DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)

Current Human Exposures Under Control

Facility Name: **Kinder Morgan Liquids Terminals (Formerly Unitank Terminals Service)**
Facility Address: **Allegheny Avenue and Delaware River**
Facility EPA ID #: **PAD087098653**

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

   X If yes - check here and continue with #2 below.

   _____ If no - re-evaluate existing data, or

   _____ if data are not available skip to #6 and enter"IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

Facility Background

The Kinder Morgan Liquids Terminals (Kinder Morgan) site is a tank farm that occupies 35 acres of land and includes 107 aboveground storage tanks (ASTs) ranging in size from 2,500 to 1,680,000 gallons. The contents of the tanks vary over time. Kinder Morgan maintains a current listing of each tank's contents on-site. The ASTs cover more than 50% of the total site property, with the remaining area generally covered with asphalt driveways, access roads and loading/unloading areas. The facility is located in an industrial portion of Philadelphia and is bounded to the north by a lumber distribution facility, to the west by another AST bulk storage facility, to the east by industrial property, and to the south by Delaware Avenue and the Delaware River.

Operation at the site date back to 1955, when the facility was owned by the Delaware River Terminal From 1970 through 1977 the facility was owned by Thru-Chem Services, Inc. Tate and Lyle owned the facility from 1977 to 1980, when the property was sold to the Unitank Storage Company, a subsidiary of Tate and Lyle. Unitank sold the property to GATX in approximately 1991. In March of 2001, GATX sold the property to the current owner/operator, Kinder Morgan. The general usage of the site has remained largely the same since 1955 (i.e., bulk liquid storage).

Kinder Morgan receives bulk liquids at its facility by cargo ship, rail cars and trucks. Kinder Morgan leases two pier berths on the Delaware River from the City of Philadelphia. The Delaware River is located approximately 1,000 feet south of Kinder Morgan's property and the piers come to within 200 feet of the site. Bulk liquids are transferred to the southern pier via above ground manifolds and then transferred through underground piping to areas near the storage tanks. Bulk liquids are transferred to the northern pier via a similar manifold system and run aboveground crossing over Delaware Avenue and then discharging into product tanks. Materials delivered by rail car and truck are transferred directly into various on-site storage tanks.

In 1980, Unitank filed a Part A Notification of Hazardous Waste Activity. Unitank became involved in an ocean incinerator project in 1983 with At-Sea, Inc. and Chemical Waste Management. Unitank's terminal was to be used to store waste that would then be burned at sea aboard various ships sailing off the east coast. By 1983, over 400,000 gallons of waste for this purpose had been stored at the site. The project never operated at full scale and by 1985, the project was bankrupt with the waste left at the Unitank facility. Unitank consolidated all remaining project-related wastes into a single aboveground storage tank (AST #225).

Unitank's Part B Permit Application indicated that 21 tanks at the facility were designated for hazardous waste storage. The combined volume of these tanks is almost five million gallons, although records indicate that the maximum volume of hazardous waste stored at the site was less than 500,000 gallons. In 1993 and 1994, Unitank completed all hazardous waste removal and decontamination activities associated with the hazardous waste storage tanks at the facility. On October 3, 1994, the Pennsylvania Department of Environmental Protection (PADEP) confirmed that the hazardous waste storage tank closure was satisfactory and that hazardous waste interim status at the facility was terminated. Currently, Kinder Morgan does not store hazardous waste on site for longer than 90 days.

There have been several recent spills at the facility caused mainly by overfilling of tanks and leaking valves or flanges. The most recent spill occurred on November 1, 2003 when AST No. 161 was overfilled and 8,000 - 10,000 gallons of acetone was spilled. While this tank is located in a containment area with concrete walls, the floor of the containment area is earthen and some of the acetone has percolated into the groundwater beneath the site. Concentrations of acetone in wells and test points installed in the vicinity of AST No. 161 in January 2004 ranged from 9.8 mg/l to 4,900 mg/l.

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale / Key Contaminants
Groundwater	X	___	___	Acetone, benzene and other volatile organic compounds (VOCs) were detected above risk based concentrations. See groundwater section below.
Air (indoors)[2]	X	___	___	Several VOCs have been detected in groundwater above EPA's indoor air target groundwater concentrations. See discussion below
Surface Soil (e.g., <2 ft)	X	___	___	There have been many spills of products containing hazardous constituents directly onto site soils.
Surface Water	___	X	___	Surface water is not suspected of currently being contaminated. See discussion below.
Sediment	___	X	___	No evidence suggests the sediments of the Delaware River have been adversely impacted by site activities.
Subsurf. Soil (e.g., >2 ft)	X	___	___	There have been many spills of products containing hazardous constituents directly onto site soils.
Air (outdoors)	___	X	___	A release of contaminants from source areas to the air above risk-based levels is not suspected.

