

WILLIAMS/ (MAGELLAN) DES MOINES TERMINAL

(Des Moines, Iowa)

GENERAL DESCRIPTION

The site is located on approximately 116 acres in the East 1/2 of Section 17, T78N, R23W, at 2503 SE 43rd Street, Pleasant Hill in Polk County, Iowa. The site was entered on the Registry in August 1990. The Complex handles and stores various petroleum products. The site has been in continuous operation since the early 1930s. Presently the site consists of 47 aboveground tanks and several tank car and truck loading racks. All the tanks are contained within berms. Additional steps have been taken since a 1997 spill to prevent future releases. This includes a tank trending program with regular static checks, the installation of fiberglass over all the metal tank bottoms, and providing cathodic protection to all tanks and lines.

The Des Moines terminal is under new ownership. On April 23, 2003 Williams Co announced the sale of Williams Energy Partners, LP. The Des Moines Terminal was included in this sale. The terminal is now owned by **Magellan Pipeline Company** and will be referred to as the **Magellan Des Moines Terminal**.

SITE CLASSIFICATION

The site is classified "b" in accordance with 455B.427.3. Hazardous substances have been disposed of at the site, posing a significant threat to the environment.

TYPE AND QUANTITY OF HAZARDOUS WASTE

Spills of over 2,000,000 gallons of petroleum products at and near the site have caused widespread contamination both on-site and off-site of the Des Moines River alluvial aquifer. In January 1982, a pipeline break on the east side of the site released approximately 840,000 gallons of diesel fuel that flowed into the swamp that forms the southeast corner of the site. As part of the cleanup of this off-site spill the swamp was drained of water, which may have contributed to contamination of sediments in the swamp. Other on-site spills occurred in March 1986 and July 1990. During the 1986 spill, an estimated 11,760 gallons of diesel were released from a leak in Tank 620. During the 1990 spill, an estimated 3,000 gallons of diesel were released from Tank 618 (located on the eastside of Tank 620). The largest spill appears to have occurred in 1997 when 1,260,000 gallons of gasoline were released from piping associated with Tank 1310. This tank is located on the northeast part of the site and much of the free product of the release migrated offsite to the east.

Southwest Corner Area

The presence of free product and groundwater contamination on the southwest part of the site was initially discovered in August 1982. Two monitoring wells were installed as part of limited investigation of a suspected gasoline leak. The sample results indicated the presence of floating free product in the area. Subsequently, a three phase hydrogeologic investigation was performed in 1983. This included the installation of one, then another five, and finally an additional fifteen groundwater monitoring wells, to track the extent of free product and the contaminated groundwater plume. The results of monitoring in December 1989 and February 1990 indicated free product was moving off-site to the southwest. Another site investigation was conducted in September 1990 to determine the extent of this migration. The investigation included the installation of three more monitoring wells.

Other Sources

From 1935 to 1979, the Williams Pipe Line Company disposed of approximately 2,600 gallons of leaded petroleum tank bottom sludge at the site. During September 1989, the EPA conducted a Site Investigation (SI) which was limited to a consideration of the potential impact of the tank bottom sludge disposal. The EPA was unable to identify the suspected sludge disposal areas during their investigation.

SUMMARY OF PUBLIC HEALTH AND ENVIRONMENTAL CONCERNS

The site is situated in a rural-industrial setting adjacent to the eastside of Des Moines, Iowa. The site is located approximately 2,000 feet north of the Des Moines River and lies within its floodplain. The threat of off-site migration of contaminants by flooding is limited by a 100-year flood levee maintained by the U.S. Army Corps of Engineers. The Des Moines Municipal Water System intakes are approximately ten miles upstream of the site. The site overlies the alluvial sediments of the Des Moines River flood plain. These sediments are predominantly sand and gravel sediments of the unconfined alluvial aquifer

A wetland area referred to as the "swamp" is located within the southeast corner of the site. The swamp contains a shallow "burn" pond on its west end near Highway 46. Occasional overflow from the swamp discharges east to the Des Moines River. The swamp has been subjected to oil spills and other waste disposal activities. Sediment samples collected from the swamp in November 1990 and January 1991 showed total extractable hydrocarbon (TEH) levels as high as 17,000 ppm. Many of the sample results had chromatographic profiles similar to the laboratory diesel fuel standard.

