PUBLIC HEALTH ASSESSMENT

MALLARD BAY LANDING BULK PLANT
GRAND CHENIERE, CAMERON PARISH, LOUISIANA

I. SUMMARY

The Mallard Bay Landing Building Plant (MBLBP)(formerly known as Talen's Landing) site is located 23 miles northeast of Grand Cheniere in Cameron Parish, Louisiana. The site is situated on approximately 10 acres of land. It consists of two 5-acre tracts of land separated by an inlet from the Intracoastal Waterway (ICW) and Talen's Marina and Fuel, an active refueling Marina facility and dock. Wooded wetlands border the site to the north. On the west the site is bordered by an unnamed road, and the site is bordered on the south by Talen's Marina and Fuel. The National Priorities List (NPL) inclusion of the site was July 27, 2000, based on the evidence that hazardous substances that have migrated and/or could migrate to nearby water bodies, and associated wetlands. The hazardous substances include: styrene, polycyclic aromatic hydrocarbons, other organic aromatic compounds, and metals, including aluminum, barium and manganese. These water bodies are used for recreational and commercial fishing and provide a habitat to numerous waterbird nesting colonies and other wildlife.

Currently, access to the site is partially restricted. Exposures to trespassers (from wetlands) could be occurring at present. Past exposures to soil contamination to on-site workers at MBLBP site did occur. No drinking water intakes are located within the surface water pathways; however, fisheries and sensitive wetland environments are present nearby. The groundwater sampling from the Talen's Marina and Fuel well was denied. It is not known if airborne off-site migration of contaminants attributable to MBLBP site has occurred. However, this pathway is unlikely because the closest resident to the site is approximately one mile away. Exposure to on-site soil and sediments are a completed pathway. On-site contamination was detected in the MBLBP East and West properties. The contaminants include aluminum, barium, manganese and polycyclic aromatic hydrocarbons. Aluminum, barium and manganese pose no public health hazard based on data available. PAHs pose an indeterminate public health hazard. Additional data will be reviewed in a separate document.

II. PURPOSE AND HEALTH ISSUES

The 1986 Superfund Amendments and Reauthorization Act to the Comprehensive Environmental Response, Compensation and Liability Act of 1980 directs the Agency for Toxic Substances and Disease Registry (ATSDR) to perform specific public health activities associated with actual or potential exposures to hazardous substances released into the...
The Section of Environmental Epidemiology and Toxicology of the Louisiana Department of Health and Hospitals, Office of Public Health (OPH) is conducting this public health assessment for the Mallard Bay Landing Bulk Plant NPL site to determine the public health significance of the site. This public health assessment contains recommendations to reduce or prevent site-related exposure that might result in adverse health effects.

III. BACKGROUND

A. Site Description and History

The Mallard Bay Landing Bulk Plant (MBLBP) site is located 23 miles northeast of Grand Cheniere in Cameron Parish, Louisiana. MBLBP is an inactive crude oil refining facility. Therefinery operated under the names Mallard Resources, Inc (MRI) and Cameron Resources, Inc (CRI). The site is situated on approximately 10 acres of land. It consists of two 5-acre tracts of land separated by an inlet from the Intracoastal Waterway (ICW) and Talen’s Marina and Fuel, an active refueling facility and dock. Those two 5-acre tracts of land are referred as MBLBP East and West facilities (Appendix A: Figure 1). The site latitude is 29 54" 59" N; longitude: 92 37" 30" W. The Mallard Bay Landing facility is bordered by a ditch, an unnamed road, and wooded wetland areas to the north and west by Talen’s Marina and Fuel to the south, and by an open field/parking lot to the east [1].

**East Facility**

The MBLBP East facility is bordered to the north and west by the ICW and by wooded wetland areas to the south and east. A dirt road runs along the east boundary of the facility. (Appendix A: Figure 2). The east facility has a locked gate which is bound to an 8-foot-high, chain-link fence. The areas included are:

a) East Tank Battery - This consists of nine aboveground storage tanks all of which are contained within an earthen containment berm. Standing water was present in the southeastern portion of the berm area. West of the Tank Battery is a barge loading dock and associated pump house.

b) Process Area - This consists of a crude oil processing unit, an office and control room building, a laboratory, a mobile trailer, and five small sheds used for storage and/or office spaces. The laboratory contained numerous chemicals, and one of the five sheds was full of soil samples.

c) Heater Area - This consists of a sheet metal building, referred to as the boiler building, two heater units and processing area via insulated pipes.

**West Facility**

The MBLBP West facility is bordered by a ditch, an unnamed road, and wooded wetland areas to the north and west, by Talen’s Marina and Fuel to the south, and by an open field/parking lot to the east (Appendix A: Figure 3). The area surrounding the site is mainly undeveloped and utilized for hunting and cattle grazing. It has a fence which was locked during the site visit. The nearest residences are located approximately one mile north of the facility [3].
The areas included are:

a) West Tank Battery.- There is evidence that standing water within the bermed area flows freely to the surrounding wooded area. Approximately 142 fifty-five-gallon metal drums were present. The vast majority were rusted, visibly empty, and stacked along the southern portion of the berm.

b) Water Treatment System.- It consists of an above ground oil-water separator and two watertreatment ponds. These two ponds are interconnected by a 4” polyvinyl chloride (PVC) pipe. This pipe is in the berm separating the ponds. Each of the two ponds was full of water.