_____ If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

__X__ If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

_____ If unknown (for any media) - skip to #6 and enter "IN" status code.

Rationale and Reference(s):

See Following Pages

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

Groundwater

The facility is located within the Atlantic Coastal Plain Province of Southeastern Pennsylvania. A layer of fill approximately six feet thick was encountered during a July 1992 soil investigation and September 1995 groundwater investigation. Below the fill is the Quaternary age Trenton Gravel, a gray to pale reddish-brown, medium to coarse grained, gravelly sand with interbedded clay-silt and crossbedded sand layers. The Trenton Gravel is underlain by the Cretaceous age Potomac Group and Raritan Formation, whose units comprise the Potomac-Raritan-Magothy aquifer, a major water supply source for New Jersey residents. The Trenton Gravel is believed to be hydraulically interconnected to Potomac-Raritan-Magothy aquifer system because of the sporadic continuity of the clay confining layers.

The depth to groundwater at the site varies from approximately three feet to seven feet below the ground surface (BGS) at high tide. Groundwater flow direction in the vicinity of the site is believed to be to the north-northeast during periods of high tide and to the south-southwest toward the Delaware River during low tide conditions. Although the site is within a few hundred feet of the Delaware River, there is no evidence to suggest that significant concentrations of contaminants have migrated to the river. Groundwater elevation data obtained during the sampling of wells in the eastern portion of the facility seem to indicate groundwater flow direction is to the northwest (away from the Delaware River), regardless of tidal conditions. The Philadelphia Water Department's Somerset Low Level Collecting Sewer is believed to run directly beneath the containment area between AST Nos. 302 and 304 in the eastern portion of the facility and may be impacting the local groundwater flow direction.

In Sept. 1995, SMC Environmental Services Group began implementation of groundwater investigation activities at the site. The investigation included the installation of seven monitoring wells including one temporary groundwater monitoring well (MW-4) within the former Waste Retention Area (Tanks 420-424), two temporary monitoring wells (MW-2 and MW-3) topographically downgradient and adjacent to Areas B (Tanks 219, 225 & 226) and K (Drum and Tank Storage Area), and two temporary monitoring wells (MW-5 and MW-7) adjacent to Area G (Tanks 144-158). Two temporary wells (MW-1 and MW-6) were also installed along the northern perimeter of the Site to establish background groundwater quality. The seven wells were sampled five times each between October 1995 and May 1999.

Samples collected from monitoring well no. MW-4 exhibited the highest concentrations of volatile organic compounds (VOCs) including benzene (330 ug/L), chlorobenzene (4,100 ug/L), methylene chloride (150 J ug/L) and xylenes (9,800 ug/L). All of these concentrations are greater than EPA's risk based concentrations (RBCs) for the contaminants in tap water. Methylene chloride was only analyzed for in the October 1995 sampling event. This compound is a common laboratory contaminant and was also found in the field blank at an estimated concentration of 5 J ug/L. In addition to MW-4, benzene has been historically detected at concentrations above EPA's tap water RBC in monitoring well nos. MW-2, MW-5, MW-6 and MW-7. Chlorobenzene was detected at a concentration of 5,100 ug/L in monitoring well no. MW-2 when that well was sampled in August 1996; however, this contaminant was detected at concentrations below 150 ug/L in samples collected from this well as part of the four other sampling events. No VOC has ever been detected in any of the above monitoring wells at a concentration above PADEP's medium specific concentration (MSC) for groundwater in a non-used aquifer in residential or non-residential settings.

In November 1998, facility personnel observed a localized leak of fuel-grade ethanol of approximately 50 to 100 gallons to the ground surface from AST No. 304, a 3.4 million gallon steel tank. Six 55-gallon drums of visually impacted soil were shipped off-site for disposal. Six groundwater grab samples were collected on April 16, 1999. Three of the samples contained benzene at concentrations in excess of PADEP's non-residential, used aquifer groundwater MSC, but below the non-used aquifer MSC. Benzene was found at concentrations greater than EPA's RBC for tap water in five out of the six samples. All five

of the samples analyzed for methyl tertiary butyl ether (MTBE) contained that contaminant at concentrations above both EPA's RBC for tap water and the non-residential used aquifer MSC, while three of those five contained estimated concentrations in excess of PADEP's non-residential non-used aquifer MSC.

In January 2000, facility personnel observed a localized leak of fuel-grade ethanol to the ground surface from AST No. 302, a 4.2 million gallon steel tank located in the same tank farm as AST No. 304. In June 2000, three groundwater grab samples were collected from locations around that tank and six additional groundwater grab samples were collected along the perimeter of the bermed tank farm area to delineate the local groundwater quality. The groundwater samples were each analyzed for ethanol, benzene, ethylbenzene, toluene, xylenes, MTBE, naphthalene, styrene and 1,1,2,2-tetrachloroethane. Groundwater grab sample GW-P-2 contained benzene (850 ug/l) and MTBE (1,700 ug/l) at concentrations above the non-residential, non-use aquifer groundwater MSC. MTBE was also found above this MSC in GW-P-4 and above the non-residential, used aquifer groundwater MSC in GW-302-1 and GW-302-2. MTBE was detected above EPA's RBC for tap water in eight of the nine samples analyzed. Benzene was found above EPA's RBC and PADEP's non-residential, used aquifer groundwater MSC in GW-P-3. Naphthalene was detected just above the RBC for tap water in GW-P-4.

