UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 W. JACKSON BLVD
CHICAGO, IL 60604

MEMORANDUM

SUBJECT: ACTION MEMORANDUM - Request for Approval and Funding for a Removal Action at the Charlevoix Municipal Well Superfund Site, Charlevoix, Charlevoix County, Michigan (Site ID #0553)

FROM: Ralph Dollhopf, On-Scene Coordinator
Emergency Response Branch 1/Response Section 2

THRU: Jason H. El-Zein, Chief
Emergency Response Branch 1

TO: Richard C. Karl, Director
Superfund Division

I. PURPOSE

This memorandum requests and documents your approval to expend up to $412,195 to conduct a removal action at the Charlevoix Municipal Well Superfund Site ("the site") in Charlevoix, Charlevoix County, Michigan.

The response actions proposed in this memorandum are necessary to mitigate threats to public health, welfare, and the environment posed by the presence of uncontrolled hazardous substances at the site, as documented by the United States Environmental Protection Agency's (U.S. EPA) On-Scene Coordinator (OSC). The funding will be utilized to remove and dispose of an on-site underground storage tank (UST), conduct additional vapor intrusion assessment activities, conduct source area soil assessment, install sub-slab depressurization (SSD) units at affected properties, and develop a comprehensive geographic information system (GIS) database of available site data for ongoing removal and remedial assessments.

The removal action and assessment activities will be conducted in accordance with Section 104(a)(1) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9604(a)(1), and 40 C.F.R. § 300.415 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) to abate or eliminate the immediate threats posed to public health and/or the environment.

The uncontrolled conditions of the hazardous substances present at the site require that this action be classified as a time-critical removal action. The U.S. EPA's removal action will require approximately 50 on-site working days to complete.

The site was delisted from the National Priorities List (NPL) in 1993.

II. SITE CONDITIONS AND BACKGROUND

SEMS (CERCLIS) ID: 0503013
RCRA ID : MID980794390:
Category: Time-Critical Removal Action

A. Site Description

1. Removal Site Evaluation

The following sections provide background information on the site. The U.S. EPA utilized information and historical data gathered from previous inspections conducted by U.S. EPA's remedial response program and the Michigan Department of Environmental Quality (MDEQ).

a. Charlevoix Well

The Charlevoix Municipal Well Superfund Site is located on the shore of Lake Michigan in Charlevoix, MI (the City) and consists of a municipal well system made up of a shallow well connected to a horizontal flume, buried beneath the beach. This well is no longer in use. In 1981, the City was notified by the Michigan Department of Public Health (MDPH) that its water system was contaminated following routine sampling of the City's chlorinated water supply. In response, the City installed four monitoring wells near its municipal well with the assistance of the Michigan Department of Natural Resources (MDNR).

Groundwater was found to be contaminated with trichloroethylene (TCE) that was impacting the municipal water supply. During the investigation, an adjacent tetrachloroethylene (PCE) plume was discovered. At that time, a portion of the PCE plume overlapped the location of the TCE plume. U.S. EPA investigated the contamination and selected an initial cleanup remedy in a Record of Decision (ROD) dated June 12, 1984 (1984 ROD) (Administrative Record Index [ARI] #13). In 1985, U.S. EPA constructed a new water intake system and filtration plant, using water from Lake Michigan as its source. A buried intake pipe was constructed that connected to the existing city pump house. A chlorine diffuser, anchored inside, and running the entire length of the intake pipe, disinfects the water. Soon after operation of the lake water intake and water treatment plant began, the City experienced a capacity diminishment problem. U.S. EPA constructed a new water intake structure in 1992. The intake system and water treatment plant successfully provided safe drinking water.
On September 30, 1985, after completing an investigation of site contamination, U.S. EPA issued a second ROD (1985 ROD) that selected a remedy, which included groundwater monitoring and restrictions on groundwater use (ARI#14). The selected alternative allows the

contaminated groundwater plumes to naturally migrate and disperse into Lake Michigan. The 1985 ROD estimated that the contaminated groundwater will be purged in approximately 50 years.

A Close-Out Report was prepared by U.S. EPA on July 12, 1993, and the site was deleted from the NPL on December 2, 1993 (ARI #15).

In 2006, while reviewing the site for potential designation as "ready for reuse," U.S. EPA noted that contamination remained in the groundwater above levels that would provide for unrestricted use (ARI #16). Due to this concern, U.S. EPA determined that a new five-year-review (FYR) should be conducted to ensure that the remedy remains protective. In 2011, the FYR concluded that PCE contamination that remained in the soil and groundwater could potentially pose vapor intrusion risks via the indoor air pathway and that groundwater may take longer to return to a useable state (ARI #12) than previously had been determined. Additional evaluation of the source was determined to be necessary to evaluate the potential for vapor intrusion.

b. U.S. EPA

U.S. EPA completed a soil gas, soil and groundwater assessment in August 2012. Follow-up samples of soil, soil gas, sub-slab soil gas and indoor air were conducted during multiple mobilizations from June 10, 2013, through April 29, 2014. Sample results suggested potential vapor intrusion concerns in former known source areas of the site.

U.S. EPA Region V Field Services personnel conducted a geophysical investigation to identify the potential presence of underground storage tanks (UST) at the property in December 2013 (ARI #17). Surveyed locations include the former Impact Tools property at 204 Lincoln Avenue and the former Art's Drycleaners property at 230 Antrim Street. USTs were located at both properties. The UST at 230 Antrim Street has a hole in the top of the tank and at least two pipes running from the tank to the building. At the time of the investigation, the UST contained approximately two feet of an unknown liquid.

Vapor Intrusion Assessment Results

U.S. EPA collected 19 soil gas samples in August 2012. Thirteen of the 19 samples exhibited concentrations of at least one compound in excess of a 10^{-5} U.S. EPA residential cancer risk vapor intrusion screening level (10^{-5} EPA Vapor Intrusion Screening Level [VISL])[1]. Dominant contaminants included acrolein, TCE and PCE.

