

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA725) Current Human Exposures Under Control

Facility Name: Tenneco Polymers, Inc. – Flemington Plant
Facility Address: River Road, Flemington Borough, New Jersey
Facility EPA ID#: NJD001890300

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 programs 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 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).

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

Facility Information

The Tenneco Polymers facility (now known as El Paso Energy Corporation [EPEC] Polymers, Inc.) is located in Flemington, New Jersey. The operations at the facility began in 1957 with the production of polyvinylchloride (PVC) resin by Cary Chemicals. In 1965, Tenneco Polymers Inc. purchased Cary Chemicals and continued the production of PVC resin through November 1985, when manufacturing operations ceased and only research and development activities (R&D) were conducted. R&D ceased at the site in May 1986. Cessation of operations triggered the New Jersey Environmental Cleanup Responsibility Act (ECRA, now ISRA) and a facility investigation was performed to identify areas of environmental concern associated with all operations at the site. The investigation identified 26 areas of concern (AOCs) requiring additional investigation and/or remediation.

In 1989, the Environmental Protection Agency (EPA) and the NJDEP conducted a RCRA Facility Assessment, which identified fifteen Solid Waste Management Units (SWMUs) and AOCs, all of which had been previously identified during ECRA activities. Seven of the identified SWMUs required further investigation. EPA and NJDEP issued a RCRA Post-closure Permit for the facility which included corrective action.

As the result of activities at the site, groundwater beneath the facility is contaminated with volatile organic compounds (VOCs), specifically vinyl chloride, trichloroethylene (TCE), methylene chloride, and trans-1,2 dichloroethylene. When this contamination was discovered, the NJDEP required that Tenneco develop and install a groundwater remediation system to both treat the contaminated groundwater, and prevent the migration of contaminated groundwater from the site.

The groundwater treatment system currently consists of six recovery wells installed into the bedrock. Water is extracted at a combined rate of 40 gallons per minute (gpm) and is treated by two 1,500 pound granular activated carbon (GAC) units. Treated water is subsequently discharged to the Raritan Township Municipal Utilities Authority (RTMUA). The system has been in operation since January 1987. Chemical oxidation injections have also been used for the past three years to enhance degradation of the TCE and vinyl chloride in the bedrock water-bearing zones. Additionally, pilot tests of Dual Phase Vacuum Extraction (DPVE) have indicated that degradation of the chlorinated compounds in groundwater can be greatly enhanced with this technology. A work plan to install such a system is currently under review by the NJDEP and EPA. Recent sampling results indicate that the levels of TCE and vinyl chloride continue to decrease. Levels of TCE in groundwater from wells sampled in January and March 2002 range from 2.6 ug/l (MW-5) to 745 ug/l (MW-9), still above the NJDEP Groundwater Quality Standard of 1.0 ug/l.

EPA has conducted sampling activities at four residential properties with supply wells. A preliminary report indicates that none of the four off-site residential wells sampled are impacted. At the time this EI was prepared, the EPA report was not yet available for review.

See Site Location Map (Figure 1) and Site Plan (Figure 2) in Remedial Action Progress Report, Former EPEC Polymers, Inc. Facility, River Road, Flemington, Hunterdon County, New Jersey, ISRA Case No. 86315 (Prepared by Sovereign Consulting Inc.). See the groundwater contour maps for trichloroethylene and vinyl chloride in Quarterly Monitor Well Data, April 2002, EPEC Polymers, Inc., River Road, Flemington, New Jersey, NJPDES-DGW NJ0001660, Doremus Engineering Environmental Consultants. See Attachment 1 for the summary of media impacts to AOCs and SWMUs.

Summary of Areas of Concern (AOCs):

AOC 1, PVC Resin Fill Area: This area was used for disposal of PVC resin from 1959 to 1973. Samples collected from this area were analyzed for VOCs, base neutral compounds (BNs), and metals. Elevated concentrations of Barium (Ba) were encountered starting at a depth of 12 feet below ground surface. However, the concentrations detected were well below the Non-Residential Direct Contact Soil Cleanup Criteria (NRDCSCC) of 47,000 parts per million (ppm). On February 26, 1993 NJDEP approved Tenneco's proposal for No Further Action (NFA) for AOC 1 provided the remaining soil contamination was incorporated into a deed restriction notice. On August 4, 1994, Tenneco/EPEC filed the deed notice (Declaration of Environmental Restriction) for the PVC Resin landfill with Raritan Township.

