DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Facility Name: International Flavors and Fragrances
Facility Address: 800 Rose Lane, Union Beach, New Jersey, 07735
Facility EPA ID#: NJD002194843

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 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 RCRAIfo 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 International Flavors and Fragrances (IFF) site occupies approximately 105 acres in Union Beach, New Jersey, of which 41 acres was developed and utilized for chemical manufacturing. The developed portion of the IFF site ranges from 10 to 15 feet above sea level, and is surrounded by land at lower elevations that includes wetlands associated with East Creek, Thorns Creek, and Natco Lake to the west, east, and south, respectively. Raritan Bay borders the IFF site to the north, and tidal wetlands are present along the shoreline. Surrounding land uses are primarily undeveloped wetlands within one-quarter mile of

the site, except for residences adjacent to the southwestern part of the site along Rose Lane. A New Jersey Railroad line also borders the southern edge of the IFF property, connecting to the rail spur at the former unloading area at the western part of the site.

IFF manufactured specialty organic chemicals for use as flavors and fragrances at the Union Beach facility from 1951 through 1997, when the site was closed. Prior to operation of the IFF facility, ceramic tiles were manufactured at the site by the National Brick and Tile Company. Discarded tiles and bricks from this operation were used as fill at the northwest part of the site. Manufacturing processes performed at the IFF site included chemical processing, formulation, distillation, and packaging. The IFF facility included approximately 40 buildings used for chemical manufacturing, storage and offices; drum storage areas; surface impoundments; storage tanks; a sludge disposal area; and a parking area. The 41-acre manufacturing area is fenced and gated.

Contamination was first detected at the site in 1979 when the United States Coast Guard observed seepage of contaminated groundwater from the site into Raritan Bay. The Coast Guard ordered IFF to install an interceptor trench to recover contaminated groundwater and treat the contamination to prevent discharge to Raritan Bay.

IFF signed an Administrative Consent Order (ACO) with the New Jersey Department of Environmental Protection (NJDEP) to expand and test a recovery trench to control the seepage to Raritan Bay on October 14, 1982. Groundwater monitoring and operation of the recovery trench has been performed since 1982. The facility applied for a RCRA permit to store and treat hazardous wastes in 1985, and submitted a revised permit application to NJDEP and EPA in 1986. NJDEP and IFF signed a second ACO in October 1986 that required completion of a site-wide Remedial Investigation/Feasibility Study (RI/FS) and implementation of remedial action. A RCRA permit for hazardous waste management was issued to IFF in 1989, renewed in 1994, and reissued in 1996 for container storage only. NJDEP also issued a Discharge to Groundwater (DGW) Permit to IFF in 1990 for the operation of unlined surface impoundments in the wastewater treatment system. The facility also was permitted for industrial discharges to the Bayshore Regional Sewage Authority under New Jersey Pollutant Discharge Elimination System (NJPDES) Permit NJ0001082.

The site-wide RI identified soil and groundwater contamination throughout the site. Based on the results of the RI, NJDEP issued the Final Decision Document that specified the preferred remedies for the site in October 1995. The selected remedy for soil and wetland soil contamination involved excavation and off-site disposal of polychlorinated biphenyl (PCB) contaminated soil to the relevant cleanup level (i.e., 100 mg/kg where asphalt capping was used, 50 mg/kg where soil/vegetative capping was used, 0.75 mg/kg in wetland soil areas). Soil remedial actions were undertaken in 1999 and completed in 2000. The Decision Document also specifies continued operation of the groundwater collector trench that included a slurry wall addition in 1997 and 1999. NJDEP has also required IFF to perform effectiveness monitoring for operation of the collector trench. The first annual report for ongoing operation of the trench system is due at the end of 2001. A Deed Notice is in place for this site to restrict the property to non-residential use only and identify areas of impacted soil. A Classification Exception Area (CEA) has also been submitted to NJDEP and the Borough of Union Beach to outline impacted groundwater areas 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 (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

