**DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION**

# RCRA Corrective Action
# Environmental Indicator (EI) RCRAInfo Code (CA725)
# Current Human Exposures Under Control

**Facility Name:** Aristech Chemical Corporation (formerly USX Corporation)
**Facility Address:** 1711 West Elizabeth Avenue, Linden, New Jersey 07036
**Facility EPA ID#:** NJD001724988

## Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EIs) are measures being used by the Resource Conservation and Recovery Act (RCRA) Corrective Action Program to go beyond programmatic activity measures (e.g., reports received and approved) to track changes in the quality of the environment. The two EIs 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 objectives of the RCRA Corrective Action Program, the EIs 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 is for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and does 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 determination status codes should remain in the Resource Conservation and Recovery Information System (RCRAInfo) national database ONLY as long as they remain true (i.e., RCRAInfo status codes must be changed when the regulatory authorities become aware of contrary information).

## Facility Information

The Aristech Chemical Corporation (Aristech) site–formerly United States Steel Corporation (a.k.a., USX)–in Linden, New Jersey, is located on four parcels (Lots 18, 19, 20 and 21) totaling 3.25 acres. The site is bordered by industrial properties to the southwest and northeast, by Merck Pharmaceuticals and rail lines of the Penn-Central Railroad (currently owned by Amtrak) and the New Jersey Transit Authority to

the east, and by West Elizabeth Avenue to the west. The property is zoned for industrial use by the City of Linden.

The Aristech site was vacant land until 1950. From 1950 to 1980, the site was used for manufacturing polyester resins under the consecutive ownership of Marco, Celanese Corporation of America, Cornelius Wax Refining Co., W.R. Grace, USX, and eventually Aristech. ARSH, Inc., which recently changed its name from Avonite, Inc., is currently managing the trailing environmental responsibility of the former Aristech/USX facility as a result of a previous acquisition and merger involving Aristech. From 1980 to 1985, only two small pilot plants remained in intermittent operation to produce small batches of specialty resins. In 1986, USX entered into an agreement to transfer the Linden site to Aristech. Aristech began scaling back facility operations in 1985, and operations ceased in 1998. Buildings or asphalt currently cover approximately 95 percent of the site.

The site has been divided into four property parcels (Lots 18 through 21), as shown on Figure 2 from the Off-Property Remedial Investigation Report/Remedial Investigation Workplan dated November 26, 2001. In 1998, Aristech sold Lot 20 to Chemical Services, Inc. (CSI), and in July 2003, Avonite sold Lot 21 to CSI. CSI currently operates on Lot 20 and Lot 21. Aristech/ARSH no longer operates facilities or leases property on Lots 18 and 19.

In June 1994, Aristech/USX entered into a Memorandum of Agreement (MOA) with the New Jersey Department of Environmental Protection (NJDEP), which required Aristech/USX to remediate the site pursuant to the New Jersey Industrial Site Recovery Act (ISRA). Subsequent investigations performed at the site include a Preliminary Assessment (June 1996), two Remedial Investigations (April 1995, August 1996), a Remedial Investigation for Lots 20 and 21 (February 1998), and two Off-Property Remedial Investigations (November 2001, June 2003). In 1999, Aristech and NJDEP signed a Remediation Agreement under ISRA cases E86894, E94252, and E98486, which established the terms of the site remediation. NJDEP approved the bifurcation of the off-property remedial issues from Lot 20 and 21 remedial issues in comments dated June 14, 2000.

In June 1997, Aristech submitted a Remedial Action Report (RAR) for Lots 18 and 19 to NJDEP with a No Further Action (NFA) request for these lots. Aristech submitted a RAR for Lots 20 and 21 to NJDEP in January 2003, with a NFA request for soils on these lots. In an October 30, 2003, letter, NJDEP issued a NFA Determination and Covenant Not To Sue for all on-site soils, including Lots 18 through 21.

The remaining concerns at the Aristech site include polychlorinated biphenyl (PCB) residuals present in the off-property soil and slight benzene contamination in groundwater. In the June 2003 Conceptual Remedial Action Workplan (RAWP) for the Off-Property Area, Aristech proposed to excavate PCB hot-spots and establish engineering and institutional controls for PCBs in soil above New Jersey Residential Direct Contact Soil Cleanup Criteria (NJ RDCSCC). A formal RAWP is due to NJDEP in early 2004. Additionally, benzene concentrations remain slightly above New Jersey Groundwater Quality Criteria (NJ GWQC) in one on-site well, MW-8. In the November 10, 2003, Remedial Action Progress Report (RAPR) for Lots 20 and 21, Aristech proposed a Classification Exception Area (CEA) for the site to address the residual benzene contamination. However, Aristech also proposed conducting two additional quarters of groundwater sampling from MW-8 for benzene. If this sampling confirms that the remaining low-level concentration has naturally attenuated below the NJ GWQC, a CEA will not be necessary at the site.

