

**Notice:** Use this form to request a **written response (on agency letterhead)** from the Department of Natural Resources (DNR) regarding technical assistance, a post-closure change to a site, a specialized agreement or liability clarification for Property with known or suspected environmental contamination. A fee will be required as is authorized by s. 292.55, Wis. Stats., and NR 749, Wis. Adm. Code., unless noted in the instructions below. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Public Records law [ss. 19.31 - 19.39, Wis. Stats.].

## Definitions

**"Property"** refers to the subject Property that is perceived to have been or has been impacted by the discharge of hazardous substances.

**"Liability Clarification"** refers to a written determination by the Department provided in response to a request made on this form. The response clarifies whether a person is or may become liable for the environmental contamination of a Property, as provided in s. 292.55, Wis. Stats.

**"Technical Assistance"** refers to the Department's assistance or comments on the planning and implementation of an environmental investigation or environmental cleanup on a Property in response to a request made on this form as provided in s. 292.55, Wis. Stats.

**"Post-closure modification"** refers to changes to Property boundaries and/or continuing obligations for Properties or sites that received closure letters for which continuing obligations have been applied or where contamination remains. Many, but not all, of these sites are included on the GIS Registry layer of RR Sites Map to provide public notice of residual contamination and continuing obligations.

## Select the Correct Form

This form should be used to request the following from the DNR:

- Technical Assistance
- Liability Clarification
- Post-Closure Modifications
- Specialized Agreements (tax cancellation, negotiated agreements, etc.)

**Do not use this form if one of the following applies:**

- Request for an **off-site liability exemption or clarification** for Property that has been or is perceived to be contaminated by one or more hazardous substances that originated on another Property containing the source of the contamination. Use DNR's Off-Site Liability Exemption and Liability Clarification Application Form 4400-201.
- Submittal of an Environmental Assessment for the **Lender Liability Exemption**, s 292.21, Wis. Stats., **if no response or review by DNR is requested**. Use the Lender Liability Exemption Environmental Assessment Tracking Form 4400-196.
- Request for an **exemption to develop on a historic fill site** or licensed landfill. Use DNR's Form 4400-226 or 4400-226A.
- **Request for closure** for Property where the investigation and cleanup actions are completed. Use DNR's Case Closure - GIS Registry Form 4400-202.

**All forms, publications and additional information are available on the internet at:** [dnr.wi.gov/topic/Brownfields/Pubs.html](http://dnr.wi.gov/topic/Brownfields/Pubs.html).

## Instructions

1. Complete sections 1, 2, 6 and 7 for all requests. Be sure to provide adequate and complete information.
2. Select the type of assistance requested: Section 3 for technical assistance or post-closure modifications, Section 4 for a written determination or clarification of environmental liabilities; or Section 5 for a specialized agreement.
3. Include the fee payment that is listed in Section 3, 4, or 5, unless you are a "Voluntary Party" enrolled in the Voluntary Party Liability Exemption Program **and** the questions in Section 2 direct otherwise. Information on to whom and where to send the fee is found in Section 8 of this form.
4. Send the completed request, supporting materials and the fee to the appropriate DNR regional office where the Property is located. See the map on the last page of this form. A paper copy of the signed form and all reports and supporting materials shall be sent with an electronic copy of the form and supporting materials on a compact disk. For electronic document submittal requirements see: <http://dnr.wi.gov/files/PDF/pubs/rr/RR690.pdf>

The time required for DNR's determination varies depending on the complexity of the site, and the clarity and completeness of the request and supporting documentation.

# Technical Assistance, Environmental Liability Clarification or Post-Closure Modification Request

Form 4400-237 (R 10/21)

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## Section 1. Contact and Recipient Information

### Requester Information

This is the person requesting technical assistance or a post-closure modification review, that his or her liability be clarified or a specialized agreement and is identified as the requester in Section 7. DNR will address its response letter to this person.

Last Name Jagemann	First Mike	MI	Organization/ Business Name Jagemann Plating Co., Inc.
Mailing Address 1324 S. 26th Street			City Manitowoc
			State WI
			ZIP Code 54220
Phone # (include area code) (920) 682-6883	Fax # (include area code)	Email mjagemann@jagemannplating.com	

The requester listed above: (select all that apply)

- Is currently the owner
  Is considering selling the Property  
 Is renting or leasing the Property
  Is considering acquiring the Property  
 Is a lender with a mortgagee interest in the Property  
 Other. Explain the status of the Property with respect to the applicant:

### Contact Information (to be contacted with questions about this request)

Select if same as requester

Contact Last Name Kappen	First Brian	MI J	Organization/ Business Name EnviroForensics, LLC
Mailing Address N16W23390 Stone Ridge Dr, Suite G			City Waukesha
			State WI
			ZIP Code 53188
Phone # (include area code) (414) 326-4412	Fax # (include area code) (317) 972-7870	Email bkappen@enviroforensics.com	

### Environmental Consultant (if applicable)

Contact Last Name Kappen	First Brian	MI	Organization/ Business Name EnviroForensics, LLC
Mailing Address			City
			State
			ZIP Code
Phone # (include area code)	Fax # (include area code)	Email	

### Attorney (if applicable)

Contact Last Name Skwierawski	First Andy	MI	Organization/ Business Name Davis Kuelthau, sc
Mailing Address 111 E. Kilbourn Ave, Suite 1400			City Milwaukee
			State WI
			ZIP Code 53202
Phone # (include area code) (414) 225-1485	Fax # (include area code) (414) 278-3685	Email askwierawski@dkattorneys.com	

## Section 2. Property Information

Property Name Jagemann Plating Co., Inc	FID No. (if known) 436041980
BRRTS No. (if known) 02-36-555544	Parcel Identification Number 05216000008500

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Street Address 1324 S. 26th Street		City Manitowoc	State WI	ZIP Code 54220
County Manitowoc	Municipality where the Property is located <input checked="" type="radio"/> City <input type="radio"/> Town <input type="radio"/> Village of Manitowoc	Property is composed of: <input checked="" type="radio"/> Single tax parcel <input type="radio"/> Multiple tax parcels	Property Size Acres 4.58	

1. Is a response needed by a specific date? (e.g., Property closing date) Note: Most requests are completed within 60 days. Please plan accordingly.

