K P R G

ENVIRONMENTAL CONSULTATION & REMEDIATION

KPRG and Associates, Inc.

REMEDIAL ACTION EXEMPTION REQUEST
MW-30 INJECTION

February 3, 2020

Mr. Binyoti Amungwafor
Wisconsin Department of Natural Resources
2300 N. Dr. Martin Luther King, Jr. Drive
Milwaukee, Wisconsin 53212

VIA FEDEX

KPRG Project No. 11717

Re: Former Navistar/RMG Foundry
1401 Perkins Ave., Waukesha, WI 53186
FID# 268005430, BRRTS# 02-68-098404

Dear Mr. Amungwafor:

On behalf of Navistar, Inc. (Navistar), KPRG and Associates, Inc. (KPRG) is submitting a NR 140.28(5) temporary exemption request for utilizing the injection of a chemical oxidant (sodium persulfate) for groundwater treatment within the bedrock. This is an interim remediation measure while working towards the development of a Remedial Action Plan (RAP). Pursuant to s. NR 140.28(5), a temporary exemption is required for the injection of a remedial material as part of a remedial action for groundwater. This letter is serving as our exemption request under NR 140.28(5) and addresses the requirements of NR 140.28(5)(b). This exemption request addresses the following NR140.28(5)(c) exemption prerequisites:

- The remedial action for restoring contaminated soil or groundwater, and any infiltrated or injected contaminated water and remedial material, shall achieve the applicable response objectives required by s. NR 140.24(2) or 140.26(2) within a reasonable period of time

- The type, concentration and volume of substances or remedial material to be infiltrated or injected shall be minimized to the extent that is necessary for restoration of the contaminated soil or groundwater and be approved by the department prior to use

- Any infiltration or injection of contaminated water or remedial material into soil or groundwater will not significantly increase the threat to public health or welfare
- No uncontaminated or contaminated water, substance or remedial material will be infiltrated or injected into an area where a floating non-aqueous phase liquid is present in the contaminated soil or groundwater

- There will be no expansion of soil or groundwater contamination, or migration of any infiltrated or injected contaminated water or remedial material, beyond the edges of previously contaminated areas, except that infiltration or injection into previously uncontaminated areas may be allowed if the department determines that expansion into adjacent, previously uncontaminated areas is necessary for the restoration of the contaminated soil or groundwater, and the requirements of subd. 1. will be met

- All necessary federal, state and local licenses, permits and other approvals are obtained and all applicable protection requirements will be complied with.

This exemption request also addresses the following requirements under NR 140(5)(d):

- The remedial action design, operation and soil and groundwater monitoring procedures to insure compliance with the requirements under par.(c) and applicable criteria under this paragraph

- The level of pre-treatment for contaminated groundwater prior to reinfiltration or reinjection

- The types and concentrations of substances or remedial material being proposed for infiltration or injection

- The volume and rate of infiltration or injection of contaminated groundwater or remedial material

- The location where the contaminated groundwater or remedial material will be infiltrated or injected.

In addition, a request for a WPDES general permit for groundwater remedial operation is being submitted as required since treatment material will be injected into impacted groundwater.

Site Investigation Summary

There have been several phases of site assessment and investigation work at this site starting in 1993 and with the most recent submittal, being a Revised Additional Site Investigation Work Plan dated May 3, 2019. The various phases of site investigation have identified the primary constituent of concern to be trichloroethene (TCE) and its breakdown products. The residual impacts are primarily within pockets of soil in the southwest parking lot, the parking lot south of the facility (between Raymond St. and The Strand), in and near the core room, and also within groundwater.

Geology
The geology beneath the site consists of up to approximately 13 feet of fill material underlain by unconsolidated glacial deposits. The fill materials are generally a mixture of sandy clay, sand and gravel, crushed limestone and some intermingled foundry sands. The underlying glacial deposits are primarily outwash sand and gravels with some intermixed silt and clay. The glacial deposits are underlain by Silurian bedrock and is encountered at depths of approximately 10 to 20 feet bgs at the site. The weathered surface of the dolomite can range up to several feet in thickness.

