CON 12-15
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CERCLA PRE-REMEDIAL

EXTENDED SITE SCREENING WORK PLAN RESULTS

FOR THE

BOONE CISTERN

BOONE, BOONE COUNTY, IOWA

SEPTEMBER 2, 2014

IOWA DEPARTMENT OF NATURAL RESOURCES

Prepared by

Tami Quam
IDNR Project Manager
Contaminated Sites Section

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1.0 INTRODUCTION

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA) the Iowa Department of Natural Resources, Contaminated Sites Section (Department), is conducting a CERCLA Pre-Remedial Extended Site Screening (ESS). The purpose of this investigation was to evaluate volatile organic compounds (VOCs) observed in a cistern to determine the possible source of contamination and the presence or absence of a hazardous condition.

2.0 SITE DESCRIPTION

2.1 Location

The site consists of a cistern discovered along 6th Street at the intersection of Story Street in Boone during a sanitary sewer project. Due to the fact that several utilities have been installed in the vicinity of the cistern, the site has been extended to include the property north of the cistern located at 605 Story Street. See Appendix A, Figure 1, Site Location.

2.2 Site Description

The site is currently used as a bakery (Van Hemert's Dutch Oven Bakery) with Iowa State University Extension operating out of the basement. The site is owned by Dutch Oven Bakery Inc. and consists of 0.25 acres that includes a 4,668 square foot commercial building with a paved parking lot. Historically, the site operated as a filling station from about 1932 to 1956 and gas tanks were identified in a 1925 Sanborn Map in the southeast corner of the property near the cistern.

2.3 Operational History and Waste Characteristics

This site came to our attention when the City of Boone discovered the cistern while excavating a boring pit for a trenchless sanitary sewer installation. The City opened the cistern to collect a sample of the fluid inside but while waiting for the results, a thunderstorm passed through town filling the cistern and bore pit with storm water. Due to the rain event, the City pumped out about 9,000 gallons of liquid from the cistern and bore pit which were stored in a tanker truck onsite. A second water sample was collected from the tanker truck to determine proper disposal of the liquid. The cistern collapsed when the City attempted to dig down next to it to determine if all of the contents were removed. Therefore, the City removed the collapsed cistern along with surrounding debris and/or soil to ensure there would be no voids under the existing road. Excavated debris/soil was stockpiled onsite and sampled to determine proper disposal.

In the first cistern sample collected on June 2, 2010, several metals and volatile organic compounds (VOCs) were detected but only concentrations of arsenic, lead, mercury, benzene, hexane, 1,1,2,2-tetrachloroethane, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene exceeded an applicable standard. There were several analytes detected in the second cistern sample collected on June 14, 2010, after the rain event; however, only concentrations of benzene, TEH as diesel, and TEH as waste oil exceeded an applicable standard. The benzene concentration increased slightly after the rain event

while TEH was not analyzed in the first cistern sample. Due to the amount and elevated concentrations of contaminants observed in the cistern and the unknown source of contamination in the cistern, additional investigation was conducted to determine the existence of contaminated groundwater in the vicinity.

2.4 Geology

The site is located in the Des Moines lobe of the Wisconsin glaciated area of north central Iowa. While there are a limited number of wells in the site vicinity, boring and well logs from the general area indicate that there is about 195 feet of clay over shale and sandstone. Boring logs for a nearby Leaking Underground Storage Tank (LUST) site [9LTE24] were drilled to 15 feet deep with groundwater observed at depths of 8 to 10 feet. The boring logs generally indicated silty clay throughout the borings with traces of sand and/or gravel observed periodically. The site is about 3 miles east of the Des Moines River.

3.0 FIELD ACTIVITIES

Field personnel (Tami Quam, Hylton Jackson, and Angie Clark) were onsite June 16, 2014. Prior to the commencement of field activities, field team members were made aware of underground utility locate markings and sample point locations were adjusted to stay clear of any hazard. Above ground utilities were also noted as the Geoprobe extends 12 feet above the ground surface. Fieldwork was performed in Level 'D' Personal Protection Equipment as described by the Occupational Safety and Health Guidance Manual as noted in the Health and Safety Plan.