In January 1983, a Resource Conservation and Recovery Act (RCRA) inspection was conducted at Mallard Resources, Inc. (MRI), by the Environmental Protection Agency (EPA) and the Louisiana Department of Natural Resources (LDNR). The result of this inspection was a Notice of Violation. In July 1983, a violation letter was sent to MRI. During November 1983, another inspection visit was done. The facility was not in operation, and there were no indications that the violations were corrected. Therefore, LDNR issued a Letter of Warning to MRI [1].

In early 1984, MRI filed for Chapter XI Bankruptcy Proceedings and the facility was sold to Cameron Resources, Inc. (CRI). In January 1985, Louisiana Department of Environmental Quality (LDEQ) conducted a general inspection of the facility, and this revealed that a complete renovation was being conducted in order to bring facility up to full operating status.

CRI began operations at the facility in August 1985. In October 1985, January 1986, and March 1986, the EPA and LDEQ-Hazardous Waste Division (HWD) conducted inspections and follow-up visits to verify compliance. The facility has been complying with the order [1].

In April 1987, LDEQ-HWD performed a general inspection based on information that CRI had undergone bankruptcy, and that the facility was closed. This revealed that the facility was not operating and was in negotiations for sale. CRI accepted hazardous waste fuels that were not permitted. LDEQ reported that CRI had received styrene which it tried to process, resulting in serious problems within the refinery that ultimately led to its closure.

In April 1993, the LDEQ Inactive and Abandoned Sites Division (IASD) conducted a preliminary inspection of the facility. The inspection revealed that material and/or sludge was present in several tanks, and that the southwest tank in the East facility was nearly full. LDEQ also noted three ponds full of liquid, several drums, numerous process samples located in a small shed, and various areas of stained soil. In June 1993, LDEQ-IASD referred MBLBP to EPA for consideration of assessment under Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) as a potential hazardous waste site [1].

On July 30, 1996, EPA tasked the Superfund Technical Assessment and Response Team (START) to conduct a removal assessment. START conducted the removal assessment from August 5 to August 11, 1997. During this removal START numbered, inventoried and sampled 17 aboveground storage tanks and eight 55-gallon drums for hazard categorization. Many of the tanks were deteriorating. The presence of a chemical odor around some of the tanks further substantiated the fact that the tanks were not sealed and/or spillage of tank contents had occurred [1]. From January to March 1999, approximately 866,304 gallons of tank waste material was transported off site for disposal. Some material remains in the tanks because it could not be pumped out due to its thick consistency.
On July 27, 2000, MBLBP was included on the National Priorities List (NPL). This was based on the evidence that hazardous substances were in tanks and drums at elevated concentrations. Among those substances are: benzene, ethylbenzene, styrene, toluene, 2-methylnaphthalene, and naphthalene, as well as other organic aromatic compounds, and metals, including arsenic, chromium, lead, mercury, cobalt, copper, manganese, nickel, vanadium and zinc. Those hazardous chemicals could migrate to nearby water bodies, including the Intracoastal Waterway (ICW), GrandLake, Mermentau River, White Lake, Gueydan Canal, bayous, other small water bodies, and associated wetlands. These water bodies are used for recreational and commercial fishing and provide habitats to numerous waterbird nesting colonies and other wildlife. A total of one mile of contaminated wetlands was identified by chemicals during the 1999 START Site Investigation [3].

**B. Site Visit**

On Friday, April 6, 2001, persons from OPH, EPA, Tetra Tech and LDEQ visited the MBLBP site (east and west facilities). No residences are close to the site. The access road and Talen’s Marina and Fuel are in-between the two parcels of MBLBP property. Talen’s Marina and Fuel operates a boat launch for recreational fishers and has a large parking lot for the cars of people who work on the barges on the ICW. They also own an area that, according to DEQ, had been used in the past for informal camping. The camping area could only comfortably accommodate about two campers or tents.

The MBLBP east parcel contains the process unit, an office and some tanks. The site was fenced on the side by the road. A trespasser could access the site by boat or through the wetland side of the site. We could smell a styrene odor because styrene has coated the inside of the process unit. The process unit is surrounded by a levee. Several cuts on the levee were seen, which had been made in order to allow rainwater to flow out from around the process unit. Contamination is already in the wetland, and an oily sheen on water was visible.

In its current condition, the east site contains physical hazards, including asbestos, debris on the ground, and a catwalk between two storage tanks. LDEQ related that they found radish plants which were planted by trespassers to attract deer. A deer stand was observed on the exterior of the process area in the marshy portion of the site. Shotgun shells also have been found in the past on the site.

The west side was locked. The west side had only a 3-foot high fence with no barbed wire. This area served as a waste water treatment area. Two ponds which were full of rainwater were observed. A ditch surrounds the west side of the site which contains a discharge pipe.