In response to the groundwater contamination found in the groundwater grab samples collected in the vicinity of AST Nos. 302 and 304, Kinder Morgan installed five monitoring wells (MW-1 through MW-5) within the eastern portion of the facility in the spring of 2002. These wells have each been sampled four times since they were installed, the latest round of which occurred in January 2004. Benzene has been detected as high as 1,700 ug/l in a sample collected from MW-2, the closest well to AST Nos. 302 and 304. The PADEP's non-use non-residential aquifer MSC for benzene is 500 ug/l. MTBE concentrations were detected as high as 2,100 ug/l in MW-2,which is also above PADEP's non-use non-residential aquifer MSC (200 ug/l). Although there is no state or federal standard for ethanol in groundwater, samples collected from MW-2 were found to contain this analyte at concentrations ranging from 6,100 ug/l to 295,000 ug/l. Trace concentrations of MTBE (<10 ug/l) have been found in samples collected from MW-1, MW-4 and MW-5. Benzene was found at a concentration below EPA's MCL in MW-5 during the April 2002 sampling event and was not detected in the three subsequent events. Naphthalene has been detected as high as 24 ug/l in MW-2 and 4.1 ug/l in MW-1, which are both below the PADEP non-use non-residential aquifer MSC (100 ug/l).

A release of approximately 1,000 gallons of No. 2 fuel oil occurred at AST #420 on November 12, 2001. Approximately 200 gallons of product was recovered shortly after the spill event and twenty 55-gallon drums of visually impacted soil were excavated and disposed of off-site. Grab groundwater samples were collected from six Geoprobe locations in the vicinity of AST #420 in August 2002. Benzene was detected at concentrations greater than the PADEP MSC (500 ug/l) for nonresidential non-use aquifers at four of those locations. Benzene, ethylbenzene, cumene, toluene and naphthalene were detected in at least one grab groundwater sample at concentrations exceeding their corresponding PADEP MSC for nonresidential used aquifers.

On September 9, 2001, a puddle of spent sulfuric acid was observed inside the containment area at the base of AST No. 141. Stained soils were excavated and three 2-inch diameter temporary wells were installed by hand in the area adjacent to AST No. 141 on September 18, 2001. The following contaminants were detected in the groundwater samples collected from the temporary wells at concentrations greater than EPA's tap water RBC and PADEP's MSC for nonresidential non-use aquifers: benzo(a)anthracene (25.6 ug/l), benzo(b)fluoranthene (15.7 ug/l), benzo(k)fluoranthene (18.9 ug/l), benzo(a)pyrene (17.9 ug/l) and chrysene (33.3 ug/l). Kinder Morgan's consultant concluded that the release from Tank 141 did not appear to have impacted the quality of the soils or groundwater in the area of the tank. This statement is true because a sample of spent sulfuric acid from the tank did not upon chemical analysis contain the above contaminants detected in the groundwater. However, Kinder Morgan has not addressed the origin of the SVOC contamination detected in both the groundwater and soil samples collected in the immediate vicinity

of AST. No. 141.
On February 28, 2003, approximately 6,000 gallons of motor oil were released within the secondary containment system of the horizontal aboveground storage tank area (AST #s 481 - 488). Immediately following the release, an emergency response contractor was able to recover approximately 2,000 gallons of product from the secondary containment area. In April 2003, two shallow sump wells were installed within the secondary containment area and twelve soil borings were installed adjacent to the secondary containment area. Monitoring wells were installed at six of the boring locations. Separate phase hydrocarbons (SPH) were observed in five of the six monitoring wells at apparent thickness ranging from 0.01 feet to greater than 5.00 feet. The detection of SPH on the groundwater confirmed that the secondary containment system was not functioning properly. A breach in a joint in the secondary containment system in the pump manifold area was discovered and repaired. Kinder Morgan is planning to install additional wells to fully delineate the extent of the SPH around the motor oil AST area and has proposed to periodically use vacuum extraction to remove SPH from the wells where the contamination was present.

On November 1, 2003, AST No. 161 was overfilled and 8,000 - 10,000 gallons of acetone was spilled. While this tank is located in a containment area with concrete walls, the floor of the containment area is earthen and some of the acetone percolated into the groundwater beneath the site. Concentrations of acetone in wells and test points installed in the vicinity of AST No. 161 in January 2004 ranged from 9.8 mg/l to 4,900 mg/l. EPA Region III's RBC for acetone in tap water is 5.5 mg/l and the PADEP MSC for acetone in a nonresidential non-use aquifer is 100 mg/l. Kinder Morgan is preparing a plan to address the acetone contamination in this area.

Surface and Subsurface Soil:

In 1992, SMC Environmental Services Group collected soil samples from 88 sample locations in association with the closure of several tanks that formerly contained hazardous wastes. Soil samples were collected from Area B (containing AST Nos. 219, 225, 226 and other tanks not used for hazardous waste storage, Area F (containing AST Nos. 481 through 488, the Waste Retention Area (containing AST Nos. 420 through 424, Area K (the Drum and Tank Storage Area, and Area G (containing Tanks 144, 149, 150, 153, 157, 158 and other tanks not used for hazardous waste storage. Background soil samples were also collected from three areas located topographically upgradient of all facility operations.