- No  Yes

Date requested by: 07/08/2022

Reason: Implement remediation prior to transaction

2. Is the "Requester" enrolled as a Voluntary Party in the Voluntary Party Liability Exemption (VPLE) program?

- No. **Include the fee that is required for your request in Section 3, 4 or 5.**  
 Yes. **Do not include a separate fee.** This request will be billed separately through the VPLE Program.

**Fill out the information in Section 3, 4 or 5 which corresponds with the type of request:**

**Section 3. Technical Assistance or Post-Closure Modifications;  
 Section 4. Liability Clarification; or Section 5. Specialized Agreement.**

### Section 3. Request for Technical Assistance or Post-Closure Modification

Select the type of technical assistance requested: **[Numbers in brackets are for WI DNR Use]**

- No Further Action Letter (NFA) (Immediate Actions) - NR 708.09, [183] - Include a fee of \$350. Use for a written response to an immediate action after a discharge of a hazardous substance occurs. Generally, these are for a one-time spill event.
- Review of Site Investigation Work Plan - NR 716.09, [135] - **Include a fee of \$700.**
- Review of Site Investigation Report - NR 716.15, [137] - **Include a fee of \$1050.**
- Approval of a Site-Specific Soil Cleanup Standard - NR 720.10 or 12, [67] - **Include a fee of \$1050.**
- Review of a Remedial Action Options Report - NR 722.13, [143] - **Include a fee of \$1050.**
- Review of a Remedial Action Design Report - NR 724.09, [148] - **Include a fee of \$1050.**
- Review of a Remedial Action Documentation Report - NR 724.15, [152] - **Include a fee of \$350**
- Review of a Long-term Monitoring Plan - NR 724.17, [25] - **Include a fee of \$425.**
- Review of an Operation and Maintenance Plan - NR 724.13, [192] - **Include a fee of \$425.**

Other Technical Assistance - s. 292.55, Wis. Stats. [97] (For request to build on an abandoned landfill use Form 4400-226)

- Schedule a Technical Assistance Meeting - **Include a fee of \$700.**
- Hazardous Waste Determination - **Include a fee of \$700.**
- Other Technical Assistance - **Include a fee of \$700.** Explain your request in an attachment.

Post-Closure Modifications - NR 727, [181]

- Post-Closure Modifications: Modification to Property boundaries and/or continuing obligations of a closed site or Property; sites may be on the GIS Registry. This also includes removal of a site or Property from the GIS Registry. **Include a fee of \$1050, and:**
  - Include a fee of \$300 for sites with residual soil contamination; and
  - Include a fee of \$350 for sites with residual groundwater contamination, monitoring wells or for vapor intrusion continuing obligations.

Attach a description of the changes you are proposing, and documentation as to why the changes are needed (if the change to a Property, site or continuing obligation will result in revised maps, maintenance plans or photographs, those documents may be submitted later in the approval process, on a case-by-case basis).

### Section 4. Request for Liability Clarification

Select the type of liability clarification requested. Use the available space given or attach information, explanations, or specific questions that you need answered in DNR's reply. Complete Sections 6 and 7 of this form. **[Numbers in brackets are for DNR Use]**

**Technical Assistance, Environmental Liability  
Clarification or Post-Closure Modification Request**

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"Lender" liability exemption clarification - s. 292.21, Wis. Stats. [686]

❖ **Include a fee of \$700.**

Provide the following documentation:

- (1) ownership status of the real Property, and/or the personal Property and fixtures;
- (2) an environmental assessment, in accordance with s. 292.21, Wis. Stats.;
- (3) the date the environmental assessment was conducted by the lender;
- (4) the date of the Property acquisition; for foreclosure actions, include a copy of the signed and dated court order confirming the sheriff's sale.
- (5) documentation showing how the Property was acquired and the steps followed under the appropriate state statutes.
- (6) a copy of the Property deed with the correct legal description; and,
- (7) the Lender Liability Exemption Environmental Assessment Tracking Form (Form 4400-196).
- (8) If no sampling was done, please provide reasoning as to why it was **not** conducted. Include this either in the accompanying environmental assessment or as an attachment to this form, and cite language in s. 292.21(1)(c)2.,h.-i., Wis. Stats.:
  - h. The collection and analysis of representative samples of soil or other materials in the ground that are suspected of being contaminated based on observations made during a visual inspection of the real Property or based on aerial photographs, or other information available to the lender, including stained or discolored soil or other materials in the ground and including soil or materials in the ground in areas with dead or distressed vegetation. The collection and analysis shall identify contaminants in the soil or other materials in the ground and shall quantify concentrations.
  - i. The collection and analysis of representative samples of unknown wastes or potentially hazardous substances found on the real Property and the determination of concentrations of hazardous waste and hazardous substances found in tanks, drums or other containers or in piles or lagoons on the real Property.

"Representative" liability exemption clarification (e.g. trustees, receivers, etc.) - s. 292.21, Wis. Stats. [686]

❖ **Include a fee of \$700.**

Provide the following documentation:

- (1) ownership status of the Property;
- (2) the date of Property acquisition by the representative;
- (3) the means by which the Property was acquired;
- (4) documentation that the representative has no beneficial interest in any entity that owns, possesses, or controls the Property;
- (5) documentation that the representative has not caused any discharge of a hazardous substance on the Property; and
- (6) a copy of the Property deed with the correct legal description.

Clarification of local governmental unit (LGU) liability exemption at sites with: (select all that apply)

- hazardous substances spills - s. 292.11(9)(e), Wis. Stats. [649];
- Perceived environmental contamination - [649];
- hazardous waste - s. 292.24 (2), Wis. Stats. [649]; and/or
- solid waste - s. 292.23 (2), Wis. Stats. [649].

