MINNESOTA POLLUTION CONTROL AGENCY
520 Lafayette Road North
St. Paul, MN 55155-4194

RI Work Plan

Project Title: **Remediation Master Contract – Category A Scenario A**

1. Project Summary

The site consists of a former ag chemical plant that operated from 1960 to 1991. Through review of available documentation, several high risk areas of contamination were identified at the site. These areas were summarized in Section 5.1 of this proposal and are listed in the Proposed Sampling Strategy provided later in this Work Plan. Previous investigations conducted at the site identified the presence of chlorinated ethenes (most notably TCE) and several ag chemicals in soil and GW above applicable Minnesota agency criteria. Additionally, VI sampling (subslab and passive vapor) indicated concentrations of vapors that may pose an unacceptable risk. We have also identified several other potential COCs, including PFAS, dioxins, furans, and petroleum constituents based on operations at the site. Based on the results of the previous investigations and data gaps identified at the site, additional investigation is warranted.

2. Statement of Problems, Opportunities, and Existing Conditions

Existing data from the site indicate that unacceptable risk may be present at the site and nearby properties due to exposure to contaminated soil, GW, and indoor air (from VI). Through review of available information, data gaps were identified that warrant additional investigation. A summary of the site status and identified data gaps is provided in EA's Understanding of the Project (Section 5.1) attached to this Work Plan. In general, the data gaps associated with the former ag building, garage area, SW and sediment, GW, and the private residences were identified based on the use of the property and existing data. To address these data gaps, an RI is proposed at the site. The overall approach for the RI and future action is provided in EA's Approach (Section 5.2) attached to this Work Plan. Specific details as to the methodology of the RI are included in this Work Plan. The RI will be performed in accordance with MPCA and MDA guidance, including, but not limited to:

- MPCA Risk-Based Site Evaluation Manual and associated guidance (Risk-Based Site Characterization and Sampling Guidance, etc.)
- MPCA Soil and GW Assessments Performed during Site Investigations (prp4-01)
- MPCA VI Assessments Performed during Site Investigations (prp4-01a)
- MPCA Soil Sample Collection and Analysis Procedures (prp4-04)
- MPCA GW Sample Collection and Analysis Procedures (prp-05)
- MDA RI and Work Plan (GD9)
- MDA Soil Sampling Guidance (GD11)
- MDA GW Sampling Guidance (GD12).

3. Goals, Objectives, Tasks, and Subtasks

The goal of the project is to address any site contamination that results in unacceptable risk to onsite and offsite receptors. To accomplish this goal, the first objective is to complete an investigation at the site to adequately characterize sources of unacceptable risk at the site. This objective will be accomplished through performance of the following Tasks:

Task A: RI Work Plan

Prior to initiation of fieldwork, a site visit will be held to observe the site conditions and an RI Work Plan will be developed. The Work Plan will include a summary of the work conducted to date, identification of the data gaps and the need for further investigation, and the methodology for completion of the investigation. Included in the Work Plan will be a list of soil borings, monitoring wells, and sample locations that will be part of the field effort. Figures showing the proposed locations will be prepared. The Work Plan will be developed based on a review of existing guidance documents associated with all of the relevant MPCA/MDA programs (discussed above and summarized in Section 2.6 of this proposal) and through collaborative discussion with representatives of these programs during project planning. The investigative plan will be developed to satisfy all the program requirements, while identifying opportunities to combine sampling efforts to perform the investigation in the most efficient manner possible. Additionally, where possible, the plan will incorporate green and sustainable practices, such as the use of field instrumentation and phased investigation to minimize the number of samples required. The Work Plan will be submitted to MPCA/MDA for review.

Following review, EA is prepared to address any comments received and prepare a revised Work Plan for approval.

Task B: Field Investigation

Following approval of the Work Plan, the field investigation will be initiated. The investigation will consist of the subtasks summarized below.

Subtask 1: Pre-Mobilization Preparation
Prior to mobilization, EA will perform the following tasks:

- Obtain permission to access the site and identify any existing onsite limitations that warrant adjustment to proposed sample locations
- Obtain necessary permits (well permits, etc.)
- Perform a utility location/clearance.