AOC 2 Former Settling Pond: Off-spec PVC was disposed of in this area. Disposal of material ceased in 1983, at which time all pond material and underlying native soils were excavated to the top of bedrock and disposed off-site. Post-excavation soil samples were collected and analyzed for VOCs. No compounds were detected at concentrations exceeding their respective Impact to Groundwater Soil Cleanup Criteria (IGWSCC). In its letter of February 26, 1993, the NJDEP approved a proposal of No Further Action for this AOC.

AOC 3 Effluent Drainage Ditch: Storm waters and discharges from the process waste catch basin (AOC 20) were diverted into this ditch. Soil samples were collected from borings installed adjacent to this area to determine the nature and extent of any impact from the discharges. Soil samples were analyzed for VOCs, BNs and metals. Lead was detected at concentrations in excess of the Residential Direct Contact Soil Cleanup Criteria (RDCSCC). In December 1992 approximately 20 cubic yards of soil were excavated from the drainage ditch. Post excavation sampling showed lead concentrations were below the RDCSCC and the NJDEP approved NFA for this AOC in its letter of June 12, 1995.

AOC 4 Incinerator: The former incinerator (used to destroy vinyl chloride vapors) was located on a concrete pad in the south central portion of the facility. Sodium hydroxide (NaOH) was reportedly used to treat process cooling water associated with the operation of the incinerator. In May 1992, four soil samples were collected from borings on all four sides of the concrete pad. Each sample was collected from the top six inches of soil and analyzed for pH, with values ranging from 5.6 to 7.4. This range is considered to be within normal range for mineral soils. The borings were subsequently advanced to 2.5 feet below grade and the soils were screened for VOCs using a photo-ionization detector (PID). Since no PID readings were above background, no soil samples were collected. The NJDEP approved NFA for this AOC in its letter dated February 26, 1993.

AOC 5 Spill Control Facility: The Spill Control Facility was located adjacent to the wastewater settling basin in the south-central portion of the site. This area consisted of the spill control pad and the spill collection tank. This AOC was originally investigated in September 1986. A soil boring was drilled through the center of the former waste collection tank and analyzed for VOCs, BNs, and metals. TCE was detected at 13.0 ppm which exceeded the NJDEP's ECRA Action Levels. In October 1987 soil was excavated to bedrock and spread out on a concrete slab, then aerated several times during the next three months. Approximately 450 cubic yards were treated in this manner. The soil was returned to the excavation in January 1988 and post-remediation samples were collected to determine if treatment had been effective. Soil sampling results indicated TCE was below the ECRA Action Levels in all samples except one. Soil from this "hot spot" was removed and backfilled with clean fill. In May 1992, additional confirmation sampling was conducted at the request of NJDEP. Samples were analyzed for VOCs, and results indicated no exceedances of ECRA Action Levels. Based upon soil sampling results, the NJDEP approved a proposal of No Further Action for this AOC in its letter dated February 26, 1993.

AOC 6 Drainage Ditch: The drainage ditch is located in the south-central portion of the site. A total of six samples were collected from soil borings to characterize this AOC. Samples were analyzed for VOCs, BNs, and metals. Soil sampling results indicated no exceedance of ECRA Action Levels. A proposal of No Further Action was approved by NJDEP in its letter of February 26, 1993.

AOC 7 Reactor Building Septic Leach Field: The former septic leach field is located in the northwest corner of the site. Soil samples collected from this area were analyzed for VOCs, BNs, Total Petroleum Hydrocarbons (TPH) and metals. No analytes were detected at concentrations exceeding ECRA Action Levels, and a proposal for No Further Action was approved in NJDEP's letter dated February 26, 1993.

AOC 8 Unlabeled Drum Storage Pad: The former drum storage shed was located in the south-central portion of the facility. Three soil borings were installed in this area, and soil samples were analyzed for VOCs, BNs, TPH, and metals. No analytes were detected at concentrations exceeding ECRA Action Levels. The NJDEP approved a proposal of No Further Action for this AOC in its letter dated February 26, 1993.