4.0 COLLECTION OF NON-SAMPLING DATA

Boring logs from nearby Leaking Underground Storage Tank (LUST) sites were reviewed to determine the geology of the site vicinity. Borings drilled in the site vicinity were generally 15 feet deep and consisted of silty clay. Groundwater was observed at the nearby LUST sites at 8 to 10 feet deep.

5.0 COLLECTION OF SAMPLING DATA

5.1 Soil Samples

No soil samples or soil cores were collected as part of this investigation.

5.2 Groundwater Samples

The Departments' Geoprobe® screen point 15 groundwater sampler was used to collect groundwater samples at two locations onsite (TMW-1 and TMW-2). The sampler was drilled to depths of 19 to 23 feet deep. TMW-1 was initially drilled to 19 feet deep but was dry so the boring was redrilled (TMW-1R) to 23 feet deep and screened from 19 to 23 feet. A groundwater sample (TMW-1R) and a duplicate groundwater sample (TMW-1D) were collected from TMW-1R. TMW-2 was drilled to 19 feet deep and screened from 15 to 19

feet. A groundwater sample (TMW-2) was collected from TMW-2. An oily sheen was observed in TMW-2 and a petroleum odor was observed in both borings. See Appendix A, Figure 2 for sample locations.

All of the groundwater samples and a trip blank were submitted to the State Hygienic Laboratory (SHL) for analysis of volatile organic compounds (VOCs). A summary of the analytical results for the groundwater samples are presented below in Section 6.0 CONCLUSIONS AND RECOMMENDATIONS. See Appendix B for Chain of Custody and analytical results.

5.3 Sample Handling

Sample containers, preservation, and holding times were followed as listed in the SHL Guidebook, which describes the required sample submission information for SHL. Each sample had a label attached to the sample container. Labels were supplied by SHL with a SHL identification number. The facility, location, or sample identification were site-specific and descriptive of where the sample was taken. Date, time, and collector's name were also written on the sample label. All sample labels were completed in waterproof ink.

The groundwater samples were stored in a cooler at or below 4°Celsius and maintained in the custody of the collector until submitted directly to SHL in Ankeny on June 16, 2014. Chain-of-Custody (COC) forms were used to document samples collected and submitted for laboratory analyses. Upon receipt of the samples, laboratory personnel signed and retained the COC form and the IDNR Project Manager received a copy of the form.

All groundwater samples were collected in a manner utilizing the procedures in 'ASTM D6001-96e1, Standard Guide for Direct-Push Water Sampling for Geo-Environmental Investigations', and 'Geoprobe® Screen Point 15 Groundwater Sampler SOP; Technical Bulletin No. 95-1500' both for direct push groundwater sampling. All groundwater collecting equipment was decontaminated after sample collection was complete at each location in accordance with Quality Assurance Project Plan for Iowa Department of Natural Resources Land Quality Bureau Contaminated Sites Section.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Acetone was observed in TMW-1R and TMW-1D at concentrations of 8 and 11 ug/L respectively which do not exceed the protected groundwater standard of 6,300 ug/L. No other VOCs were observed in the groundwater samples from TMW-1R. Benzene, ethylbenzene, and xylenes were observed in TMW-2 at concentrations of 180 ug/L, 290 ug/L, and 540 ug/L respectively. The actual groundwater ingestion standards from the Tier 1 Look Up Table for benzene, ethylbenzene, and xylene are 5 ug/L, 700 ug/L, and 10,000 ug/L respectively. No other VOCs were observed in TMW-2 and only the concentration of benzene observed exceeded the actual groundwater ingestion standard but was below the potential groundwater ingestion standard from the Tier 1 Look Up Table. See Table 1 below for additional information.

Table 1 –Groundwater Results (ug/L)

	Acetone	Benzene	Ethylbenzene	Xylenes
TMW-1R	8	<5	<5	<5
TMW-1D	11	<5	<5	<5
TMW-2	<100	**180**	290	540
LRP Protected Groundwater Standard	6,300	-	-	-
LRP Non-protected Groundwater Standard	32,000	-	-	-
Tier 1 Look Up Table- Actual Groundwater Ingestion	-	5	700	10,000
Tier 1 Look Up Table- Potential Groundwater Ingestion	-	290	3,700	73,000

The extent of groundwater contamination has not been determined but is likely related to the filling station previously located on the property north of the cistern where TMW-2 was located. The filling station appears to have been located on the northern property from 1932 to 1956. In addition, a 1925 Sanborn map identified gasoline tanks in the vicinity of TMW-2. Due to the historic nature of the release, low concentrations of contamination observed, and the lack of nearby receptors of concern, additional investigation is not required at this time.