Subtask 2: Soil Borings and Sample Collection – Initial Phase
Following completion of the pre-mobilization preparation, the field team will mobilize to the site to perform the investigation activities. EA is proposing completion of the RI in a phased-approach, including an initial phase and a follow-up phase. The initial phase will include collection of samples from all media in all the high risk areas with GW samples being collected from existing wells (monitoring, potable, and onsite supply) and temporary monitoring wells. The follow-up phase will consist of addressing any remaining data gaps and include installation and sampling of permanent monitoring wells, as warranted. By conducting the investigation in a phased approach, initial data collected will be used to focus in on areas of concern during the follow-up phase, resulting in the collection of a higher quality data set and reduction of costs associated with the investigation. The initial phase will consist of the following:

- Collection of surface soil samples for analysis
- Advancement of soil borings to collect subsurface soil for analysis
- Completion of selected soil borings as temporary monitoring wells for GW sample collection
- Collection of GW samples from the onsite supply well and offsite residential potable wells
- Collection of sediment samples from the adjacent river
- Collection of SW samples from the adjacent river
- Collection of soil gas/subslab samples from the onsite garage and offsite residences
- Performance of a geophysical survey to identify the location of the UST and any underground utilities that may act as subsurface conduits for contaminant migration in areas of identified soil contamination.

Soil collected from the site will be field screened utilizing a photoionization detector. In addition, soil from areas of petroleum impact will be evaluated via a petroleum-saturated soil screening test for the presence of free-phase petroleum. The samples will be collected following MPCA/MDA protocols and submitted for laboratory analysis of various constituents, including VOCs, DROs, GROs, PFAS, metals, dioxins/furans, MDA pesticides (List 1 and 2), TKN, and nitrate. The COCs, proposed number of soil borings/samples, sample intervals, and analyses for the high risk areas are summarized in the table below. Additionally, the target areas of the investigation are discussed in the Section 5.1 attached to this Work Plan. The proposed locations, number of borings, and analyses may be adjusted based on what is observed in the field. Additional analyses may be added to samples based on the observations at other locations. Selected soil borings will be completed as temporary monitoring wells based on site observations and field screening. The temporary monitoring wells will be sampled for the same parameters as the soil within those borings following MPCA/MDA protocols. In addition to the parent samples, appropriate quality control/quality assurance samples will be collected, including field blanks, trip blanks, blind duplicates, matrix spike/matrix spike duplicates, and rinsate blanks. Additionally, data will be submitted for data validation.

Proposed Sampling Strategy

High Risk Area	COCs	Proposed Number of Borings/Samples	Sampling Intervals**	Laboratory Analysis
Former Dry Fertilizer Building	Ag Chemicals, PFAS, VOCs, dioxins/furans	9 borings	**Non-Petroleum** 0-4 feet bgs (2-6 inches for surface) and 4-12 feet bgs, deeper as needed to evaluate soil impacts to GW **Ag Chemical** Composite surface (0-6 inches bgs), composite subsurface (2-2.5 ft bgs), discrete subsurface (4.5-5 ft)	VOCs by EPA Method 8260, PFAS by EPA Method 537, dioxins/furans by EPA Method 8290A Ag Chemicals by EPA Method 8270D_AgChem (List 1), EPA Method 8151A/B (List 2), nitrate by EPA Method 353.2, and TKN by EPA Method 351.2
Service Garage	VOCs, SVOCs (PAHs), GROs, DROs, Ag Chemicals, metals, PCBs	3 borings	**Non-Petroleum** 0-4 feet bgs (2-6 inches for surface) and 4-12 feet bgs, deeper as needed to evaluate soil impacts to GW **Ag Chemical** Composite surface (0-6 inches bgs), composite subsurface (2-2.5 ft bgs), discrete subsurface (4.5-5 ft) **Petroleum** 2 samples per boring depending on observations (borings to 5 feet into GW or 10 ft below contamination	VOCs by EPA Method 8260, SVOCs by EPA Method 8270, DROs/GROs by WI DNR Methods, RCRA metals by EPA Method 6010, PCBs by EPA Method 8082, grain size Ag Chemicals by EPA Method 8270D_AgChem (List 1), EPA Method 8151A/B (List 2), nitrate by EPA Method 353.2, and TKN by EPA Method 351.2
Parking Areas	Ag Chemicals	6 borings (3 on north and 3 on south)	**Ag Chemical** Composite surface (0-6 inches bgs), composite subsurface (2-2.5 ft bgs), discrete subsurface (4.5-5 ft)	Ag Chemicals by EPA Method 8270D_AgChem (List 1), EPA Method 8151A/B (List 2), nitrate by EPA Method 353.2, and TKN by EPA Method 351.2
Trench Drain/500-Gallon UST	VOCs, SVOCs (PAHs), GROs, DROs, Ag Chemicals, metals	7 borings (4 around tank, 3 along drain line)	**Non-Petroleum** 0-4 feet bgs (2-6 inches for surface) and 4-12 feet bgs, deeper as needed to evaluate soil impacts to GW **Ag Chemical** Composite surface (0-6 inches bgs), composite subsurface (2-2.5 ft bgs), discrete subsurface (4.5-5 ft) **Petroleum** 2 samples per boring depending on observations (borings to 5 feet into GW or 10 ft below contamination	VOCs by EPA Method 8260, SVOCs by EPA Method 8270, DROs/GROs by WI DNR Methods, RCRA metals by EPA Method 6010, PCBs by EPA Method 8082, grain size Ag Chemicals by EPA Method 8270D_AgChem (List 1), EPA Method 8151A/B (List 2), nitrate by EPA Method 353.2, and TKN by EPA Method 351.2