U.S. EPA collected 111 soil gas, 21 sub-slab soil gas and 32 indoor air samples between June and July 2013. Contaminants detected in excess of a 10^{-5} EPA VISL included acrolein, benzene, chloroform, TCE and PCE.

[1] Vapor Intrusion Screening Leve ; Calculator Version 3.3.1, May 2014, 10^{-5} cancer risk for Residential Carcinogens, Hazard Quotient of 1 for Non Carcinogens.

U.S. EPA collected 10 sub-slab soil gas and 10 indoor air samples in March 2014. This sampling was biased to the highest previous sub-slab readings from the Summer 2013 event. Contaminants detected in excess of a 10^{-5} EPA VISL included acrolein, benzene, chloroform, TCE and PCE. Concentrations of contaminants detected in excess of a 10^{-5} EPA VISL during the March 2014 sampling events are summarized in Table 1, 2014 Sub-Slab Soil Gas and Indoor Air Analytical Summary.

2013/2014 Soil Vapor/Indoor Air Analytical Summary

Acrolein, benzene and PCE were identified in soil gas above the 10^{-5} EPA VISL. Acrolein, chloroform, TCE and PCE were identified in sub-slab soil gas above the 10^{-5} EPA VISL. Acrolein, benzene, chloroform, ethylbenzene and PCE were identified in indoor air above the 10^{-5} EPA VISL.

Ten properties exhibited sub-slab soil gas concentrations in excess of a 10^{-4} EPA VISL during the 2013 and/or 2014 sampling event. Two of these 10 properties also exhibited indoor air concentrations in excess of a 10^{-5} EPA VISL; chloroform at 228 Antrim Street (Building 22) and PCE at 208 Lincoln Avenue NW (Building 2). Although indoor air concentrations did not exceed a 10^{-5} EPA VISL at the remaining eight properties; sub-slab soil gas concentrations pose a risk for vapor intrusion:

- 207 Garfield Avenue W (Building 1)
- 205 Garfield Avenue W (Building 4)
- 204 A Lincoln Avenue W (Building 5)
- 204 Lincoln Avenue W (Building 3)
- 102 Hurlbut Avenue W (Building 15)
- 100 Hurlbut Avenue W (Building 11)
- 703 Bridge Street (Building 13)
- 230 Antrim Street (Building 21)

Underground Storage Tank Results

U.S. EPA collected two samples from the UST located at 230 Antrim Street and one sample from the UST located at 204 Lincoln Avenue on March 27, 2014. The UST at 204 Lincoln Avenue contained petroleum compounds including 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene; n-butylbenzene; n-propylbenzene; p-isopropyltoluene; sec-butylbenzene; tert-butylbenzene; toluene and xylenes. PCE was identified in both samples collected from the 230 Antrim Street UST exceeding Toxicity Characteristic Leaching Procedure (TCLP) limits for PCE (ARI #18). In addition, chromium and mercury concentrations exceeded TCLP limits in one sample. The tank contents are therefore considered to be Resource Conservation and Recovery Act (RCRA) characteristic hazardous waste; it may also be a listed hazardous waste.

UST Analytical Summary

1,2-Dichloropropane; ethylbenzene; isopropylbenzene (cumene); naphthalene; PCE; TCE; xylenes; chromium and mercury were detected in the USTs identified above and are hazardous substances as defined by CERCLA § 101(14). 1,2,4-Trimethylbenzene; 1,3,5-trimethylbenzene; n-butylbenzene; n-propylbenzene; p-isopropyltoluene; sec-butylbenzene; and tert-butylbenzene, were also detected in the USTs, and are pollutants and contaminants as defined by CERCLA §101(33).

2. Physical location

The former Charlevoix Municipal Well NPL site is located at Lakeshore Drive in Charlevoix, Charlevoix County, Michigan (Figure 1) with coordinates 45.317780 degrees north latitude and 85.266685 degrees west longitude. The areal extent of the study area of the site is estimated at 400 acres and extends north to south from Pine River to Garfield Avenue and east to west from Bridge Street to Sherman Street. The approximate center of the study area is 45.185088 degrees north latitude and 85.154422 degrees west longitude.

EPA conducted an Environmental Justice (EJ) analysis for the Site. Screening of the surrounding area used Region 5's EJ Screen Tool, which applies the interim version of the national EJ Strategic Enforcement Assessment Tool (EJSEAT). Region 5 has reviewed environmental and demographic data for the area surrounding the Site, and determined there is a low potential for EJ concerns at this location.

3. Site characteristics

The site is comprised of seven known source areas and associated groundwater plumes (Figure 2). They include:

- TCE plume at 204 Grant Street (Former Charlevoix Middle School);
- PCE plume at 230 Antrim Street (Former Art's Dry Cleaners);
- PCE plume at 201 Hurlbut Avenue (Former Commercial Laundry);
- PCE plume at 100 Hurlbut Avenue (Former Hooker's Cleaners);
- PCE plume at 208 W. Lincoln (Former Hoskin's Manufacturing);
- PCE plume at 207 W. Garfield (Former Dry Cleaners); and
- Petroleum plume at 204 W. Lincoln Street (Former Impac Tools).

The site is located in a mixed-use area in downtown Charlevoix that includes commercial and residential properties. Residences are located within 50 feet of identified source areas.

4. Release or threatened release into the environment of a hazardous substance, or pollutant, or contaminant

A release or threat of release of hazardous substances, pollutants, or contaminants is present at the site. U.S. EPA has collected samples from site soil, groundwater, soil gas, sub-slab soil gas, indoor air and on-site USTs. The sample results documented the presence of hazardous substances as defined by CERCLA § 101(14) including 1,2-dichloropropane; ethylbenzene; isopropylbenzene (cumene); naphthalene; PCE; TCE; xylenes; chromium and mercury; and pollutants and contaminated as defined by CERCLA § 101(33) including 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene; n-butylbenzene; n-propylbenzene; p-isopropyltoluene; sec-butylbenzene; and tert-butylbenzene.