❖ **Include a fee of \$700, a summary of the environmental liability clarification being requested, and the following:**

- (1) clear supporting documentation showing the acquisition method used, and the steps followed under the appropriate state statute(s).
- (2) current and proposed ownership status of the Property;
- (3) date and means by which the Property was acquired by the LGU, where applicable;
- (4) a map and the ¼, ¼ section location of the Property;
- (5) summary of current uses of the Property;
- (6) intended or potential use(s) of the Property;
- (7) descriptions of other investigations that have taken place on the Property; and
- (8) (for solid waste clarifications) a summary of the license history of the facility.

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Section 4. Request for Liability Clarification (cont.)

- Lease liability clarification - s. 292.55, Wis. Stats. [646]
- ❖ **Include a fee of \$700 for a single Property, or \$1400 for multiple Properties and the information listed below:**
  - (1) a copy of the proposed lease;
  - (2) the name of the current owner of the Property and the person who will lease the Property;
  - (3) a description of the lease holder's association with any persons who have possession, control, or caused a discharge of a hazardous substance on the Property;
  - (4) map(s) showing the Property location and any suspected or known sources of contamination detected on the Property;
  - (5) a description of the intended use of the Property by the lease holder, with reference to the maps to indicate which areas will be used. Explain how the use will not interfere with any future investigation or cleanup at the Property; and
  - (6) all reports or investigations (e.g. Phase I and Phase II Environmental Assessments and/or Site Investigation Reports conducted under s. NR 716, Wis. Adm. Code) that identify areas of the Property where a discharge has occurred.

General or other environmental liability clarification - s. 292.55, Wis. Stats. [682] - Explain your request below.

- ❖ **Include a fee of \$700 and an adequate summary of relevant environmental work to date.**

- No Action Required (NAR) - NR 716.05, [682]

- ❖ **Include a fee of \$700.**

Use where an environmental discharge has or has not occurred, and applicant wants a DNR determination that no further assessment or clean-up work is required. Usually this is requested after a Phase I and Phase II environmental assessment has been conducted; the assessment reports should be submitted with this form. This is not a closure letter.

- Clarify the liability associated with a "closed" Property - s. 292.55, Wis. Stats. [682]

- ❖ **Include a fee of \$700.**

- Include a copy of any closure documents if a state agency other than DNR approved the closure.

Use this space or attach additional sheets to provide necessary information, explanations or specific questions to be answered by the DNR.

Requesting approval of a remedial injection request.

Section 5. Request for a Specialized Agreement

Select the type of agreement needed. Include the appropriate draft agreements and supporting materials. Complete Sections 6 and 7 of this form. More information and model draft agreements are available at: [dnr.wi.gov/topic/Brownfields/lgu.html#tabx4](http://dnr.wi.gov/topic/Brownfields/lgu.html#tabx4).

- Tax cancellation agreement - s. 75.105(2)(d), Wis. Stats. [654]

- ❖ **Include a fee of \$700, and the information listed below:**

- (1) Phase I and II Environmental Site Assessment Reports,
- (2) a copy of the Property deed with the correct legal description.

- Agreement for assignment of tax foreclosure judgement - s.75.106, Wis. Stats. [666]

- ❖ **Include a fee of \$700, and the information listed below:**

- (1) Phase I and II Environmental Site Assessment Reports,
- (2) a copy of the Property deed with the correct legal description.

- Negotiated agreement - Enforceable contract for non-emergency remediation - s. 292.11(7)(d) and (c), Wis. Stats. [630]

- ❖ **Include a fee of \$1400, and the information listed below:**

- (1) a draft schedule for remediation; and,
- (2) the name, mailing address, phone and email for each party to the agreement.

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Section 6. Other Information Submitted

Identify all materials that are included with this request.

Send both a paper copy of the signed form and all reports and supporting materials, and an electronic copy of the form and all reports, including Environmental Site Assessment Reports, and supporting materials on a compact disk.

Include one copy of any document from any state agency files that you want the Department to review as part of this request. The person submitting this request is responsible for contacting other state agencies to obtain appropriate reports or information.

- Phase I Environmental Site Assessment Report - Date: \_\_\_\_\_
- Phase II Environmental Site Assessment Report - Date: \_\_\_\_\_
- Legal Description of Property (required for all liability requests and specialized agreements)
- Map of the Property (required for all liability requests and specialized agreements)

Analytical results of the following sampled media: Select all that apply and include date of collection.

- Groundwater
- Soil
- Sediment
- Other medium - Describe: \_\_\_\_\_

Date of Collection: \_\_\_\_\_

- A copy of the closure letter and submittal materials
- Draft tax cancellation agreement
- Draft agreement for assignment of tax foreclosure judgment
- Other report(s) or information - Describe: Injection Request

For Property with newly identified discharges of hazardous substances only: Has a notification of a discharge of a hazardous substance been sent to the DNR as required by s. NR 706.05(1)(b), Wis. Adm. Code?

- Yes - Date (if known): \_\_\_\_\_
- No

**Note:** The Notification for Hazardous Substance Discharge Form - Non-Emergency Only (Form 4400-225) is accessible through the RR Program Submittal Portal application. Directions for using the form and the Submittal Portal application are available on the [Submittal Portal web page](#).

Section 7. Certification by the Person who completed this form

- I am the person submitting this request (requester)
- I prepared this request for: Mike Jagemann  
Requester Name

I certify that I am familiar with the information submitted on this request, and that the information on and included with this request is true, accurate and complete to the best of my knowledge. I also certify I have the legal authority and the applicant's permission to make this request.