**C. Demographics, Land Use, and Natural Resource Use**

The MBLBP site is located in Cameron Parish, Louisiana, which had a total population of 9,260 in 1990. Cameron Parish, the largest parish (area-wise) in Louisiana, is located in the southwestern corner of the state on the Gulf of Mexico, bordering the Texas line. The area has no day care facilities, schools, or permanent residents within 200 feet of observed contamination. The nearest individual is the resident manager of the Spirit 76 Energy Plant (a.k.a. the Jupiter Plant) located approximately 1/4 mile northeast of the MBLBP West facility site. The next closest residence is located approximately 1 mile north of the site. The residential population within a 1-mile radius of the site is estimated to be approximately 4 individuals (Appendix A: Figure 4) and the residential populations within a 4-mile radius of the site is estimated to be approximately 20 individuals [2].
The 1,441-square-mile parish is home to four wildlife refuges comprising about 284,000 acres of both fresh and saltwater marshes and bird sanctuaries. According to the National Wetlands Inventory Maps, there are more than 20 linear miles of wetland frontage area. Recreational and commercial fishing is conducted within 15 miles of the site for both freshwater and marine species including: catfish, buffalo (fish), blue crabs, paddlefish, and white shrimp. Grand Lake is the primary commercial fishing ground for those species in Cameron Parish. Hunting and crabbing, shelling and birdwatching on 36 miles of accessible beaches are other activities close to the site[1,3]. The area surrounding the site is mainly undeveloped and utilized for hunting. No commercial, agriculture, livestock production or grazing occurs near or at the site.

D. Health Outcome Data

There have not been any data collected from area residents to evaluate.

IV. DISCUSSION

A. Environmental Contamination and Other Hazards

In this section, we review the environmental data collected at the site, evaluate sampling adequacy, select contaminants of concern, and list the maximum and mean contaminant concentrations.

We select contaminants of concern based on the following factors:

1. Concentrations of contaminants on and off-site. Although background concentrations are useful in determining if contaminants are site-related, contaminants are only eliminated from further consideration if both the background and on-site concentrations are below standard health comparison values. This is necessary to assess the public health risk of all contaminants detected, whether site-related or not.

2. Field data quality, laboratory data quality, and sample design.

3. Community health concerns.

4. Comparison of maximum and mean on- and off-site concentrations with published Agency for Toxic Substances and Disease Registry (ATSDR) standard comparison values. ATSDR published standard comparison values are media-specific concentrations used to select contaminants for further evaluation. They are not used to predict health effects or to set cleanup levels. Contaminants with media concentrations above an ATSDR standard comparison value do not necessarily represent a health threat, but are selected for further evaluation. Contaminants with media concentrations below an ATSDR standard comparison value are unlikely to be associated with health effects and are not evaluated further.

5. Other health-based guidelines are used for comparison of maximum and mean on-and-off-site concentrations when there are no ATSDR standard comparison values. This includes the Environmental Protection Agency (EPA's) references doses (RfDs).

We used the following five ATSDR standard comparison values, in order of priority, to select contaminants of concern:
Environmental Media Evaluation Guide (EMEG) - derived from ATSDR’s Minimal Risk Level (MRL) using standard exposure assumptions, such as ingestion of 50 - 200 grams of soil per day (mg/day), and body weight of 70 kilograms (kg) for adults and 10 kg for children. MRLs are an estimate of daily human exposure to a chemical likely to be without an appreciable risk of noncancerous health effects.

• Reference Dose Media Evaluation Guide (RMEG) - derived from EPA’s Reference Dose (RfD) using standard exposure assumptions. RfDs are an estimate of daily human exposure to a chemical likely to be without an appreciable risk of noncancerous health effects.

• Maximum Contaminant Level (MCL) - the maximum permissible level of a contaminant in a public water system.

ATSDR standard health-based comparison values are used only to select contaminants of concern for further consideration. Identification of a contaminant of concern in this section does not necessarily mean that exposure will be associated with illnesses. Identification serves to narrow the focus of the public health assessment to those contaminants most important to public health. We evaluate the contaminants of concern in subsequent sections and determine whether exposure to them has public health significance.

1. On-Site Contamination

Waste
The Target Compound List (TCL) Volatile Organic Compounds (VOC) analytical results for the 16 above ground tank samples collected at East and West Mallard Bay Landing Bulk Plant (MBLBP) showed that benzene, toluene, ethylbenzene, and xylene (BTEX) were present in all tank samples. The results of the sample analysis in 1997 were: benzene was detected in concentrations of up to 510 milligrams per kilogram (mg/kg); toluene up to 1,000 mg/kg; ethylbenzene up to 810 mg/kg; and xylene up to 4,000 mg/kg. Eleven samples analyzed showed polycyclic aromatic hydrocarbons (PAHs): acenaphthene up to 740 mg/kg; anthracene up to 490 mg/kg; fluoranthene up to 700 mg/kg; 2-methyl napthalene up to 8,900 mg/kg; napthalene up to 12,000 mg/kg; phenanthrene up to 2,100 mg/kg; and pyrene up to 1,100 mg/kg. Dibenzofuran was found at concentrations of 390 mg/kg, and phenol at concentrations up to 2,800 mg/kg [3]. Data on the waste is included here to provide information on what is likely to be found in soils and sediments.