Possible exposure routes for hazardous substances include inhalation of volatile organic compounds (VOC) migrating from the UST, site soil and groundwater, i.e. vapor intrusion. Potential human receptors include site workers, nearby residents, and employees of nearby businesses. Residential properties are located less than 50 feet from source areas identified at the site.

5. NPL status

The site was deleted from the NPL in 1993.

6. Maps, pictures and other graphic representations

A figure detailing the location of the site is included in the attached Site Location Map (Figure 1). A figure detailing the location of the study area including the location of known source areas and the location of the former municipal drinking water well field is presented in the attached Site Map (Figure 2). Figure 3 (Site Layout Map) depicts the location of USTs and recommended vapor intrusion sampling points and vapor intrusion mitigation system installation locations. Attachment I contains photographs of site conditions.

B. Other Actions to Date

1. Previous actions

Refer to Section II for information on previous actions.

2. Current actions

Refer to Section II for information on current actions.

C. State and Local Authorities' Roles

U.S. EPA is the lead federal Agency in partnership with the MDEQ and local government agencies. The city of Charlevoix and the Northwest Michigan Community Health Agency are responsible for restricting the installation or use of private wells in the vicinity of the site.

III. THREATS TO PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

The conditions present at the site present an imminent and substantial threat to the public health, or welfare, and the environment based upon the factors set forth in NCP, 40 C.F.R. § 300.415(b)(2). These factors include, but are not limited to, the following:

> **Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants**;

Hazardous substances were identified in on-site USTs, soil, groundwater, soil gas, sub-slab soil gas and indoor air. Laboratory analytical results confirmed the presence of hazardous substances as defined by CERCLA § 101(14), including 1,2-dichloropropane; acrolein; ethylbenzene; isopropylbenzene (cumene); naphthalene; PCE; TCE; xylenes; chromium and mercury; and pollutants and contaminated as defined by CERCLA § 101(33) including 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene; n-butylbenzene; n-propylbenzene; p-isopropyltoluene; sec-butylbenzene; and tert-butylbenzene..

These hazardous substances represent an actual or potential exposure threat to nearby human populations. Possible exposure routes for these hazardous substances include inhalation of VOCs migrating from USTs, soil and to groundwater, i.e. vapor intrusion. Potential human receptors include site workers, nearby residents, and employees of nearby businesses.

The Agency for Toxic Substances and Disease Registry (ATSDR), U.S. EPA, and other agencies have studied toxicological effects of the identified hazardous substances, pollutants, and contaminants. Toxicological information is provided below and referenced in the ARI (Attachment IV).

Acrolein: Breathing large amounts of acrolein damages the lungs and could cause death. Breathing lower amounts may cause eye watering and burning of the nose and throat and a decreased breathing rate. Animal studies show that breathing acrolein causes irritation to the nasal cavity, lowered breathing rate, and damage to the lining of the lungs. We do not know if eating food or drinking water containing acrolein affects your health. However, animals that swallowed acrolein had stomach irritation, vomiting, stomach ulcers, and bleeding. The International Agency for Research on Cancer (IARC) has determined that acrolein is not classified as to carcinogenicity in humans (AR #21)

Chromium: Breathing high levels of chromium (VI) can cause irritation to the lining of the nose, nose ulcers, runny nose, and breathing problems, such as asthma, cough, shortness of

breath, or wheezing. The concentrations of chromium in air that can cause these effects may be different for different types of chromium compounds, with effects occurring at much lower concentrations for chromium (VI) compared to chromium (III). The main health problems seen in animals following ingestion of chromium(VI) compounds are irritation and ulcers in the stomach and small intestine and anemia. Chromium (III) compounds are much less toxic and do not appear to cause these problems. Sperm damage and damage to the male reproductive system have also been seen in laboratory animals exposed to chromium (VI). Skin contact with certain chromium (VI) compounds can cause skin ulcers. Some people are extremely sensitive to chromium (VI) or chromium (III). Allergic reactions consisting of severe redness and swelling of the skin have been noted. In workers, inhalation of chromium (VI) has been shown to cause lung cancer. Chromium (VI) also causes lung cancer in animals. An increase in stomach tumors was observed in humans and animals exposed to chromium (VI) in drinking water (ARI #2).

Ethylbenzene: Exposure to high levels of ethylbenzene in air for short periods can cause eye and throat irritation. Exposure to higher levels can result in dizziness. Irreversible damage to the inner ear and hearing has been observed in animals exposed to relatively low concentrations of ethylbenzene for several days to weeks. Exposure to relatively low concentrations of ethylbenzene in air for several months to years causes kidney damage in animals. The IARC has determined that ethylbenzene is a possible human carcinogen (ARI #10).

Mercury: The nervous system is sensitive to metallic mercury. Exposure to very high levels of metallic mercury vapor can cause brain, kidney, and lung damage and may seriously harm a developing fetus. Exposure to mercury vapor concentrations high enough to produce such serious effects might also cause coughing, chest pains, nausea, vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation. Exposure to lower levels of airborne mercury for prolonged periods of time would produce more subtle effects, such as irritability, sleep disturbances, excessive shyness, tremors, coordination problems, changes in vision or hearing, and memory problems. Most of the effects of mercury resulting from prolonged lower-level exposure are reversible, once exposure is terminated and the mercury has left your body. Very young children are more sensitive than adults to the effects of mercury. Children 5 years of age and younger are considered to be particularly sensitive to the effects of mercury on the nervous system, since their central nervous system is still developing. Some children exposed to high mercury vapor levels develop a reversible condition called acrodynia, in which the palms of the hands and soles of the feet often become reddened and tender, before beginning to peel. Children with acrodynia may also have mood swings, increased irritability, difficulty sleeping, and muscle or joint pains. Exposure levels high enough to cause acrodynia might also cause coughing or pain in the chest area. Acrodynia is usually, but not always, associated with urine mercury concentrations of 100 micrograms (or more) of mercury per liter of urine (ARI #1).