AOC 9 Drum Rack: The former drum rack was located in the eastern portion of the facility. Three soil borings were installed in this area, and soil samples were analyzed for VOCs, BNs, TPH, metals, and pH. No analytes were detected at concentrations exceeding ECRA Action Levels and pH results were within normal range. The NJDEP approved a proposal of No Further Action for this AOC in its letter dated February 26, 1993.

AOC 10 Drum Storage Pad: This AOC is located in the central portion of the facility. Three soil borings were installed in this area, and soil samples were analyzed for VOCs, BNs, and metals. No analytes were detected at concentrations exceeding ECRA Action Levels and the NJDEP approved the proposal of No Further Action for this AOC in its letter dated February 26, 1993.

AOC 11 Former 2,000 gallon Diesel Fuel Underground Storage Tank (UST): A 2,000 gallon diesel fuel UST was formerly located along the northern property line near the railroad tracks. The UST was removed in 1986. Visual inspection revealed no evidence of corrosion and no staining or odors were observed in the excavation. Eight soil samples collected from four soil borings were analyzed for VOCs, BNs, TPH, and metals. No VOCs were detected and

concentrations of BNs and metals were all below their respective ECRA Action Levels. The NJDEP approved the proposal for No Further Action in its letter dated February 26, 1993.

AOC 12 Transformers: An electrical control building and three electrical transformers were located in the central portion of the facility. A total of sixteen soil samples were collected between 1986 and 1998 to characterize this AOC. In October 1997 removal of the electrical transformers and the electrical control building was initiated. Soil sampling was conducted and results indicated elevated concentrations of polychlorinated biphenyls (PCBs) in several samples surrounding Transformer 1 and 3. In May 1998 the PCB contaminated soils were excavated to a depth of two feet below surface grade. All post-excavation samples were below the NJDEP's RDCSCC of 0.49 ppm. The NJDEP approved the proposal for No Further Action for this AOC in its letter dated October 26, 1998.

AOC 13 Stream Sediments: The site is bordered immediately to the west and south by Bushkill Creek. The creek flows south along the western property line and then to the east along the southern property line towards the South Branch Raritan River. At the direction of NJDEP, Tenneco collected four sediment samples from Bushkill Creek. The sediment samples were collected near the northwest corner of the site to represent sediment quality upstream; at a pipeline outfall (AOC 24) that discharged wastewater and non-contact cooling water under a NJPDES permit; at the discharge point of a drainage ditch (AOC 6); and at a location considered downstream from the site (where the River Road Bridge crosses the creek). Each sample was collected from the top six inches of sediment in the creek and analyzed for VOCs, BNs, barium, cadmium and lead.

The analytical results indicated that concentrations of metals and VOCs were below the applicable NJDEP action levels in all four sediment samples. However, the two upstream samples contained several polycyclic aromatic hydrocarbons (PAHs) that exceeded either the NJDEP RDCSCC or NRDCSCC. In a letter dated February 26, 1993 the NJDEP approved NFA for this AOC for the following reasons: 1) the reported concentrations of PAHs do not pose a significant ecological concern to the stream; 2) the compounds detected were reportedly not used at the site and were most likely originating from an asphalt recycling plant upstream of the Tenneco facility and 3), the two upstream samples contained elevated levels of PAHs while the downstream samples did not, indicating the contamination had not migrated downstream.

AOC 14 Former Storage Warehouse Waste Collection UST: The former waste collection UST was located on the east side of the storage warehouse in the eastern portion of the facility. This UST was removed in February 1986. Visual inspection of the tank and excavation did not reveal evidence of a discharge and no odors were noted. Six post-excavation soil samples were collected and analyzed for VOCs, BNs, and metals. No contamination was detected above NJDEP action levels. A proposal for No Further Action was approved by the NJDEP in its letter dated February 26, 1993.