TCL Pesticides and Polychlorinated biphenyls (PCBs) results from 11 tank samples and herbicideresults for two composite tank samples showed: endrin aldehyde at 2.8 mg/kg; one herbicide, 2,4-dichlorophenoxybutyric acid (2,4-DB), detected at 0.674 mg/kg in one of the composite samples.

Soil

Soil Sampling MBLBP East Facility
In March 1999, four grab soil samples from 0-6 feet depth were collected from the MBLBP East Facility and the analyses showed the presence of phenol, bis-(2-ethylhexyl)phthalate, acetone, 2-butanone, benzene, ethylbenzene, styrene, toluene, and total xylene. Chemical analysis of the inorganic fraction revealed the presence of 13 metals (aluminum, arsenic, barium, chromium, copper, lead, magnesium, manganese, mercury, nickel, selenium,
In March 1999, five grab soil samples from 0-6 feet depth were collected from the MBLBP West Facility containment area. Chemical analysis of the organic fraction revealed the presence of four compounds (acetone, 2-butanone, xylene, and pyrene). Chemical analysis of the inorganic fraction revealed the presence of 13 metals (aluminum, arsenic, barium, chromium, copper, lead, magnesium, manganese, mercury, nickel, selenium, vanadium, and zinc). Table 2 in Appendix B shows only the chemicals which exceed the health CV [3].

Water Treatment Pond Sampling

START identified two water treatment ponds, located in the MBLBP West facility in August 1997. Two composite samples were collected, one from each pond and analyzed for BTEX, PAHs, pesticides, and metals. Toluene was detected in trace quantities of 0.015 mg/kg. Two PAHs were detected with a combined concentration of 0.121 mg/kg. The pesticides beta and deltahexachlorocyclohexene (BHC) were detected at 0.097 mg/kg and 0.050 mg/kg respectively. The START report states that twenty metals were detected in one or both samples. Concentrations are not reported in this document because the table which contained actual data was not available.

Groundwater

The region in the vicinity of the site obtains its water from the Chicot aquifer system. A water well database provided by the Louisiana Department of Transportation and Development (LDOTD) indicates groundwater is used for rig supply, industrial (commercial and public), and private domestic wells. There are 13 wells (12 industrial non-drinking water wells and one domestic drinking water well) within a 3 to 4 mile area of the site. These wells range in depth from 150 to 233 feet below groundwater surface (bgs). The closest wells to the site are located approximately 500 feet south of the West facility and 500 feet west of the East facility.

The nearest documented drinking water well is located approximately 0.19 miles south of the site at Talen’s Marina and Fuel. This well is listed as a rig supply; however, the Superfund Technical Assessment and Response Team (START) documented that the well was used only to provide potable water for boats and the Talen’s Marina (approximately 30 employees). A sample was obtained from Talen’s Marina and Fuel well, but it was not analyzed.

Talen’s Marina and Fuel is reported to use well water for human consumption. They allowed EPA to sample their tap water but then rescinded permission to have this sample analyzed on the advice of their consultant. DEQ suspects they draw from a deeper aquifer than the wells on MBLBP because the shallower groundwater contains too high a level of total dissolved solids for human consumption.

Employees of the Jupiter Plant stated that a rig supply well located at their facility was not used for public consumption. All employees drank only bottled water. The well water sample was analyzed for VOCs, semi-volatile organic compounds (SVOCs) and metals. No contaminants were found which exceeded the EPA MCL. Assessment of the migration pathway indicates documented observed releases to the groundwater pathway; however, the groundwater pathway has limited targets.

Surface Water
The topography of the site and the entire region is flat and low lying. Surface water runoff from the East facility flows west and north of the Intercoastal Waterway (ICW) and south and east into wetlands. A ditch runs along the west side of the West facility. This ditch runs between Talen’s Marina and Fuel and the Jupiter Plant. When the water level in the ditch is high enough, it overflows west to an unnamed tributary to the ICW. The ICW, south of the site to the Gulf of Mexico, comprises interconnected lakes, bayous, canals, and wetlands. No on site surface watersamples have been collected at this time.

Air
No air sampling and analysis has been performed at the site.

2. Off-Site Contamination

Sixteen surface water pathway sediment samples, including six background samples were collected to evaluate the surface water pathways. Three were collected in the ditch west of the West facility, and two in the barge slips to the west of the east facility, one in the ICW approximately 500 feet east of the site, one in the ICW approximately 500 feet west of the site. All sediment samples will be analyzed for TAL metals, TCL VOCs, and TCL SVOCs. No results of those analyses were provided to OPH [3].

3. Physical and Other Hazards

The MBLBP site has a partial fence around both facilities with a gate which is locked. START identified ten types of insulating material present in the Process Area and Heater Area in the East Facility. A total of 32 grab samples was collected for asbestos analysis. The results showed that asbestos was not detected above the practical quantitation limit. One sample showed a trace of asbestos. START and Louisiana Department of Environmental Quality (LDEQ) posted signs on the laboratory and the five buildings, stating "KEEP OUT DANGEROUS CHEMICALS." Contaminated sampling equipment was labeled and secured in the lavatory of the control room with the door locked. The gates at the entrance of the West and East facilities were locked [3].