Naphthalene: Exposure to large amounts of naphthalene may damage or destroy human red blood cells. This can result in too few red blood cells . This condition is called hemolytic anemia. Some symptoms of hemolytic anemia are fatigue, lack of appetite, restlessness, and pale skin. Exposure to large amounts of naphthalene may also cause nausea, vomiting, diarrhea, blood in the urine, and a yellow color to the skin. Animals sometimes develop cloudiness in their eyes after swallowing high amounts of naphthalene. It is not clear whether this also develops in

people. Rats and mice that breathed naphthalene vapors daily for a lifetime developed irritation and inflammation of their nose and lungs. Naphthalene is reasonably anticipated to be a human carcinogen (ARI #3).

n-Propylbenzene: n-Propylbenzene is irritating to mucous membranes, eyes, nose, throat, and skin. Systematically it causes depression of the central nervous system, headache, anorexia, muscular weakness, incoordination, nausea, vertigo, mental confusion, and unconsciousness (ARI #9).

PCE: High concentrations of tetrachloroethylene (particularly in closed, poorly ventilated areas) can cause dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death. Irritation may result from repeated or extended skin contact with it. These symptoms occur almost entirely in work (or hobby) environments when people have been accidentally exposed to high concentrations or have intentionally used tetrachloroethylene to get a "high." In industry, most workers are exposed to levels lower than those causing obvious nervous system effects. The health effects of breathing in air or drinking water with low levels of tetrachloroethylene are not known. Results of animal studies, conducted with amounts much higher than those that most people are exposed to, show that tetrachloroethylene can cause liver and kidney damage. Exposure to very high levels of tetrachloroethylene can be toxic to the unborn pups of pregnant rats and mice. Changes in behavior were observed in the offspring of rats that breathed high levels of the chemical while they were pregnant (ARI#4).

1,2,4-Trimethylbenzene: Breathing large amounts of 1,2,4-trimethylbenzene (TMB) for short periods of time adversely affects the human nervous system. Effects range from headaches to fatigue and drowsiness. TMB vapor irritates the nose and the throat. Prolonged contact with liquid TMB irritates the skin. These effects are not likely to occur at levels of 1,2,4-trimethylbenzene that are normally found in the environment. The petroleum industry has conducted several studies on the C9 fraction in response to an U.S. EPA request for testing. These studies show that repeat exposure to this mixture of chemicals in air adversely affects the reproductive system and the developing fetus of animals. U.S. EPA believes that adverse effects associated with exposure to the C9 fraction are similar to those expected to occur as a result of exposure to individual chemicals, like 1,2,4-trimethylbenzene, that make up this mixture (ARI #7).

1,3,5-Trimethylbenzene: Any exposure to 1,3,5-TMB is a medical emergency. Breathing high levels of 1,3,5-TMB causes an immediate build-up of fluid in the lungs, causing severe shortness of breath, coughing, and nose and throat irritation. Exposure to high levels causes headaches, tiredness, dizziness, lightheadedness or confusion. Short-term health effects to 1,3,5-TMB include irritation and burning of the skin and eyes. Long-term health effects include liver damage and anemia (reduced ability of the blood to carry oxygen). Another lasting effect is an asthma-like allergy, with shortness of breath, wheezing, coughing and/or chest tightness (ARI #8).

TCE: Breathing small amounts may cause headaches, lung irritation, dizziness, poor coordination, and difficulty concentrating. Breathing large amounts of TCE may cause impaired

heart function, unconsciousness and death. Breathing it for long periods may cause nerve, kidney, and liver damage. The IARC has determined that TCE is "probably carcinogenic to humans" (ARI #11).

Xylenes: High levels of exposure to xylenes for short or long periods can cause headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance. Exposure of people to high levels of xylene for short periods can also cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; problems with the lungs; delayed reaction time; memory difficulties; stomach discomfort; and possibly changes in the liver and kidneys. It can cause unconsciousness and even death at very high levels (ARI #5).

High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate;

Historical soil sampling has documented the existence of elevated levels of hazardous substances deposited in and on soils in the vicinity of the site. Several hazardous substances exceed the MDEQ migration to groundwater screening level, indicating potential for hazardous substances to migrate to groundwater where they could pose a vapor intrusion threat.

Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released;

There is potential for precipitation to cause mitigation of hazardous substances from the site. Heavy rain may increase discharge of fluids from USTs to migrate into groundwater (hole in top of tank).

Threat of fire or explosion;

The mixed product in the UST located at 230 Antrim Street has a flashpoint of 130°F and is therefore considered flammable. There is potential that vapors may migrate from the UST, soil and groundwater and accumulate in adjacent structures and if combustible materials are present, create conditions conducive to a fire.

The availability of other appropriate federal or State response mechanisms to respond to the release;

There are no State/local response actions expected to mitigate the threats to public health or the environment on the site.

IV. ENDANGERMENT DETERMINATION

Given the site conditions, the nature of the known and suspected hazardous substances on site, and the potential exposure pathways described in Sections II and III, actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response actions

selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed action description

The objective of the removal action is to remove hazardous substances from the site, in order to eliminate the threat of vapor intrusion from hazardous substances into adjacent residential and commercial structures. The following actions will occur at the site:

a. Excavate on-site UST located at 230 Antrim Street;

b. Collect samples to characterize the nature and extent of contaminated soil and groundwater for off-site disposal at the 230 Antrim Street site;

c. Consolidate, package, and transport hazardous substances, pollutants and contaminants off-site for disposal in accordance with the U.S. EPA Off-Site Rule, 40 C.F.R. § 300.440;