SUMMARY OF ASSESSMENT, MONITORING OR REMEDIAL ACTIONS

There are two major remediation area at the Magellan Des Moines Terminal designated as the Northeast Area and the Southern Area. The following is a summary of the current status of the projects and changes that were implemented in 2007.

NORTHEAST AREA

There are four systems that are operational in the northeast area, Systems 1, 2, and 3, and the Air Lift Circulation (ALC) Trench. Systems 1, 2, and 3 are a series of 93 wells that can operate in Soil Vapor Extraction (SVE) or sparging mode or a combination of both. There are three separate control systems for these 93 wells. Soil Vapor Extraction (SVE) remediates the unsaturated soil by recovering volatiles from the soil with airflow and by adding oxygen to the unsaturated zone to enhance bioremediation. Air Sparging (AS) remediates the dissolved phase impacts by adding oxygen to the groundwater to enhance bioremediation and strip VOCs from the groundwater. Due to a significant decline in the mass recovery of petroleum hydrocarbons, TRC Companies, Inc., and Apex Companies, LLC, proposed implementation of in-situ biosparging instead of continuing with soil vapor extraction (SVE). The proposed work plan (received at Iowa DNR Field Office 5 on July 18, 2007) stated that biosparging should enhance naturally occurring biodegradation processes through the addition of oxygen and nutrients. The new work plan will be to operate selected wells in sparging mode only. This change in operations was implemented on September 11, 2007.

The other operational system in the Northeast Area is the Air Lift Circulation (ALC) Trench which is a remediation system installed east (down gradient) of the main area of contamination and Systems 1, 2, and 3. The objective of this remediation system is to capture and remediate the groundwater that is migrating from the Northeast Area of the terminal toward the Des Moines River. The ALC Trench remediation system consists of 12 air-lift wells that extract groundwater and discharge to an open infiltration trench. The air-lift pumping process and the open trench add oxygen to the groundwater. The extraction/infiltration causes vertical circulation in the aquifer, which distributes the oxygen into the formation to stimulate aerobic biodegradation. Additionally, Volatile Organic Compounds (VOCs) are stripped from the groundwater by the air-lift pumping process. The ALC Trench continues to be operated without any modification; during April 2009 the ALC Trench wells were redeveloped to allow greater groundwater recovery.

There was a fifth remediation system in the Northeast Area called the Levee Air Sparge System. This was a series of Air Sparge wells installed east of the ALC Trench near the river levee to capture and remediate any contamination that had already gone beyond the ALC Trench. This system was shut down in March 2003.

System air emissions from the Northeast Area and Southern Area SVE systems were treated by a catalytic oxidation (CatOx) air treatment unit to meet Polk County Title V Air Emission Standards for the facility. Since the systems

are now operating in biosparge mode only they do not produce air emissions that require treatment by the CatOx. The CatOx system has also been shut down.

Site Monitoring

In the Semi-Annual Monitoring Report for the period October 2008 through March 2009 (Samples collected on December 22, 2008 and March 9 – 11, 2009) the results for the Northeast Area are as follows:

In the northeast area free product was only detected in well MPE-11 – 0.08' during the March 2009 sampling event. A sample of the free product was collected and analyzed for age dating and fuel type determination. Analytical results showed the sample to be 90% regular grade gasoline and 10% diesel/fuel oil. The gasoline was estimated to have been manufactured in approximately 1990; the diesel/fuel oil portion was determined to be relatively “fresh” or of recent manufacture.

Of the monitoring wells sampled MW97-33, MW97-37, MW97-39, MW97-40, MW99-47A and MW00-55A exceeded at least one of the parameters of the agreed to groundwater clean up goals (benzene 3.88 mg/L, toluene 1.9 mg/L, ethylbenzene 1.3 mg/L, xylenes 1.65 mg/L, & MTBE 13.0 mg/L). Monitoring wells MW97-33 (8.89 mg/L) and MW97-37 (9.05 mg/L) exceeded the level for benzene, MW97-37 (2.88), MW97-39 (12.40 mg/L) and MW97-40 (2.47 mg/L) exceeded the level for toluene, MW 97-33 (2.44 mg/L), MW97-39 (2.12 mg/L), MW97-40 (1.55 mg/L) and MW990-47A (1.82 mg/L) exceeded the limit for ethylbenzene, and MW97-33 (11.30 mg/L), MW97-37 (5.45 mg/L), MW97-39 (11.70 mg/L), MW97-40 (8.14 mg/L), MW99-47A (10.50 mg/L), and MW00-55A (4.38 mg/L) exceeded the limit for xylenes. All of these were from the March sampling data.