The underlying Silurian bedrock is part of the Niagara dolomite (Mudrey, et al, 1982). The Niagara dolomite is an aquifer, which is underlain by the Maquoketa Shale. The Maquoketa Shale is a regional confining layer, which is underlain by sandstone aquifers. In the vicinity of the proposed treatment areas (near the core room), bedrock is encountered at roughly 13 feet below ground surface (bgs).

Hydrogeology
The water table beneath the property varies, depending on location, from approximately 2 to 19 feet bgs. Within the area of the proposed remedial action, depth to groundwater is generally between 14 feet and 15 feet bgs. Groundwater flow is generally in a westerly direction with a hydraulic gradient of approximately 0.013 ft/ft.

Potential Receptors
There are no water supply wells located within the Silurian dolomite within 1,000 feet of the subject site and the injection locations. The former Navistar/RMG Foundry facility is serviced by City of Waukesha's water supply, storm sewer, and sanitary sewer. The injection will occur below the depths of all utilities.

Injection Proposal Specifications

Pilot Test
The pilot test will include the injection of an 18% sodium persulfate at one (1) injection point for a total of approximately 900 gallons of injectate. The injection point will be one drilled well (IW-1) with a screen from 20 to 60 feet bgs in the location shown on Figure 1 in Attachment 1. The injection well will be constructed by advancing a 10-inch borehole into competent bedrock. At this point, a permanent 6-inch steel casing will be set and grouted to seal off the unconsolidated overburden. The borehole will then be extended through this casing to a target depth of 60 feet. Pressure packer testing will then be performed at the 20-30', 30-40', 40-50' and 50-60' intervals. This will be completed by sealing off a specific test interval with pneumatic packers, pressurizing or depressurizing the interval and measuring pressure recovery over time. This testing will provide important information on how the dolomite formation may be accepting injectate at differing intervals within the vertical treatment zone. Once the testing is completed, the injection test well will remain an open borehole well for subsequent injection pilot-test work.

The vertical treatment zone will extend from roughly 60 feet bgs to 20 feet bgs, providing for treatment through the impacted saturated zone. The selected treatment chemistry will

be injected into the drilled well and then into the surrounding formation. The packer system will be raised through the vertical treatment zone in five-foot intervals while simultaneously injecting the treatment chemistry into the formation. The total volume, pressure and rate of treatment chemistry injection will be monitored and amended according to field conditions to maximize effectiveness. The anticipated operating pressure for the injection is 20-60 pounds per square inch (psi) and the maximum operating pressure is 100 psi, which should not create secondary permeability within the subsurface.

Water levels, pH and specific conductance, DO and ORP will be monitored during the injection and on a daily basis for one week after injection in monitoring wells MW-23, MW-23D, MW-24, and MW-24D. In addition, one day, one week, two weeks and four weeks after injection, groundwater samples will be collected for laboratory analysis of CVOCs, total/dissolved iron and sulfate to assist in evaluating the effectiveness of the injection. The resulting pilot test data will be used to adjust the proposed saturated zone injection, if necessary.

Saturated Zone

The proposed remedial action to be implemented as part of this request to achieve the applicable response objectives required by s. NR 140.26 is the in-situ injection of a chemical oxidant. The remediation will be accomplished using sodium persulfate. The above injectate material is identified as the preferred treatment chemistry for TCE and has been shown to successfully breakdown TCE and its associated breakdown products in saturated soils.

The remediation will be accomplished using sodium persulfate. Sodium persulfate is a stable, highly soluble material, which generates the sulfate radical when activated, which is a very strong oxidant that is capable of oxidizing volatile organic compounds. The proposed remediation product is Klozur® by PeroxyChem. Klozur® is a sodium persulfate product mixed with water, and is activated using ferrous iron, sodium hydroxide, lime or hydrogen peroxide. The byproduct of the persulfate reaction is sodium monosulfate that subsequently breaks down into sulfate ions, which is the end of the reaction.

The appropriate chemistry and associated dosing requirements are based upon the target remediation goal for groundwater that is set by the promulgated Enforcement Standards (ESs) for each specific compound. Based upon preliminary estimates, an average of up to 1,600 gallons of 18% catalyzed sodium persulfate will be injected into each injection location. The total volume of material to be injected is anticipated to be 48,000 gallons. The previously mentioned injection parameters may be altered based upon field conditions; however only the minimum amount of activated sodium persulfate will be used that is necessary to achieve the response objectives as required by s. NR 140.26(2) and subsequently s. NR 140.24(2).