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 (SWMUs), regulated units (RUs), and areas of concern (AOCs)), 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

**Summary of Historical Operations and Areas of Environmental Concern (AECs):**

Polyester resin was produced at the Aristech site by combining various raw organic chemicals (e.g., glycols, organic acids) in a closed, heated reactor and blending this material with an organic diluent (styrene) to form a viscous liquid at room temperature. Heat transfer systems were used to keep the raw chemicals heated to their molten states so they could be pumped and metered into the reaction vessels. Prior to 1972, hydraulic oil used in the two heat transfer systems contained PCBs, typically Aroclor 1242. The total quantity of PCB-containing oil (FR-1, manufactured by Monsanto) historically introduced into the systems is unknown. In 1972, Monsanto discontinued the sale of PCBs, and PCB-containing oil in the heat transfer systems was replaced with phthalate ester heat transfer fluids (Ref. 6). Contamination at the Aristech site is likely related to former activity at the pilot plants, the distillate incinerator, the aboveground storage tanks, and the raw material storage area. Ethylbenzene, specifically, is considered an inherent impurity in styrene production and a byproduct of the styrene decomposition process.

PCBs have historically been the primary constituents of concern (COCs) for soil at the Aristech site, with impacts identified on Lots 18 through 21. Elevated PCB levels in soil on a portion of Lot 20 were assumed to be associated with incidental spills from the heat transfer systems, as no other known PCB uses exist for the Aristech site. PCBs discharged on Lot 20 were then apparently tracked onto Lots 18, 19, and 21 via vehicular traffic, resulting in the observed distribution of PCBs in surface soil on all four of the parcels. This method of transport seems to be confirmed by the sporadic and spatially variable concentrations of PCBs in soil in both on- and off-property soil (Ref. 6). PCB contamination is also present in off-property areas adjacent to the southeastern boundary of the site; these impacts are believed to be associated with storm water runoff from the Aristech site and other, non-Aristech, sources.

The four areas of environmental concern (AECs) are described below. Current use of the site and surrounding area is non-residential; therefore, only the contaminants exceeding the New Jersey (NJ) Non-Residential Direct Contact Soil Cleanup Criteria (NRDCSCC) are of concern for current site conditions.

**Lots 18 and 19:** On Lot 18, 99.9 percent of the PCB mass was identified as Aroclor 1248, with insignificant quantities of Aroclors 1242, 1254 and 1260. On Lot 19, 30.8 percent of the PCB mass was identified as Aroclor 1242; 56.3 percent as Aroclor 1248; 12.7 percent as Aroclor 1254; and 0.3 percent as Aroclor 1260. PCB concentrations associated with these lots were highest along the southeast boundary of Lot 18. This contamination is likely attributable to occasional backflow from the drainage ditch that runs along the southeastern property boundary during significant storm events (Ref. 6).

The off-property ditch is located primarily on the Amtrak property. It originates south of the site and generally parallels the railroad tracks, flowing southwest to northeast into a catch basin behind Lot 18. The catch basin subsequently drains into the municipal storm sewer system. The drainage ditch receives storm water runoff from the rear (southern) portion of the site as well as other industrial properties located up-flow and down-flow of the site. The ditch typically lacks standing or flowing water. However, during heavy rainfall events, storm water can exceed the capacity of the drainage ditch, thus allowing water from the ditch to flow back on site and cause minor flooding conditions in the rear portion of the Aristech site. Thus, significant PCB impacts documented along the southeastern boundary of the site are likely due to surface runoff of PCB-impacted particulates in surface soil from the Aristech site and other adjacent properties into the off-property drainage ditch.

Remediation activities were completed on Lots 18 and 19 in 1997. Aristech excavated all PCBs in soil above the NJ RDCSCC of 0.49 mg/kg. Excavated soil was disposed of properly off site, and excavated areas were backfilled and paved with asphalt (Ref. 1). NJDEP subsequently determined that no further investigation or remedial action (NFI/NFA) was required for Lots 18 and 19 (exclusive of off-property issues) in a letter dated October 2, 1998 (Ref. 4). In an October 30, 2003, letter, NJDEP issued a NFA Determination and Covenant Not To Sue for all on-site soils, including Lots 18 and 19 (Ref. 12).

**Lots 20 and 21:** On Lots 20 and 21, where the PCB heat transfer fluid was used, 99.1 percent of the PCB mass was identified as Aroclor 1242 and 0.8 percent as Aroclor 1248. Insignificant quantities of Aroclor 1254 and 1260 were also identified. The highest concentrations of PCBs were detected within the property boundaries as compared to the samples taken along the southeast property boundary (Ref. 6). Limited hot-spots of ethylbenzene, styrene, polynuclear aromatic hydrocarbons (PAHs), and total petroleum hydrocarbons (TPHs) above NJ RDCSCC and NJ NRDCSCC were also observed in soil on Lots 20 and 21. These impacts have been linked to accidental and routine releases during processing and chemical storage at Lots 20 and 21.

