

Mr. Mike Schmoller
Hydrogeologist
Wisconsin Department of Natural Resources
South Central Region
3911 Fish Hatchery Rd
Fitchburg WI 53711

Subject:

Request for a Temporary Exemption for Injection of Remedial Materials for an In-Situ Chemical Oxidation Groundwater Treatment, Madison-Kipp Corporation (MKC) Site, 201 Waubesa Street, Madison, Wisconsin.

Dear Mr. Schmoller:

ARCADIS has been retained by MKC to conduct In-Situ Chemical Oxidation (ISCO) treatment to address a historic chlorinated solvent release at the facility located at 201 Waubesa Street in Madison, Wisconsin (Site) (Figure 1). The Wisconsin Department of Natural Resources (WDNR) approved the *Groundwater Remedial Strategy* for the Site in a letter dated October 15, 2013.

One of the components of the treatment will include chemical oxidation of tetrachloroethene (PCE) in the groundwater at the Site. A solution of water and sodium permanganate will be injected into the aquifer to destroy PCE and its various degradation products through chemical oxidation reactions. This process involves injecting remedial material into the waters of the state (i.e., groundwater); a current Wisconsin Pollutant Discharge Elimination System (WPDES) permit number WI-0046566-6 will be utilized in conjunction with this request for a temporary exemption, per Chapter NR 140.28(5) of the Wisconsin Administrative Code.

On behalf of MKC, ARCADIS has prepared this request for a temporary exemption. This letter includes a description of the groundwater remediation process and the information necessary to address the exemption prerequisites and criteria listed in Sections NR 140.28(5)(c) and (d).

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ENVIRONMENT

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February 21, 2014

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Our ref:
WI001368.0014

Imagine the result

Site Location and Background

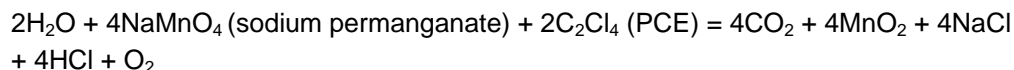
The Site is approximately 7.5 acres in size. A 130,000-square foot building occupies much of the Site, with asphalt parking lots located in the northeastern, southwestern and southeastern portions of the Site. The building has a 25,000-square foot second floor and a 25,000-square foot basement. The Site is currently used as a metals casting facility.

The Site is located in the eastern portion of Madison, in a mixed use area of commercial, industrial and residential land use. The Site is also located at the northeast end of the Madison isthmus, approximately 1,500 feet north of Lake Monona and approximately 6,800 feet east of Lake Mendota.

Environmental investigation and remediation activities have been ongoing at the Site since 1994. Historical chemical usage at the Site included PCE and oil potentially containing polychlorinated biphenyls (PCBs); and current chemical usage includes chlorine, hydraulic oils, caustic solutions and Stoddard solvent. Several phases of investigation have evaluated the presence and extent of chlorinated solvents, including PCE; petroleum hydrocarbons, hydraulic oil, and gasoline; polycyclic aromatic hydrocarbon and PCBs in soil, groundwater, and soil vapor/indoor air.

Description of Chemical Oxidation Treatment

An ISCO pilot test was conducted in December 2012 to gain information regarding aquifer characteristics such as fracture flow, aquifer hydraulics, bedrock storage capacity and aquifer contaminant mass delineation; and to further evaluate the effectiveness of ISCO as a potential interim and final groundwater remedy. ISCO is a method of in-situ remediation that adds a chemical oxidant to the subsurface to break the carbon bonds in volatile organic compounds (VOCs) and allow complete degradation of PCE and trichloroethylene to their non-toxic daughter products. The overall chemical reaction for the oxidation of PCE is as follows:



The intention of the treatment is to remove mass from the groundwater present within the unconsolidated formation.

The ISCO reagent (sodium permanganate) will be mixed on Site. Approximately 2,350 gallons of 5 percent sodium permanganate solution will be injected in the shallow interval via Injection Well IW-1.

Post-injection event performance monitoring will be conducted during the general Site groundwater monitoring for 2014. Water levels and groundwater samples from the Site wide wells will be collected for laboratory analysis using low-flow sampling techniques.

Groundwater samples will be submitted for laboratory analysis of VOCs and total and dissolved metals (arsenic, chromium, manganese and iron). These parameters will be sampled from Monitoring Well MW-3 and MW-18S.