No VOCs were detected above PADEP's MSCs for industrial soils in any of the soil samples collected. No VOCs were detected above EPA's RBCs or MSCs for residential soils in any of the surficial soil samples (0 - 2 feet) collected. One of the background subsurface soil samples (B-3) collected at a depth greater than three feet contained benzene at a concentration of 43 mg/kg (RBC $Soil_{RES}$ = 12 mg/kg; RBC $Soil_{IND}$ = 52 mg/kg). Benzene was only found at one other sample location at a concentration above the residential soil RBC. Subsurface soil sample No. 149-4 collected adjacent to AST No. 149 exhibited a benzene concentration of 27 mg/kg. One of the subsurface samples collected in the area of Tank 219 (219-6) exhibited a 1,2-dichloroethane concentration of 22 ppm (RBC $Soil_{RES}$ = 7 mg/kg, RBC $Soil_{IND}$ = 31 mg/kg). This level of contamination is above the PADEP MSC for residential soil (12 mg/kg) but below the PADEP MSC for industrial surface/subsurface soils (63/73 mg/kg). A subsurface soil sample collected from the vicinity of Tank 420 (420-3) was found to contain 1,4-dichlorobenzene (150 ppm) in excess of that contaminant's industrial soil RBC (120 mg/kg). Subsurface soil sample 423-2 contained 1,4-dichlorobenzene (93 ppm) above the residential soil RBC (27 mg/kg). Both occurrences of 1,4-dichlorobenzene were below the PADEP MSC for residential soils for that substance (750 mg/kg).

All of the areas sampled contained at least one soil sample with a total petroleum hydrocarbon (TPH) concentration of at least 1,000 ppm. Areas with elevated TPH concentrations (>10,000 ppm) included Tank Nos. 144, 149, 157 and 420-424. The highest TPH concentration (80,000 ppm) was found in a subsurface soil sample collected near Tank 226 (226-1). This value is more than an order of magnitude greater than the TPH concentrations at the other five samples collected around the perimeter of that tank. The background TPH concentrations ranged from 380 to 11,000 ppm.

There have been numerous spills of products containing hazardous constituents onto the site soils adjacent to tanks and pipelines. Below is a summary of spills known to have impacted site soils:

- On March 6, 1991, two pipelines failed a hydrostatic integrity test. Excavation was performed in the area of the suspected leaks and soil contamination was discovered. Chemical analyses indicated that alpha methyl styrene and ethyl acrylate were present in the soil. It was estimated that less than 50 gallons of alpha methyl styrene was released. No estimate was available for the amount of ethyl acrylate spilled.

- On January 17, 1996, 3,400 gallons of ethyl acetate was spilled during the routine pipeline transfer from a vessel to a storage tank near AST No. 212. Two test pits were installed and samples were collected. Contamination was found prior to excavation. Confirmatory samples indicated that all of the contaminated soil had been removed during excavation activities.

- On February 7, 1996, a railcar of xylene was in the process of offloading into an empty AST when one end of a pipe was left open. A contractor was hired to clean up the spill. No additional information is available.

- In November 1998 facility personnel observed a localized leak of fuel-grade ethanol (estimated 50 to 100 gallons) to the ground surface from AST #304, a 3.4 million gallon steel AST. Six 55-gallon drums of visually impacted soil were shipped off-site for disposal.

- On January 5, 1999, during the off-loading of nonene from two tank trucks into AST 218, the chemical was observed flowing from a vent located near the top of the storage tank into the clay lined dike area around the tank. Approximately 380 gallons of the estimated 400 gallons released was recovered in the dike's catch basin and an excavated trench.

- In January 2000, GATX personnel observed a localized leak of fuel-grade ethanol to the ground surface from AST #302, a 4.2 million gallon steel AST. This AST is located within the same bermed tank farm area as AST #304. Six 55-gallon drums of visually contaminated soil were disposed of off-site. In June 2000, soil samples were collected in the areas of AST Nos. 302 and 304 where fuel-grade ethanol historically had been spilled/leaked. One sample was collected from each area. The samples were analyzed for ethanol, benzene, ethylene, toluene, xylenes, MTBE, naphthalene, styrene and 1,1,2,2-tetrachloroethane. No constituents were detected above the non-residential, non-use aquifer soil to groundwater MSC or EPA's RBCs for residential soils in either of the samples. Only benzene was detected slightly above the non-residential, used-aquifer, soil-to-groundwater MSC in the sample collected adjacent to AST #304. Although PADEP does not have a published MSC for ethanol, this substance was not detected in either soil sample (<10 mg/kg). Based of the results of this data, no further soil investigation or remediation activities were proposed.

- On April 25, 2000, approximately 300 gallons of acetone was released to surface soils while stripping acetone from AST #159 to AST #160. GATX personnel were able to recover approximately 260 gallons of product within an hour of the discharge. Nine drums of visually contaminated soil were excavated and disposed of off-site shortly after the spill was detected. Post-remediation soil sampling revealed that although acetone was detected in 8 out of the 14 samples collected, the contaminant was not detected at a concentration above PADEP's non-residential direct contact MSC or used-aquifer soil to groundwater MSC.