Up to thirty (30) injection wells will be spaced based on the results of the pilot test and the post-pilot test groundwater monitoring as shown on Figure 2 in Attachment 1. This

area is where the predominant amount of TCE mass is located and focusing on this area will remove the greatest amount of TCE.

The full-scale injection wells will be constructed in a similar fashion to the pilot test injection well. The depth of each well will be further determined based on the results of the pilot test, but they may be extended up to 60 feet bgs. The vertical treatment zone will extend from 20 feet bgs to 60 feet bgs, providing for treatment through the residually impacted saturated zone. The selected treatment chemistry will be injected through the wells into the surrounding formation. The packer system will be raised through the vertical treatment zone in five-foot intervals while simultaneously injecting the treatment chemistry into the formation. The total volume, pressure and rate of treatment chemistry injection will be monitored and amended according to field conditions to maximize effectiveness. The anticipated operating pressure for the injection is 20-60 pounds per square inch (psi) and the maximum operating pressure is 100 psi, which should not create secondary permeability within the subsurface. The injection wells will remain in place in the event that a polishing injection is needed based on the results of the post-injection groundwater monitoring.

Remedial Action Monitoring

To monitor groundwater quality conditions after the proposed injections, quarterly groundwater monitoring will continue for the duration of the interim period preceding RAP approval, and in accordance with the approved RAP thereafter. The groundwater sampling will be performed on the existing monitoring well network, which consists of 46 monitoring wells. The samples will be sent to Pace Analytical for analysis under a completed chain-of-custody.

The injection for treatment of TCE is not expected to create a vapor concern since the injections will take place below surface areas capped by asphalt, where the asphalt acts as a vapor barrier.

Field activities will be logged and documented during the injections.

Inventory of Injection Wells

The Inventory of Injection Wells form, 3300-253, is enclosed in Attachment 2

Underground Injection Approval Checklist

The Underground Injection Approval Request Checklist Summary is in Attachment 3.

If you have any questions, please call us at 262-781-0475.

Sincerely,
KPRG and Associates, Inc.

Richard R. Gnat, P.G.
Principal

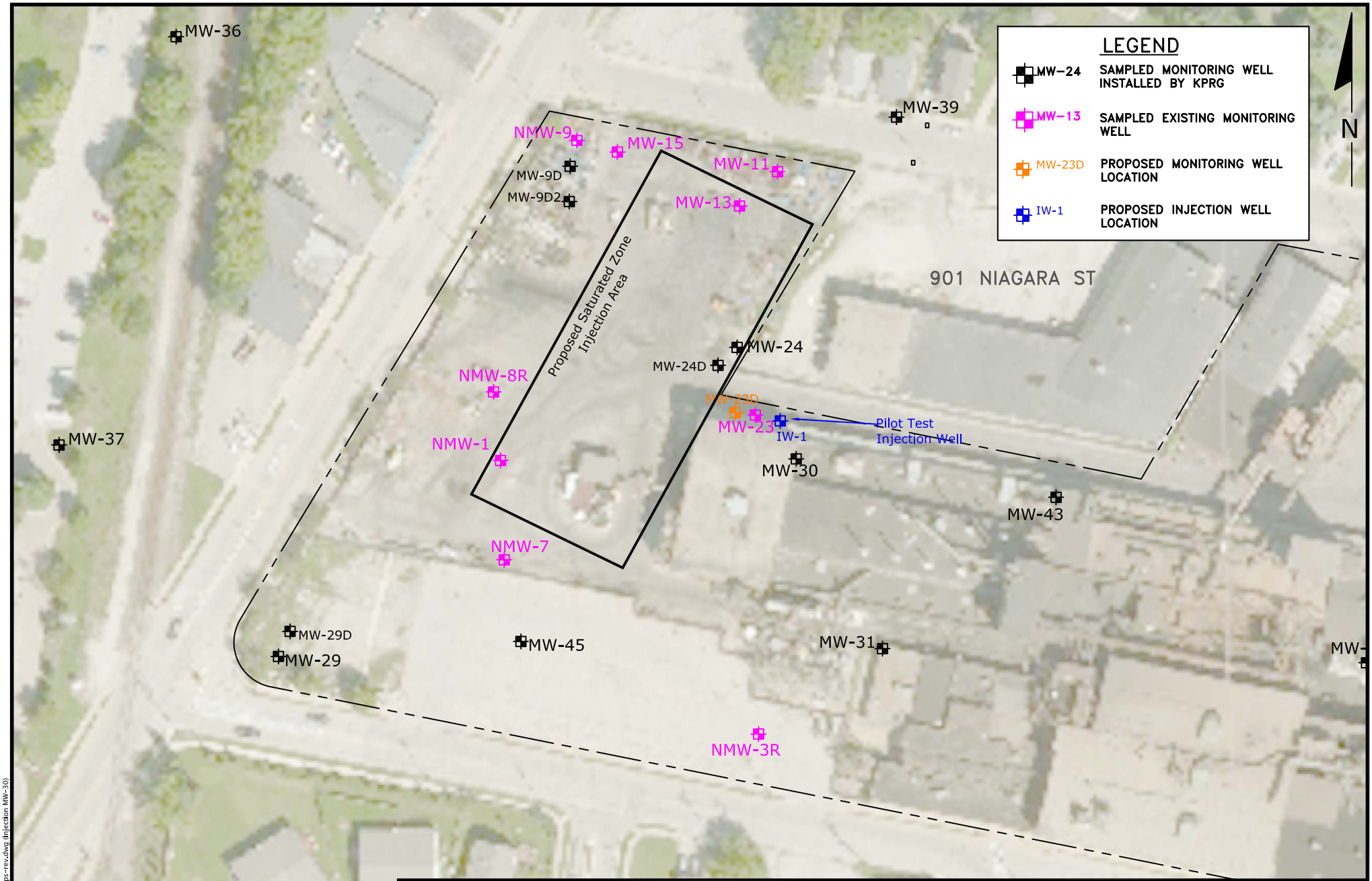
Joshua D. Davenport, P.E.
Project Engineer