AOC 15 Former R&D Center Waste Collection UST: This former waste collection UST was located at the southeast corner of the R&D building in the eastern portion of the facility. The UST was removed in February 1986. Visual inspection of the tank did not reveal evidence of corrosion. No stained soil or odors were observed in the excavation. Five post-excavation soil samples were collected and analyzed for VOCs, BNs and metals. No contamination was detected above NJDEP ECRA Action Levels and NJDEP approved the proposal for No Further Action in its letter dated February 26, 1993.

AOC 16 Former Septic Systems: Three septic fields serviced the R&D center, the Office Building, Storage Warehouse, and the Office Laboratory. The septic fields for the R&D Center and the Office/Warehouse were located in the northeast corner of the site. The Office Laboratory septic system was located in the north-central portion of the facility. All three systems were removed from service when the facility connected to the public sanitary sewer system in 1971. Soil samples were collected from each of these areas and analyzed for VOCs, BNs, and metals. No NJDEP ECRA Action Levels were exceeded, and the NJDEP approved the proposal for No Further Action for all three former septic fields in its letter dated February 26, 1993.

AOC 17, Former 30,000 Gallon No. 6 Fuel Oil UST: A 30,000 gallon No. 6 fuel oil UST was formerly located in the central portion of the facility. The UST was removed in February 1986. Visual inspection of the tank did not reveal evidence of corrosion. No stained soil or odors were observed in the excavation. Five post-excavation soil samples were collected and analyzed for VOCs, BNs and metals. No contamination was detected above NJDEP ECRA Action Levels and NJDEP approved the proposal for No Further Action in its letter dated February 26, 1993.

AOC 18 Former 1,000 Gallon No. 2 Fuel Oil UST: The former 1,000 gallon No. 2 fuel oil UST was located on the east side of the small office building in the northeast portion of the facility. Soil samples were collected adjacent to the UST in April 1992. Samples were analyzed for TPH, which was detected at a maximum concentration of 677 ppm. Since TPH concentrations did not exceed the NJDEP action level of 1,000 ppm, no additional VOC analyses were required and NJDEP approved a proposal of No Further Action in its letter dated February 26, 1993.

As part of its property acquisition agreement, Flemington Industrial Park required that the 1,000 gallon UST be removed by Tenneco. Remaining product in the UST was removed, and the tank was excavated in October 1997. Visual inspection of the tank revealed evidence of corrosion and perforation in several areas. Soils samples collected from the excavation indicated contamination present in the surrounding soils, which were subsequently removed. Following post excavation sampling the area was backfilled with clean overburden and clean fill. The NJDEP approved NFA for this AOC in their letter dated February 20, 1998.

AOC 19 Railroad PVC Loading Area: The railroad loading area is located along the northern property line. This area was used to unload vinyl chloride monomer (VCM) from pressurized tank cars and to load PVC resin. Fourteen soil samples were collected from this area and analyzed for VOCs, BNs, and metals. Sampling results indicated soils had been impacted, but at concentrations below NJDEP soil cleanup criteria. Based upon these results, NJDEP approved the proposal for No Further Action in its letter dated April 10, 1995.

AOC 20 Process Waste Catch Basin System: The catch basin and piping in this area are located on the north side of the property and discharge into the effluent drainage ditch (AOC 3). The catch basin received process discharge water from the centrifuges used in the manufacturing process. The catch basin was visually inspected and it was determined that soil samples should be collected to characterize this AOC. Three samples were collected and analyzed. Sampling results indicated no exceedances of applicable NJDEP action levels. The NJDEP approved the proposal for No Further Action in its letter dated February 26, 1993.

AOC 21 Stressed Vegetation South of the R&D Center: During a site inspection, NJDEP noted three areas of stressed vegetation to the south of the R&D Center. In May and June 1992,

eight soil samples were collected and analyzed for VOCs, TPH, barium, cadmium and lead. No analytes were detected at concentrations exceeding their respective cleanup criterion. Based upon these results, NJDEP approved the proposal for No Further Action in its letter dated February 26, 1993.

AOC 22 Drainage Ditch through Spill Control Area: After reviewing an aerial photograph from 1963, NJDEP identified a drainage ditch that ran through the spill control facility. In May 1992 two soil samples were collected and analyzed for VOCs, pH, barium, cadmium and lead. No analytes were detected at concentrations exceeding their respective cleanup criterion. NJDEP approved the proposal for No Further Action in its letter dated February 26, 1993.