Summary of Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs): A RCRA Facility Assessment (RFA) was performed in 1988 and identified numerous SWMUs and AOCs at the IFF site, which are briefly described below. The subsequent RI/FS, however, did not focus on specific SWMU and AOC areas, but rather on site-wide soil and groundwater. In general, soil and groundwater contamination has not been identified at or related to SWMU or AOC source areas. Rather, the FS and Final Decision Document indicated that cleanup at the site would focus on PCB Soil Contamination Areas. Where possible, SWMUs/AOCs have been correlated with PCB Soil Contamination Areas in the descriptions below. However, PCB Soil Contamination Areas do not encompass all SWMUs/AOCs at the site. Remedial actions associated with the PCB Soil Contamination Areas were completed in 2000 and documented in the June 2001 Remedial Action Report (RAR), which was approved by NJDEP on September 6, 2001 (Ref. 16). SWMU and AOC locations are presented on Attachment 1.

SWMU 1, Oil/Water Separator #1 and SWMU 2, Oil/Water Separator #2: SWMU 1 was an 18-foot diameter steel tank with a fiberglass cover, located near the wastewater treatment system in the southeast part of the site. SWMU 2 was a 16-foot by 16-foot in-ground masonry tank that was also located nearby the wastewater treatment system in the southeast part of the site (Ref. 2). Solvent-contaminated wastewaters flowed to the units from the drum storage areas (SWMU 6, AOC E) and from the process buildings. Waste solvents collected in the units included benzene, toluene, ethylbenzene, and xylene (BTEX), chlorobenzene, and methylene chloride. Waste solvent was removed from influent wastewater by gravity separation and was pumped from the separator to a waste solvent holding tank (SWMU 9). Effluent wastewater from the units flowed to the equalization basin (SWMU 3) in the wastewater treatment system. The oil/water separators were located in a paved area. NJDEP did not recommend any sampling at either of these units because of their construction; however, a site-wide evaluation of soil contamination was performed as part of the RI/FS. These units were not included as part of any PCB Soil Contamination Areas. Both units were taken out of service upon shutdown of manufacturing operations at the site in December 1997. This area is currently covered by asphalt (Ref. 15).

SWMU 3, Equalization Basin: This unit was an unlined surface impoundment that was constructed in the natural clay underlying the site (Ref. 2). The equalization basin had lateral dimensions of 70 feet by 110 feet and a depth of 12 feet. The impoundment was used to store effluent from the oil/water separators (SWMUs 1 and 2) prior to treatment in the primary clarifier (AOC B). The equalization basin was replaced by an aboveground tank when the unit was decommissioned in 1991 (Ref. 5). The basin was backfilled and capped in 1991; the decommissioning has been approved by NJDEP (Ref. 5). This unit is not located within a PCB

Soil Contamination Area. Historical waste management activities in this area likely contributed to groundwater impacts beneath the site. Groundwater monitoring in this area is ongoing as part of the site-wide groundwater monitoring program. The most recent groundwater monitoring data (May 2001) from the site indicates that benzene is present in groundwater at the aeration basin at 280 µg/L, and chlorobenzene is present at 5,200 µg/L at well AR-1, both of which exceed New Jersey Ground Water Quality Criteria (NJ GWQC) (Ref. 14).