On August 24, 2000, NJDEP approved a Remedial Action Work Plan (Addendum #2) to address PCB impacts on Lots 20 and 21 (Refs. 5 and 8). In November 2000, a commercially available oxygen release compound (ORC), manganese peroxide, was injected into the subsurface. The purpose of the treatment program was to elevate oxygen levels in soil and groundwater to stimulate aerobic biodegradation of ethylbenzene hot-spot areas and volatile organic compound (VOC) source residuals. In accordance with NJDEP requirements, groundwater monitoring was completed before and after the ORC injections to document the results of the remedial strategy; these results are further discussed in the Groundwater AEC description below. Sampling was not conducted to assess impacts of the ORC injections on soil contamination because Aristech agreed to excavate hot-spot areas of PCB and organic contamination. In February 2002, all PCB-impacted soil above 50 mg/kg[1] was excavated from Lots 20 and 21. Co-located areas of PAH, TPH, styrene, and ethylbenzene contamination above the NJ NRDCSCC were also excavated. Approximately 450 linear feet of concrete curbing and 600 linear feet of a six-foot high chain link, barbed-wire security fence were installed in August 2002 (Ref. 9). A durable asphalt cap was

[1] 50 mg/kg is the USEPA Toxic Substances Control Act (TSCA) excavation criterion for PCBs and was conditionally approved for use in Lots 20 and 21 by NJDEP in an August 6, 1998, comment letter (Ref. 5).

then installed over at least 18 inches of crushed, compacted stone across the entire rear eastern and southern sections of the property. A RAR documenting the PCB removal effort, capping details, and establishment of a Draft Deed Notice was submitted to NJDEP in January 2003 (Ref. 9). The RAR also contained a NFA Request for soils on Lots 20 and 21. In an October 30, 2003 letter, NJDEP issued a NFA Determination and Covenant Not To Sue for all on-site soils, including Lots 20 and 21 (Ref. 12). The final Deed Notice was recorded in July 2003 and the appropriate documentation was sent to NJDEP on September 24, 2003 (Ref. 11).

**Off-Property Areas:** The property adjacent to the southeast boundary of the Aristech site has been used as a railroad corridor since the 1830s. In 1916, the area was raised above grade to facilitate more lines and faster trains. This rail line currently serves Amtrak's Northeast Corridor High Speed Rail Line for passenger travel. A freight rail line and several spurs were also installed in this area in the 1950s and were actively used through the 1980s. PCBs were commonly used in electric transformers and capacitors associated with electric-powered locomotives and rail lines, but PCB use was phased out in the late 1970s and early 1980s (Ref. 6). Aristech performed soil sampling in the off-site area because this area also may have been impacted by contaminated runoff from the site.

In September 2000 and September 2002, soil samples were collected for PCB analysis in off-site areas primarily along the southeastern boundary of Lots 18, 19, and 20 (Ref. 10). No soil samples were necessary in the area of Lot 21, given that delineation to the NJ RDCSCC (0.49 mg/kg) was previously accomplished for this area. On the Amtrak property, 99.1 percent of the PCB mass was identified as Aroclor 1248; 0.6 percent as Aroclor 1254; 0.3 percent as Aroclor 1260; and an insignificant amount as Aroclor 1242. PCB concentrations in the off-property areas were highly variable, which Aristech attributes to contaminant contributions from off-site sources (e.g., other industrial properties in the area and the railroad itself) and general drainage and storm water flow patterns associated with on-property areas and the off-property drainage ditch (Ref. 6).

In the June 2003 Off-Property Remedial Investigation Report, Aristech presented a conceptual RAWP, which the NJDEP found reasonable in a September 12, 2003, comment letter. (See Figure 4 from Reference 10 for an overview of the conceptual remedial strategy). The conceptual RAWP proposes to excavate four hot-spots of PCBs above 50 mg/kg, conduct post-excavation sampling, and establish engineering and institutional controls for PCBs in soil above NJ RDCSCC (Ref. 10). The proposed engineering control consists of installing a geo-textile fabric or membrane over the surface of a portion of the drainage ditch area, then covering it with ballast or stone material. For areas outside the drainage ditch, where much lower PCB concentrations exist, Aristech proposes to use the existing railroad ballast material as an engineering control. The proposed institutional control for this area is the establishment of a Deed Notice. The current property owner, Amtrak, has reviewed a copy of the Off-Property Remedial Investigation Report and the recommendations herein. Amtrak representatives concurred with the delineation program and had no specific objections to the proposed remedy for the off-property area (Ref. 10). A formal RAWP for the Off-Property Remediation, including documentation of the property owner's acceptance of the proposed engineering and institutional controls, is due to NJDEP in early 2004.

