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CERCLIS No.

## 1. INTRODUCTION

Under authority of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), the Superfund Amendments and Reauthorization Act of 1986 (SARA), and a State/EPA agreement, the Iowa Department of Natural Resources (IDNR) conducted a preliminary assessment (PA) at a site known as IDOT Maintenance Garage in Mason City.

The purpose of this investigation was to collect sufficient information concerning conditions at the site to assess the threat posed to human health and the environment and to determine the need for additional CERCLA/SARA or other appropriate action. The scope of this investigation included review of available file information, a comprehensive target survey, and an onsite reconnaissance to collect information and photographs (Fig.1-1).

## 2. SITE DESCRIPTION, OPERATIONAL HISTORY, AND WASTE CHARACTERIZATIONS

### 2.1 Location

The Iowa Department of Transportation (IDOT) Maintenance Garage is located at 680 6th Street, Southeast, in Mason City, Iowa. Geographic coordinates for the IDOT site are 43° 8' 49.46" N latitude and 93° 11' 21.96" W longitude (Ref.1). Figure 2-2 shows the site location.

### 2.2 Climate

The average summer temperature in Mason City is 70.7 °F with daytime temperatures reaching 90° F or more. The winter months average 18.2° F and the average annual rainfall is 31.4 inches (Ref.2,p.103).

### 2.3 Site Description

The IDOT garage is located in a residential area of Mason City. The site is bounded by residential areas on all sides. Railroad tracks are located to the east and west of the facility (Fig.2-2).

The area is fenced and the gates secured at night (Ref.20). The surface is mostly asphalt covered with some grassy areas (Fig.2-1). Surface drainage flows east to a drainage ditch which runs parallel to the railroad tracks located east of the site. The water then flows to the northeast to the nearest road and disappears underground.

The extent of contamination is unknown so a conservatively estimated area of 5.33 acres is proposed by considering the area of the property (Fig.2-3).

## 2.4 Operational History and Waste Characteristics:

This has been the site of an IDOT maintenance garage since the 1930's (Ref.14). In 1988, a 500 gallon diesel underground storage tank (UST) and a 500 gallon waste oil UST were removed (Ref.3; Ref.20).

In October 1991, evidence of contaminated soil was discovered during the removal of two 1000-gallon diesel USTs (Ref.3). Soil samples collected during the tank removal indicated levels up to 11,000 ppm total extractable hydrocarbons (TEH) from soil near the piping of UST #2 and up to 78 ppm TEH from soil near the center piping of UST #1 (Fig.2-4; Ref.4). Green soil with a diesel odor was noted during the removal of UST #2 (Ref.4,p.2).

Shallow monitoring wells (the deepest being 9.5 below the ground surface) had originally been installed at each end of the USTs but none of the monitoring wells ever had water in them (Ref.5,p.1). The tanks were situated on 6 to 12 inches of sand covering fractured limestone bedrock (Ref.4,p.2; Ref.5).

In October of 1992, Monitoring well (MW) 1 was installed north of UST #2 and a groundwater sample indicated levels of benzene at 2200 ppb, toluene at 5700 ppb, xylene at 6700 ppb, ethyl benzene at 560 ppm, gasoline at 46,000 ppb, and TPH at 17 ppb. Additionally, the gas chromatograph/mass spectrometer (GC/MS) analysis indicated the presence of naphthalene, 2-methylnaphthalene, 2,4-dimethyl phenol, bis (2-ethylhexyl) phthalate, and approximately 200 other hydrocarbon compounds. These additional compounds ranged from light aromatics to relatively long-chain aliphatics and did not match the laboratory's fuel or oil standards (Ref.6). At this point, the site was referred to the solid waste section of the IDNR to assess the significance of these additional compounds.

In December 1992, MW-1 was sampled by the consultant for priority pollutants - volatiles and base-neutrals. The results indicated 316 ppb trichloroethene, 283 ppb naphthalene and 160 ppb bis (2-ethylhexyl) phthalate in addition to 2250 ppb benzene, 1160 ppb ethyl benzene, 5920 ppb toluene and 6800 total xylenes (Ref.17).

In April of 1993, MW-2 and MW-3 were installed south of UST #1 and south of a 10,000 gallon gas/gasohol tank which was recently removed (Fig.2-5; Ref.15).

On May 6, 1993, the three monitoring wells were sampled by the consultant (W.E. Miner Environmental Consultants, Inc.) for benzene, toluene, ethyl benzene and xylene (BTEX). At that time, samples were collected by IDNR and analyzed for priority pollutant volatiles and semivolatiles. In addition to BTEX, 140 ppb naphthalene, 39 ppb methyl naphthalene, 340 ppb acetone, and 28 ppb bis (2-ethylhexyl) phthalate were detected. Unknown and tentatively identified semivolatiles were also detected in the three monitoring wells with most of the contamination occurring in MW-1. Figure 2-6 summarizes the May 6 sampling results. During the site visit, 5 sumps were observed in the maintenance garage and one sump was observed west of the garage. Four of the sumps connect to a storm sewer located south of the garage. Two of the sumps, in the older (north) part of the building terminate at an unknown location.