SWMU 4, Aeration Basin: The aeration basin was an unlined surface impoundment utilized for biological treatment of wastewater and contaminated groundwater at the IFF site. The unit measured 280 feet by 120 feet, with a depth of 14 feet. The basin received discharges from the primary clarifier (AOC B), and provided biological treatment of organic contaminants. The effluent was discharged to the final clarifiers (AOC C). The aeration basin was decommissioned under requirements of the NJ DGW Permit in April 1988; the decommissioning has been approved by NJDEP (Ref. 5). Soil sampling conducted during decommissioning detected PCB concentrations up to 28 mg/kg, which is above the New Jersey Non-Residential Direct Contact Soil Cleanup Criteria (NJ NRDCSCC) of 2.0 mg/kg. The basin was backfilled with soil excavated from areas throughout the site, capped with a geomembrane liner, covered by 14 inches of clean fill and 4 inches of topsoil, and then seeded. Historical waste management activities in this area likely contributed to groundwater impacts beneath the site. Groundwater monitoring in this area is ongoing as part of the site-wide groundwater monitoring program. The most recent groundwater monitoring data (May 2001) from the site indicates that benzene is present in groundwater in the vicinity of this unit at 280 µg/L and chlorobenzene is present at 5,200 µg/L at well AR-1, both of which exceed NJ GWQC (Ref. 14).

SWMU 5, Sludge Lagoon: The sludge lagoon was an unlined surface impoundment used for storage of wastewater treatment sludges generated at the primary and final clarifiers (AOCs B and C). The impoundment measured 170 feet by 240 feet, and 11 feet deep. Water decanted from the sludge was returned to the treatment process and the sludge was disposed off site as a non-hazardous industrial waste. Waste sludges may have contained hazardous constituents, including BTEX, metals, and methylene chloride. The sludge basin was taken out of service in 1991, concurrently with the equalization basin. The basin was filled in and capped at that time; the decommissioning has been approved by NJDEP (Ref. 5). The unit was not located within a PCB Soil Contamination Area identified in the FS. The most recent groundwater monitoring data (May 2001) from the site indicates that benzene is present in groundwater at the aeration basin at 280 µg/L and chlorobenzene is present at 5,200 µg/L at well AR-1, both of which exceed NJ GWQC (Ref. 14).

SWMU 6, Drum Storage Area: This unit consisted of a 167-foot by 74-foot concrete storage pad that was used to store drums of waste solvents and other waste liquids, including toluene, xylenes, methylene chloride, and alcohols. This unit was located outdoors at the southeast corner of the site. Although the concrete pad was not bermed, the floor sloped toward two drains that discharged to the oil/water separators (SWMUs 1 and 2). The pad was installed in 1980. Documentation indicates that inspections performed by USEPA prior to 1980 noted leaking drums stored directly on the ground at this area. In addition, inspections by NJDEP noted discolored soil at this area after the installation of the concrete pad. Characterization and remediation of the drum storage area was incorporated into the site-wide RI/FS. Soil sampling results indicated that volatile organic compounds (VOCs) were not detected in soil. Semi-volatile organic compounds (SVOCs) were detected at levels below NJ NRDCSCC. The storage area was closed per

RCRA requirements in 2000, and the pad was taken out of service and decontaminated. The RCRA Closure for this unit has been approved by NJDEP (Ref. 13). This unit was located within PCB Soil Contamination Area 2.

SWMU 7, Waste Solvent Tank 320A and SWMU 8, Waste Solvent Tank 320B: Tanks 320A and 320B are aboveground steel tanks with capacities of 5,000-gallons and 10,000-gallons, respectively. The tanks were used to store waste solvents and both were built on concrete pads adjacent to building 320 with secondary containment that drained back to the oil/water separators (SWMUs 1 and 2). Waste solvents stored at the tanks were burned in an on-site boiler or were shipped off site for disposal. One documented spill of 220 gallons of waste solvents occurred at Tank 320A in 1974. Available documentation indicates that some of the spilled waste reached the stormwater system and discharged to Raritan Bay. Soil sampling conducted during tank closure detected PCBs in the area of both tanks at concentrations from 5.5 to 12 mg/kg, which is above the NJ NRDCSCC of 2.0 mg/kg (Ref. 3). These tanks were closed under RCRA requirements in 1991, including decontamination and removal of the tank; however, according to available documentation, RCRA clean closure has not been achieved and RCRA post-closure care requirements have not been determined. Any remaining soil and groundwater contamination was to be addressed by the site-wide RI/FS conducted at the facility. These units are not part of any PCB Soil Contamination Areas identified in the FS. This area is currently covered with asphalt, thus preventing direct exposure to impacted soil above NJ NRDCSCC (Ref. 15).