AOC 23 Diked Area at Production/Reactor Building: This area is comprised of a diked area near the southwest corner of the former Production/Reactor Building on the west side of the facility. The NJDEP directed that one soil boring be located within two feet of the south side of the dike due to the presence of a discharge pipe originating in an unknown area. In May 1992, three soil samples were collected from the soil boring and analyzed for VOCs, TPH, barium, cadmium and lead. No compounds were detected at concentrations exceeding their respective soil cleanup criterion. NJDEP approved the proposal for No Further Action in its letter dated February 26, 1993.

AOC 24 Discharge Pipeline: This AOC is comprised of a six-inch diameter clay pipe that formerly discharged process wastewater and non-contact cooling water from the vinyl chloride monomer tanks (AOC 26) to Bushkill Creek under the terms of a NJPDES permit. In April 1992, nine soil samples were collected along the length of the discharge pipe and analyzed for VOCs, BNs, TPH, barium, cadmium and lead. No analytes were detected at concentrations exceeding their respective soil cleanup criterion. NJDEP approved the proposal for No Further Action in its letter dated February 26, 1993.

AOC 25 Clarifier Building and Boiler House Swale: This AOC consists of a swale approximately 140 feet long that runs parallel to the south side of the Boiler House in the central portion of the facility. During a site inspection in May 1991, the NJDEP identified stained sediments within the swale. In September 1992, accumulated sediment was removed and disposed of off site. The asphalt liner forming the base of the swale was visually inspected and several small cracks were observed. NJDEP required that soil samples be collected from below the invert of the swale. The samples were analyzed for TPH, barium, cadmium and lead. Results indicated no exceedances of soil cleanup criteria and a proposal for No Further Action was approved by NJDEP in its letter dated July 27, 1994.

AOC 26 Former Vinyl Chloride Monomer Tanks: This AOC includes four vinyl chloride monomer (VCM) USTs in the north central portion of the facility. These USTs were excavated in February 1986 after PVC production ceased at the facility. At the time of tank removal activities, the USTs were visually inspected and no evidence of corrosion or perforation was observed. Additionally, no stained soil or odors were evident in the excavations. Post-excavation soil samples were collected and analyzed for VOCs, BNs, and metals. In addition, a bedrock monitoring well was installed at this AOC (TP-28) to determine if groundwater had been impacted by any historical releases from the VCM tanks. Based on soil sampling and groundwater sampling results, the NJDEP approved the proposal for No Further Action in its letter dated July 27, 1994.

References:

- (1) Draft New Jersey Pollutant Discharge Elimination System (NJPDES) RCRA Post-Closure Renewal Permit, prepared by NJDEP – October 29, 1991
- (2) Groundwater Remediation Work Plan for Former Tenneco Polymers, Inc. Plant Flemington, Hunterdon County, New Jersey, prepared by R.E. Wright Associates, Inc. – June 1994

- (3) Remedial Action Report, prepared by Sovereign Consulting Inc. - October 15, 1999
- (4) Remedial Action Progress Report prepared by Sovereign Consulting Inc.- July 2002

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)?

| Media | | | | Rationale/Key Contaminants |
|-------------------------------|--|--|--|--|
| Groundwater | | | | Vinyl chloride, trichloroethylene (TCE), methylene chloride, and trans-1,2 dichloroethylene. |
| Air (indoors) ² | | | | |
| Surface Soil (e.g., <2 ft) | | | | |
| Surface Water | | | | |
| Sediment | | | | |
| Subsurface Soil (e.g., >2 ft) | | | | |
| Air (Outdoor) | | | | |

 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.

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.

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

Rationale:

Groundwater: As the result of activities at the site, groundwater beneath the facility is contaminated with volatile organic compounds, specifically vinyl chloride, TCE, methylene chloride, and trans-1,2-dichloroethylene. When this contamination was discovered, the NJDEP required that Tenneco develop and install a groundwater remediation system to both treat the contaminated groundwater, and prevent the migration of contaminated groundwater from the site.