**Groundwater:** Groundwater investigation and remediation at the Aristech site has focused on Lots 20 and 21, as groundwater beneath Lots 18 and 19 has not been impacted with site-related contamination (Refs. 2 and 3). Groundwater beneath Lots 20 and 21 has historically been

impacted by VOCs, including benzene, ethylbenzene, and styrene, above NJ GWQC. The plume of contamination has not migrated beyond site boundaries. A map of groundwater monitoring locations at the Aristech site is presented in Figure 1 of Reference 7. An area of VOC contamination, primarily benzene and ethylbenzene, had been observed in the area around monitoring wells MW-1A, MW-3, MW-4A, and MW-13A at the center of the site. In November 2000, Aristech implemented a remedial program involving subsurface injection of manganese peroxide near wells MW-3 and MW-13A, as described above for Lots 20 and 21. According to groundwater monitoring data collected both before and after the injections, benzene and ethylbenzene concentrations declined significantly (Ref. 7). Ethylbenzene concentrations dropped between 68 and 100 percent following the ORC injections. Benzene concentrations decreased between 38 and 48 percent (Ref. 7).

Nevertheless, benzene concentrations remain slightly above NJ GWQC in well MW-8. In the November 10, 2003, RAPR for Lots 20 and 21, Aristech has proposed a CEA for the site to address the residual benzene contamination (Ref. 13). However, Aristech also proposed conducting two additional quarters of groundwater sampling from MW-8 for benzene. If this sampling confirms that the remaining low-level concentrations have naturally attenuated below the NJ GWQC, a CEA will not be necessary at the site.

**References:**

1. Remedial Action Report for Lots 18 and 19 of the USX Corporation Facility. Prepared by Environmental Liability Management (ELM), Inc. Dated June 25, 1997.
2. Memorandum from David Haymes, NJDEP, to Joe Goliszewski, NJDEP, re: Review of Remedial Action Report and Request for No Further Action for Lots 18 and 19. Dated July 29, 1997.
3. Letter from Ann Wolf, NJDEP, to Colleen Donovan, Pitney Hardin Kipp & Szuch, re: Remedial Action Report for Lots 18 and 19. Dated March 13, 1998.
4. Letter from Ann Wolf, NJDEP, to Colleen Donovan, Pitney Hardin Kipp & Szuch, re: USX Corporation. Dated October 2, 1998.
5. Remedial Action Workplan Addendum #2 for Lots 20 and 21. Prepared by ELM, Inc. Dated January 13, 2000.
6. Off-Property Remedial Investigation Report/Remedial Investigation Workplan for the Former USX Corporation Site. Prepared by ELM, Inc. Dated November 26, 2001.
7. Letter from Mark Whitaker, ELM, to Joseph Goliszewski, NJDEP, re: Results of Groundwater Remediation/Monitoring Program and Request for No Further Action for Groundwater with Establishment of a CEA. Dated April 10, 2002.
8. Letter from Mark Fisher, ELM, to Karen Lesto, NJDEP, re: Revised Schedule of Implementation and Project Status Update. Dated April 23, 2002.
9. Remedial Action Report for Lots 20 and 21 of the Former USX Corporation Site. Prepared by ELM, Inc. Dated January 17, 2003.
10. Off-Property Remedial Investigation Report for the Former USX Corporation Site. Prepared by ELM, Inc. Dated June 11, 2003.
11. Deed Notice. Dated September 24, 2003.
12. Letter from Stephen Maybury, NJDEP, to Colleen Donovan, Pitney Hardin Kipp & Szuch, re: On-Site Areas of Concern (AOCs), Restricted Use, No Further Action Letter and Covenant Not to Sue, et al. Dated October 30, 2003.
13. Remedial Action Progress Report for Lots 20 and 21 of the Former USX Corporation Site. Prepared by ELM, Inc. Dated November 10, 2003.

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be "**contaminated**"[2] 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)?

| Media | Yes | No | ? | Rationale/Key Contaminants |
|---|---|---|---|---|
| Groundwater | X | | | Benzene |
| Air (Indoors)[3] | | X | | |
| Surface Soil (e.g., <2 ft) | X | | | PCBs, PAHs, TPH, ethylbenzene, and styrene |
| Surface Water | | X | | |
| Sediment | | X | | |
| Subsurface Soil (e.g., >2 ft) | X | | | PCBs, PAHs, TPH, ethylbenzene, and styrene |
| Air (Outdoor) | | X | | |

____ 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:**

**Groundwater**

Groundwater in the vicinity of the Aristech site is encountered at approximately five feet below ground surface (bgs) in unconsolidated Wisconsin Glaciation sediments. Groundwater also occurs in joints and fractures of the underlying Brunswick Formation bedrock, consisting of thinly bedded shale, mudstone, and sandstone. Groundwater flow within the sediment deposits (both shallow and deep) is to the north/northwest, with an average horizontal hydraulic gradient of 0.0009 feet per foot and horizontal

[2] "Contamination" and "contaminated" describe media containing contaminants (in any form, nonaqueous phase liquid (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).

[3] Recent evidence (from the Colorado Department of Public Health and Environment, and others) suggests 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.

velocity of 27.6 feet per year (Refs. 1, 2 and 5). A slight upward vertical flow gradient has also been observed between shallow and deep wells within the water table aquifer (Ref. 1).