  
Signature

5/26/2022  
Date Signed

Senior Geologist  
Title

(414) 326-4412  
Telephone Number (include area code)

# Technical Assistance, Environmental Liability Clarification or Post-Closure Modification Request

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## Section 8. DNR Contacts and Addresses for Request Submittals

Send or deliver one paper copy and one electronic copy on a compact disk of the completed request, supporting materials, and fee to the region where the property is located to the address below. Contact a [DNR regional brownfields specialist](#) with any questions about this form or a specific situation involving a contaminated property. For electronic document submittal requirements see: <http://dnr.wi.gov/files/PDF/pubs/rr/RR690.pdf>.

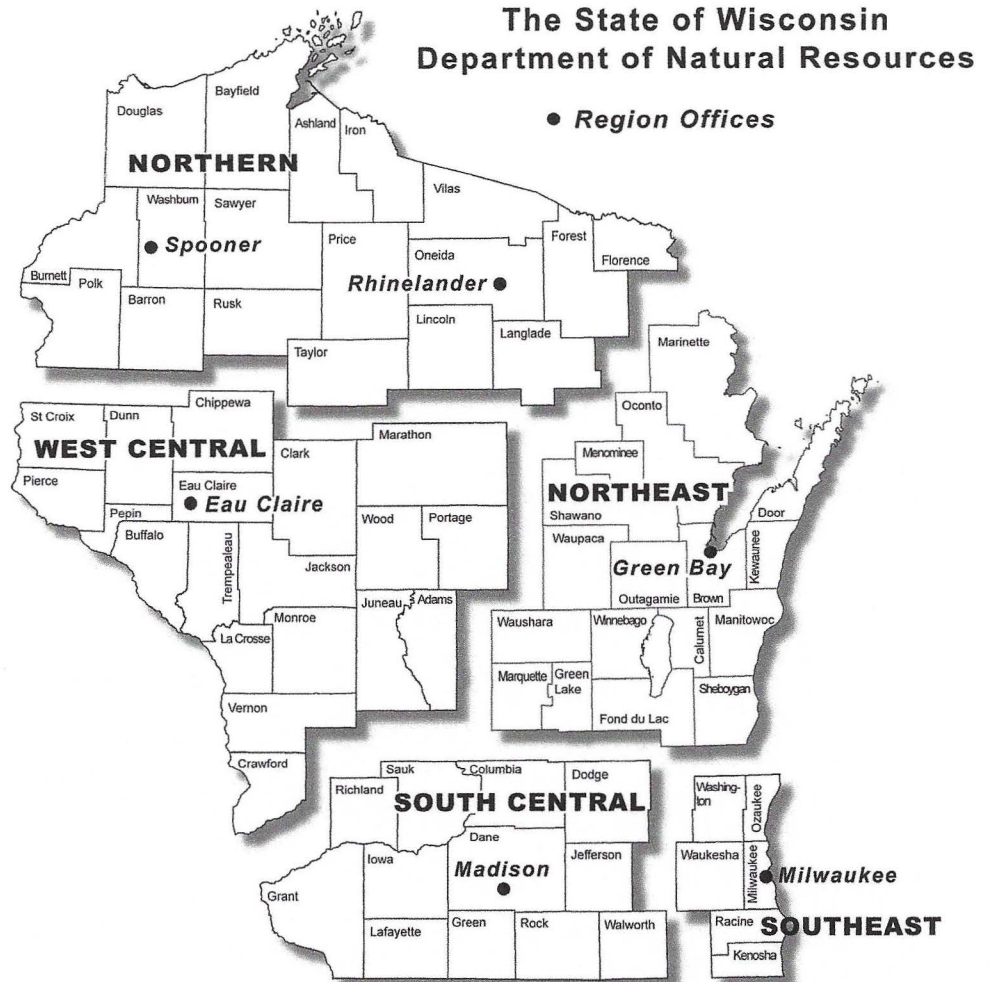
**DNR NORTHERN REGION**  
 Attn: RR Program Assistant  
 Department of Natural Resources  
 223 E Steinfest Rd Antigo, WI 54409

**DNR NORTHEAST REGION**  
 Attn: RR Program Assistant  
 Department of Natural Resources  
 2984 Shawano Avenue  
 Green Bay WI 54313

**DNR SOUTH CENTRAL REGION**  
 Attn: RR Program Assistant  
 Department of Natural Resources  
 3911 Fish Hatchery Road  
 Fitchburg WI 53711

**DNR SOUTHEAST REGION**  
 Attn: RR Program Assistant  
 Milwaukee DNR Office  
 1027 West St. Paul Ave  
 Milwaukee WI 53233

**DNR WEST CENTRAL REGION**  
 Attn: RR Program Assistant  
 Department of Natural Resources  
 1300 Clairemont Ave.  
 Eau Claire WI 54702



*Note: These are the Remediation and Redevelopment Program's designated regions. Other DNR program regional boundaries may be different.*

DNR Use Only			
Date Received	Date Assigned	BRRTS Activity Code	BRRTS No. (if used)
DNR Reviewer		Comments	
Fee Enclosed? <input type="radio"/> Yes <input type="radio"/> No	Fee Amount \$	Date Additional Information Requested	Date Requested for DNR Response Letter
Date Approved	Final Determination		



May 26, 2022

Tauren Beggs  
Wisconsin Department of Natural Resources  
2984 Shawano Ave  
Green Bay, WI 54313

**Re: Remediation Injection Request  
BRRTS# 02-36-555544**

Dear Mr. Beggs:

EnviroForensics is proposing subsurface injection of a solution containing products that produce and support chemical and biological reduction pathways as a method of remediating volatile organic compound contamination in groundwater at the Jagemann Plating facility in Manitowoc, Wisconsin (Site). Initially, a pilot study will be performed to evaluate the feasibility of subsurface injections and the potential effectiveness of the proposed treatment approach. Additional technical details are provided in the attached injection request. General site information is provided below.