Exemption Request

Chapter NR 140.28(5) identifies prerequisites and criteria for granting a temporary exemption where infiltration or injection is utilized for a remedial action. The following sections provide additional information as requested in Paragraphs NR140.28(5)(c) and (d).

NR140.28(5)(c) - Exemption Prerequisites

This section addresses the exemption prerequisites listed in Paragraphs 1 through 6 of NR140.28(5)(c):

1. Reasonable Period of Time: This prerequisite requires that the remedial action achieve the response objectives of NR140.24(2) (compliance with Preventive Action Limits) or NR140.26(2) (compliance with Enforcement Standards) within a reasonable period of time.

It is anticipated that groundwater treatment will achieve reduction in dissolved constituent concentrations in the unconsolidated formation shortly after injection. This injection event is a one-time injection, followed by routine groundwater monitoring.

2. Minimization of Injected Remedial Material: The results of the pilot test have been utilized to calculate the minimal injection volume needed for effective treatment during this event.
3. Impacts to Public Health or Welfare: The remedial material will be prepared from a clean water source and high-grade sodium permanganate purchased from a chemical supplier. Sodium permanganate was selected over potassium permanganate or Fenton's reagent as the oxidant of choice because it minimizes health and safety concerns to the public during transportation and to the facility and contractors during the injection process; while still achieving timely treatment and source reduction. Thus, the proposed process does not appear to present a threat to public health or welfare. A site health and safety plan has been prepared to address potential exposure during the implementation.
4. Injection into Areas of Floating Non-Aqueous Liquid: Light non-aqueous phase liquid was not observed during investigation of the injection area at the Site. Therefore, this prerequisite is not applicable to the Site.
5. Expansion of Groundwater Contamination: The injection process will target the area of impacted groundwater in the unconsolidated formation. Injection will only occur in the area of known or suspected groundwater contamination. The proposed injection methodology will introduce relatively small volumes of oxidant solution into the impacted area of the aquifer. During the treatment, a total of approximately 2,350 gallons of the oxidant solution will be injected.

Due to the low injection volumes relative to the volume of water being treated, it is not expected that the remedial treatment will create mounding of the groundwater table or otherwise have a significant effect on groundwater flow. Our experience with this technology is that significant mounding does not occur with gravity-fed injection of the solution.

6. Other Permits and Licenses: A general permit, WPDES Permit No. 0046566-06, is available for discharges associated with the remediation of contaminated groundwater from remedial action operations.

NR140.28(5)(d) - Remedial Action Design, Operation, and Monitoring Criteria

This section addresses the design, operation and monitoring criteria listed in paragraphs 1 through 5 of NR140.28(5)(d):

1. Procedures for Monitoring Compliance: Procedures will be established to evaluate compliance with this exemption. As indicated earlier, a groundwater monitoring program will be implemented to evaluate the progress of remediation and aquifer parameters. VOC results will provide an indication of the rate of PCE and daughter product destruction, contraction or expansion of the dissolved plume, constituent concentrations relative to Chapter NR 140 Enforcement Standards, and a determination of where the mass resides within the remedial area.

Reporting will be conducted in accordance with the WPDES General Permit.

2. Pre-Treatment of Contaminated Groundwater for Reinfiltration: The remedial system will utilize a solution of clean water and chemical-grade sodium permanganate. No pre-treatment would be required for this treatment method.
3. Remedial Material Proposed for Injection: A 5 percent solution of clean water and sodium permanganate will be used as the remedial material at the Site.
4. Volume and Rate of Injection: Initial estimates indicate a total of approximately 2,350 gallons of oxidant solution will be injected via gravity feed into the shallow interval in the unconsolidated formation.
5. Locations of Injection. Figure 2 illustrates the treatment area.

Closing

We appreciate your continued assistance with this project. The injection phase of the treatment is tentatively scheduled to begin on March 3, 2014. To maintain the project schedule, we look forward to your review and approval of this exemption request at your earliest convenience. We hope that this information meets your needs. Should you have any questions relating to the information presented herein, please feel free to call us at your convenience at 414.276.7742.

Sincerely,

ARCADIS U.S., Inc.