Although groundwater does not discharge near the Aristech site, some groundwater to surface water discharge is believed to occur at Morses Creek, approximately 4,000 feet downgradient of the site. Groundwater beneath the site is currently classified as Class II-A (potential potable water supply). Nevertheless, local water authorities (i.e., the Elizabethtown and Rahway Water Companies) indicate that the entire area surrounding the site is served by public water, and that groundwater in the Aristech area is not and will not be used as a public water supply in the foreseeable future (i.e., 25 years) (Ref. 3).

Groundwater monitoring began at the Aristech site in 1990. A total of 15 groundwater monitoring wells have been installed in the water table aquifer between the surficial fill layer and underlying bedrock at the site, as shown on Figure 1 of Reference 6. Several wells have since been abandoned (including the two deep wells) and/or replaced due to lack of contamination or structural damage. The lack of contamination in lower portions of the water table aquifer is supported by the measured upward vertical gradient (Refs. 2 and 3). In addition to various groundwater investigation efforts over the years, a quarterly shallow groundwater monitoring program was implemented at the Aristech site in October 1998 (Ref. 4). The most recent quarterly monitoring round for which data are available was conducted in August 2003 (Ref. 10).

The only contaminant routinely detected above NJ GWQC during the post-ORC groundwater sampling rounds is benzene, in wells MW-1A and MW-8 (i.e., at the center of the site). Benzene was not detected in MW-1A during the August 2003 groundwater sampling event (Ref. 10). Table 1 below presents results from the last four sampling rounds for benzene in MW-8. These concentrations are lower than the maximum concentrations of benzene ever reported in well MW-8 (4 µg/L), although they may be slightly above the applicable NJ GWQC in several instances (Ref. 6).

**Table 1. Groundwater Monitoring Results for Benzene**
**(NJ GWQC = 1 µg/L)**

| Well | Date | Reported Concentration (µg/L) |
|---|---|---|
| MW-8 | 1/17/03 | BS |
| | 2/14/03 | *1.9* U |
| | 5/9/03 | *1.1* U |
| | 8/8/03 | 1.4 |

BS – Below NJ GWQC Standard
U – Not detected above level indicated
*Italic* value indicates method detection limit exceeds NJ GWQC
Source: Reference 10, Table 2.

As mentioned above, to address the benzene exceedence in MW-8, Aristech has proposed establishing a CEA for the site (Ref. 10). However, Aristech also proposed in the RAPR to conduct two additional quarters of groundwater sampling from MW-8 for benzene. If this sampling confirms that the remaining

low-level benzene contamination has naturally attenuated below the NJ GWQC, a CEA will not be necessary at the site.

Well MW-4A and well MW-8 (which is downgradient of MW-4A) both displayed an increase in detected ethylbenzene concentrations above NJ GWQC and a subsequent decreasing trend in the November 2002 through August 2003 groundwater sampling results (Ref. 10). However, ethylbenzene was not detected above NJ GWQC (700 µg/L) in any well during the August 2003 sampling event. These increases are therefore considered to be a one-time occurrence associated with the excavation of PCB and VOC source material immediately upgradient of MW-4A, which included periods of rainfall infiltrating the excavation area prior to completion of removal activities (Ref. 10).

**Air (Indoors)**

Benzene is the only VOC that was detected slightly above its NJ GWQC in the most recent groundwater sampling event (August 2003). The one benzene exceedence from MW-8 was compared to the State of Connecticut Groundwater Standards for the Protection of Indoor Air under the Industrial/Commercial Scenario (CT I/C VC) to determine whether migration of VOCs to indoor air may be of concern. Benzene (1.4 µg/L) was not detected above the CT I/C VC (530 µg/L). MW-8 is located underneath a building on Lot 20. Documentation indicates that CSI currently operates on Lot 20. Although the site is zoned industrial, specific use of the building on Lot 20 is not documented. Regardless, migration of benzene to indoor air on Lot 20 is not a concern given the low levels of benzene detected in MW-8. Thus, potential migration of VOCs from groundwater to indoor air is not a concern at the Aristech property.

**Surface/Subsurface Soil**

Surface soil (< 2 feet bgs) has historically been impacted at the site by PCBs, PAHs, ethylbenzene, and styrene above NJ NRDCSCC, while subsurface soil (> 2 feet bgs) has historically been impacted by PCBs, PAHs, TPHs, ethylbenzene, and styrene above the NJ NRDCSCC. Only those contaminants exceeding the NJ NRDCSCC are of concern for current site conditions because the facility is an industrial site. Contaminants are listed by AEC below, with the maximum detected concentration and the applicable NJ NRDCSCC in parentheses following the contaminant name. Samples collected from the off-property drainage ditch were classified as soil samples because the ditch typically lacks any standing or flowing water during periods without precipitation, and water is only present during and immediately following storm events (see photos in Attachment A of Reference 8). The ditch elevation is topographically above the elevation of the groundwater table and is not a discharge point for groundwater (Ref. 8).