B. Pathways Analyses

To determine whether people are exposed to contaminants migrating from the site, ATSDR and OPH, Section of Environmental Epidemiology and Toxicology evaluated the environmental and human components that lead to human exposure. This pathways analysis consists of studying five elements: a source of contamination, transport through an environmental medium, a point of exposure, a route of human exposure, and an exposed population.

ATSDR categorizes an exposure pathway as a completed or potential exposure pathway. Completed pathways require that the five elements exist and indicate that exposure to a contaminant has occurred in the past, is currently occurring, or will occur in the future. Potential pathways, however, require that at least one of the five elements is missing but could exist. Potential pathways indicate that exposure to a contaminant could have occurred in the past, could be occurring now, or could occur in the future. An exposure pathway can be eliminated if at least one of the five elements is missing and will never be present.

In Appendix B, Table 3 identifies the completed exposure pathways, and Table 4 identifies the potential exposure pathways. The discussion that follows incorporates only those pathways that are important and relevant to the site.
1. Completed Exposure Pathways

On-site soil

A completed exposure pathway existed in the past for industrial workers who worked at the MBLBP when it was operational. Contaminants found in the on-site soil that workers could have been exposed to include chromium, copper, arsenic, lead and polycyclic aromatic hydrocarbons (PAHs). Table 2 in Appendix B shows only the chemicals which exceed the health comparison value (CV). Exposure could have occurred through ingestion, inhalation and dermal contact.

The East and West sites of MBLBP are partially fenced; therefore, trespassers can currently get into the site and be exposed to the contaminants on-site. This exposure can occur presently and in the future so the site could be a future health hazard, as well. Because the area is actively used for hunting and fishing, the most likely trespasser would be an adult or older youth. A younger child would gain access to the site only if brought there by an adult or older youth.

On-site Sediment

From the East and West properties, past exposure to contaminated sediments is likely from the on-site sediments. Current and future exposures to sediments are possible. Past exposure through dermal contact and ingestion may have occurred to on-site workers and youth who may have trespassed onto the site. Present and future exposure may occur to those who trespass onto the site.

On-site air

In the past, a completed exposure pathway to on-site workers existed via inhalation. Currently, the possibility exists for particulate inhalation if dust forms from remaining sludge, solids, and non-pumpable liquids remaining in two tanks and uncovered contaminated soil at the site. VOCs were found in soil samples; therefore, volatilization might have occurred and resulted in exposure of MBLBP workers in the past. During the Removal Assessment, no air samples were taken due to the lack of residents in proximity to the site.

2. Potential Exposure Pathways

Off-site Sediment

Off-site sediment includes the sediment in the surrounding wetlands which are not within the fence which partially surrounds the site. This pathway is considered potential because the amount of hunting and fishing close to the site is unknown and the ditch and ditch sediments are inaccessible.

Off-site air

Air samples for contaminants attributable to the site have not been collected, thus, it is not known if airborne migration of contaminants has occurred. The possibility exists for generation of particulate dusts from remaining sludge, soils and non-pumpable liquids remaining in two tanks as well as uncovered contaminated soil at the site. VOCs were found in soil samples; therefore, volatilization might have occurred. The nearest individual is the resident manager of the Jupiter Plant located approximately 1,200 feet north of the MBLBP West facility. The nearest regularly occupied building is the Talen's Marina and Fuel facility, located at 1/4 mile of the MBLBP site. Approximately 30 people work at Talen's. The next
The closest residence is located approximately 1 mile north of the site. The total number of individuals living or working within the 4-mile radius is 90. Due to the lack of residents in proximity to the site, no air samples were collected and exposure via this pathway is unlikely.

Residential Water Wells

Talen’s Marina and Fuel had the closest drinking water well (1/4 mile) for their 30 employees. However, permission to sample the water was denied, so there is no knowledge if the water is contaminated. Residential water wells are considered as potential exposure pathways.

Biota

The MBLBP is close to nearby water bodies, including the ICW, Grand Lake, Mermentau River, White Lake, Gueydan Canal, bayous, other small water bodies, and associated wetlands. These water bodies are used for recreational and commercial fishing. During the sample collection performed in 1999, no biota samples were collected. Tetra Tech sampled biota in April 2001 to perform the Ecological Risk Assessment.

C. Public Health Implications

1. Toxicological Evaluation

In this section, health effects that could result from exposures to contaminants at the MBLBP site are discussed. Information on the toxicity of constituents found in completed exposure pathways is presented below. People can only be exposed to a site contaminant if they come in contact with it. In order to understand health effects that may be caused by a specific chemical, three factors affecting how the human body responds to exposure need to be considered. These factors include the exposure concentration, the duration of exposure, and the route of exposure. Individual characteristics of each human such as age, sex, nutritional status, and overall health can affect how a contaminant is absorbed, distributed, metabolized or eliminated from the body. Together these factors determine the individual’s response to chemical contaminants and what health effects may occur for that individual.