Site Details: Jagemann Plating Co., Inc.  
1324 S 26th Street  
Manitowoc, WI 54220  
BRRTS# 02-36-555544

Responsible Party: Jagemann Plating Co., Inc.  
Mike Jagemann, Executive VP/GM  
1324 S 26th Street  
Manitowoc, WI 54220  
(920) 682-6883  
[mjagemann@jagemannplating.com](mailto:mjagemann@jagemannplating.com)

Consultant: EnviroForensics, LLC  
Rob Hoverman, Regional Director  
N16 W23390 Stone Ridge Drive, Suite G, Waukesha, WI 53188  
(414) 630-0060  
[rhoverman@enviroforensics.com](mailto:rhoverman@enviroforensics.com)

Document: 200032-0129



On behalf of the responsible party, we are requesting review and approval of the attached request. A Technical Assistance review fee of \$700 was sent to Denise Danelski with a copy of this cover letter.

Sincerely,  
**EnviroForensics, LLC**

A handwritten signature in blue ink, appearing to read "R Fedorchak".

Robert Fedorchak, PE  
*Senior Engineer*

A handwritten signature in blue ink, appearing to read "B J Kappen".

Brian Kappen, PG  
*Senior Geologist*

Copy: M. Andrew Skwierawski, Davis | Kuelthau, s.c.

enclosure

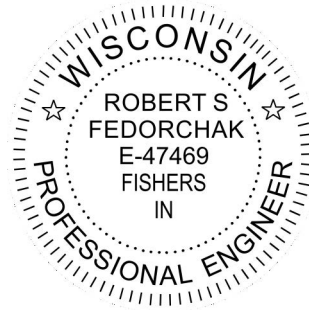
INJECTION REQUEST  
JAGEMANN PLATING CO., INC  
1324 S. 26<sup>th</sup> STREET, MANITOWOC, WI

**Certifications**

I, Robert Fedorchak, hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.



\_\_\_\_\_  
Signature, title and P.E. number



I, Brian Kappen, hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03 (1), Wis. Adm. Code, am registered in accordance with the requirements of ch. GHSS 2, Wis. Adm. Code, or licensed in accordance with the requirements of ch. GHSS 3, Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.



\_\_\_\_\_  
Signature and title

Senior Geologist

5/26/22  
Date



INJECTION REQUEST  
JAGEMANN PLATING CO., INC  
1324 S. 26<sup>th</sup> STREET, MANITOWOC, WI

EnviroForensics is requesting approval to perform a groundwater remediation pilot study at the Jagemann Plating facility in Manitowoc, Wisconsin (Site). The remedial technology selected for testing is a combination of in-situ chemical reduction (ISCR) and enhanced reductive dechlorination (ERD) implemented by injection. The objective of the pilot study is to determine whether groundwater remediation by injection can be a feasible and effective approach to reduce concentrations of chlorinated volatile organic compounds (CVOCs) in groundwater. The proposed remedial approach will also reduce the concentration of hexavalent chromium in groundwater, if present in the treatment zone. If the pilot study results are positive, a design for a full-scale ISCR/ERD application will be submitted.

Soil encountered during investigation activities consisted primarily of silty clay and silt. Native sediments in the area consist of glacial till of the Two Rivers Member of the Kewaunee Formation. The Two Rivers Member consists primarily of pebbly and cobbly, sandy silt. Bedrock in the vicinity of the Site consists of Silurian-aged dolomite. Bedrock was not encountered during the completion of the soil borings at the Site. Bedrock is anticipated to be more than 100 feet below ground.

The shallow water table is encountered at the Site within the native sediments at an average of 4.5 feet below ground surface (bgs). The groundwater flow direction as indicated by measurements in site monitoring wells is toward the northeast. The Manitowoc River at its closest point is approximately 1 mile to the northeast. Lake Michigan is approximately 1.37 miles east of the Site.

The target compounds for treatment are the CVOCs trichloroethene, dichloroethene, and vinyl chloride, identified in Site groundwater at concentrations up to 183 milligrams per liter (mg/L). The injection solution will be a combination of the following products, manufactured by Regenesis:

- 3-D Microemulsion (3DME<sup>®</sup>), an electron donor to promote ERD;
- Sulfidated Zero-Valent Iron (S-Micro ZVI), a colloidal ISCR reagent.

The Regenesis product brochures are attached. The products will be delivered directly to the site in drums or pails and stored inside the site building prior to use. These products are non-hazardous and safe to handle with level D personal protective equipment. Site data indicates that bacteria responsible for the biological breakdown of CVOCs are present; however, the population will be augmented by adding a specialized bacteria culture to the injection solution if a full-scale treatment is designed. It is not cost-effective or necessary to add the bacteria culture during the pilot study phase.



INJECTION REQUEST  
APPLETON WIRE (FORMER)  
908 N. LAWE STREET, APPLETON, WI

## Implementation Plan

For pilot study purposes, injections will occur in two areas near exterior monitoring wells MW-1 and MW-14 which are easily accessible and within the zone of contamination. The proposed pilot study layout is depicted on **Figure 1**. The target injection interval is 5 to 15 feet bgs.

Immediately prior to injections, groundwater samples will be collected from existing monitoring wells MW-1 and MW-14 and analyzed for VOCs by EPA Test Method 8260, hexavalent chromium by EPA Test Method 7196, and total chromium by EPA Test Method 6010 to establish baseline concentrations. These two (2) wells will also be used for performance monitoring purposes.

The proposed injection test layout is depicted on **Figure 1**; however, the final locations may be adjusted slightly to avoid subsurface utilities. A drilling contractor will advance five (5) direct-push injection points (IP-1 through IP-5) to facilitate the injection activities. The points will be positioned at incremental distances from the nearest monitoring well, (approximately 4, 7, and 10 feet), and injection will start at the furthest point. Specialized direct-push tooling will be advanced to a depth of 15 feet below ground surface (bgs) at each injection location, and a pump will be used to inject the remedial solution every foot up to 5 feet bgs as the tooling is retracted.