- On September 9, 2001, a puddle of spent sulfuric acid was observed inside the containment area at the base of AST No. 141. Stained soils were excavated and subsurface soil and groundwater samples were collected from three locations on September 18, 2001. The soils were analyzed for SVOCs and the only contaminants detected above EPA's RBCs for industrial soils were benzo(a)anthracene (5.29 mg/kg) and benzo(a)pyrene (3.74 mg/kg). The PADEP MSC for nonresidential subsurface soil for benzo(a)anthracene is 190,000 mg/kg and for benzo(a)pyrene is 190,000 mg/kg.

- On November 12, 2001, 977 gallons of No. 2 fuel oil was spilled at Tank 420, when it was overfilled. Approximately 200 gallons of product was recovered with a vacuum truck and twenty 55-gallon drums of impacted soil were excavated for off-site disposal. Two soil samples each were collected from nine locations around AST #420 in August 2002. Grab groundwater samples were collected at six of the nine locations. The soil results indicated no exceedances of EPA's RBCs for industrial soils or PADEP's MSCs for non-residential direct contact and soil-to groundwater in the surface and subsurface soil samples.

- On June 17, 2002, an acetone leak was noted on the southern pier dock line during a routine hydrotest of the line. A contractor for Kinder Morgan determined that no soil remediation would be required. The analytical data supporting this determination has not been provided to EPA or PADEP to date.

- On June 20, 2002, spent sulfuric acid was released onto the ground surface at AST #ONT-2. A contractor for Kinder Morgan determined that no soil remediation would be required. Kinder Morgan is preparing a report with the analytical data supporting this determination for submission to PADEP and EPA.

- On February 28, 2003, approximately 6,000 gallons of motor oil were released within the secondary containment system of the horizontal aboveground storage tank area (AST #s 481 - 488). Immediately following the release, an emergency response contractor was able to recover approximately 2,000 gallons of product from the secondary containment area. In April 2003, two shallow sump wells were installed within the secondary containment area and twelve soil borings were installed adjacent to the secondary containment area. Monitoring wells were installed at six of the boring locations. Benzene, naphthalene, benzo(a)anthracene and benzo(a)pyrene were detected in the soils at concentrations exceeding at least one of the applicable PADEP MSCs at three sample locations adjacent to the northern wall of the secondary containment system. Separate phase hydrocarbons (SPH) were observed in five of the six monitoring wells at apparent thickness ranging from 0.01 feet to greater than 5.00 feet. The detection of SPH on the groundwater confirmed that the secondary containment system was not functioning properly. A breach in a joint in the secondary containment system in the pump manifold area was discovered and repaired. Kinder Morgan will install additional wells to fully delineate the extent of the SPH around the motor oil AST area and has proposed to periodically use vacuum extraction to remove SPH from the wells where the contamination was present.

- On November 1, 2003, an estimated 8,000 - 10,000 gallon spill of acetone occurred during filling operations at AST #161. Emergency remedial efforts immediately after the spill resulted in the recovery of approximately 1,000 gallons of product. Kinder Morgan is in the process of calculating the percentage of acetone that may have evaporated. Samples collected from monitoring wells installed in January 2004have indicated the presence of high concentrations of acetone in the groundwater in the immediate vicinity of the AST #161 tank farm. Soil sample results have not been made available to EPA as of yet.

Surface Water:

The Delaware River is used as a source of drinking water by the Philadelphia Water Department (PWD) at its Samuel Baxter Water Treatment Plant located approximately seven miles upstream of the facility. This treatment plant provides drinking water to approximately 60% of the residents of Philadelphia as well as some Lower Bucks County residents. Because of the tidal nature of the Delaware River at Philadelphia, it is theoretically possible for contaminants from the site to enter the river via surface runoff and/or groundwater and flow toward the Baxter Plant during high tide events. However, due to the many upstream and downstream industrial facilities lining the Delaware River, it would be virtually impossible to attribute any contamination found in the river at the intake to any facility related operations.

Swimming is prohibited in the portion of the Delaware River adjacent to the facility as the river is classified as a Zone 3 water body by the Delaware River Basin Commission (DRBC). Consumption of channel catfish, American eel and white perch caught in this portion of the Delaware River is also prohibited.

The only documented release of contamination to the Delaware River occurred on March 17, 1990, as a ship was unloading cumene to the Unitank Terminal when an opaque white liquid was observed in the slip area between the ship and the pier and on the other side of the vessel running over the fishplate. Before the pumps were shut off, approximately 12,800 gallons of cumene are believed to have spilled into the river. As part of the cleanup effort, 35,000 gallons of water and approximately 1,200 gallons of cumene were recovered by vacuum trucks. The pier was flushed with a high pressure water stream to remove any trapped cumene under the pier and the clean-up operations were completed on March 23, 1990. Due to the volatile characteristic of cumene and the size of the Delaware River, it is very unlikely that the spill is currently impacting the stream or its sediments.