To evaluate health effects, ATSDR has developed minimal risk levels (MRLs) for contaminants commonly found at hazardous waste sites. The MRL is an estimate of daily human exposure to a contaminant below which non-cancerous, adverse health effects are unlikely to occur. MRLs are developed for each route of exposure, such as ingestion and inhalation, and for the length of exposure, such as acute (less than 14 days), intermediate (15 to 364 days), and chronic (greater than 365 days). For determining possible exposures to contaminants in soil, contaminant levels in the soil are used. Cancer risk is calculated using EPA’s cancer slope factors and other exposure assumptions. These are theoretical risks, based on conservative (i.e., protective) assumptions.

Factors such as duration of exposure, age, and body weight are used to help estimate the amount of contaminant that might have entered a person’s body. For example, some young children between the ages of 1 to 6 years old are known to put everything in their mouth (pica behavior). This behavior increases their chances of exposure to soil contaminants. The assumptions for exposure calculations for a young child are a body weight of 10 kilograms (approximately 22 pounds), with an ingestion rate of 5,000 milligrams of soil per day. The assumptions for an older child (7 years or older) are a body weight of 16 kilograms.
Aluminum occurs naturally and makes up about 8% of the surface of the earth. Aluminum metal is silver-white and flexible. It is often used in cooking utensils, containers, appliances, and building materials. It is used also in paints and fireworks; to produce glass, rubber, and ceramics; and in consumer products such as antacids, astringents, buffered aspirin, food additives and antiperspirants[4].

This metal binds to particles in the air, it can be taken up into some plants from soils, and it is not known to bioconcentrate in the food chain. Persons are exposed through eating small amounts of aluminum in food and drinking water with high levels of aluminum near waste sites. Very little aluminum enters our body from aluminum cooking utensils.

The aluminum concentration in on-site soil exceeded the CV for a child but not an adult. (Appendix B, Table 2). Because the nearest residence is 1 mile away, frequent child exposure is not expected[2]. A child could accompany an adult to the site and be exposed to the contaminants identified at the site, but the frequency of this exposure is expected to be low. Aluminum in soil is not a public health hazard.

Barium

Barium is a silvery-white metal found in nature. It occurs combined with other chemicals such as sulfur or carbon and oxygen. Barium compounds are used by the oil and gas industries to make drilling muds. Drilling muds make it easier to drill through rock by keeping the drill bit lubricated. Barium is also used to make paint, bricks, tiles, glass, and rubber. Barium sulfate is sometimes used by doctors to perform medical tests and to take x-rays of the stomach [5].

Barium gets into the air during mining, refining, and production of barium compounds, and from the burning of coal and oil. Fish and aquatic organisms accumulate barium. People get exposed to barium while working in industries that make or use barium and by drinking water containing high levels of barium. EPA allows 2 parts barium per million (ppm) in drinking water [5].

The health effects caused by barium will depend upon if the compounds ingested dissolve or not in our bodies. Ingesting high amounts of barium that dissolves will cause difficulties in breathing, increase blood pressure, changes in heart rhythm, stomach irritation, brain swelling, muscle weakness, damage to the liver, kidney, heart and spleen [5].

The barium concentration level in on-site soil exceeded the CV for a child but not an adult (Appendix B, Table 2). Because the nearest residence is 1 mile away, frequent child exposure is not expected. A child could accompany an adult to the site and be exposed to this chemical, but the frequency of this exposure is expected to be low. Barium in soil is not a public health hazard.

Manganese
Manganese is a natural occurring substance found in many types of rock. It does not have any special taste or smell. Pure manganese is a silver-colored metal; however, it does not occur in the environment as a pure metal. Rather, it occurs combined with other substances such as oxygen, sulfur, and chlorine. Some manganese compounds can dissolve in water, and low levels of these compounds are normally present in lakes, streams, and the ocean. Some manganese compounds are used in the production of batteries, in dietary supplements, and as ingredients in some ceramics, pesticides, and fertilizers [6].

Manganese can be released to the air from industry and by burning of fossil fuels. Manganese is an essential nutrient, and eating a small amount of it each day is important to stay healthy. Manganese is present in many foods, including grains and cereals, and is found in many foods, such as tea [6].

Manganese miners or steel workers exposed to high levels of manganese dust in air may have mental and emotional disturbances, and their body movements may become slow and clumsy. This combination of symptoms is a disease called "manganism" [6].

Manganese was found in on-site soil. Exposure to manganese through soil ingestion may have occurred in the past to adults who may have trespassed on the site. Exposure may occur in the future to children who trespass on the site. Manganese concentration in on-site soil was found at 292mg/kg, which exceeded the CV (100mg/kg) for a child but not an adult. Because the nearest residence is 1 mile away, frequent child exposure is not expected. A child could accompany an adult to the site and be exposed to this metal, but the frequency of this exposure is expected to be low. Manganese in soil is not a public health hazard.

Polycyclic Aromatic Hydrocarbons (PAH's)

A family of compounds known as polycyclic aromatic hydrocarbons (PAHs) are a component of crude oil. They are also formed by combustion and are often found in the environment in creosote, smoke, tobacco, soot, coal and charbroiled meat. PAHs usually occur as complex combinations of chemicals, not as single compounds. More than 100 different PAHs exist. Generally, PAHs are less soluble in water and strongly absorbed to soil, so migration is limited. They bioaccumulate in the food chain and may have additive toxic effects. PAHs can be divided into noncarcinogenic and probable carcinogenic compounds [7].