SWMU 9, Waste Solvent Holding Tank: This unit was an aboveground tank located next to the oil/water separators (SWMUs 1 and 2). The tank was constructed of carbon steel with a capacity of 5,000 gallons. The tank was used to store immiscible organic liquids, primarily solvents, separated from the wastewater in the oil/water separators (SWMUs 1 and 2). The waste solvent was burned in the incinerator (SWMU 16) or transferred to Tanks 320A and 320B (SWMUs 7 and 8) for shipment off site for disposal. The tank was located on a concrete pad with a drain that discharged back to the wastewater treatment system. This tank was decommissioned as part of the closure of the wastewater treatment system required under the NJ DGW Permit (Ref. 8). Investigation and actions for soil and groundwater at these tanks was incorporated in the site-wide RI/FS. This unit was not part of any PCB Soil Contamination Areas identified in the FS. This area is currently covered with asphalt, thus preventing direct exposure to impacted soil above NJ NRDCSCC (Ref. 15).

SWMUs 10 through 13, Acid Chromium Storage Tanks: Four 2,500-gallon steel tanks were used to store waste acetic acid that contained chromium while the facility was in operation (Ref. 2). These tanks were constructed of steel and built on concrete pads with secondary containment. No releases of chromium-bearing waste from these tanks was documented while the facility was in operation. The tanks were located at the eastern part of the site, immediately south of Building 360. Chromium acetic acid waste was accumulated in the tanks for less than 90 days and then shipped off site for disposal. The tanks were taken out of service when facility operations ceased in 1997. Investigation and actions for soil and groundwater at these tanks was incorporated in the site-wide RI/FS. This unit was not part of any PCB Soil Contamination Areas identified in the FS. This area is currently covered by asphalt, thus preventing direct exposure to impacted soil above NJ NRDCSCC (Ref. 15).

SWMU 14, Waste Transfer Area: This unit consisted of a partially unpaved area next to Tank 320B (SWMU 8) that was used to store approximately 10 to 20 drums of waste, including waste

solvent, toluene, and xylenes (Ref. 6). The contents of the drums were historically pumped into Tank 320B. Any releases from this area would have resulted in soil and groundwater contamination, or would have discharged to the stormwater system and then possibly to Raritan Bay. Soil sampling conducted during the RI/FS at this area of the site detected VOCs in soil, but all concentrations were below NJ NRDCSCC. This area was incorporated in PCB Soil Contamination Area 4 in the RI/FS because soil sampled contained up to 35 mg/kg PCBs.

SWMU 15, Underground Storage Tank T-32: This unit was an underground carbon steel tank that was used for storage of waste solvents that were either shipped off site for disposal, or transferred to Tanks 320A and 320B (SWMUs 7 and 8) (Ref. 2). Waste solvents stored in the tank included xylenes and toluene. This tank was taken out of service in 1985 and closed in 1991. The tank was removed and contaminated soil was excavated during the tank closure. During closure, several VOCs were detected in residual soil below NJ NRDCSCC. PCBs were not detected above the NJ NRDCSCC of 2 mg/kg at the time the unit was closed. According to available documentation, RCRA clean-closure for this unit has not yet been achieved and RCRA post-closure requirements for this unit have not yet been established (Ref. 13).