High Risk Area	COCs	Proposed Number of Borings/Samples	Sampling Intervals**	Laboratory Analysis
North of Service Garage	VOCs, GROs, DROs, Ag Chemicals, metals, SVOCs (PAHs), PCBs	4 borings along stream	**Non-Petroleum** 0-4 feet bgs (2-6 inches for surface) and 4-12 feet bgs, deeper as needed to evaluate soil impacts to GW **Ag Chemical** Composite surface (0-6 inches bgs), composite subsurface (2-2.5 ft bgs), discrete subsurface (4.5-5 ft) **Petroleum** 2 samples per boring depending on observations (borings to 5 feet into GW or 10 ft below contamination	VOCs by EPA Method 8260, SVOCs by EPA Method 8270, DROs/GROs by WI DNR Methods, RCRA metals by EPA Method 6010, PCBs by EPA Method 8082, grain size Ag Chemicals by EPA Method 8270D_AgChem (List 1), EPA Method 8151A/B (List 2), nitrate by EPA Method 353.2, and TKN by EPA Method 351.2
500-Gallon Fuel Oil AST	DROs, SVOCs (PAHs), VOCs	3 borings around tank	**Petroleum** 2 samples per boring depending on observations (borings to 5 feet into GW or 10 ft below contamination	VOCs by EPA Method 8260, SVOCs by EPA Method 8270, DROs by WI DNR Method, grain size
1,000-Gallon Gasoline UST	GROs, VOCs	4 borings around tank	**Petroleum** 2 samples per boring depending on observations (borings to 5 feet into GW or 10 ft below contamination	VOCs by EPA Method 8260, GROs by WI DNR Method, grain size
Discolored Soil North of Fertilizer Building	Ag Chemicals, VOCs	3 borings	**Non-Petroleum** 0-4 feet bgs (2-6 inches for surface) and 4-12 feet bgs, deeper as needed to evaluate soil impacts to GW **Ag Chemical** Composite surface (0-6 inches bgs), composite subsurface (2-2.5 ft bgs), discrete subsurface (4.5-5 ft) *Possible petroleum sampling based on field observations/screening*	VOCs by EPA Method 8260 Ag Chemicals by EPA Method 8270D_AgChem (List 1), EPA Method 8151A/B (List 2), nitrate by EPA Method 353.2, and TKN by EPA Method 351.2
Stream	VOCs, SVOCs, DROs, GROs, Ag Chemicals	6 SW/sediment samples	Sampling spaced along stream	VOCs by EPA Method 8260, SVOCs by EPA Method 8270, DROs/GROs by WI DNR Methods Ag Chemicals by EPA Method 8270D_AgChem (List 1), EPA Method 8151A/B (List 2), nitrate by EPA Method 353.2, and TKN by EPA Method 351.2
Site-Wide TCE Data Gaps	VOCs	6 borings as temporary monitoring wells*	6 GW samples	VOCs by EPA Method 8260