d. Delineate extent of soil gas impact and conduct additional vapor intrusion assessment activities in properties located adjacent to 10^{-5} EPA VISL exceedances; which includes the installation and collection of samples from four clustered soil gas probe locations (5, 10 and 15 feet depth per location; total of 12 soil gas probes) and 43 coupled sub-slab soil gas and indoor air sampling locations. Cost estimate includes two sampling events for all 43 coupled sub-slab soil and indoor air sampling locations and a contingency for 12 step-out soil gas probe sampling locations following a review of vapor intrusion assessment data;

e. Conduct source area soil assessment activities at 207 Garfield Avenue W (Building 1); and

f. Install SSD systems at the 11 locations identified below. Two properties were identified with sub-slab soil gas and indoor air concentrations in excess of a 10^{-5} EPA VISL [[redacted]) and 208 Lincoln Avenue NW (Building 2)]. Seven properties exhibited sub-slab soil gas PCE concentrations in excess of the 10^{-5} EPA VISL in addition to an indoor air detection of PCE, confirming that vapor intrusion is occurring at those properties. Mitigation is recommended at all seven properties in lieu of further assessment to reduce overall costs. Mitigation to the 10^{-5} EPA VISL is proposed since all State of Michigan recommended VISLs are at least that conservative. Two properties located adjacent to identified areas of vapor

intrusion are also recommended for mitigation in lieu of further assessment to reduce overall costs [redacted] and [redacted]. Cost estimate includes a contingency for the installation of four additional SSD systems following completion of further assessment activities:

a. [redacted]
b. 208 Lincoln Avenue W (Building 2)
c. 204 A Lincoln Avenue W (Building 5)
d. 204 Lincoln Avenue W (Building 3)
e. [redacted]
f. [redacted]
g. [redacted]
h. [redacted]
i. [redacted]
j. [redacted]
k. [redacted]

The response actions described in this memorandum directly address actual or potential releases of hazardous substances on site, which pose an imminent and substantial endangerment to public health, or welfare, or the environment.

The threats posed by uncontrolled substances considered hazardous meet the criteria listed in NCP § 300.415(b)(2), and the response actions proposed herein are consistent with any long-term remedial actions which may be required. Elimination of hazardous substances, pollutants and contaminants that pose a substantial threat of release is expected to minimize substantial requirements for post-removal site controls.

Hazardous substances, pollutants or contaminants removed off-site pursuant to this emergency response action for treatment, storage and disposal shall be treated, stored, or disposed at a facility in compliance, as determined by EPA, with the EPA Off-Site Rule, 40 C.F.R. § 300.440.

The estimated costs to complete the activities outlined above are summarized below. These activities will require an estimated 50 on-site working days to complete.

2. Contribution to remedial performance

The proposed action should not impede future actions based on available information.

3. Engineering Evaluation/Cost Analysis (EE/CA)

Not Applicable.

4. Applicable or relevant and appropriate requirements (ARAR)

The OSC sent a letter on August 11, 2014 to Nicolas Dawson at MDEQ requesting the identification of any applicable State ARARs (ARI# 19). As of this writing, MDEQ has not provided a response, but has indicated one is being prepared.

The OSC also identified the following ARARs:

RCRA Hazardous Waste regulations and U.S. EPA Superfund Off-site Rule. Pollutants or contaminants removed off-site pursuant to this emergency response action for treatment, storage and disposal shall be treated, stored, or disposed at a facility in compliance, as determined by U.S. EPA, with the U.S. EPA Off-Site Rule, 40 C.F.R. § 300.440.

49 U.S.C. § 5101 et seq. regulates the transportation of hazardous waste and hazardous substances by aircraft, railcars, vessels, and motor vehicles to or from a site.

U.S. EPA will attain ARARs identified in a timely manner to the extent practicable.

B. **Estimated Costs:**

Regional Removal Allowance Costs:	
Total Cleanup Contractor Costs (Includes a 20% contingency)	$257,247
Other Extramural Costs Not Funded from the Regional Allowance	
Total START, including multiplier costs	$101,183
Subtotal, Extramural Costs	$358,430
Extramural Costs Contingency (15% of Subtotal, Extramural Costs)	$53,765
TOTAL REMOVAL ACTION PROJECT CEILING	$412,195

The response actions described in this memorandum directly address the actual or threatened release of hazardous substances, pollutants, or contaminants at the site which may pose an imminent and substantial endangerment to public health or welfare or to the environment. These response actions do not impose a burden on affected property disproportionate to the extent to which that property contributes to the conditions being addressed.

VII. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Given the site conditions, the nature of the hazardous substances documented on-site, and the potential exposure pathways to nearby populations described in Sections II and III above, actual or threatened release of hazardous substances from the site, if not addressed by implementing the time-critical actions described in this Action Memorandum, may present an imminent and substantial endangerment to public health, welfare, or the environment. Delayed or no action concerning the remaining hazardous substances, pollutants and contaminants at the site will result in increased potential of the toxic and hazardous substances to release, thereby threatening the environment and the health and welfare of nearby residents and other persons who are in proximity to the site.

VIII. OUTSTANDING POLICY ISSUES

None.

IX. ENFORCEMENT

For administrative purposes, information concerning the enforcement strategy for this site is contained in the Confidential Enforcement Addendum.

The total EPA costs of this removal action based on full-cost accounting practices that will be eligible for cost recovery are estimated to be $703,142[2].

($ 412,195 +$ 37,356) + (56.41% x $449,551) = $703,142

X. RECOMMENDATION

This decision document represents the selected removal action for the Charlevoix Municipal Well Superfund Site located in Charlevoix, Charlevoix County, Michigan. This document has been developed in accordance with CERCLA, as amended, and is not inconsistent with the NCP. This decision is based on the Administrative Record for the site (see Attachment II).