PAHs were found in on-site soils and sediments. Exposure to PAHs through soil ingestion or dermal exposure may have occurred in the past to adults who worked at the site and to children who may have trespassed on the site. Exposure may also occur in the future to children who trespass on the site. There is a potential for trespassers or remedial on-site workers to experience health effects from direct contact with the on-site soils. Dermal exposure to the PAH contaminated soil may lead to irritation and other skin sensitivities [7].

The site was not in compliance at times when it was operational. The site description mentions various sources of oily waste - ponds, drums, tanks, and stained surface soils, so OPH assumes PAHs are a contaminant of concern at MBLBP. Because the data is not yet complete, PAHs in soils and sediments are an indeterminate public health hazard.

2. ATSDR'S Child Health Initiative

ATSDR recognizes that infants and children may be more vulnerable to environmental exposure than adults in communities faced with contamination of their water, soil, air, or food. This vulnerability is a result of the following factors: (1) children are more likely to be exposed to certain media (e.g., soil or surface water) because they play outdoors; (2) children...
Children are shorter than adults, which means that they can breathe in dust, soil, and vapors close to the ground; and (3) children are smaller, therefore childhood exposures result in higher doses of chemicals per body weight. Children can sustain permanent damage if these factors lead to toxic exposure during critical growth stages.

Because children depend completely on adults for risk identification and management decisions, ATSDR is committed to evaluating their special interests at MBLBP site, as part of the ATSDR Child Health Initiative.

Children who are the most likely to be exposed to contamination at MBLBP site are the children living in nearby homes. The closest residence is 1 mile North of MBLBP. Exposures to media may include:

- **On and off-site soil**: Children may have been, and may continue to be, exposed to contaminated soils that were impacted by the site. A child accompanying an adult fishing or hunting would be exposed to site contaminants for no more than several hours. A child staying at the informal campsite could have also been exposed if they ventured onto or near to the site. OPH does not know how often that the campsite was actually used.

- **Off-site sediment**: Children may have been, and may continue to be, accessing the ditch and sediment located off the site. This exposure would likely be in the company of an adult and would last for no more than several hours.

**V. COMMUNITY HEALTH CONCERNS**

No health problems related to the site have been identified to date. No day care facilities, schools or permanent residents have been identified within 200 feet of observed contamination at Mallard Bay Landing Bulk Plant. The residential population within a 4-mile radius of the site is estimated to be approximately 20 individuals. In the near future, OPH will be able to contact community leaders in order to learn if there are concerns regarding the site and their health.

**VI. SITE UPDATE AND DATA GAPS**

The Environmental Protection Agency’s (EPA) Remedial Investigation/Feasibility Study began in May 2001. Additional samples to characterize on and off-site contamination are being analyzed. This additional data will be presented as a separate document.

Several data gaps were identified during the preparation of the public health assessment. Some of the soil samples taken composited soils from 0 to 6 feet deep into one sample. Because they are closest to the surface, contaminant levels in the 0 to 6 inch soils would likely have a higher contaminant concentration so this data may have under-reported the level of contamination which a trespasser would be exposed to. Secondly, some pages were missing from the Appendix of the Site Inspection Work Plan, March 16, 1999 so actual numbers could not be presented. Lastly, the absence of data on the drinking water at Talen’s Marina and Fuel, the nearest user of groundwater is a data gap.

**VII. CONCLUSIONS**
Access to the Mallard Bay Landing Bulk Plant (MBLBP) East and West Property is partially restricted. Current exposures to trespassers (from wetlands) could be occurring at present. Past exposures to soil contamination to on-site workers at MBLBP site did occur.

2. No drinking water intakes are located within the surface water pathways; however, fisheries and sensitive wetland environments are present nearby. The wetlands frontage area subject to actual contamination was calculated to be approximately one mile.

3. The groundwater sampling from the Talen's Marina and Fuel well was denied. No information about this water, which is used for drinking purposes by 30 employees, was obtained.

4. No on-site or off-site air samples have been collected. It is not known if airborne off-site migration of contaminants attributable to MBLBP site has occurred. However, this pathway is unlikely because the closest resident to the site is approximately one mile away.

5. Exposure to on-site soil and sediments are a completed pathway. On-site contamination was detected in the MBLBP East and West properties. The contaminants include aluminum, barium, manganese and polycyclic aromatic hydrocarbons. Aluminum, barium and manganese pose no public health hazard based on data available. PAHs pose an indeterminate public health hazard. Additional data will be reviewed in a separatedocument.

VIII. RECOMMENDATIONS

1. EPA should post warning signs to keep trespassers out of the portions of the site where no fencing is located.

2. Since sampling was not allowed at Talen's Marina and Fuel, EPA should consider installing a groundwater monitoring well down gradient of the site to determine if off-site migration has occurred or is occurring.

3. EPA should prevent off-site migration of site related contaminants.

4. During remedial activities at the site, EPA should use dust suppression techniques to prevent off-site migration of contaminants.