In the Semi-Annual Monitoring Report for the period April 2009 through September 2009 (June 22 & 23, 2009 and September 21 – 23, 2009) the results for the Northeast Area are as follows:

In the northeast area free product was not detected in any of the wells.

None of the monitoring wells sampled showed contaminant levels that exceeded the parameters of the agreed to groundwater clean up goals (benzene 3.88 mg/L, toluene 1.9 mg/L, ethylbenzene 1.3 mg/L, xylenes 1.65 mg/L, & MTBE 13.0 mg/L).

Mass Recovered

There is no longer any type of mass recovery through remediation systems taking place since all systems are now (as of September 11, 2007) operating in biosparge mode. To date free product recovery in the Northeast Area is as follows, 576,828 gal. recovered in emergency response, Systems 1, 2, & 3 have recovered 222,390 gal in the liquid phase, and 627,832 gal. in the vapor phase.

SOUTHERN AREA

The southern area remediation system originally consisted of four operational areas that were installed in two phases. Phase 1 included the Manifold System with 24 Soil Vapor Extraction (SVE)/Density-Driven Convection (DDC) wells and the Train Rack System with 15 SVE/DDC wells. Additionally, SVE wells from the former perimeter SVE/AS remediation systems (units 2008, 2009, and 2010) were incorporated into the phase 1 system. The Phase 1 systems were constructed along the western border (train rack area) and southern border (manifold area) of the southern portion of the terminal. Phase 2 includes the Central System with 28 SVE/AS wells and the Western System with 16 SVE/AS wells. The Phase 2 systems are in the interior areas of the southern portion of the terminal bordered by the Phase 1 system wells. Soil Vapor Extraction (SVE) remediates the unsaturated soil by recovering volatiles from the soil with airflow and by adding oxygen to the unsaturated zone to enhance bioremediation. The DDC wells remediate groundwater by insitu stripping of Volatile Organic Compounds (VOCs) and enhanced bioremediation through addition of oxygen. Additionally the DDC system creates a zone of influence also called a circulation cell, which oxygenates and treats groundwater as it flows through the circulation cell area. Air Sparging (AS) remediates the dissolved phase impacts by adding oxygen to the groundwater to enhance bioremediation and strip VOCs from the groundwater. The manner of operation is dependent on groundwater elevations. Soil Vapor Extraction (SVE) systems are operated during low water table conditions to maximize vapor and VOC mass recovery. Dual Density Convection (DDC) systems are operated during high water table conditions to provide the subsurface with oxygen and to enhance biological degradation.

Due to a significant decline in the mass recovery of petroleum hydrocarbons, TRC Companies, Inc., and Apex Companies, LLC, proposed implementation of in-situ biosparging instead of continuing with soil vapor extraction (SVE). The proposed work plan (received at Iowa DNR Field Office 5 on July 18, 2007) stated that biosparging should enhance naturally occurring biodegradation processes through the addition of oxygen and nutrients. The new work plan was as follows; in the Phase 1 area the Manifold System will be shut down and the Train Rack System will be operated in DDC mode only. In the Phase 2 area the Western System will be shut down and the Central System will be operated in sparging mode only. This change in operations was implemented on September 11, 2007.

System air emissions from the Southern Area and Northeast Area SVE systems were treated by a catalytic oxidation (CatOx) air treatment unit to meet Polk County Title V Air Emission Standards for the facility. Since the systems were only operating in biosparge mode only they did not produce air emissions that require treatment by the CatOx. The CatOx system has been shut down.