Conditions at the Site meet the NCP § 300.415(b)(2) criteria for a time-critical removal action. The total project ceiling, if approved, will be $412,195. Of this, as much as $311,012 comes

[2] Direct Costs include direct extramural costs and direct intramural costs. Indirect costs are calculated based on an estimated indirect cost rate expressed as a percentage of site specific direct costs, consistent with the full cost accounting methodology effective October 2, 2000. These estimates do not include pre-judgment interest, do not take into account other enforcement costs, including Department of Justice costs, and may be adjusted during the course of a removal action. The estimates are for illustrative purposes only and their use is not intended to create any rights for responsible parties. Neither the lack of a total cost estimate nor deviation of actual total costs from this estimate will affect the United States right to cost recovery.

from the Regional removal allowance. I recommend your approval of the proposed removal action. You may indicate your decision by signing below.

APPROVE: _____ DATE: 9-15-14
Director, Superfund Division

DISAPPROVE: _____ DATE: _____
Director, Superfund Division

Enforcement Addendum

Tables:

1 2014 Sub-Slab Soil Gas and Indoor Air Analytical Summary.

Figures:

1 Site Location Map
2 Site Map
3 Site Layout Map

Attachments:

I. Site Photo Log
II. Detailed Cleanup Contractor Cost Estimate
III. Independent Government Cost Estimate
IV. Administrative Record Index

cc: Sherry Fielding, U.S. EPA, 5104A
Valencia Darby, U.S. DOI
Lindy Nelson, U.S. DOI
Nicolas Dawson, MDEQ

BCC PAGE HAS BEEN REDACTED

NOT RELEVANT TO SELECTION

OF REMOVAL ACTION

Table 1
2014 Sub-Slab Soil Gas and Indoor Air Analytical Summary
Charlevoix Municipal Well Site
Charlevoix, Charlevoix County, Michigan

			Location ID	CMW-BLD001-SS01	CMW-BLD002-SS02	CMW-BLD002-IA	CMW-BLD003-SS03	CMW-BLD003-IA	CMW-BLD004-SS04
	2014		Field Sample ID	CMW-BLD001-SS01-032514	CMW-BLD002-SS02-032514	CMW-BLD002-IA02-032514	CMW-BLD003-SS03-032514	CMW-BLD003-IA03-032514	CMW-BLD004-SS04-032514
	10^{-5} VISL		Sample Date	3/26/2014	3/26/2014	3/26/2014	3/26/2014	3/26/2014	3/26/2014
Chemical Name	SS VISL	IA VISL	Unit						
Acrolein	0.21	0.021	ug/m3	0.81 UJ	1.06 UJ	**1.42 J**	0.81 UJ	1.91 UJ	**0.86 J**
Benzene	36	3.6	ug/m3	12.9	6.37	1.12	1.62 U	**3.16**	1.62 U
1,3-Butadiene	0.94	0.094	ug/m3	1.12 U	1.46 U	0.11 U	1.12 U	1.12 U	1.12 U
Chloroform	12	1.2	ug/m3	**43**	3.22 U	0.25 U	2.48 U	2.48 U	8.47
Tetrachloroethene	420	42	ug/m3	**64500**	**11800**	**63**	**16200**	8.7	**1200**
Trichloroethene	21	2.1	ug/m3	**573**	8.36	0.27 U	**69**	2.72 U	2.72 U

Notes:

Highlight and Bold exceeds the EPA VISL

EPA VISL = Vapor Intrusion Screening Level; Calculator Version 3.3.1, May 2014, Residential *Carcinogens 1.00E-05, HQ for Non Carcinogens 1*
SS= Sub-Slab
IA= Indoor Air
NA = Not analyzed
U = Constituent not detected. Reporting limit presented
J = Analyte detected below quantitation limit
ug/m3 = micrograms per meter cubed
ug/m3 = micrograms per meter cubed

Table 1
2014 Sub-Slab Soil Gas and Indoor Air Analytical Summary
Charlevoix Municipal Well Site
Charlevoix, Charlevoix County, Michigan

	2014		Field Sample ID	CMW-BLD004-IA04-032514	CMW-BLD005-SS05-032514	CMW-BLD005-IA05-032514	CMW-BLD011-SS11-032514	CMW-BLD011-IA11-032514	CMW-BLD013-SS13-032514
	10^{-5} VISL		Sample Date	3/26/2014	3/26/2014	3/26/2014	3/26/2014	3/26/2014	3/26/2014
Chemical Name	SS VISL	IA VISL	Unit						
Acrolein	0.21	0.021	ug/m3	**0.46 J**	**2.67 J**	**8.65 J**	0.81 UJ	**0.83 J**	0.81 UJ
Benzene	36	3.6	ug/m3	0.71	2.3 U	**5.15**	2.3	0.63	4.7
1,3-Butadiene	0.94	0.094	ug/m3	0.11 U	1.59 U	**4.82**	1.12 U	0.11 U	1.12 U
Chloroform	12	1.2	ug/m3	0.25 U	3.52 U	2.48 U	3.43	0.25 U	2.48 U
Tetrachloroethene	420	42	ug/m3	0.37	**8830**	17.1	**11600**	8.15	**8800**
Trichloroethene	21	2.1	ug/m3	0.27 U	**47.9**	2.72 U	13.8	0.27 U	2.72 U

Notes:
Highlight and Bold exceeds the EPA VISL

EPA VISL = Vapor Intrusion Screening Level; Calculator Version 3.3.1, May 2014, Residential Carcinogens 1.00E-05, HQ for Non Carcinogens 1
SS= Sub-Slab
IA= Indoor Air
NA = Not analyzed
U = Constituent not detected. Reporting limit presented
J = Analyte detected below quantitation limit
ug/m3 = micrograms per meter cubed
ug/m3 = micrograms per meter cubed

Table 1
2014 Sub-Slab Soil Gas and Indoor Air Analytical Summary
Charlevoix Municipal Well Site
Charlevoix, Charlevoix County, Michigan