Surface water runoff and spillage within the facility's tank containment structures are managed by a dual drainage system, which can be discharged to the PWD's sewer system, sent to an on-site oil/water separator, pumped out of sumps to trucks or drums, or diverted to three 12,000-gallon storage tanks located adjacent to the oil/water separator. When spilled material flows into a sump, the facility determines how to dispose of the material. Oil skimmed off in the separator is retained and drummed for treatment or disposal, while the effluent from the separator is directed to the PWD sewer system. Drains located outside of the containment areas (i.e., the drains along Allegheny Avenue, discharge to the PWD sewer system. Due to the proximity of the site to the Delaware River, it is possible that runoff from the facility not collected by surface drains could flow directly into the river. There is no documentation that indicates that hazardous constituents have been released into the Delaware River in this manner.

There are five monitoring wells located between the facility's bulk storage tanks and the Delaware River. RCRA closure-related monitoring well nos. MW-5 and MW-7 are located between the western tank farms and the river while the newer AST Nos. 302/304-related monitoring wells (MW-3, MW-4 and MW-5) are located between the eastern tank farms and the river. No contaminants have ever been detected above EPA's MCLs in samples collected from any of these five wells with the exception of benzene in MW-5. The benzene concentration has ranged from 2 ug/l to 30 ug/l (MCL = 5 ug/l) in the five sampling events that have occurred at this well. The benzene concentration was 2 ug/l in the last round of PADEP-required sampling (May 1999). The PADEP MSC for a non-used aquifer is 500 ug/l. This is an indication that the groundwater contamination present at the site is not adversely impacting the Delaware River.

Sediment:

The sediments of the Delaware River in the vicinity of the site have never been sampled. As described in the surface water section above, the only known release of a hazardous substance to surface water related to

the facility was a spill of approximately 12,800 gallons of cumene in March 1990. Cumene, having a density of 0.86 g/cm^3, is lighter than water and would have floated on the surface of the Delaware River at the time of the spill. This spill would therefore not have adversely impacted the sediments of the Delaware River at that time and certainly not 14 years later. Much like the surface water pathway, due to the number of industrial facilities in the immediate vicinity of the Kinder Morgan Liquids Terminals, it would be very difficult to attribute any potential contamination in the sediment to the facility. The available groundwater data indicates that the contaminants found on-site have not reached the Delaware River or its sediments.

Air (indoor)

There are approximately 35 workers at the Kinder Morgan facility, which is staffed 24 hours per day, 365 days per year. Approximately half of the employees work inside the administration building located along Delaware Avenue closest to the tank farm containing AST Nos. 205 - 212 in the southeastern portion of the facility. The other half of the employees are operators that spend the majority of their time outdoors and are not impacted by potential indoor air issues. There are other structures in addition to the office building on the site property (e.g., maintenance shop, foam house, break room); however, these structures are not continuously occupied and may be open to the outside air.

Monitoring well No. MW-5 is located adjacent to the office building. The only VOCs of indoor air quality concern detected in a groundwater sample collected from this well on April 22, 2002 were benzene (2.2 ug/l) and MTBE (4.5 ug/l). The detected benzene concentration is below EPA's maximum contaminant level (MCL) for drinking water (there currently is no MCL for MTBE). MTBE (1.4 ug/l) was the only VOC detected in the next closest monitoring well to the office building (MW-4) located about 175 feet east of the building.

In addition to benzene and MTBE, facility-wide groundwater monitoring has indicated the presence of several other contaminants of indoor air quality concern including chlorobenzene, ethylbenzene, naphthalene, toluene, and xylenes.

Air (Outdoor)

A release of contaminants from source areas to the air above a risk-based level is not suspected. The concentrations of VOCs observed at the site do not warrant a concern for a release to the atmosphere. Although there have been numerous historic spills at the facility that certainly resulted in past releases of contaminants to the atmosphere, those spills were promptly addressed by the facility so that continued releases to the atmosphere were minimized or eliminated. During normal facility operations, there are minimal releases from the product storage tanks due to diurnal temperature and pressure variations that allow for normal venting of the tanks. These controlled releases occur in accordance with the Clean Air Act.

Ref.: Final Report, Environmental Indicator Inspection Report for Kinder Morgan Liquids Terminals, Prepared by Foster Wheeler Environmental Corporation, February, 2002; Correspondence from RCC Environmental Professionals to PADEP, re: 6,000 motor oil spill at horizontal AST area, October 27, 2003; Correspondence from Roux Associates, Inc. to PADEP, re: AST #160 Area Acetone Release, February 15, 2001; Correspondence from CH2MHill to PADEP, re: Data Evaluation for Tank 420 No. 2 Fuel Oil Release, February 13, 2003; Miscellaneous analytical data and reports collected by EPA during site visit on January 7, 2004; Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils, USEPA, November 2002.

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

	Potential **Human Receptors** (Under Current Conditions)						
"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food[3]
Groundwater	No	No	No	No			No
Air (indoors)	No	No	No				
Soil (surface, e.g., <2 ft)	No	No	No	No	No	No	No
~~Surface Water~~	____	____			____	____	____
~~Sediment~~	____	____			____	____	____
Soil (subsurface e.g., >2 ft)				No			No
~~Air (outdoors)~~	____	____	____	____	____		

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated") as identified in #2 above.