In a letter from Apex Companies dated December 9, 2008 they proposed to remove remediation units 2008, 2009, and 2010 (originally referred to as the SVE/AS remediation system in the train rack area and later incorporated into the Phase 1 system) and plug and abandon 34 SVE wells associated with those units. This part of the Phase 1 system was inactive and they wanted to plug and abandon the wells to eliminate a permitted air emission source to make adjustments to their air quality permit. On December 31, 2008 Iowa DNR Field Office 5 sent a letter allowing the request for Magellan to remove remediation units 2008, 2009 and 2010 and to properly abandon and plug the 34 SVE wells that were part of those units. This approval was with the provision that any new releases or discovery of additional historic contamination in that area will have to be addressed and may require installation of new remediation systems.

On February 11, 2009 Iowa DNR Field Office 5 received a letter and attachments dated February 9, 2009 requesting closure of remedial activities in the Southern Remediation Area at the Magellan Des Moines Terminal. The letter outlined how the agreed to criteria for a Pathway to Closure have been met with respect to the Southern Remediation Area. The criteria for a pathway to closure was said to be acceptable to Iowa DNR Field Office 5 in a letter dated April 5, 2006 and includes the following:

Continued vapor recovery until free-phase product is no longer detected in monitoring or remediation wells.

Annual vapor recovery continues to decline through the next low water period (winter of 2006-2007).

Fate and transport modeling results show that by the time impacted groundwater migrates to the levee, VOC concentrations will be less than the risk-based cleanup goals.

For the first criteria the February 9, 2009 letter stated that the last detection of free product in the Southern Area was in monitoring well MW-27 on September 6, 2007. Free Product has not been detected in MW-27 or any other monitoring well since that time.

For the second criteria the February 9, 2009 letter stated: "As shown on Table 6 of the November 16, 2007 Semiannual Monitoring Report (Apex), between November 7, 2006 and April 9, 2007, 2,793 pounds of hydrocarbons were removed (approximately 18.25 pounds per day). During the same timeframe the previous year (October 28, 2005 through April 15, 2006) 6,212 pounds of hydrocarbons or 36.76 pounds per day, were removed. During the winter of 2006/2007 approximately half as many pounds of hydrocarbons were removed compared to the winter of 2005/2006, meeting IDNR's stated criteria."

For the third criteria Apex applied the Iowa DNR Tier II Risk Based Corrective Action model which is a fate and transport groundwater model to illustrate that concentrations of volatile organic compounds (VOCs) do not exceed the agreed to clean up goals at the Des Moines River levee. The agreed to clean up goals are as follows: benzene (3.88 mg/L), toluene (1.9 mg/L), ethylbenzene (1.3 mg/L), xylene (1.65 mg/L), and methyl tertiary butyl ether (13.0 mg/L). Groundwater data collected before February 9, 2009 was used to load the Tier II model and plumes were generated for ethylbenzene (MW-30, 1.53 mg/L on 6/25/2008) and xylenes (MW-30, 2.36 mg/L on 6/25/2008). The plumes generated by the Tier II model illustrated that the parameters that exceeded the agreed to groundwater clean up goals did not reach the Des Moines River levee. Sampling results for benzene and toluene did not exceed clean up goals and were not modeled.

On May 29, 2009 Iowa DNR Field Office 5 sent a letter agreeing to a shut down of all remediation systems in the Southern Remediation Area with the following conditions: monitoring of the area will have to be done to verify that contaminant levels do not exceed the agreed to clean up goals. We believe a two year monitoring program after total shut down of the system is needed to insure that contaminant levels do not rebound significantly to the level where additional remediation would be required. Assuming the remaining remediation systems would be shut down almost immediately the two year monitoring program would include the semi-annual monitoring cycles April 2009 through September 2009, October 2009 through March 2010, April 2010 through September 2010, and October 2010 through March 2011 using the current monitoring plan. All Semi-Annual Monitoring Reports must now include Plume Maps from the Iowa DNR Tier II Risk Based Corrective Action model (for the Southern Remediation Area only) for any parameter (benzene, toluene, ethylbenzene, and xylenes) that exceeds the agreed to clean up goals. At the conclusion of the final monitoring cycle (October 2010 through March 2011) the final data will be reviewed to see if additional remediation or monitoring is needed. In addition there is no recent monitoring data available for methyl tertiary butyl ether (MTBE) which is one of the parameters in the agreed to groundwater clean up goals. The agreed to groundwater clean up goal for MTBE is 13.0 mg/L and the site must meet this goal for clean up in either the Northeast Remediation Area or the Southern Remediation Area to be considered complete. Beginning with the next monitoring cycle (April 2009 through September 2009) all wells in the monitoring plan must be sampled and analyzed for MTBE as well as BTEX. It must be pointed out that the Iowa DNR Tier II Risk Based Corrective Action Model does not have the capability of modeling contaminant plumes for MTBE. If any of the wells in the Southern Remediation Area exceed the agreed to groundwater clean up goal for MTBE another modeling program will have to be used to illustrate that the plume does not extend to the Des Moines River Levee or remediation activities may have to be resumed.