## 3. GROUND WATER PATHWAY

### Regional Hydrogeologic Setting

Soil in the area is classified as Saude loam, with 0 to 2% slopes. This well-drained soil occurs mostly on stream benches. The surface layer is typically about 8 inches of very dark brown loam. The subsurface and subsoil are about 17 inches thick and change from loam to sandy loam with depth. The substratum is dark yellowish-brown friable sandy loam to a depth of about 72 inches. Saude soil has a low water capacity and is droughty during years of low moisture. Permeability is moderate in the loamy subsoil and

very rapid in the sandy substratum. Surface run-off is slow. Reaction is typically medium acid to neutral in the surface layer and medium acid to strongly acid in the subsoil. The plow layer contains about 3% organic matter (Ref.10,p.31).

The topography of Mason City is characterized by gently undulating glacial till plains. The thickness of the glacial drift is highly variable but is generally less than 20 feet thick in Mason City. The bedrock surface in Mason City is made up of Devonian age rock which has been locally modified by erosion. Younger rocks of Devonian and Mississippian age were deeply eroded before and during the deposition of glacial deposits. These erosional and depositional processes created an irregular bedrock surface that is buried beneath glacial drift and alluvium (Ref.8,p.21; Ref.9,p.13).

In the Mason City area, there are two surficial aquifer types (alluvial and glacial drift) and three bedrock aquifers available for use as sources of water. Alluvial and outwash deposits occur along stream courses (Ref.7, p.32). Unconsolidated deposits of sediment near the surface comprise the surficial aquifers and confining beds ((Ref.7,p.28). Underlying these deposits are layers of consolidated sedimentary rock. The rock units that yield significant quantities of water in the Mason City area are the Devonian aquifer, the Cambrian-Ordovician aquifer and the Dresbach aquifer (Ref.7,p.28).

The major aquifers in the Mason City are comprised of Cambrian-Ordovician systems. The formations which make up the principal aquifers include the St. Peter Sandstone, Prairie du Chien group, and the Jordan Sandstone. The Jordan Sandstone is the most productive aquifer in Cerro-Gordo County and is extensively used in the Mason City area for industrial and municipal purposes (Ref.8,p.24). Wells completed through the Jordan aquifer range in depth from 1200 to 1500 feet and can produce up to 1200 gallons per minute (gpm). Most of these wells are also open to the overlying Prairie du Chien group and St. Peter aquifer.

#### Site Specific Geologic Setting:

Glacial drift is less than 20 feet thick in this area (Ref.7,p.32). Uppermost bedrock near the site is of Devonian age and is composed primarily of limestone and dolomite, with some interbedded shales. Willow Creek, located near the site, is eroded deeply into the Shell Rock Formation (Ref.8,p.21). Well logs for the onsite monitoring wells indicated clay overlaying fractured and weathered limestone. The limestone was encountered at depths ranging from 8 feet to 17 feet (Fig.3-1a,b&c). A crevice was encountered from 21 to 63 feet in MW-1. The static water level was 41 feet in MW-1 during October 1992 (Ref.4; Fig.3-1). The static water levels in the other two wells and the groundwater flow direction have not yet been determined.

### 3.2 Ground water Targets

Mason City has 10 wells, of which 8 are available for use. All of the wells feed a common wet well. Wells #14, #12 and #16 are outlying wells and each supply approximately 25% of the water to the wet well, comprising 75% of the total water. Wells #7, #8, #9, and #10 are clustered and are used as needed to supply the remainder of the water to the wet well. Well #A1 is for future use, #A2 has been properly abandoned and #A3 is used as a back-up well (Ref.21).

The municipal wells are located within 1.5 miles of the site. The nearest municipal well is about 0.5 mile southeast of the site and other wells are located to the northwest and to the southwest (Fig.3-2; Ref.1; Fig.3-3; Ref.11). The wells all tap the Jordan aquifer at depths exceeding 1200 feet. All of the wells, except #16, are reportedly cased to a depth of 100 feet. The wells are then open until the St. Peter

formation is reached where the casing is continued. After the St. Peter, the wells are open to the bottom (Ref.12). Well #16 is reportedly cased to a depth of 960 feet (Ref.12).

Two abandoned (and plugged) private wells were identified. No private drinking water wells were identified and none are expected because of the location of the site within Mason City. Water use data was reviewed and a bottling company, permitted to use well water in food production, is located 2 miles east of the site (Ref.1). This company is located on the other side of the Winnebago River and impacts from this site are not expected. Other permitted groundwater uses include recreation and manufacturing, located outside the 2 mile radius (Ref.1).