**Lots 18 and 19:** All contamination above NJ RDCSCC has been excavated and disposed of properly off site.

**Lots 20 and 21:** All PCB-impacted soil above 50 mg/kg was excavated from Lots 20 and 21. Co-located areas of PAH, TPH, styrene, and ethylbenzene contamination above the NJ NRDCSCC were also excavated. No post-excavation sampling was required by NJDEP (Ref. 7). Therefore, only PCBs potentially remain in surface/subsurface soil above the NJ NRDCSCC (2 mg/kg), in concentrations up to 50 mg/kg. NJDEP approved the engineering and institutional controls for Lots 20 and 21, including construction of an asphalt cap and establishment of a Deed Notice, and subsequently issued a NFA Determination and Covenant Not To Sue for all on-site soils (Ref. 10).

**Off-Property Areas:** Total PCBs were detected above the NJ NRDCSCC (2 mg/kg) in surface soil (maximum of 234 mg/kg) and subsurface soil (maximum of 2.7 mg/kg).

**Surface Water**

No surface water bodies are located on or adjacent to the site. The nearest downgradient surface body is Morses Creek, which is located approximately 4,000 feet northeast of the site and discharges to the Arthur Kill tidal strait (Ref. 3). Given the limited groundwater and soil contamination, impact to this surface water body from the Aristech site is not a concern.

**Sediment**

Sediment is not present on the property or in the off-property areas and is therefore not a media of concern.

**Air (Outdoors)**

No assessment of impacts to outdoor air has been conducted at this property. However, surface characteristics at the site are not conducive to migration of contamination to outdoor air because approximately 95 percent of the Aristech site is covered by buildings, concrete, or asphalt. The remainder of the property consists of a small landscaped area that is present along West Elizabeth Avenue. The majority of the off-property area is covered with ballast material (see Figure 4 of Reference 8). Photographs from the Off-Property Remedial Investigation Report indicate that the remaining off-property area is covered with thick vegetation, except for the drainage ditch and a narrow area directly next to the railroad berm (see Attachment A of Reference 8). Thus, marginal migration of contaminants bound to airborne particulate matter is expected at this site due to the extremely limited amount of exposed surface soil. In addition, volatile emissions of VOCs (e.g., benzene, which exceeded the NJ GWQC only slightly in one well) from groundwater to outdoor air is not expected to be of concern due to the natural dispersion of contaminants once they reach the surface. Therefore, the migration of particulates entrained on dust and/or volatile emissions are not expected to be significant exposure pathways of concern at the Aristech site and off-property areas.

**References:**

1. Report of Findings for the Phase II ECRA Investigation at USX Corporation. Prepared by Keystone Environmental Resources, Inc. Dated February 1992.
2. Revised Cleanup Plan for USX Corporation Site. Prepared by ELM. Dated May 27, 1992.
3. Remedial Investigation Report, Remedial Action Selection Report & Remedial Action Workplan Report for the USX Corporation Site. Prepared by ELM. Dated August 1, 1996.
4. Letter from Mark Fisher, ELM, to Joseph Goliszewski, NJDEP, re: Revised Remedial Action Schedule of Implementation. Dated April 28, 1999.
5. Remedial Action Workplan Addendum #2 for Lots 20 and 21. Prepared by ELM, Inc. Dated January 13, 2000.
6. Letter from Mark Whitaker, ELM, to Joseph Goliszewski, NJDEP, re: Results of Groundwater Remediation/Monitoring Program and Request for No Further Action for Groundwater with Establishment of a CEA. Dated April 10, 2002.
7. Remedial Action Report for Lots 20 and 21 of the Former USX Corporation Site. Prepared by ELM, Inc. Dated January 17, 2003.

8. Off-Property Remedial Investigation Report for the Former USX Corporation Site. Prepared by ELM, Inc. Dated June 11, 2003.
9. Letter from Stephen Maybury, NJDEP, to Colleen Donovan, Pitney Hardin Kipp & Szuch, re: On-Site Areas of Concern (AOCs), Restricted Use, No Further Action Letter and Covenant Not to Sue, et al. Dated October 30, 2003.
10. Remedial Action Progress Report for Lots 20 and 21 of the Former USX Corporation Site. Prepared by ELM, Inc. Dated November 10, 2003.

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 | Trespasser | Recreation | Food[4] |
|---|---|---|---|---|---|---|---|
| Groundwater | No | No | No | No | – | – | No |
| ~~Air (indoor)~~ | | | | | – | – | – |
| Surface Soil (e.g. < 2 ft) | No | No | – | Yes | Yes | No | – |
| ~~Surface Water~~ | | | – | – | | | |
| ~~Sediment~~ | | | – | – | | | |
| Subsurface Soil (e.g., > 2 ft) | – | – | – | Yes | – | – | – |
| ~~Air (outdoors)~~ | | | | | | – | – |

Instruction 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. These spaces instead have dashes ("--"). While these combinations may not be probable in most situations, they may be possible in some settings and should be added as necessary.