			Location ID	CMW-BLD013-IA	CMW-BLD015-SS15	CMW-BLD015-IA	CMW-BLD021-SS21	CMW-BLD022-IA
	2014		Field Sample ID	CMW-BLD013-IA13-032514	CMW-BLD015-SS15-032514	CMW-BLD015-IA15-032514	CMW-BLD021-SS21-032514	CMW-BLD022-IA22-032514
	10^{-5} VISL		Sample Date	3/26/2014	3/26/2014	3/26/2014	3/26/2014	3/26/2014
Chemical Name	SS VISL	IA VISL	Unit					
Acrolein	0.21	0.021	ug/m3	**0.46 J**	**3.12 J**	**0.38 J**	**1.51 J**	**0.46 J**
Benzene	36	3.6	ug/m3	1.05	3.24 U	0.72	2.12	0.8
1,3-Butadiene	0.94	0.094	ug/m3	0.11 U	2.24 U	0.11 U	1.12 U	0.12
Chloroform	12	1.2	ug/m3	0.25 U	4.95 U	0.25 U	2.48 U	**1.96**
Tetrachloroethene	420	42	ug/m3	6.23	**756**	2.78	**458**	0.34 U
Trichloroethene	21	2.1	ug/m3	0.27 U	5.45 U	0.27 U	2.72 U	0.27 U

Notes:

Highlight and Bold exceeds the EPA VISL

EPA VISL = Vapor Intrusion Screening Level; Calculator Version 3.3.1, May 2014, Residential Carcinogens 1.00E-05, HQ for Non Carcinogens 1
SS= Sub-Slab
IA= Indoor Air
NA = Not analyzed
U = Constituent not detected. Reporting limit presented
J = Analyte detected below quantitation limit
ug/m3 = micrograms per meter cubed
ug/m3 = micrograms per meter cubed

Prepared For:
U.S. EPA REGION V
Contract No.: EP-S5-13-01
TDD: S05-0001-1406-100
DCN: 135AFFX518-001

Prepared By:
The Mannik & Smith Group, Inc.
868 Robinwood Court
Traverse City, MI 49686

Figure 1: Site Location Map
204 W. Lincoln Street and 230 Antrim Street
Charlevoix, Charlevoix County, Michigan

Notes: Map adapted from USGS, Charlevoix, Michigan 30 x 60 Minute Quadrangle dated 1984

Approx. Site Boundary

Scale: Not to scale

N

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Traverse City, MI 49686

Figure 2: Site Map
Charlevoix Municipal Well Site
Charlevoix, Charlevoix County, Michigan

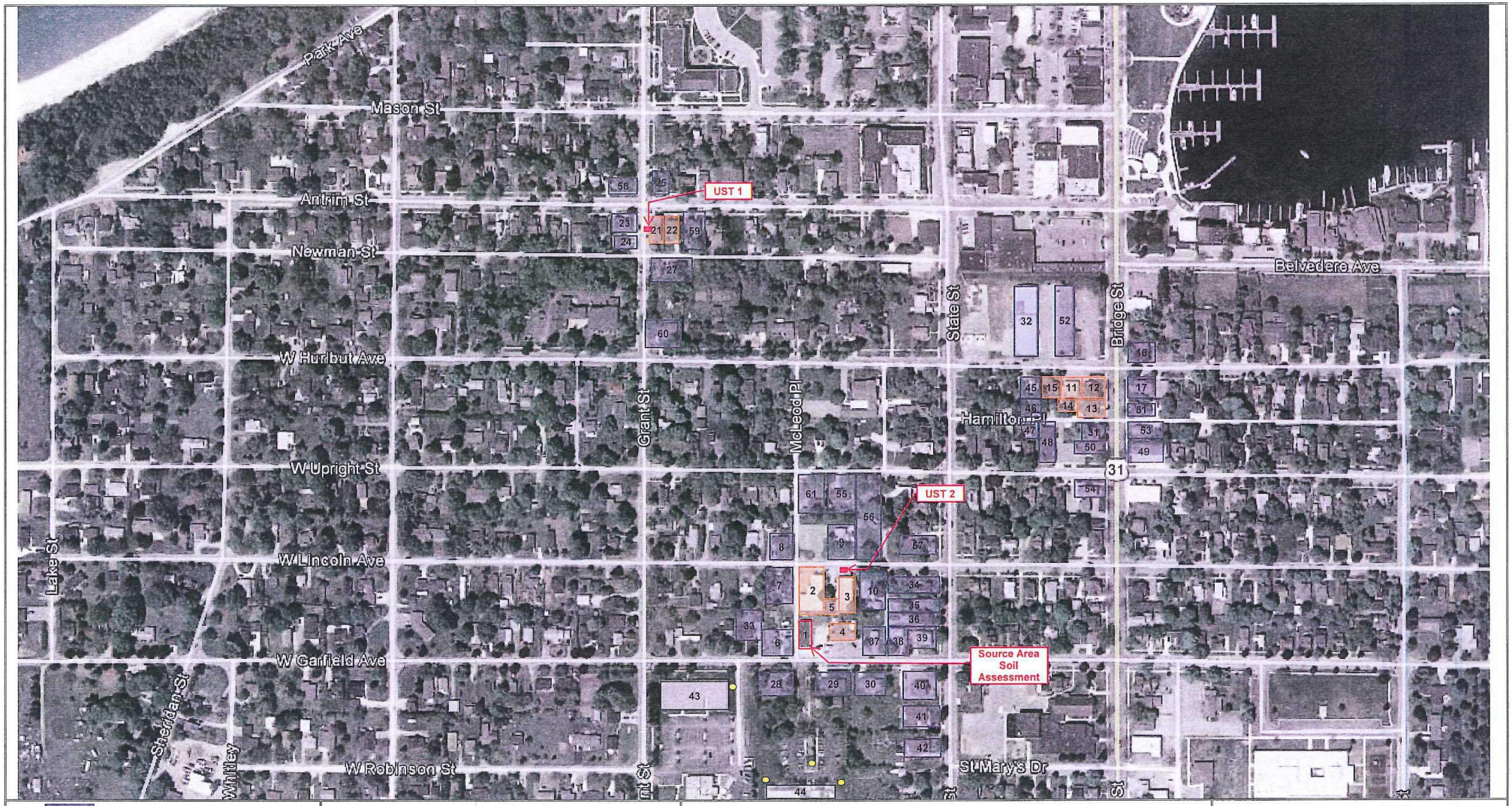
Notes: © 2014 Google, DigitalGlobe, USDA Farm Service Agency, Imagery May 13, 2012

