to average 58 minutes per response, including time to review the instructions, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any other aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistical Analysis, Room N-3644, 200 Constitution Avenue, NW, Washington, DC 20210. Do not send the completed forms to this office.

Establishment information

Your establishment name ORIN Technologies, LLC
Street 405 Investment Court
City Verona State WI Zip 53593

Industry description (e.g., *Manufacture of motor truck trailers*)

Soil and Groundwater Remediation

North American Industrial Classification (NAICS), if known (e.g., 336212)

562910

Employment information (If you don't have these figures, see the Worksheet on the next page to estimate.)

Annual average number of employees 8

Total hours worked by all employees last year 14,778

Sign here

Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

[Signature] Title Principal
Company executive
Phone 608-838-6699 Date 1/22/24

Reset

OSHA’s Form 300 (Rev. 04/2004)

Log of Work-Related Injuries and Illnesses

Note: You can type input into this form and save it. Because the forms in this recordkeeping package are “fillable/writable” PDF documents, you can type into the input form fields and then save your inputs using the [free Adobe PDF Reader](#). In addition, the forms are programmed to auto-calculate as appropriate.

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

Form approved OMB no. 1218-0176

Please Record:

- Information about every work-related death and about every work-related injury or illness that involves loss of consciousness, restricted work activity or job transfer, days away from work, or medical treatment beyond first aid.
- Significant work-related injuries and illnesses that are diagnosed by a physician or licensed health care professional.
- Work-related injuries and illnesses that meet any of the specific recording criteria listed in 29 CFR Part 1904.8 through 1904.12.

Reminders:

- Complete an Injury and Illness Incident Report (OSHA Form 301) or equivalent form for each injury or illness recorded on this form. If you're not sure whether a case is recordable, call your local OSHA office for help.
- Feel free to use two lines for a single case if you need to.
- Complete the 5 steps for each case.

Establishment name **ORIN Technologies, LLC**

City **Verona** State **WI**

Step 1. Identify the person		Step 2. Describe the case				Step 3. Classify the case				Step 4.		Step 5.						
(A) Case no.	(B) Employee's name	(C) Job title (e.g., Welder)	(D) Date of injury or onset of illness (e.g., 2/10)	(E) Where the event occurred (e.g., Loading dock north end)	(F) Describe injury or illness, parts of body affected, and object/substance that directly injured or made person ill (e.g., Second degree burns on right forearm from acetylene torch)	SELECT ONLY ONE circle based on the most serious outcome:				Enter the number of days the injured or ill worker was:		Select one column:						
						Remained at Work				Away from work (K)	On job transfer or restriction (L)	Illness						
						Death (G)	Days away from work (H)	Job transfer or restriction (I)	Other recordable cases (J)			(M)						
													Injury (1)	Skin disorder (2)	Respiratory condition (3)	Poisoning (4)	Hearing loss (5)	All other illnesses (6)
Reset			/ month / day															
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OSHA's Form 300A (Rev. 04/2004)

Summary of Work-Related Injuries and Illnesses

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Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no work-related injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete and accurate before completing this summary.

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Number of Cases			
Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	0	0	0
(G)	(H)	(I)	(J)

Number of Days	
Total number of days away from work	Total number of days of job transfer or restriction
0	0
(K)	(L)

Injury and Illness Types			
Total number of . . . (M)			
(1) Injuries	0	(4) Poisonings	0
(2) Skin disorders	0	(5) Hearing loss	0
(3) Respiratory conditions	0	(6) All other illnesses	0

Post this Summary page from February 1 to April 30 of the year following the year covered by the form.

Public reporting burden for this collection of information is estimated to average 58 minutes per response, including time to review the instructions, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any other aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistical Analysis, Room N-3644, 200 Constitution Avenue, NW, Washington, DC 20210. Do not send the completed forms to this office.

Establishment information

Your establishment name

ORIN Technologies, LLC

Street

405 Investment Court

City

Verona

State

WI

Zip

53593

Industry description (e.g., Manufacture of motor truck trailers)

North American Industrial Classification (NAICS), if known (e.g., 336212)

562910

Employment information (If you don't have these figures, see the Worksheet on the next page to estimate.)

Annual average number of employees

8

Total hours worked by all employees last year

13,909.75

Sign here

Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

Signature

Principal

Company executive

Title

Phone

608-838-6699

Date

4-25-25

Reset