The groundwater treatment system currently consists of six recovery wells installed into the bedrock. Water is extracted at a combined rate of 40 gpm and is treated by two 1,500 pound GAC units. Treated water is subsequently discharged to the Raritan Township Municipal Utilities Authority. The system has been in operation since January 1987. Additionally, chemical oxidation injections have been used for the past three years to enhance degradation of the TCE and vinyl chloride in the bedrock water-bearing zones. Also, pilot tests of Dual Phase Vacuum Extraction (DPVE) have indicated that degradation of the chlorinated compounds in groundwater can be greatly enhanced with this technology. A work plan to install such a system is currently under review. Recent sampling results indicate that the levels of TCE and vinyl chloride generally continue to decrease. Levels of TCE in groundwater from January and March 2002 range from 2.6 ug/l (MW-5) to 745 ug/l (MW-9), still above the NJDEP Groundwater Quality Standard of 1.0 ug/l.

EPA has conducted sampling activities at four residential properties with supply wells. A preliminary report indicates that none of the four off-site residential wells sampled are impacted. At the time this EI was prepared, the EPA report was not yet available for review.

Potential exposure to contaminated groundwater is limited to sampling activities performed by trained technicians operating under site specific health and safety plans. There is currently no other exposure scenario associated with contaminated groundwater.

Air (Indoors): Groundwater beneath the site is contaminated with elevated levels of vinyl chloride and TCE. Therefore, contaminant volatilization into indoor air is possible but unlikely. Available documentation indicates potential VOC migration to indoor air is not a concern because the levels of the contaminant detected in groundwater near the occupied buildings are low and not a concern.

Surface/Subsurface Soil: During the investigation of all the AOCs, both surface and subsurface soil sampling was conducted. In those instances where contamination was found to exist above appropriate NJDEP criteria, the soil was removed and replaced with clean fill. Though the cleanup criteria have changed since many of the NFAs were approved, the NJDEP in its letter dated October 15, 1999, indicated that the NFA approvals were still acceptable so long as groundwater remediation continued. However, any exceedances of soil cleanup criteria appear to be at depth and only associated with IGWSCC, and there is currently no surface soil contamination that might present a potential exposure hazard.

Surface Water: The site is bordered immediately to the west and south by Bushkill Creek. The creek flows south along the western property line and then to the east along the southern property line towards the South Branch Raritan. Although no surface water sampling has been conducted in Bushkill Creek, sediment sampling was conducted to determine if facility operations had caused any impacts. Results from sediment sampling indicate that VOCs in sediments were below NJDEP remediation criteria. Also, any contaminated groundwater in the vicinity of Bushkill Creek is not expected to discharge to the Creek

since there are active recovery wells onsite which prevent this from occurring. Therefore, surface water is not expected to be impacted by contamination from the facility.

Sediment: The site is bordered immediately to the west and south by Bushkill Creek. The creek flows south along the western property line and then to the east along the southern property line towards the South Branch Raritan River. At the direction of NJDEP, Tenneco collected four sediment samples from Bushkill Creek. The sediment samples were collected near the northwest corner of the site to represent sediment quality upstream; at a pipeline outfall (AOC 24) that discharged wastewater and non-contact cooling water under a NJPDES permit; at the discharge point of a drainage ditch (AOC 6); and at a location considered downstream from the site (where River Road Bridge crosses the creek). Each sample was collected from the top six inches of sediment in the creek and analyzed for VOCs, BNs and barium, cadmium and lead.

The analytical results indicated that concentrations of metals and VOCs were below the NJDEP applicable remediation criteria in all four sediment samples. However, the two most upstream samples contained several PAHs that exceeded either the NJDEP RDCSCC or NRDCSCC. In NJDEP's letter dated February 26, 1993 the NJDEP approved NFA for this AOC for the following reasons: 1) The reported concentrations of PAHs do not pose a significant ecological concern to the stream; 2) These compounds were reportedly not used at the site and appear to be originating from an off-site upstream source. The upstream source could be an asphalt recycling plant located upstream on Bushkill Creek; 3) The two upstream samples contained elevated levels of PAHs while the downstream samples did not, indicating the contamination had not migrated downstream.

Air (Outdoors): There is no reason to believe outdoor air has been contaminated based on the levels of contaminants detected and the mixing that would occur due to normal air flow.