Mixing will be performed in tanks with continuous agitation to ensure a homogeneous solution. The target injection volume will be 135 gallons of solution at each point, consisting of:

- 2 gallons S-Micro ZVI
- 5 gallons 3DME
- 128 gallons potable water from municipality

Injection will occur in one point at a time during the pilot study. Flow rate and pressure will be measured continuously, and pressure will be limited to a maximum of 100 psi. Groundwater in the nearest monitoring well (i.e., either MW-1 or MW-14) will be inspected visually for color changes during injections, and a water quality meter will be used to frequently measure changes in oxidation-reduction potential (ORP). These data will indicate the radius of influence around the injection points.

The direct-push tooling will be removed from each location after the prescribed volume of solution is injected, and the boreholes will be abandoned in accordance with Chapter NR 141.25.



INJECTION REQUEST  
APPLETON WIRE (FORMER)  
908 N. LAWE STREET, APPLETON, WI

**Monitoring Plan**

Groundwater elevation measurements will be collected from Site monitoring wells before, during, and after injections to evaluate the temporary effect of injection on the potentiometric surface. The depth to water in each well will be measured to the nearest 0.01 foot using an electronic water level indicator.

Two (2) post-injection monitoring events will be conducted at one and three months after the pilot injections, respectively. Groundwater samples will be collected from MW-1 and MW-14 using disposable bailers and analyzed for VOCs. Water quality data including electrical conductivity, temperature, dissolved oxygen, total dissolved solids, pH and ORP will be measured in the field with a portable meter.

Although the risk of generating high concentrations of flammable gas is low considering the nature and distribution of contaminants at the site, methane and hydrogen sulfide can be produced via in-situ chemical reduction processes. The production of vapors at each injection area will be evaluated by collecting headspace field measurements at monitoring wellheads using a portable gas analyzer. Vapor screening measurements will be collected prior to injections and during the groundwater monitoring events. The wellheads will be fitted with expandable plugs with ports designed for vapor monitoring. If the vapor concentration exceeds 10% of the LEL (i.e., 0.5% by volume methane or 0.4% by volume hydrogen sulfide), vapors will be evacuated using appropriate, intrinsically-safe equipment. Additional mitigation methods will be evaluated if necessary.

Investigation-derived media (IDM), including purge water and decontamination fluids, will be containerized in 55-gallon drums. A licensed contractor will be retained to remove drums following the final monitoring event. The IDM will be managed under existing waste profiles.

**Timeframe**

The remedial injection pilot study is tentatively scheduled to begin in July 2022. EnviroForensics anticipates the injection activities can be completed in two (2) days. Two (2) post-injection monitoring will be performed at one and three months after injections, respectively. EnviroForensics is requesting injection approval through the end of 2024 to cover the timeframe anticipated for a potential full-scale ISCR/ERD injection program.



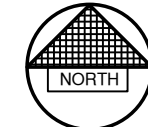
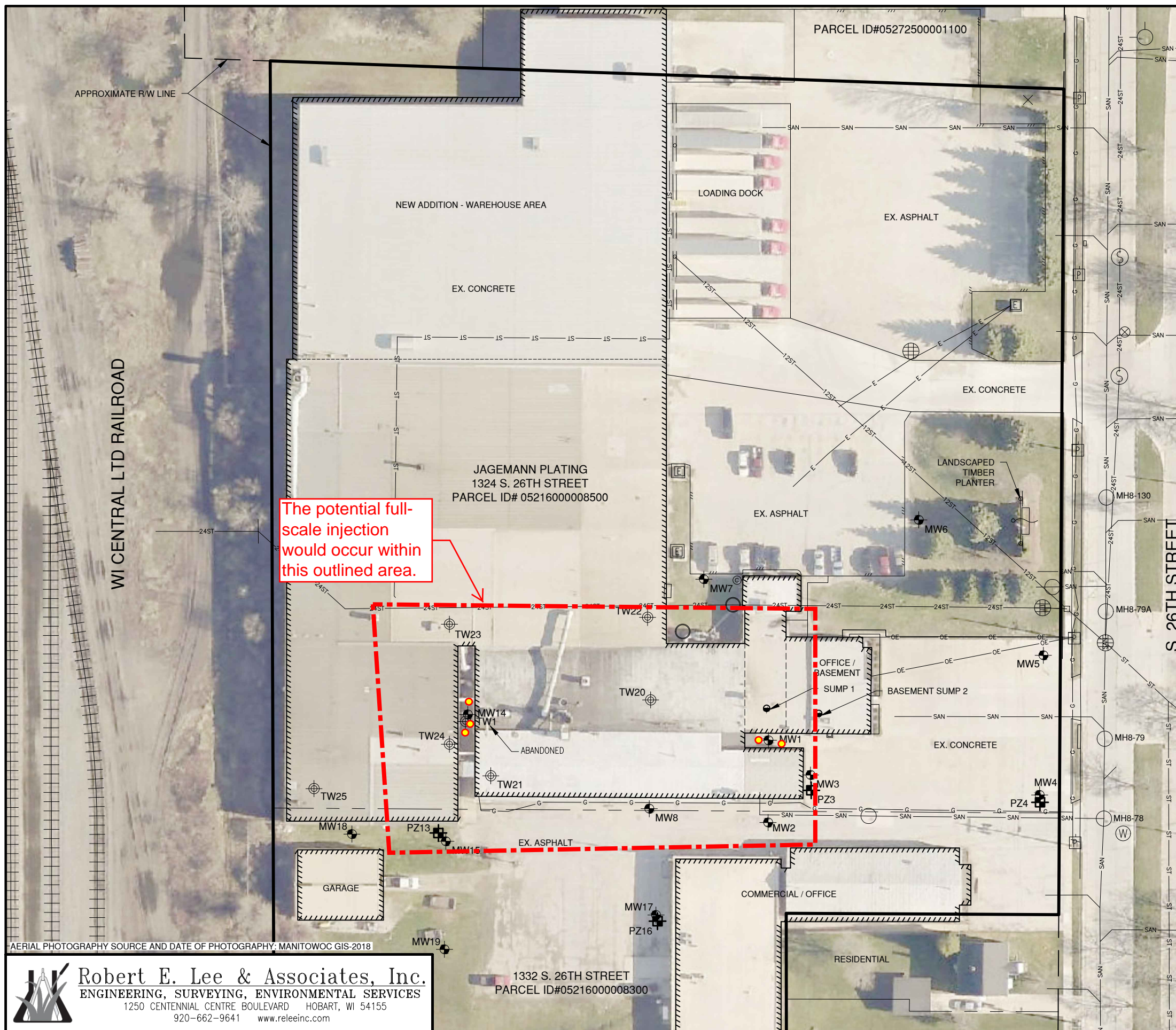
INJECTION REQUEST  
APPLETON WIRE (FORMER)  
908 N. LAWE STREET, APPLETON, WI