High Risk Area	COCs	Proposed Number of Borings/Samples	Sampling Intervals**	Laboratory Analysis
Waterfill Supply Well Area	VOCs, Ag Chemicals	3 borings	**Non-Petroleum** 0-4 feet bgs (2-6 inches for surface) and 4-12 feet bgs, deeper as needed to evaluate soil impacts to GW **Ag Chemical** Composite surface (0-6 inches bgs), composite subsurface (2-2.5 ft bgs), discrete subsurface (4.5-5 ft), deep subsurface (25 ft or at GW table)	VOCs by EPA Method 8260 Ag Chemicals by EPA Method 8270D_AgChem (List 1), EPA Method 8151A/B (List 2), nitrate by EPA Method 353.2, and TKN by EPA Method 351.2
Scale Area	Ag Chemicals	3 borings	**Ag Chemical** Composite surface (0-6 inches bgs), composite subsurface (2-2.5 ft bgs), discrete subsurface (4.5-5 ft), deep subsurface (25 ft or at GW table)	Ag Chemicals by EPA Method 8270D_AgChem (List 1), EPA Method 8151A/B (List 2), nitrate by EPA Method 353.2, and TKN by EPA Method 351.2
Residential Area – GW	VOCs (possibly Ag Chemicals)	Sample 5 potable wells	5 GW samples	VOCs by EPA Method 8260 Ag Chemicals by EPA Method 8270D_AgChem (List 1), EPA Method 8151A/B (List 2), nitrate by EPA Method 353.2, and TKN by EPA Method 351.2
Residential Area – VI	VOCs	2 subslab samples at each of 9 houses (2 events) 20 subslab samples at garage (1 event opposite season of previous event) = total of 56 samples	Subslab/soil gas (depending on building construction)	VOCs via EPA Method TO-15

* These locations are in addition to other proposed boring locations that will also be sampled for VOCs to evaluate site-wide TCE concentrations. EA is proposing to analyze all GW samples collected for VOCs.

** In addition to intervals prescribed by MPCA/MDH guidance, field observations and soil screening will also be utilized to determine depths from which samples are collected.

NOTES: bgs = Below ground surface.
PAH = Polycyclic aromatic hydrocarbons.
PCB = Polychlorinated biphenyls.
RCRA = Resource Conservation and Recovery Act.
SVOC = Semivolatile organic compound.
WI DNR = Wisconsin Department of Natural Resources.

Subtask 3: Additional Sample Collection and Monitoring Well Installation and Sampling

Following receipt and evaluation of data collected from the initial phase, a follow-up phase will be conducted at the site. The sample locations, number of samples, and analytical methodologies will be based on the findings of the initial phase. The goal will be to further refine the extent of contamination and address any remaining data gaps. As part of this follow-up phase and based on the results on temporary monitoring well/supply well/potable well sampling, permanent monitoring wells will be installed at the site and sampled. The wells will be installed in accordance with MDH regulations and will be properly developed. GW flow will be determined/verified and hydraulic properties will be evaluated (i.e., slug tests, etc.), as appropriate. The monitoring wells will be sampled utilizing low-flow methodology in

accordance with MPCA and MDA guidance. Field water quality parameters will also be collected as part of determining stabilization prior to sampling. Applicable QC/QA samples will also be collected as noted in Subtask 2 and data will be validated. As part of this second phase, the second round of VI sampling will be conducted. Unless the initial round of sampling indicates an exceedance of the 33X ISV values, samples will be collected from the same locations. If the 33X ISV value is exceeded in the initial round, additional samples are not warranted at that location, as mitigation is required. The samples collected from the site during the follow-up round will be analyzed via the same methodologies listed above, as appropriate.

Task C: Risk Evaluations

Following completion of the field investigation and receipt of the analytical data, human health and ecological risk evaluations will be performed. The risk evaluations will be conducted in accordance with the MPCA risk-based guidance (human health) and MPCA/EPA guidance (ecological) and include a tiered approach in order to identify the potential risk and the COCs that drive that risk. Appropriate up-to-date MPCA/MDH/EPA media-specific criteria will be utilized in the risk evaluations. The risk evaluations will evaluate the exposure mechanisms, pathways, and receptors (receptor survey) and the site CSM will be updated based on the findings of the risk evaluation. The conclusions of the risk evaluations will be utilized to determine a path forward with respect to the need for RA, and identification of what areas/media/COCs warrant further action.