Rebecca A Robbennolt

Rebecca Robbennolt
Remediation Specialist

Jennine L. Trask

Jennine L. Trask, PE
Project Manager

Figures:

Figure 1 – Site Location Map

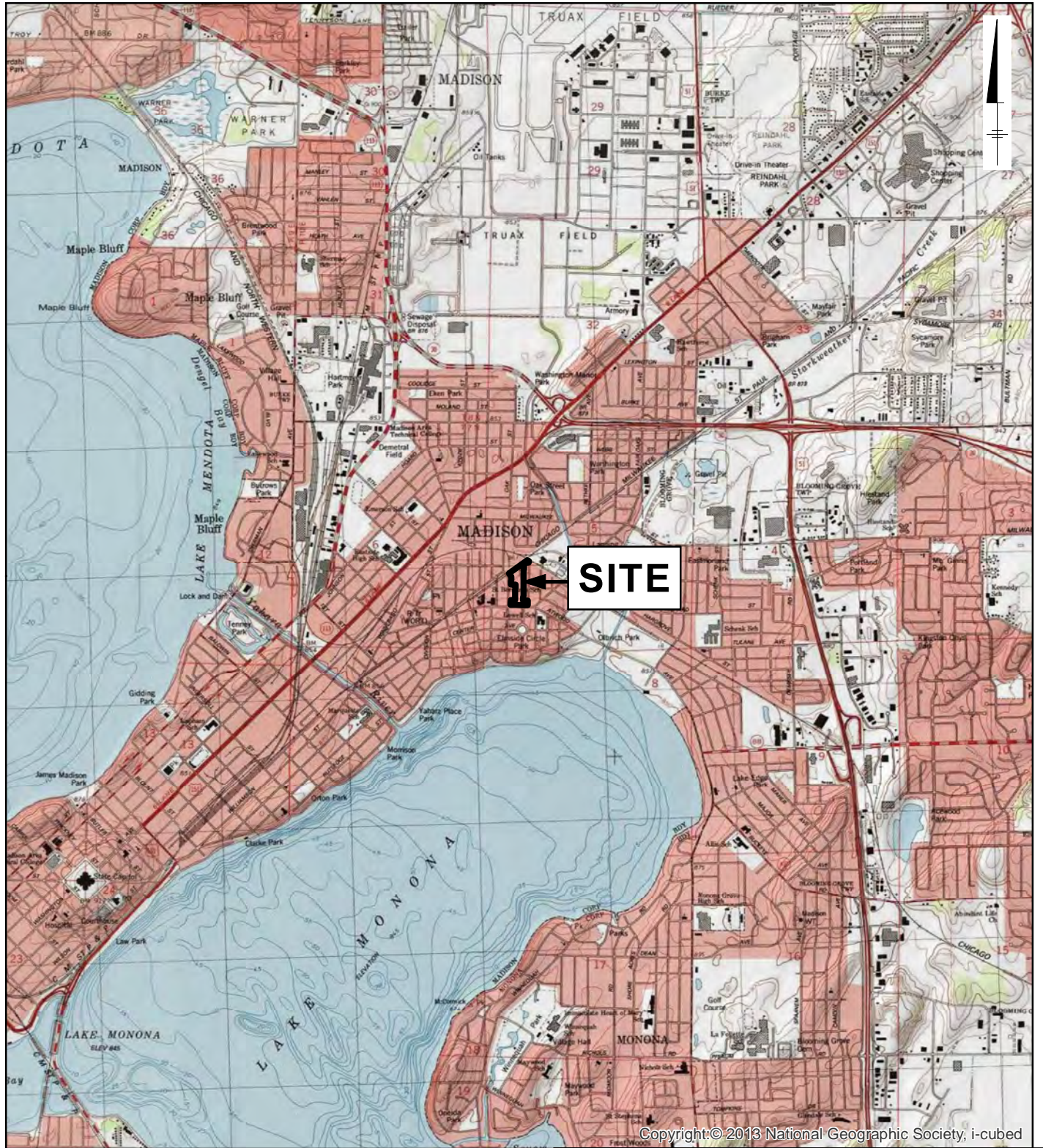
Figure 2 – Injection Well Locations

Copies:

David Crass – Michael Best

Linda Hanefeld – WDNR (electronic)

Mark Meunier – Madison Kipp



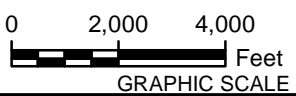
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WISCONSIN

SITE LOCATION



NOTE:
 TOPO BASE MAP OBTAINED FROM
 ESRI ONLINE MAPPING, USING
 ARCMAP 10 ACCESSED 10/4/2013

MADISON-KIPP CORPORATION
 201 WAUBESA STREET
 MADISON, WISCONSIN

SITE LOCATION MAP



FIGURE
 1