APPENDIX A

FIGURES

Figure 1 - Site Location
Figure 2 - Sample Locations

BOONE CISTERN ESS

Figure 1 – Site Location

Boone Cistern ESS

Boone, Iowa

Figure 2 – Sample Locations

Boone Cistern ESS

Boone, Iowa

APPENDIX B

SHL RESULTS

BOONE CISTERN ESS

State Hygienic Laboratory

The University of Iowa

Accession Number	169934
Date Sample Finalized	2014-06-24 10:10
Date Received	2014-06-16 14:56
Sample Source	Non-Drinking Water
Project	WMSF
Date Collected	2014-06-16 09:10
Collection Site	tmw-1r
Collection Town	BOONE
Sample Description	ground water
Client Reference	7533/1553
Collector	quam tamy
Phone	515/281-4420

TAMY QUAM
IDNR CONTAMINATED SITES
LAND QUALITY BUREAU
502 E 9TH STREET
DES MOINES, IA 50319-0034

Note: Upon arrival, sample met container and preservation requirements for the analysis requested. Please review carefully your sample results for additional analyte comments or method exceptions.

Results of Analyses

GCMS Volatiles, EPA 8260

Units	ug/L	Analyzed In	Coralville
Date Analyzed	2014-06-23 09:07	Date Verified	2014-06-24 10:10
Analyst	LJL	Verifier	TGC

Analyte	Result	Quant Limit
Chloromethane	<5	5
Bromomethane	<5	5
Vinyl chloride	<5	5
Chloroethane	<5	5
Methylene chloride	<5	5
Methyl-t-butyl ether (MtBE)	<5	5
Acetone	8	5
Carbon disulfide	<5	5
1,1-Dichloroethene	<5	5
1,1-Dichloroethane	<5	5
Total 1,2-Dichloroethenes	<5	5
Chloroform	<5	5
1,2-Dichloroethane	<5	5
2-Butanone	<5	5
1,1,1-Trichloroethane	<5	5
Carbon tetrachloride	<5	5
Bromodichloromethane	<5	5
1,2-Dichloropropane	<5	5
cis-1,3-Dichloropropene	<5	5
Trichloroethene	<5	5
Dibromochloromethane	<5	5
1,1,2-Trichloroethane	<5	5
Benzene	<5	5
trans-1,3-Dichloropropene	<5	5
Bromoform	<5	5
4-Methyl-2-pentanone	<5	5
2-Hexanone	<5	5

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Lakeside Laboratory
1838 Highway 86
Milford, IA 51351
712/337-3669 ext. 6 Fax: 712/337-0227

Iowa Laboratories Complex
2220 S. Ankeny Blvd
Ankeny, IA 50023
515/725-1600 Fax: 515/725-1642

Accession Number | 169934

Analyte	Result	Quant Limit
Tetrachloroethene	<5	5
1,1,2,2-Tetrachloroethane	<5	5
Toluene	<5	5
Chlorobenzene	<5	5
Ethylbenzene	<5	5
Styrene	<5	5
Total Xylenes	<5	5

Description of Units used within this report

ug/L = Micrograms per Liter

The result(s) of this report relate only to the items analyzed. This report shall not be reproduced except in full without the written approval of the laboratory.

Iowa Environmental Laboratory IDs are: Ankeny #397, Iowa City/Coralville #027, Lakeside #393.

If you have any questions, please call Client Services at 800/421-IOWA (4692) or 319/335-4500. Thank you.