SWMU 16, Incinerator: This unit was located on a 50-foot by 50-foot concrete pad, with a diked area in the center that drained to two 5,000-gallon underground storage tanks that were considered integral parts of the incinerator system (Ref. 2). The burn chamber was constructed of concrete walls lined with three courses of fire brick. Drums of waste were drained into the pit that flowed to the underground tanks. Wastes were pumped from the tanks to the burn chamber and ignited. The unit was constructed in 1969, and taken out of service in 1985. Wastes burned in this unit included distillation wastes from chemical manufacturing processes, which contained xylenes, mineral oil, methanol, methyl ethyl ketone, ethanol, and toluene. The unit was closed in 1991 when the incinerator structure and the associated tanks were decontaminated and removed from the site. Soil contamination detected in the immediate vicinity of the incinerator location was excavated and removed during the closure of the unit (Ref. 3). PCBs were detected in all soil samples collected during closure of the incinerator, ranging in concentration from 9.3 to 290 mg/kg, which is above the NJ NRDCSCC of 2.0 mg/kg. Because of the elevated PCB concentrations detected in soil at the incinerator, this area was included with PCB Soil Contamination Area 2 in the FS. According to available documentation, RCRA clean-closure for this unit has not yet been achieved and RCRA post-closure requirements for this unit have not yet been established (Ref. 13).

SWMU 17, Sludge Disposal Area: In 1976, sludge from the wastewater treatment system was disposed in an area approximately 20 feet by 50 feet and several feet deep next to the final clarifier (AOC C) near the western property boundary (Ref. 2). Because the sludge was buried without a liner present, this disposal possibly resulted in soil and groundwater contamination from VOCs and metals in the wastewater treatment sludge. Soil contamination at the unit was investigated as part of the site-wide RI/FS, and groundwater contamination that may have occurred due to sludge disposal was evaluated as part of the groundwater remedial action for the site. This area was incorporated as part of PCB Soil Contamination Area 1.

SWMU 18, Stormwater Weir Box #1: Three in-ground concrete weir boxes were used for the management of stormwater collected in catch basins located throughout the manufacturing area of the site. Each weir box contained three chambers. The first chamber was a sump that contained a pump used to transfer accumulated stormwater to the wastewater treatment system

(Ref. 2). The overflow from the first compartment discharged to the second and then third compartments in each weir box. When stormwater flows exceeded the capacity of the sump pumps at the weir boxes, the overflow from the third unit discharged onto the ground (Ref. 1). Overflows and discharges of contaminated stormwater containing oils and solvents have been documented at Weir Box #1. Discharges from Weir Box #1 resulted in contamination in the brick and tile fill area at the north-central part of the site that has discharged to Raritan Bay. During the remediation of site soil contamination, the flow from Weir Box #1 was redirected to Weir Box #2 by a pipeline that was installed at the site to eliminate discharge of stormwater to the brick and tile fill area. The storm water now discharges from one location at the site, east of Weir Box #2. Contaminated soil was also excavated from the site during the Weir Box #1 removal, and remaining soil contamination at this unit was included with PCB Soil Contamination Area 6.

SWMU 19, Stormwater Weir Box #2: Weir box #2 was constructed in a similar manner to Weir Box #1, and the unit is still present at the northwest part of the site (Ref. 2). Discharges from Weir Box #2 resulted in contamination to East Creek along the western site boundary. Impacted soil was removed and capped at the area of the site where Weir Box #2 is located within PCB Soil Contamination Area 12 (Ref. 7).

SWMU 20, Stormwater Weir Box #3: Weir box #3 was constructed in the same manner as the other weir boxes at the site and is located in the northern central part of the site (Ref. 2). Based upon available documentation it is unclear whether this unit is still in place at the site. Discharges from this unit contributed to soil contamination at the northern central part (PCB Soil Contamination Area 7) of the site and off-site areas (PCB Soil Contamination Area 7A). This unit is located within PCB Soil Contamination Area 7 and 7a.