___ 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).

__X__ 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

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

**Rationale:**

**Groundwater**

Groundwater is contaminated with benzene slightly above the NJ GWQC of 1 µg/L in MW-8 (1.4 µg/L). MW-8 is located underneath a building near the center of the site. Approximately 95 percent of the site is covered with asphalt, concrete, or buildings, which provides extremely limited opportunities for direct exposure to the minimally contaminated groundwater. Additionally, on-site remedial activities are complete for Lots 18 - 21, so it is highly unlikely that on-site remedial workers will be performing intrusive activities that would put them in direct contact with contaminated groundwater. Furthermore, the Deed Notice for Lots 20 and 21 restricts intrusive activities in these Lots (Ref. 3). Therefore, despite the relatively shallow depth to groundwater (approximately 5 feet bgs), direct contact with contaminated groundwater is not considered a potentially complete pathway for on-site remedial workers, classified as construction workers for the purposes of this EI determination.

Groundwater at the site is classified as a Class II-A aquifer (i.e., potential potable water supply). However, there is no current or planned use of groundwater in the Aristech area for potable consumption, based on a 25-year planning horizon (Ref. 1). Because groundwater at the site is not used for potable purposes and contamination in the potable aquifer is not currently migrating beyond site boundaries, exposure to contaminated groundwater associated with the site due to ingestion is not a concern at this time.

Thus, there are no potentially complete exposure pathways between groundwater contaminants and human receptors.

**Surface/Subsurface Soil**

As presented in response to Question 2, there are several areas on site with potential contamination in surface/subsurface soil above NJ NRDCSCC. Total PCBs may remain in surface and subsurface soil up to 50 mg/kg in Lots 20 and 21. All hot-spot soil excavation activities for Lots 20 and 21 were completed in February 2002, and subsequent engineering control installation (including asphalt capping) has also been completed. The Deed Notice for Lots 20 and 21, issued in July 2003, restricts future site use to non-residential and does not permit disturbance of the engineering controls (Ref. 3). Additionally, approximately 95 percent of the site is covered with asphalt, concrete, or buildings.

Given the presence of engineering and institutional controls over the areas with potential contamination above NJ NRDCSCC, the lack of planned intrusive activities, and the minimal amount of exposed surface soil on site, direct exposure to on-site contaminated surface and subsurface soil is not being considered a potentially complete exposure pathway for on-site remedial workers at this time.

As presented in response to Question 2, total PCBs were detected above NJ NRDCSCC in surface soil and subsurface soil in the off-property area. Like the NJDEP-approved remedial strategy for Lots 20 and 21, the off-property conceptual RAWP proposed to excavate four hot-spots of PCBs above 50 mg/kg, conduct post-excavation sampling, and establish engineering and institutional controls for PCBs in soil above NJ RDCSCC (Ref. 2). The proposed engineering control consists of installing a geo-textile fabric or membrane over the surface of a portion of the drainage ditch area, then covering it with ballast or stone

material. Aristech proposes to use the existing railroad ballast material as an engineering control for the lower-contamination areas outside the drainage ditch (Ref. 2). The proposed institutional control for this area is the establishment of a Deed Notice. Currently, public access to the off-property areas to the south of Lots 18 through 21 is restricted by security gates and fencing (Ref. 2). However, given that the off-property area has contamination in place in surface and subsurface soil above NJ NRDCSCC, the potential for direct exposure to impacted surface and subsurface soil is being considered a potentially complete exposure pathway for off-site remedial workers at this time.

Trespassing is not likely on the former Aristech site due to the site's location in a highly industrialized section of Linden. Even if trespassers did gain access to the site from West Elizabeth Avenue, they would not be expected to come into direct contact with contaminated surface soil because the front section of the facility is covered by buildings, asphalt, and a vegetative soil cover. Access to the rear of the former Aristech site from West Elizabeth Avenue is restricted by buildings and fencing, and rear access is also restricted from the off-property areas by fencing.

Though unlikely, the potential exists for trespassers to come into direct contact with pre-remedial contaminated surface soil off site. Thus, potential exposure to off-site contaminated surface soil is being considered a potentially complete exposure pathway for trespassers.

**References:**

1. Letter from Mark Whitaker, ELM, to Joseph Goliszewski, NJDEP, re: Results of Groundwater Remediation/ Monitoring Program and Request for No Further Action for Groundwater with Establishment of a CEA. Dated April 10, 2002.
2. Off-Property Remedial Investigation Report for the Former USX Corporation Site. Prepared by ELM, Inc. Dated June 11, 2003.
3. Deed Notice. Dated September 24, 2003.

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **significant**[5] (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?

__X__ If no (exposures cannot 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:**

**Surface/Subsurface Soil**

As discussed in response to Question 3, the potential for off-site remedial workers to come in direct contact with contaminated surface and subsurface soil in the off-property area is being considered a potentially complete exposure pathway due to proposed remedial activities on the railroad property. However, exposures are not expected to be significant because remedial workers are assumed to wear personal protective equipment (PPE) and adhere to strict Occupational Safety and Health Administration (OSHA) guidelines to minimize exposure to contamination. Thus, exposure to contaminated soil off-site for remedial workers conducting remedial activities is not expected to pose a significant risk.