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State Hygienic Laboratory

The University of Iowa

Accession Number	169935
Date Sample Finalized	2014-06-24 10:11
Date Received	2014-06-16 14:56
Sample Source	Non-Drinking Water
Project	WMSF
Date Collected	2014-06-16 09:05
Collection Site	tmw-1d
Collection Town	BOONE
Sample Description	ground water
Client Reference	7533/1553
Collector	quam tamy
Phone	515/281-4420

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Results of Analyses

GCMS Volatiles, EPA 8260

Units	ug/L	Analyzed In	Coralville
Date Analyzed	2014-06-23 09:33	Date Verified	2014-06-24 10:11
Analyst	LJL	Verifier	TGC

Analyte	Result	Quant Limit
Chloromethane	<5	5
Bromomethane	<5	5
Vinyl chloride	<5	5
Chloroethane	<5	5
Methylene chloride	<5	5
Methyl-t-butyl ether (MtBE)	<5	5
Acetone	11	5
Carbon disulfide	<5	5
1,1-Dichloroethene	<5	5
1,1-Dichloroethane	<5	5
Total 1,2-Dichloroethenes	<5	5
Chloroform	<5	5
1,2-Dichloroethane	<5	5
2-Butanone	<5	5
1,1,1-Trichloroethane	<5	5
Carbon tetrachloride	<5	5
Bromodichloromethane	<5	5
1,2-Dichloropropane	<5	5
cis-1,3-Dichloropropene	<5	5
Trichloroethene	<5	5
Dibromochloromethane	<5	5
1,1,2-Trichloroethane	<5	5
Benzene	<5	5
trans-1,3-Dichloropropene	<5	5
Bromoform	<5	5
4-Methyl-2-pentanone	<5	5
2-Hexanone	<5	5

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Accession Number | 169935

Analyte	Result	Quant Limit
Tetrachloroethene	<5	5
1,1,2,2-Tetrachloroethane	<5	5
Toluene	<5	5
Chlorobenzene	<5	5
Ethylbenzene	<5	5
Styrene	<5	5
Total Xylenes	<5	5

Description of Units used within this report

ug/L = Micrograms per Liter

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State Hygienic Laboratory

The University of Iowa

Accession Number	169936
Date Sample Finalized	2014-06-30 09:40
Date Received	2014-06-16 14:56
Sample Source	Non-Drinking Water
Project	WMSF
Date Collected	2014-06-16 09:45
Collection Site	tmw-2
Collection Town	BOONE
Sample Description	ground water
Client Reference	7533/1553
Collector	quam tamy
Phone	515/281-4420

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Note: Upon arrival, sample met container and preservation requirements for the analysis requested. Please review carefully your sample results for additional analyte comments or method exceptions.

Results of Analyses

GCMS Volatiles, EPA 8260

Units	ug/L	Analyzed In	Coralville
Date Analyzed	2014-06-23 11:43	Date Verified	2014-06-30 09:40
Analyst	LJL	Verifier	TGC

Analyte	Result	Quant Limit
Chloromethane	<100	100
Bromomethane	<100	100
Vinyl chloride	<100	100
Chloroethane	<100	100
Methylene chloride	<100	100
Methyl-t-butyl ether (MtBE)	<100	100
Acetone	<100	100
Carbon disulfide	<100	100
1,1-Dichloroethene	<100	100
1,1-Dichloroethane	<100	100
Total 1,2-Dichloroethenes	<100	100
Chloroform	<100	100
1,2-Dichloroethane	<100	100
2-Butanone	<100	100
1,1,1-Trichloroethane	<100	100
Carbon tetrachloride	<100	100
Bromodichloromethane	<100	100
1,2-Dichloropropane	<100	100
cis-1,3-Dichloropropene	<100	100
Trichloroethene	<100	100
Dibromochloromethane	<100	100
1,1,2-Trichloroethane	<100	100
Benzene	180	100
trans-1,3-Dichloropropene	<100	100
Bromoform	<100	100
4-Methyl-2-pentanone	<100	100
2-Hexanone	<100	100

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Analyte	Result	Quant Limit
Tetrachloroethene	<100	100
1,1,2,2-Tetrachloroethane	<100	100
Toluene	<100	100
Chlorobenzene	<100	100
Ethylbenzene	290	100
Styrene	<100	100
Total Xylenes	540	100

Note: A variety of hydrocarbons were observed in the analysis of this sample.

Description of Units used within this report

ug/L = Micrograms per Liter

Iowa Environmental Laboratory IDs are: Ankeny #397, Iowa City/Coralville #027, Lakeside #393.

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