### 3.3 Ground water Conclusions

Impacts to drinking water are unknown. Synthetic organic compound (SOC) testing requirements for Mason City have not revealed a problem to date. Contamination by a leaking diesel UST has been documented. The source of contamination by the additional hydrocarbon compounds is not known for certain. However, because the maintenance garage has been located at this site for a long time, it is quite possible that past solvent use by the maintenance garage accounts for these additional compounds. The site needs to be hydrogeologically characterized and the extent of contamination needs to be defined.

## SURFACE WATER PATHWAYS

### 4.1 Hydrologic Setting

Overland drainage from the site flows to a drainage ditch which runs adjacent to the railroad tracks east of the site (Fig1-1b; Ref.18). The surface water disappears at the first street to the north but generally drains toward Willow Creek and the Winnebago River, located about 0.4 mile north and 0.7 mile northeast of the site, respectively. Willow Creek drains into the Winnebago River about 0.7 miles north of the site (Fig.2-1). The Winnebago River then flows to the southeast approximately 18 miles to its confluence with the Shell Rock River (Ref.16; Ref.19).

No gauging stations were identified for Willow Creek, however the Winnebago River has an average annual mean flow of 262 cfs at gauging station #05459500, located about one mile upstream from its confluence with Willow Creek (Ref.20).

Lack of vegetation was observed in the drainage ditch east of the site (Fig.1-1b). The lack of vegetation may be due to flowing water as no obvious chemical stress was observed. Willow Creek was observed at East Park, located about .4 miles north of the site (Fig.1-1f). Rainfall has been unusually heavy during the spring so above normal flows were observed. The site is located outside the 500-year flood boundary (Ref.13).

### 4.2 Surface Water Targets

No drinking water intakes were identified within 15 downstream miles of the site (Fig.4-1; Ref.1). Water use permits were reviewed and identified uses include recreation, materials production at quarries and farm use for general and specialty crops (Ref.1).

Willow Creek is considered a significant fishery for smallmouth bass and the Winnebago River is considered a significant fishery channel catfish, northern pike and smallmouth bass. Based on record

searches, other sensitive environments are located at distances which would indicate impacts from this site are unlikely (Fig.4-2).

#### 4.3 Surface Water Conclusions

Surface drainage from the site needs to be investigated to determine whether contaminants are moving from the site via the surface water pathway. The area east of the site, where a storm discharge is located, may need to be sampled. The nearest surface water target appears to be Willow Creek, located 0.4 mile north of the site. Measurable surface water impacts are not expected because of the distance from the site and the amount of flow at Willow Creek.

### 5. SOIL EXPOSURE AND AIR PATHWAYS

#### 5.1 Physical Conditions

The property is fenced around the perimeter with 6 foot tall chain link fence and barbed wire above the chain link. A gate is located at the entrance and locked every night (Ref.20). The traveled surface is asphalt. Some grassy areas are present around the edge of the facility.

#### 5.2 Soil and Air Targets

There are 12 to 15 workers onsite at the maintenance garage (Ref.15). The nearest residence is located approximately 100 feet east of the site (Fig.1-1b; Ref.21) and the site is located in a residential area of Mason City.

The estimated population within a four-mile radius from the site is as follows:

>0 TO 1/4 MILE = 825  
>1/4 MILE TO 1/2 MILE = 2218  
>1/2 MILE TO 1 MILE = 6730  
>1 MILE TO 2 MILES = 10439  
>2 MILES TO 3 MILES = 4452  
>3 MILES TO 4 MILES = 3249

POPULATION FIGURES ARE FROM THE 1990 CENSUS FOR IOWA ONLY

#### 5.3 Soil and Air Pathway Conclusions

The site is covered with asphalt or well vegetated, and is fenced to prevent unauthorized access. The physical nature of the site suggest that impacts by the soil and air pathways are unlikely.

### 6. SUMMARY AND CONCLUSIONS

The contamination at this site may or may not be petroleum-derived. Additional sampling is needed to define the actual source of contamination as well as the extent of contamination. Acetone and trichloroethene (TCE) were detected in MW-1, however, acetone was detected at a level which falls below the current pseudo-Health Advisory Level (HAL) of 700ppb (Ref.24) and the TCE was not detected in any of the IDNR samples. This site appears to be a LUST site but the presence of solvents and unknown hydrocarbons should be addressed.

The groundwater pathway is of most concern at this site because groundwater contamination has been documented in fractured limestone bedrock conditions. The municipal wells are located from 0.5 mile to about 1.5 miles from the facility.

Surface drainage from the site needs to be investigated to determine whether contaminants are moving from the site via the surface water pathway.

Based on information collected to date, the soil and air pathways do not appear to pose a significant threat. More information is needed on the history of disposing of wastes and the discharge location for the older sumps.

#### RECOMMENDATIONS:

1. The site subsurface needs to be characterized hydrogeologically, including groundwater flow direction(s) and hydraulic gradients.
2. The extent of groundwater contamination needs to be defined.
3. The surface water drainage pathway should be sampled.
4. Soil samples may be needed along the surface water pathway.
5. Information is needed on the discharge location of the older sumps.

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