References:

- (1) Remedial Action Report, prepared by Sovereign Consulting Inc. – October 15, 1999
- (2) Quarterly Monitor Well Data April 2000, prepared by Doremus Engineering – May 8, 2000
- (3) Letter from NJDEP to EPEC Polymers, Inc. May 11, 2000
- (4) Quarterly Monitoring Well Data January 2002, prepared by Doremus Engineering- February 13, 2002
- (5) Sovereign Consulting Inc., Remedial Action Progress Report, July 2002
- (6) Verbal report of groundwater sampling results from EPA Edison New Jersey Project Officer, August 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 | Trespasser | Recreation | Food ¹ |
|--------------------------------|-----------|---------|----------|--------------|------------|------------|-------------------|
| Groundwater | No | No | No | No | -- | - | No |
| Air (indoor) | | | | | | | |
| Surface Soil (e.g. < 2 ft) | _____ | | | | | | |
| Surface Water | | | | | | | |
| Sediment | | | | | | | |
| Subsurface Soil (e.g., > 2 ft) | | | | | | | |
| 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.

- 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:

Groundwater: Although groundwater is contaminated onsite at levels above NJDEP standards, there are no drinking water wells or supply wells currently in use onsite, therefore, exposures to contaminated groundwater are limited to groundwater sampling activities conducted by trained technicians operating under site specific health and safety plans. There is an active groundwater remediation system comprised of several recovery wells which impedes contaminated groundwater migration off-site. Additionally, recent sampling of residential drinking water wells conducted by EPA indicates that these wells are not impacted from the Tenneco operations.

Based upon the available information, it appears that no current direct exposure to groundwater is occurring on- or off-site.

Reference(s):

- 1) Remedial Action Report, prepared by Sovereign Consulting Inc. – October 15, 1999
- 2) Groundwater Remediation Work Plan, prepared by R.E. Wright Associates, Inc. – June 1994
- 3) Quarterly Monitor Well Data April 2000, prepared by Doremus Engineering – May 8, 2000
- 4) Remedial Action Report, prepared by Sovereign Consulting Inc. – October 15, 1999
- 5) Quarterly Monitor Well Data April 2000, prepared by Doremus Engineering – May 8, 2000
- 6) Quarterly Monitoring Well Data January 2002, prepared by Doremus Engineering-February 13, 2002
- 7) Sovereign Consulting Inc., Remedial Action Progress Report, July 2002
- 8) Verbal report of groundwater sampling results from EPA Edison New Jersey Project Officer August 2002

4. Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **significant**² (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 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.”

² 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.

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

Rationale and Reference(s):

This question is not applicable. See response to question #3.

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):

This question is not applicable. See response to question #3.

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 Tenneco Polymers, Inc. facility EPA ID# NJD001890300, located on River Road, in Flemington, 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.

Andrew Park, Project Manager
RCRA Programs Branch
EPA Region 2

Date: _____

Clifford Ng, Acting Section Chief
RCRA Programs Branch
EPA Region 2

Date: _____

Approved by:

Original signed by:
Barry Tornick, Acting Chief
RCRA Programs Branch
EPA Region 2

Date: September 30, 2002

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:

Andrew Park, EPA Project Manager
(212) 637-4160
park.andy@epamail.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.

Attachment

The following attachment has been provided to support this EI determination.
Attachment 1 - Summary of Media Impacts Table

Attachment 1 - Summary of Media Impacts Table

Tenneco Polymers, Inc.