On June 4, 2009 the remaining Southern Remediation Area systems were shut down.

To date (December 31, 2009) the 34 SVE/AS wells associated with remediation units 2008, 2009 and 2010 have not been abandoned and plugged (Per Dave Hruby with Apex Companies, LLC).

Site Monitoring

In the Semi-Annual Monitoring Report for the period October 2008 through March 2009 (Samples collected on December 22, 2008 and March 9 – 11, 2009) the results for the Southern Area are as follows:

Free product was not found in any of the southern area monitoring wells.

Of the monitoring wells sampled MW-30 exceeded two of the parameters of the agreed to groundwater clean up goals (benzene 3.88 mg/L, toluene 1.9 mg/L, ethylbenzene 1.3 mg/L, xylenes 1.65 mg/L, & MTBE 13.0 mg/L). Monitoring well MW-30 (1.62 mg/L – on 3/10/2009) exceeded the level for ethylbenzene and (1.75 mg/L – on 12/22/2008 and 2.68 mg/L – on 3/10/2009) exceeded the level for xylenes.

In the Semi-Annual Monitoring Report for the period April 2009 through September 2009 (June 22 & 23, 2009 and September 21 – 23, 2009) the results for the Southern Area are as follows:

Free product was not found in any of the southern area monitoring wells.

Of the monitoring wells sampled MW-26 and MW-30 exceeded one of the parameters of the agreed to groundwater clean up goals (benzene 3.88 mg/L, toluene 1.9 mg/L, ethylbenzene 1.3 mg/L, xylenes 1.65 mg/L, & MTBE 13.0 mg/L). Monitoring Well MW-26 (4.98 mg/L – on 9/22/2009) exceeded the level for benzene. Monitoring well MW-30 (1.98 mg/L – on 9/23/2009) exceeded the level for xylenes.

During both sampling events for the period April 2009 through September 2009 (June 22 & 23, 2009 and September 21 – 23, 2009) all samples collected were analyzed for BTEX and MTBE and Plume Maps from the Iowa DNR Tier II Risk Based Corrective Action model (for the Southern Remediation Area only) for any parameter (benzene, toluene, ethylbenzene, and xylenes) that exceeded the agreed to clean up goals were included in the monitoring report; in this case the parameters of benzene and xylenes were exceeded during the September 21 – 23 2009 monitoring event. Analyzing samples for MTBE and the Tier II Plume Maps were part of the conditions outlined in the approval letter dated May 29, 2009 to shut down the remaining remediation systems in the Southern Area.

Mass Recovered

There is no longer any type of mass recovery through remediation systems taking place since all systems are now (as of September 11, 2007) operating in biosparge mode. The total mass of petroleum hydrocarbons recovered in the Southern Area since the start up of the Phase 1 recovery systems (Feb. 2003) is 39,401 gallons.

SUMMARY

The monitoring results obtained from the Northeast Area for the current sampling year (October 2008 through September 2009) are similar to those from the previous year (October 2007 through September 2008).

All of the remaining remediation systems in the Southern area were shut down on June 4, 2009. The first two sampling events since that time for the period April 2009 through September 2009 (June 22 & 23, 2009 and September 21 – 23, 2009) do not indicate a significant change in the contaminant levels of the parameters sampled (BTEX & MTBE). Monitoring in the Southern Area will continue through March 2011 when the final data will be reviewed to see if additional remediation or monitoring is needed.