2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("___"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

X	If no (pathways are not complete for any contaminated media-receptor combination) - skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).
_____	If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.
_____	If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

See Following Pages

[3] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

Groundwater

As described in the rationale for Question No. 2 above, several VOCs and SVOCs have been detected in various groundwater sampling events that have occurred at the facility over the past ten years. The most common contaminants include the BTEX compounds (benzene, toluene, ethylbenzene and xylenes) with significant concentrations of chlorobenzene, MTBE, , acetone and a few polycyclic aromatic hydrocarbons (PAHs) also apparent.

Analyses of groundwater samples from the five monitoring wells located between the facility's bulk storage tanks and the Delaware River have indicated that on-site groundwater contamination has not adversely impacted the river. No contaminants have ever been detected above EPA's MCLs in samples collected from any of these five wells with the exception of benzene in RCRA closure-related monitoring well MW-5. The benzene concentration has ranged from 2 ug/l to 30 ug/l (MCL = 5 ug/l) in the five sampling events that have occurred at this well. The benzene concentration was 2 ug/l in the last round of PADEP-required sampling (May 1999). The PADEP MSC for benzene in a non-used aquifer in a residential or non-residential setting is 500 ug/l.

In the eastern portion of the site, where groundwater has been observed flowing away from the river to the northwest, the two furthest downgradient wells (MW-1 from the RCRA closure activities and MW-1 from the ethanol spill investigation) have been relatively clean. Both of these wells are located about 300 feet north/northwest of the localized groundwater contamination observed in the eastern portion of the property. These are also the closest wells to the residential area located more than 1,000 feet north of the localized areas of groundwater contamination.

No contaminants were detected in former RCRA monitoring well MW-1 in any of the four latest sampling events (August 1996, February 1997, November 1997, and May 1999). The only contaminant detected in all four monitoring events at the ethanol spill related MW-1 is MTBE, which has ranged in concentration from 1.9 to 11 ug/l. While there is no MCL for MTBE and EPA Region III's tap water RBC for this contaminant is 2.6 ug/l, PADEP's MSC for MTBE in a used aquifer in a residential setting is 20 ug/l and the more applicable MSC for MTBE in a non-used aquifer in a non-residential area is 200 ug/l. Naphthalene was detected in this well in two sampling events at trace concentrations of 1.0 and 4.1 ug/l. There is no current MCL for this contaminant, but EPA's tap water RBC for naphthalene is 6.5 ug/l, the MSC for a used aquifer in a residential area is 100 ug/l and the MSC for a non-used aquifer is 30,000 ug/l.

Groundwater is not used as a potable water source or for any other purpose (i.e., industrial, agricultural, etc.) in the vicinity of the site. There are no schools or day care facilities located within 1,000 feet of areas of observed groundwater contamination. The only possible groundwater exposure pathway is to workers during periods of construction when excavation activities may expose them to the shallow groundwater table that exists three to seven feet below grade at the site. Kinder Morgan Liquids Terminals is aware of the groundwater contamination issues at the facility and will ensure that any workers that potentially could come into contact with groundwater are adequately trained and protected to ensure that the groundwater pathway remains incomplete or that the exposure risks are minimized to acceptable levels.

Air (indoor)

There are approximately 35 workers at the Kinder Morgan facility, which is staffed 24 hours per day, 365 days per year. Approximately half of the employees work inside the administration building located along Delaware Avenue closest to the tank farm containing AST Nos. 205 - 212 in the southeastern portion of the facility. The other half of the employees are operators that spend the majority of their time outdoors and are not impacted by potential indoor air issues.

Monitoring well No. MW-5 is located adjacent to the office building. The only VOCs of indoor air quality concern detected in a groundwater sample collected from this well on April 22, 2002 were benzene (2.2 ug/l) and MTBE (4.5 ug/l). While these contaminant levels are above EPA's RBC values for tap water, they are below PADEP's residential used aquifer MSC values. The detected benzene concentration is also below EPA's maximum contaminant level (MCL) for drinking water (there currently is no MCL for MTBE). MTBE (1.4 ug/l) was the only VOC detected in the next closest monitoring well to the office building (MW-4) located about 175 feet east of the building.

Since the benzene concentration detected in MW-5 is below the MCL of 5 ug/l, per EPA's November 2002 "Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils," this contaminant is screened out of the indoor air quality assessment at the office building location. The target groundwater concentration for MTBE that would indicate the potential for an indoor air quality problem in Table 2b of the above Guidance is 120,000 ug/l, which is five orders of magnitude greater than the level of MTBE found in MW-5. Although the Guidance specifies that its tables with generic attenuation factors may not be appropriate for use in situations where the depth from the base of a building foundation to groundwater is less than five feet (depth to groundwater varies from 3 to 7 feet at the facility), it is very unlikely that an MTBE concentration of 4.5 ug/l in groundwater would cause the indoor air MTBE concentration to rise above the target indoor air concentration of 3,000 ug/m^3 regardless of the depth to groundwater.