As discussed in response to Question 3, the potential for off-site trespassers to come in direct contact with contaminated surface soil in the off-property area is being considered a potentially complete exposure pathway. The off-property area consists of a narrow section of land sandwiched between the property fence and a raised railroad berm, as shown on Figure 4 from Reference 1. Thus, the only potential access to the off-property area would be through adjacent industrial facilities located along the railroad property, however this access is generally restricted by fencing (Ref. 1). Additionally, until the area is excavated and covered, exposure to contaminated off-site soil for trespassers is not expected to pose a significant risk, due to the following: (1) active high-speed rail lines at the top of the berm; (2) steep ballast-covered slopes leading up to the high-speed line; and (3) the presence of thick brush between the fenceline and the ballast-covered berm (Ref. 1) (see photos in Attachment A of Reference 1). These hazards would presumably make the off-property area extremely undesirable to trespassers.

[5] 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.

## References:

1. Off-Property Remedial Investigation Report for the Former USX Corporation Site. Prepared by ELM, Inc. Dated June 11, 2003.

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:**

This question is not applicable. See response to Question 4.

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 Aristech Chemical Corporation (formerly USX Corporation) site, EPA ID #NJD001724988, located at 1711 West Elizabeth Avenue, Linden, New Jersey, 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:** _____ Date:_____

Amy Brezin
Environmental Consultant
Booz Allen Hamilton

**Reviewed by:** _____ Date:_____

Kristin McKenney
Senior Risk Assessor
Booz Allen Hamilton

**Also Reviewed by:** _____ Date:_____

Alan Straus, RPM
RCRA Programs Branch
USEPA Region 2

_____ Date:_____

Barry Tornick, Section Chief
RCRA Programs Branch
USEPA Region 2

**Approved by:** Origunal signed by: Date: 12/18/2003

Adolph Everett, Acting Chief
RCRA Programs Branch
USEPA Region 2

**Locations where references may be found:**

References reviewed to prepare this EI determination are identified after each response. Reference materials are available at the USEPA Region 2, RCRA Records Center, located at 290 Broadway, 15th Floor, New York, New York, and the New Jersey Department of Environmental Protection Office located at 401 East State Street, Records Center, 6th Floor, Trenton, New Jersey.

**Contact telephone and e-mail numbers:** Alan Straus, USEPA RPM
(212) 637-4160
straus.alan@epa.gov

**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.**

## Attachments

The following attachments have been provided to support this EI determination.

- Attachment 1 - Summary of Media Impacts Table

## Attachment 1 - Summary of Media Impacts Table
## Aristech Chemical Corporation (formerly USX Corporation) Site

| | GW | AIR (Indoors) | SURF SOIL | SURF WATER | SED | SUB SURF SOIL | AIR (Outdoors) | CORRECTIVE ACTION MEASURE | KEY CONTAMINANTS |
|---|---|---|---|---|---|---|---|---|---|
| Lots 18 and 19 | No | No | No | No | No | No | No | *Completed*: Excavation of PCBs above NJ RDCSCC, off-site disposal of excavated soil, and backfilling and asphalt paving of excavated areas. | None remaining above NJ RDCSCC |
| Lots 20 and 21 | No | No | Yes | No | No | Yes | No | *Completed*: Excavation and off-site disposal of PCB hot-spots and co-located areas of PAH, TPH, styrene, and ethylbenzene contamination; installation of concrete curbing and a six-foot high security fence, and construction of a durable asphalt cap over contamination above NJ RDCSCC; establishment of a Deed Notice. | PCBs, PAHs, TPH, ethylbenzene, styrene |

| | GW | AIR (Indoors) | SURF SOIL | SURF WATER | SED | SUB SURF SOIL | AIR (Outdoors) | CORRECTIVE ACTION MEASURE | KEY CONTAMINANTS |
|---|---|---|---|---|---|---|---|---|---|
| Off-Property Areas | No | No | Yes | No | No | Yes | No | *Proposed*: Excavation and disposal of PCB hot-spots, capping, and establishment of a Deed Notice. The off-property area consists of a narrow section of land sandwiched between the property fence and a raised railroad berm. The only potential access to the off-property area would be through adjacent industrial facilities located along the railroad property, however this access is generally restricted by fencing. Additionally, until the area is excavated and covered, exposure to contaminated off-site soil for trespassers is not expected to pose a significant risk, due to the following: (1) active high-speed rail lines at the top of the berm; (2) steep ballast-covered slopes leading up to the high-speed line; and (3) the presence of thick brush between the fenceline and the ballast-covered berm.. These hazards would presumably make the off-property area extremely undesirable to trespassers. | PCBs |
| Groundwater | Yes | No | No | No | No | No | No | *Completed*: Injection of oxygen release compound (manganese peroxide) into the subsurface soil and up to 12 post-remedial groundwater monitoring events for appropriate wells.<br>*Proposed*: Two additional quarters of groundwater monitoring for benzene in MW-8; establishment of a CEA if monitoring does not demonstrate that benzene levels have naturally attenuated. The Deed Notice restricts intrusive activities. | Benzene |