5. During EPA remedial activity, air monitoring should occur to determine if dust suppression techniques are effective.

IX. PUBLIC HEALTH ACTION PLAN

The following is a description of actions already taken and those to be taken by the Louisiana Office of Public Health (OPH), Section of Environmental Epidemiology and Toxicology and the Agency for Toxic Substances and Disease Registry (ATSDR) at the Mallard Bay Landing Bulk Plant (MBLBP) site and surrounding areas. The purpose of the public health action plan is to ensure that this public health assessment not only identifies public health hazards, but provides a plan of action to mitigate and prevent adverse human health effects resulting from
exposure to hazardous substances in the environment. This is a commitment on the part of OPH/ATSDR to follow upon these actions to ensure that they are implemented. The public health actions which have either been implemented or are planned for the future by OPH/ATSDR are as follows:

Past Actions

1. OPH staff obtained from representatives of EPA, Region 6, on February 2001 information about Hazardous Ranking and Site Inspection.

2. OPH staff visited the site on April 6, 2001.

Actions Planned

1. OPH will complete the initial public health assessment in 2002.

2. OPH will review more data as it becomes available.

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Regional Operations, Region VI
Office of the Assistant Administrator

REFERENCES


**APPENDICES**

**APPENDIX A: FIGURES**

Figure 1. Site Sketch

Figure 2. East Facility

Figure 3. West Facility
### APPENDIX B: TABLES

#### Table 1.


<table>
<thead>
<tr>
<th></th>
<th>Concentration (mg/kg)¹</th>
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<tr>
<td><strong>Volatile Organic Compounds</strong></td>
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<tr>
<td>Benzene</td>
<td>1,420</td>
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<tr>
<td>Ethylbenzene</td>
<td>2,040</td>
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<td>Styrene</td>
<td>3,010</td>
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<tr>
<td>Toluene</td>
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<td>Xylene (total)</td>
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<tr>
<td><strong>Semivolatile Organic Compounds</strong></td>
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<tr>
<td>2-Methylnaphthalene</td>
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<tr>
<td>Naphthalene</td>
<td>954</td>
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<td><strong>Metals</strong></td>
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<tr>
<td>Aluminum</td>
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<td>Arsenic</td>
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<td>Barium</td>
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<td>Cadmium</td>
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<td>Copper</td>
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<tr>
<td>Lead</td>
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<td>Manganese</td>
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<td>Mercury</td>
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<td>Nickel</td>
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<td>Selenium</td>
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Table 2.

<table>
<thead>
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<th>Contaminant of Concern</th>
<th>East Facility</th>
<th>West Facility</th>
<th>Comparison Values</th>
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<tr>
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<td>Max. conc. detected (mg/kg)³</td>
<td>Max. conc. detected (mg/kg)</td>
<td>(mg/kg)</td>
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<tr>
<td>Inorganics</td>
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<tr>
<td>Aluminum</td>
<td>6,370</td>
<td>8,390</td>
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<tr>
<td>Barium</td>
<td>180</td>
<td>211</td>
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<tr>
<td>Manganese</td>
<td>292</td>
<td>79.9</td>
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1 - micrograms per kilogram
2 - Environmental Media Evaluation Guide
3 - Reference Dose Media Evaluation Guide

Table 3.
Completed Exposure Pathways. Mallard Bay Landing Bulk Plant, Grand Cheniere City. Cameron Parish, Louisiana

<table>
<thead>
<tr>
<th>Pathway Names</th>
<th>Exposure Pathway Elements</th>
<th>Time</th>
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<tbody>
<tr>
<td>Source</td>
<td>Environmental Media</td>
<td>Point of Exposure</td>
</tr>
<tr>
<td>Soil</td>
<td>Site</td>
<td>Soil</td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sediment</td>
<td>Site</td>
<td>Sediment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air</td>
<td>Site</td>
<td>Volatilization of site contaminant</td>
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Table 4.
Potential Exposure Pathways. Mallard Bay Landing Bulk Plant, Grand Cheniere City. Cameron Parish, Louisiana

<table>
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<tr>
<th>Pathway Names</th>
<th>Exposure Pathway Elements</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Source</strong></td>
<td><strong>Environmental Media</strong></td>
<td><strong>Point of Exposure</strong></td>
</tr>
<tr>
<td>Air</td>
<td>Mallard Site</td>
<td>Airborne soil particulate</td>
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<tr>
<td>Water</td>
<td>Mallard site</td>
<td>Drinking Water</td>
</tr>
<tr>
<td>Sediment</td>
<td>Mallard Site</td>
<td>Sediment</td>
</tr>
<tr>
<td>Biota</td>
<td>Mallard Site</td>
<td>Fish</td>
</tr>
<tr>
<td>Water</td>
<td>Mallard Site</td>
<td>Groundwater</td>
</tr>
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</table>

CERTIFICATION

This Mallard Bay Landing Bulk Plant Public Health Assessment was prepared by the Louisiana Department of Health and Hospitals/Office of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the public health assessment was begun.

Alan W. Yarbrough
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The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.

Lisa C. Hayes
for Chief, State Program Section, SSAB, DHAC, ATSDR

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