In addition to benzene and MTBE, facility-wide groundwater monitoring has indicated the presence of several other contaminants of indoor air quality concern including chlorobenzene, cumene, ethylbenzene, naphthalene, toluene, and xylenes. Benzene, chlorobenzene, cumene, naphthalene and toluene have been found at concentrations above EPA's target groundwater concentrations in at least one groundwater sample. None of the groundwater contaminants were detected above PADEP's residential or nonresidential volatilization to indoor air screening levels.

The highest concentrations of benzene (7,713 ug/l), cumene (26,900 ug/l), naphthalene (177 ug/l) and toluene (4,165 ug/l) in groundwater at the facility were found in grab groundwater samples collected on August 19, 2002 in the vicinity of AST No. 420. These sample locations are several hundred feet from the nearest occupied building (the Kinder Morgan office building). While these concentrations are all above EPA's residential target groundwater concentrations for indoor air at the 10^{-5} risk level, only the benzene concentration was detected above PADEP's non-residential volatilization to indoor air groundwater screening level (5,900 ug/l). The distance and the prevailing groundwater flow direction prevents the benzene from impacting the indoor air quality of the Kinder Morgan office building..

The highest concentration of chlorobenzene (1,400 ug/l) in groundwater was found in RCRA monitoring well MW-4in a sample collected on May 21, 1999. This sample location is approximately 800 feet from the nearest occupied building (the Kinder Morgan office building). This concentration is also above EPA's target groundwater concentration for chlorobenzene (390 ug/l) but below PADEP's residential groundwater screening level (27,000 ug/l).

The occurrences of VOC groundwater contamination at Kinder Morgan appear to be very localized with no evidence of off-site plume migration. Therefore, the significant concentrations of benzene and chlorobenzene detected in groundwater are not currently suspected of impacting the indoor air quality at any structures in the site vicinity.

Surface and Subsurface Soil:

As described in the rationale for Question No. 2 above, there have been numerous releases of materials containing hazardous constituents onto facility soils. Kinder Morgan's emergency response to these

releases has been expedient, typically resulting in the removal of various quantities of visually stained or otherwise determined contaminated soils for off-site treatment and disposal. However, residual contamination is suspected to exist at several of the release sites in both the surface and subsurface soils, potentially at concentrations above acceptable risk levels. This is certainly true for areas like the AST #161 acetone spill and the motor oil spill at AST #s 481 - 488, where Kinder Morgan is in the process of further evaluating the extent of contamination.

There is no evidence to support that site-related activities ever resulted in the contamination of any off-site soils. This eliminates the resident, day care and food human receptors from the list of potential complete soil exposure pathways. Furthermore, no known recreational activities occur on-site, especially in the tank farm areas where residual soil contamination may still exist.

Access to the tank farms by non-authorized individuals is prevented by a chain link fence with gates located along both Allegheny and Delaware Avenues. Plant personnel are present at the site three shifts/day, 24 hours/day, 365 days/year. Plant personnel inspect each of the tank farm areas at least one time per shift so the likelihood of trespassers being exposed to hazardous constituents on-site is minimal.

Kinder Morgan Liquids Terminals is aware of the areas of potential soil contamination around its tank farms. Workers are not typically located in any of these areas unless the tanks require maintenance or there is some type of construction activity occurring. Kinder Morgan will ensure that any workers that potentially could come into contact with contaminated surface and/or subsurface soil are adequately trained and protected to ensure that the soil exposure pathway remains incomplete or that the exposure risks are minimized to acceptable levels.

Ref.: Final Report, Environmental Indicator Inspection Report for Kinder Morgan Liquids Terminals, Prepared by Foster Wheeler Environmental Corporation, February, 2002; Correspondence from RCC Environmental Professionals to PADEP, re: 6,000 motor oil spill at horizontal AST area, October 27, 2003; Correspondence from Roux Associates, Inc. to PADEP, re: AST #160 Area Acetone Release, February 15, 2001; Correspondence from CH2MHill to PADEP, re: Data Evaluation for Tank 420 No. 2 Fuel Oil Release, February 13, 2003; Miscellaneous analytical data and reports collected by EPA during site visit on January 7, 2004; Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils, USEPA, November 2002.

4 Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[4] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

_____ If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

_____ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

_____ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

[4] If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

5 Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

_____ If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

_____ If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

_____ If unknown (for any potentially "unacceptable" exposure) - continue and enter "IN" status code

Rationale and Reference(s):

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

__X__ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the Kinder Morgan Liquids Terminals facility, EPA ID #PAD087098653, located at Allegheny Avenue and Delaware River, Philadelphia, PA under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO - "Current Human Exposures" are NOT "Under Control."

____ IN - More information is needed to make a determination.

Completed by /s/ Date 3/22/04
Andrew Clibanoff
RCRA Project Manager

Supervisor /s/ Date 3/22/04
Paul Gotthold
PA Operations Branch Chief
EPA, Region 3

Locations where References may be found: Facility RCRA Project File
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FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.