Approx. Site Boundary

Former municipal well field

Scale: Not to scale

N



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LEGEND

- Recommended Soil Gas Assessment
- Recommended Sub-Slab/Indoor Air Assessment
- Recommended SSD System Installation

Figure 3: Site Layout Map

Charlevoix Municipal Well Site

Charlevoix, Charlevoix County, Michigan

Notes: © 2014 Google, DigitalGlobe, USDA Farm Service Agency, Imagery May 13, 2012

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ATTACHMENT I

U.S. ENVIRONMENTAL PROTECTION AGENCY

SITE PHOTO LOG

CHARLEVOIX MUNICIPAL WELL SUPERFUND SITE
CHARLEVOIX, CHARLEVOIX COUNTY, MICHIGAN

SEPTEMBER 2014

Number	1
Description	**UST area at [redacted]. Orange mallet is located in the center is placed directly on top of the center of the UST.**
Photographer	**Scott Stolz**
Date	**12/5/2013**

Number	2
Description	Photo depicting UST locating field services at [redacted] located proximal to residential apartment building.
Photographer	Scott Stolz
Date	**12/5/2013**

Number	3
Description	[redacted] **and surrounding residential area.**
Photographer	**Scott Stolz**
Date	**12/5/2013**

ATTACHMENT II

DETAILED CLEANUP CONTRACTOR ESTIMATE

HAS BEEN REDACTED – ONE PAGE

ATTACHMENT III

INDEPENDENT GOVERNMENT COST ESTIMATE

HAS BEEN REDACTED – SEVEN PAGES

NOT RELEVANT TO SELECTION

OF REMOVAL ACTION

ATTACHMENT IV

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMOVAL ACTION

ADMINISTRATIVE RECORD
FOR
CHARLEVOIX MUNICIPAL WELL SUPERFUND SITE TANK REMOVAL

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	914908	03/11/01	ATSDR	File	ATSDR Tox Fact Sheet - Metallic Mercury	3
2	914909	09/01/08	ATSDR	File	ATSDR Tox Fact Sheet - Chromium - CAS #7440-47-3	2
3	914910	09/01/05	ATSDR	File	ATSDR Tox Fact Sheet - Naphthalene - CAS #91-20-3, 1-Methylnaphthalene CAS #90-12-0, 2-Methylnaphthalene CAS#91-57-6	2
4	914911	09/01/97	ATSDR	File	ATSDR Tox Fact Sheet - Tetrachloroethylene - CAS # 127-18-4	2
5	914912	08/01/07	ATSDR	File	ATSDR Tox Fact Sheet - Xylene - CAS # 1330-20-7	2
6	-	-	Dollhopf, R., U.S. EPA	Karl, R., U.S. EPA	Action Memorandum re: Request for Approval and Funding for a Removal Action at the Charlevoix Municipal Well Superfund Site (PENDING)	-
7	914913	08/01/94	U.S. EPA	File	OPPT Chemical Fact Sheet - 1,2,4-Trimethylbenzene (CAS No. 95-63-6)	2

8	914914	01/01/00	Delaware Health & Human Services	File	DHS Frequently Asked Questions - 1,3,5-Trimethylbenzene	2
9	914915	02/12/14	National Library of Medicine	Public	Toxnet Fact Sheet - N-Propylbenzene CAS: 103-65-1	27
10	914916	09/01/07	ATSDR	File	ATSDR Tox Fact Sheet - Ethylbenzene - CAS #100-41-4	2
11	914917	07/01/03	ATSDR	File	ATSDR Tox Fact Sheet - Trichlroethylene - CAS #79-01-6	2
12	411961	09/01/11	Ohl, M., U.S. EPA	File	U.S. EPA Third Five-Year Review Report	33
13	209247	06/12/1984	Adamkus, V., U.S. EPA	File	U.S. EPA Superfund: Record of Decision	18
14	208670, 209254	09/30/1985	Adamkus, V., U.S. EPA	File	U.S. EPA Superfund: Record of Decision	10
15	409879	12/2/93	Adamkus, V., U.S. EPA	Federal Register	Federal Register Notice: Notice of Deletion of the Charlevoix Municipal Well Superfund Site from the NPL	3
16	159314	05/15/01	Clark, R., U.S. EPA	Bass, C., U.S. EPA	U.S. EPA Second Five-Year Review Report	4
17	914920	12/16/13	Bakkila, M., U.S. EPA START	Ohl, M., U.S. EPA	Charlevoix Municipal Well Site - December 2013 UST Confirmation Field Work	8
18	914921	03/27/14	Bakkila, M., U.S. EPA START	Ohl, M., U.S. EPA	Charlevoix Municipal Well Site - UST Sampling Results	8
19	914919	08/11/14	Dollhopf, R., U.S. EPA	Dawson, N., MDEQ	U.S. EPA Letter - Request for Applicable or Relevant and Appropriate Requirements (ARARs) for the Charlevoix Municipal Well Site	1
20	914933	-	Dawson, N., MDEQ	Dollhopf, R., U.S. EPA	MDEQ Letter - ARARs for the Charlevoix Municipal Well Site	1
21	914918	09/01/05	ATSDR	File	ATSDR Tox Fact Sheet - Acrolein - CAS # 107-02-8	2

ENFORCEMENT ADDENDUM

HAS BEEN REDACTED – FIVE PAGES

ENFORCEMENT CONFIDENTIAL

NOT SUBJECT TO DISCOVERY

FOIA EXEMPT

NOT RELEVANT TO SELECTION

OF REMOVAL ACTION