| AREA OF CONCERN (AOC) | GW | AIR (Indoors) | URF SOIL | SURF WATER | ED | SUB SURF SOIL | AIR (Outdoors) | CORRECTIVE ACTION MEASURE and STATUS | KEY CONTAMINANTS |
|------------------------------|-----------|----------------------|-----------------|-------------------|-----------|----------------------|-----------------------|---|-------------------------|
| AOC 1 | No | No | No | No | o | Yes | No | Deed Restriction Notice August 1994 | Barium |
| AOC 2 | Yes | No | o | No | o | No | No | Removal of soil and waste material. NJDEP NFA determination February 26, 1993 | VOCs |
| AOC 3 | No | No | o | No | o | No | No | Removal of 20 yd ³ of soil from ditch. NJDEP NFA determination June 12, 1995 | Lead |
| AOC 4 | No | No | o | No | o | No | No | NJDEP NFA determination February 26, 1993 | NA |
| AOC 5 | Yes | No | o | No | o | No | No | Soil was excavated to bedrock, aerated, returned to excavation. NJDEP NFA determination February 26, 1993 | TCE |
| AOC 6 | No | No | o | No | o | No | No | NJDEP NFA determination February 26, 1993 | NA |
| AOC 7 | No | No | o | No | o | No | No | NJDEP NFA determination February 26, 1993 | NA |
| AOC 8 | No | No | No | No | No | No | No | NJDEP NFA determination February 26, 1993 | NA |
| AOC 9 | No | No | No | No | No | No | No | NJDEP NFA determination February 26, 1993 | NA |
| AOC 10 | No | No | No | No | No | No | No | NJDEP NFA determination February 26, 1993 | NA |

| AREA OF CONCERN (AOC) | GW | AIR (Indoors) | URF SOIL | SURF WATER | ED | SUB SURF SOIL | AIR (Outdoors) | CORRECTIVE ACTION MEASURE and STATUS | KEY CONTAMINANTS |
|------------------------------|-----------|----------------------|-----------------|-------------------|-----------|----------------------|-----------------------|---|-------------------------|
| AOC 11 | No | No | No | No | No | No | No | NJDEP NFA determination February 26, 1993 | NA |
| AOC 12 | No | No | No | No | No | No | No | Removal of contaminated soil. NJDEP NFA determination October 26, 1998 | PCBs |
| AOC 13 | No | No | No | No | No | No | No | NJDEP NFA determination February 26, 1993 | NA |
| AOC 14 | No | No | No | No | No | No | No | NJDEP NFA determination February 26, 1993 | NA |
| AOC 15 | No | No | No | No | No | No | No | NJDEP NFA determination February 26, 1993 | NA |
| AOC 16 | No | No | No | No | No | No | No | NJDEP NFA determination February 26, 1993 | NA |
| AOC 17 | No | No | No | No | No | No | No | NJDEP NFA determination February 26, 1993 | NA |
| AOC 18 | No | No | No | No | No | No | No | Tank and impacted soil removed. NJDEP NFA determination February 20, 1998 | No. 2 Fuel Oil |
| AOC 19 | No | No | No | No | No | No | No | NJDEP NFA determination April 10, 1995 | NA |
| AOC 20 | No | No | No | No | No | No | No | NJDEP NFA determination February 26, 1993 | NA |
| AOC 21 | No | No | No | No | No | No | No | NJDEP NFA determination February 26, 1993 | NA |
| AOC 22 | No | No | No | No | No | No | No | NJDEP NFA determination February 26, 1993 | NA |
| AOC 23 | No | No | No | No | No | No | No | NJDEP NFA determination | NA |

| AREA OF CONCERN (AOC) | GW | AIR (Indoors) | URF SOIL | SURF WATER | ED | SUB SURF SOIL | AIR (Outdoors) | CORRECTIVE ACTION MEASURE and STATUS | KEY CONTAMINANTS |
|------------------------------|-----------|----------------------|-----------------|-------------------|-----------|----------------------|-----------------------|---|-------------------------|
| | | | | | | | | February 26, 1993 | |

| | | | | | | | | | |
|---------|-----|----|----|----|----|----|----|---|-------------|
| | | | | | | | | | |
| AOC 24 | No | No | No | No | No | No | No | NJDEP NFA determination February 26, 1993 | NA |
| AOC 25 | No | No | No | No | No | No | No | Stained sediments removed from swale. NJDEP NFA determination July 27, 1994 | TPH, metals |
| AOC 26 | No | No | No | No | No | No | No | NJDEP NFA determination July 27, 1994 | NA |
| SWMU 13 | Yes | No | No | No | No | No | No | On-going groundwater remediation program | VOCs |
| SWMU 14 | Yes | No | No | No | No | No | No | On-going groundwater remediation program | VOCs |

Notes:

1. NJDEP- New Jersey Department of Environmental Protection
 2. NFA- No Further Action
 3. NA- not applicable
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