cc: Mr. Mark Drews, WDNR
Mr. Ferdinand Alito, Navistar
Mr. Chris Perzan, Navistar

Attachments

ATTACHMENT 1

Figure



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KPRG and Associates, inc.

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414 Plaza Drive, Suite 106 Westmont, Illinois 60559 Telephone 630-325-1300 Facsimile 630-325-1593

GROUNDWATER INJECTION STUDY LOCATIONS

RMG WAUKESHA FOUNDRY
1401 PERKINS AVE, WAUKESHA, WI

Scale: 1" = 100' | Date: February 3, 2020

KPRG Project No. 11717 | FIGURE 1

W:\c\projects\Navistar Drawings\11717 SI Maps-rev.dwg (Injection MW-30)

ATTACHMENT 2

Inventory of Injection Wells

State of Wisconsin
Department of Natural Resources
PO Box 7921, Madison WI 53707-7921

Inventory of Injection Wells

Form 3300-253 (5/01)

This information is collected under the authority of the Safe Drinking Water Act.

Notice: Code of Federal Regulations (40 CFR 144.26 Inventory Requirements): owners or operators of all injection wells authorized by rule shall submit inventory information to an approved State Underground Injection Control Program. Personal information collected on this form will be used for inventory purposes. Information will be made accessible to requesters under Wisconsin's Open Records laws (s. 19.32 to 19.39, Wis. Stats.) and requirements.

Date Prepared (Year, Month, Day)	Facility ID Number	Transaction Type (Please check one of the following)
2019, September 4	268005430	☐ Deletion ☐ Entry Change ☒ First Time Entry ☐ Replacement

Facility Name and Location

Last Name	First	MI	Latitude: DEG	MIN	SEC	Longitude: DEG	MIN	SEC
RMG Foundry					N			W

Street Address / Route Number	Township	Range	Section	¼ Section
1401 Perkins Ave.	7 N	19 E	35	SW

City / Town	State	ZIP Code	County	Tribal Land
Waukesha	WI	53186	Waukesha	☐ Yes ☒ No

Legal Contact

Type	Last Name	First	MI	Telephone Number (incl. area code)
☒ Owner ☐ Operator	Alido	Ferdinand		(331) 332-6364

Organization: Navistar, Inc.