**Potential Full-Scale Application**

If the efficacy of the ISCR/ERD remedial approach is demonstrated by the pilot study results, a full-scale application will be designed and submitted in a Remedial Action Design Report. EnviroForensics anticipates injection would occur in accessible areas within the area outlined and labeled on **Figure 1**. In addition to the 3DME and S-microZVI products, the remedial solution would be augmented with Bio-Dechlor Inoculum (BDI), a microbial consortium containing species of Dehalococcoides, to accelerate the complete dechlorination of TCE. Preliminary dosing for the target treatment area would be:

- 6,000 pounds 3DME
- 4,500 pounds S-microZVI
- 18 liters BDI

This equates to approximately 18,300 gallons of solution, distributed into 135 injection points targeting the depth interval of 5-15 feet bgs.



0' 60' 120'



SCALE IN FEET

LEGEND

- MW1 MONITORING WELL LOCATION
- TW1 TEMPORARY WELL LOCATION
- PZ1 PIEZOMETER LOCATION
- SUMP
- EX. SANITARY MANHOLE
- EX. STORM SEWER MANHOLE
- EX. STORM SEWER CATCH BASIN
- EX. FIRE HYDRANT
- EX. WATER VALVE
- EX. WATER MANHOLE
- EX. ELECTRIC PEDESTAL
- EX. POWER POLE
- EX. STORM SEWER
- EX. SANITARY SEWER
- EX. WATERMAIN
- EX. GAS LINE
- EX. ELECTRIC LINE
- EX. TELEPHONE LINE
- EX. FIBER OPTICS LINE
- PROPERTY LINE
- RIGHT OF WAY LINE
- SITE BOUNDARY LINE
- Proposed Pilot Study Injection Point

JAGEMANN PLATING COMPANY  
 1324 S. 26TH STREET  
 MANITOWOC, WI

SITE LAYOUT AND PROPOSED PILOT  
 STUDY INJECTION POINT LOCATIONS

FIGURE 1

AERIAL PHOTOGRAPHY SOURCE AND DATE OF PHOTOGRAPHY: MANITOWOC GIS-2018

**Robert E. Lee & Associates, Inc.**  
 ENGINEERING, SURVEYING, ENVIRONMENTAL SERVICES  
 1250 CENTENNIAL CENTRE BOULEVARD HOBART, WI 54155  
 920-662-9641 www.releeinc.com

## 3-D Microemulsion<sup>®</sup> Factory Emulsified Technical Description

3-D Microemulsion (3DME<sup>®</sup>) is comprised of a patented molecular structure containing oleic acids (i.e., oil component) and lactates/poly lactates, which are molecularly bound to one another (figure 1). The 3DME molecule contains both a soluble (hydrophilic) and in-soluble (lipophilic) region. These two regions of the molecule are designed to be balanced in size and relative strength. The balanced hydrophilic/lipophilic regions of 3DME result in an electron donor with physical properties allowing it to initially adsorb to the aquifer material in the area of application, then slowly redistribute via very small 3DME “bundles” called micelles. These 3DME micelles spontaneously form within sections of the aquifer where concentrations of 3DME reach several hundred parts per million. The micelles’ small size and mobility allow it to move with groundwater flow through the aquifer matrix, passing easily through the pore throats in between soil grains resulting in the further redistribution of 3DME within the aquifer. This allows for advective distribution of the oleic acids which are otherwise insoluble and unable to distribute in this manner, allowing for increased persistence of the lactate/poly lactates component due to their initial attachment to the oleic acids.

Due to its patented molecular structure, 3DME offers far greater transport when compared to blended emulsified vegetable oil (EVO) products, which fail to distribute beyond the limits of pumping. 3DME also provides greater persistence when compared to soluble substrates such as lactates or simple sugars. The 3DME molecular structures capitalize on the best features of the two electron-donor types while at the same time, minimize their limitations. 3DME is delivered to the site as a ready-to-apply emulsion that is simply diluted with water to generate a large volume of a 3DME colloidal suspension.

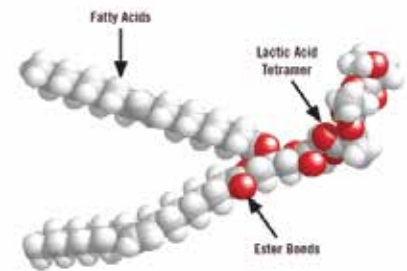
Suspension of 3DME generated by this mixing range from micelles on the order of .02 microns to .05 microns in diameter, to “swollen” micelles, (termed “microemulsions”) which are on the order of .05 to 5 microns in diameter. Once injected into the subsurface in high volumes, the colloidal suspension mixes and dilutes in existing pore waters. The micelles/microemulsions on the injection front will then begin to sorb onto the surfaces of soils as a result of zeta potential attraction and organic matter within the soils themselves. As the sorption continues, the 3DME will “coat” pore surfaces developing a layer of molecules and in some cases a bilayer. This sorption process continues as the micelles/microemulsion moves outward and disassociates into their hydrophilic/hydrophobic components. The specialized chemistry of 3DME results in a staged release of electron donors: free lactate (immediate); polylactate esters (mid-range) and free fatty acids & fatty acid esters (long-term). Material longevity of three years or greater has been seen at most sites as determined from biogeochemical analyses.