AOC A, Railroad Transfer Area: A rail spur from the New Jersey Railroad ran through the western side of the site to the rail unloading area at the northwest part of the manufacturing area. This area was used for unloading of raw materials from rail cars from 1953 through 1983 (Ref. 6). Materials handled at this area included hydrochloric acid, ethylene oxide, and fragrance oils. There were no releases documented from rail transfer activities at the IFF site. The railroad ballast at the transfer area was investigated as part of the RI/FS. BTEX, polycyclic aromatic hydrocarbons (PAHs), and phthalate esters were detected in soil, but at levels below NJ NRDCSCC. No PCBs were detected in soil at the railroad transfer area.

AOC B, Primary Clarifier: The primary clarifier was a 40-foot diameter circular steel aboveground storage tank that was used for treatment of wastewater by removal of settled solids. The primary clarifier received inflow from the equalization basin, and discharged the wastewater decanted from the unit to the aeration basin. Sludge from this unit was discharged to the sludge lagoon. The unit was taken out of service when facility operations ceased in December 1997. Any soil or groundwater contamination associated with the unit was included in the site-wide RI/FS. This area is located within PCB Soil Contamination Area 4.

AOC C, Final Clarifiers: The final clarifiers consisted of two circular steel aboveground treatment tanks that were 30 and 400 feet in diameter. The units were located in the southeast part of the site near the equalization basin. The unit received discharges from the aeration basin and provided the final treatment for wastewater prior to discharge to the Bayshore Regional Sewage Authority. Sludges from the final clarifiers were discharged to the sludge basin. The

clarifiers were taken out of service when facility operations ceased in December 1997. Any soil or groundwater contamination associated with the unit was included in the site-wide RI/FS (Ref. 6). This area is located within PCB Soil Contamination Area 1 (Ref. 7).

AOC D, Drum Wash Area: The drum wash area was located inside Building 133, in the northwest part of the site, near Weir Box #2 (SWMU 19). Used drums were rinsed with a water-detergent solution, and the water, detergent and residual drum contents were discharged to the wastewater treatment system through the underground effluent pipeline (AOC F) that traverses the site. No releases were documented from this area. Soil samples were collected during the RI/FS at the area surrounding Building 133 and no hazardous constituents were detected above NJ NRDCSCC (Ref. 6). This area is located within PCB Soil Contamination Area 12.

AOC E, Temporary Drum Storage Areas: Ten drum storage areas were identified in the site-wide RI/FS conducted at the site. The drum storage areas were unpaved or partially paved. Releases from these areas may have resulted in soil and groundwater contamination, and could have discharged to the stormwater system, thus possibly discharging to Raritan Bay. The investigation of the drum storage areas during the RI/FS identified contamination primarily of PCBs, but also VOCs and PAHs at several locations in the manufacturing area of the plant, that exceeded NJ NRDCSCC. Based on the extent of PCB contamination in soil at the site delineated during the RI/FS, NJDEP determined that it was not practicable to address the limited non-PCB soil contamination. NJDEP determined that excavating and capping PCB soil contamination areas at the site, along with other access controls in place at the site, would be protective for any potential soil exposures to non-PCB contamination. Based upon the selected remedial action, specific locations where non-PCB contamination remains above NJ NRDCSCC could not be identified. Remedial actions associated with PCB contamination at the site were completed in 2000, and documented in the June 2001 RAR. The RAR was approved by NJDEP on September 6, 2001 (Ref. 16). Thus, all PCB-impacted areas at the site have been excavated and capped. In addition, a majority of the site is capped by either asphalt, concrete, buildings, or a soil/vegetative cover, thus preventing exposure to any on-site residual contamination. There are several grassy areas (seven major areas) at the site that have not been capped during historic remedial activities. Soil samples collected during the Phase I and II RI within these grassy areas did not detect contamination above the NJ RDCSCC or NJ NRDCSCC.