Street / P.O. Box: 2701 Navistar Dr.

City / Town	State	ZIP Code
Lisle	IL	60532

Ownership

☒ Private ☐ County / Local Government
☐ State ☐ Federal
☐ Specify Other _____

Well Information

WELL CLASS	WELL TYPE	TOTAL NUMBER OF WELLS	WELL OPERATION STATUS				
			UC	AC	TA	PA	AN
	Pilot Test Injection Well	1	X				
	Injection Well	30	X				

KEY:

DEG = Degree
MIN = Minute
SEC = Seconds
SECT = Section
¼ SECT = Quarter Section
AC = Active
UC = Under Construction
PA = Permanently Abandoned and Aproved by State
AN = Permanently Abandoned and Not Approved by State
TA = Temporarily Abandoned and Not Approved by State

Comments *(Optional)*:

ATTACHMENT 3

Underground Injection Approval Request Checklist Summary

UNDERGROUND INJECTION APPROVAL REQUEST CHECKLIST SUMMARY

1) Have required fees been paid? *YES.*

2) Has Water Program been notified regarding project? *YES.*

3) Site Investigation Report complete and accurate? *The site investigation is ongoing and continues to be reviewed by the WDNR.*

a) List contaminants present at the site. *Based on the site investigation work, the primary contaminants are trichloroethene (TCE) and its related breakdown products.*
b) Is measurable free product present? *No.*
c) Soil types? Silt/silty sand. *Please see attached Remedial Action Exemption Request dated September 9, 2019, Page 1, Geology.*
d) Depth to groundwater? *Please see attached Remedial Action Exemption Request dated September 9, 2019, Page 2, Hydrogeology.*
e) Depth to bedrock? *Please see attached Remedial Action Exemption Request dated September 9, 2019, Page 1, Geology. Depth to bedrock ranges from roughly 10 to 20 feet bgs on site. In the vicinity of the proposed injections, depth to bedrock is approximately 13 feet at MPW-23.*

f) Potential receptors:
   a. Supply wells within 100 feet? *No*
   b. Supply wells within 1,000 feet? *No*
   c. Other receptors? *No*

   Please see attached Remedial Action Exemption Request dated September 9, 2019, Page 2, Potential Receptors.

4) Injection proposal specifications

   Please refer to the Remedial Action Exemption Request dated September 9, 2019.

a) Depth of injectors? *20 to 60 feet below ground surface (bgs).*

b) Injection array? *Please see Figure 1 provided as Attachment 1 to the Remedial Action Exemption Request dated September 9, 2019.* Construction materials? *The injections will be done via drilled injection wells.*

c) Rate of injection? *This will depend on how the formation will take the injection. Based on work at other sites, a rate of injection between 1 and 3 gallons per minute is anticipated.*

d) Operating pressure? *This is also formation specific. Based on work at other sites injection pressures are expected to range from 20 to 60 pounds per square inch (psi).*

e) Calculation of maximum injection pressure possible without creating secondary permeability. *The maximum operating pressure for injection based on the contractor equipment is 100 psi, which should not result in potential secondary permeability issues.*

f) List and concentration of injected materials. *18% sodium persulfate.*

g) Source of make-up water. *City of Waukesha.*

h) Total volume to be injected.
An estimated average of 800-1600 gallons of 18% catalyzed sodium persulfate will be injected into each of the two injection wells.

5) Monitoring proposal specifications

a) Adequate vapor and groundwater monitoring well network?
Yes, groundwater monitoring will be performed using the existing well network as outlined in the Remedial Action Exemption Request dated September 9, 2019, Page 4, Remedial Action Monitoring.

b) Adequate vapor monitoring plan?
This is not applicable because the impacts are capped by an asphalt parking lot. Please see the Remedial Action Exemption Request dated September 9, 2019, Page 4, Remedial Action Monitoring.

c) Adequate groundwater monitoring plan?
Yes, an adequate groundwater monitoring plan is part of the WDNR approved Site Investigation Plan in development of a Remedial Action Plan. Please see the Remedial Action Exemption Request dated September 9, 2019, Page 4, Remedial Action Monitoring.

6) Inventory of Injection Well form submitted? *Yes, please see Attachment 2 of the Remedial Action Exemption Request dated September 9, 2019.*