Task D: Report

The results of the investigation and risk evaluations will be summarized in an RI Report. The report will include a discussion of the field effort, data collected, results of the sample analysis, methodology and results of the risk evaluations, and conclusions and recommendations with respect to further action, as warranted. The RI Report will be prepared in accordance with the MPCA Risk-Based Site Evaluation Manual guidance, MPCA Petroleum Remediation Program Guidance (Investigation Report, prp4-06), and MDA Guidance (Ag Chemical Incident RI Report and Corrective Action Plan, GD10). The RI Report will be submitted to MPCA/MDA for review. Following review, EA is prepared to address any comments received and prepare a revised RI for approval.

Objective 1 Timeline: It is anticipated that the work will be conducted on the following timeline:

- Draft Work Plan – 30 days
- Final Work Plan – 15 days (following receipt of MPCA/MDA comments)
- Initial Phase (including laboratory analysis) – 45 days
- Review and evaluation of initial phase data and follow-up phase planning – 30 days (following receipt of initial phase data)
- Follow-Up Phase (including laboratory analysis) – 45 days
- Risk Evaluation – 21 days (following receipt of follow-up phase data)
- Draft RI Report – 45 days (following receipt of follow-up phase data)
- Final RI Report – 15 days (following receipt of MPCA/MDA comments).

Objective 1 Deliverables: Deliverables for this objective include the following:

- Draft and Final RI Work Plan
- Draft and Final RI Report.

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Attachment B
*Example Scenario Project Spreadsheet

*EXAMPLE ONLY - ADD OBJECTIVES/TASKS/CLASSIFICATIONS WHERE APPLICABLE

Project title: Remediation Master Contract - Category A - RD/RA

	1. Personnel																2. Subcontracting	3. Equipment		4. Other Expenses			Totals (Extended)
Project Budget	Ecological Risk Assessor 2	Ecological Risk Assessor 3	Engineer 1	Engineer 2	Engineer 3	Engineer 4	Field Technician	GIS/CADD Specialist	Human Health Risk Assessor 2	Human Health Risk Assessor 3	On-Site Inspector	Project Manager	QA/QC Officer	Scientist 1	Scientist 2	Total Hours							
*** Objective 1**																							
Task A: Remedial Design			80	120	40	16		40				20	16		40	372	NA	NA	NA	NA	NA	NA	NA
Task B: Remedial Action Work Plan			40	80	20	8		16				20	16	40	80	320	NA	NA	NA	NA	NA	NA	NA
Total for Objective 1 Hrs	**0**	**0**	**120**	**200**	**60**	**24**	**0**	**56**	**0**	**0**	**0**	**40**	**32**	**40**	**120**	**692**							
Total Project Hours	0	0	120	200	60	24	0	56	0	0	0	40	32	40	120	692							

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Attachment B
*Example Scenario Project Spreadsheet

*EXAMPLE ONLY - ADD OBJECTIVES/TASKS/CLASSIFICATIONS WHERE APPLICABLE

Project title: Remediation Master Contract - Category A - RI Sampling Plan

	1. Personnel																2. Subcontracting	3. Equipment		4. Other Expenses			Total (Extended)
Project Budget	Ecological Risk Assessor 2	Ecological Risk Assessor 3	Engineer 1	Engineer 2	Engineer 3	Engineer 4	Field Technician	GIS/CADD Specialist	Human Health Risk Assessor 2	Human Health Risk Assessor 3	On-Site Inspector	Project Manager	QA/QC Officer	Scientist 1	Scientist 2	Total (Hours)							
* **Objective 1**																							
Task A: Work Plan				20	8			20				8	8	60	40	164	NA	NA	NA	NA	NA	NA	
Task B: Field Investigation				40			160	8				16	8		40	272	NA	NA	NA	NA	NA	NA	
Task C: Risk Evaluation	80	40							80	40						240	NA	NA	NA	NA	NA	NA	
Task D: Report	8			20	8			20	8			16	8	80	40	208	NA	NA	NA	NA	NA	NA	
Total for Objective 1 Hrs	**88**	**40**	**0**	**80**	**16**	**0**	**160**	**48**	**88**	**40**	**0**	**40**	**24**	**140**	**120**	884	NA	NA	NA	NA	NA	NA	
Total Project Hours	88	40	0	80	16	0	160	48	88	40	0	40	24	140	120	884							