For a list of treatable contaminants with the use of 3DME, view the [Range of Treatable Contaminants Guide](#)



Example of 3-D Microemulsion

FIGURE 1: THE 3-D MICROEMULSION MOLECULAR STRUCTURE



### Chemical Composition

- Hydrogen Release Compound Partitioning Electron Donor – CAS #823190-10-9
- Sodium Lactate – CAS# 72-17-3
- Water – CAS# – 7732-18-5



# 3-D Microemulsion® Factory Emulsified Technical Description

## Properties

- Density – Approximately 1.0 grams per cubic centimeter (relative to water)
- pH – Neutral (approximately 6.5 to 7.5 standard units)
- Solubility – Soluble in Water
- Appearance – White emulsion
- Odor – Not detectable
- Vapor Pressure – None
- Non-hazardous

## Storage and Handling Guidelines

### Storage

Store in original tightly closed container

Store in a cool, dry, well-ventilated place

Store away from incompatible materials

Recommended storage containers: plastic lined steel, plastic, glass, aluminum, stainless steel, or reinforced fiberglass

### Handling

Avoid contact with eyes, skin, and clothing

Provide adequate ventilation

Wear appropriate personal protective equipment

Observe good industrial hygiene practices

## Applications

- 3DME is diluted with water prior to application. Resulting emulsion has viscosity similar to water.
- Easily injects into formation through direct push injection points, injection wells or other injection delivery systems.

Application instructions for this product are contained here [3DME FE Application Instructions](#).

## Health and Safety

Material is food grade and relatively safe to handle. We recommend avoiding contact with eyes and prolonged contact with skin. OSHA Level D personal protection equipment including vinyl or rubber gloves, and eye protection are recommended when handling this product. Please review the Material Safety Data Sheet for additional storage, usage, and handling requirements here: [SDS-3DME FE](#).



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# S-MicroZVI Specification Sheet

## S-MicroZVI Technical Description

S-MicroZVI™ is an *In Situ* Chemical Reduction (ISCR) reagent that promotes the destruction of many organic pollutants and is most commonly used with chlorinated hydrocarbons. It is engineered to provide an optimal source of micro-scale zero valent iron (ZVI) that is both easy to use and delivers enhanced reactivity with the target contaminants via multiple pathways. S-MicroZVI can destroy many chlorinated contaminants through a direct chemical reaction (see Figure 1). S-MicroZVI will also stimulate anaerobic biological degradation by rapidly creating a reducing environment that is favorable for reductive dechlorination.



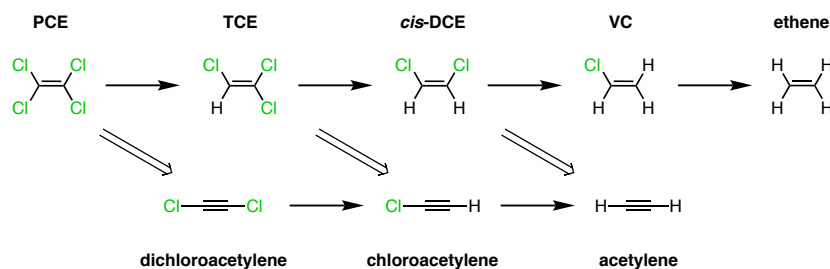
### Sulfidated ZVI

S-MicroZVI is composed of colloidal, sulfidated zero-valent iron particles suspended in glycerol using proprietary environmentally acceptable dispersants. The passivation technique of sulfidation, completed using proprietary processing methods, provides unparalleled reactivity with chlorinated hydrocarbons like PCE and TCE and increases its stability and longevity by minimizing undesirable side reactions.

**S-MicroZVI is Best in Class For**

- Longevity
- Reactivity
- Transport

In addition to superior reactivity, S-MicroZVI is designed for easy handling that is unmatched by any ZVI product on the market. Shipped as a liquid suspension, S-MicroZVI requires no powder feeders, no thickening with guar, and pneumatic or hydraulic fracturing is not mandatory. When diluted with water prior to application, the resulting suspension is easy to inject using either direct push or permanent injection wells.



**Figure 1:** Chlorinated ethene degradation pathways and products. The top pathway with single line arrows represent the reductive dechlorination (hydrogenolysis) pathway. The lower pathway with downward facing double line arrows represent the beta-elimination pathway.

To see a list of treatable contaminants, view the S-MicroZVI treatable contaminants guide.

# S-MicroZVI Specification Sheet

## Chemical Composition

Iron, powders CAS 7439-89-6  
Iron (II) sulfide CAS 1317-37-9  
Glycerol CAS 56-81-8

## Properties

**Physical State:** Liquid  
**Form:** Viscous metallic suspension  
**Color:** Dark gray  
**Odor:** Slight  
**pH:** Typically 7-9 as applied  
**Density:** 15 lb/gal

## Storage and Handling Guidelines

### Storage:

- Use within four weeks of delivery
- Store in original containers
- Store at temperatures below 95F°
- Store away from incompatible materials

### Handling:

- Never mix with oxidants or acids
- Wear appropriate personal protective equipment
- Do not taste or swallow
- Observe good industrial hygiene practices

## Applications

S-MicroZVI is diluted with water on site and easily applied into the subsurface through low-pressure injections. S-MicroZVI can also be mixed with products like 3-D Microemulsion<sup>®</sup> or PlumeStop<sup>®</sup> prior to injection.

## Health and Safety

The material is relatively safe to handle; however, avoid contact with eyes, skin and clothing. OSHA Level D personal protection equipment including: vinyl or rubber gloves and eye protection are recommended when handling this product. Please review the Safety Data Sheet for additional storage, and handling requirements here: S-MicroZVI SDS.



[www.regensis.com](http://www.regensis.com)

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