AOC F, Underground Effluent Pipeline: The underground effluent pipeline system was used to transport wastewater from the process buildings located throughout the manufacturing area to the wastewater treatment system at the southeastern part of the site (Ref. 6). The discharge line was taken out of service in 1990. Soil contamination was discovered during construction near the cold storage box and maintenance shed (Buildings 512 and 513) in 1996. Investigation of this unit was incorporated into the site-wide RI/FS. Toluene and xylene were detected in soil samples, but concentrations were below NJ NRDCSCC. Based upon available documentation, it is unclear which PCB Soil Contamination Areas included these piping areas. Despite this fact, a majority of the site is capped by either asphalt, concrete, buildings, or a soil/vegetative cover, thus preventing exposure to any on-site residual contamination. There are several grassy areas (seven major areas) at the site that have not been capped during historic remedial activities. Soil samples collected during the Phase I and II RI within these grassy areas did not detect contamination above the NJ RDCSCC or NJ NRDCSCC.

PCB Soil and Wetlands Contamination Areas: Eleven primary areas of PCB contamination in soil and wetlands soil have been identified during previous investigations (Phase I and II RI/FS) conducted at the site. Nine of these areas of soil/wetlands contamination were delineated and determined to contain PCBs above NJ NRDCSCC (2.0 mg/kg) and the site-specific wetlands soil criterion (0.75 mg/kg). Table 1 identifies the PCB Soil Contamination Areas, their approximate location at the site, and the remedial action taken at each area. The areas are located throughout the site and are depicted in Attachment 2.

Table 1 - PCB Soil Contamination Areas and Relevant Actions Taken

PCB Area[1]	Area Description	Remedial Action
1	B-127 and B-127 Area (along the east fence line)	Excavated to a cleanup level of 50 mg/kg, backfilled, and soil/vegetative cover installed.
2	Southeast Corner Area	Excavated to a cleanup level of 50 mg/kg, backfilled, and soil/vegetative cover installed.
3	MW-106 Area	Delineated and determined not to require remediation. All delineation samples less than 2.0 mg/kg.
4	Transformer Area	Excavated to a cleanup level of 100 mg/kg. Capped with three inches of crushed concrete blocks which was covered by three more inches of asphalt.
5	MW-103 Area	Capped by existing asphalt roadway. PCB concentration are less than 100 mg/kg.
6	MW-113 Area	Excavated to a cleanup level of 100 mg/kg. Capped with three inches of crushed concrete blocks which was covered by three more inches of asphalt.
7	Northern Property Area South of Fence Line	Excavated to a cleanup level of 50 mg/kg, backfilled, and soil/vegetative cover installed.
7a	Wetlands Area North of Fence Line	Excavated to a cleanup level of 0.75 mg/kg, backfilled, and soil/vegetative cover installed.
8	MW-201 area	Hot spot excavation area. Excavated to a cleanup level of 50 mg/kg, backfilled, and soil/vegetative cover installed.
9	Test Pit-4A (outside eastern fence)	Delineated and determined not to required remediation. All delineation samples less than 2.0 mg/kg.
10	Test Boring-204 (west side of site)	Non-wetland portion excavated to a cleanup level of 50 mg/kg. Wetlands portion excavated to a cleanup level of 0.75 mg/kg (or to saturated zone). Each area backfilled and soil/vegetative cover installed.
12	MW-6 (South west area)	Excavated to a cleanup level of 0.75 mg/kg, backfilled, and soil/vegetative cover installed.

[1] PCB Soil Contamination Areas and boundaries have been altered several times during investigation. This EI utilizes only the most recent PCB Soil Contamination Area designation as presented in the FS and RAR. Because of the extent of PCB contamination above NJ NRDCSCC, PCB Soil Contamination Areas grew and conglomerated during remedial actions. The final remedial approach and actions used are depicted in Attachment 3.
Note: No area identified as No. 11
(Refs. 6, 12)

Soil remedial actions were undertaken in 1999 and completed in 2000. The June 2001 RAR was approved by NJDEP on September 6, 2001. During the excavation of PCB-impacted soil, many of the PCB Soil Contamination Area boundaries grew as achievement of relevant cleanup standards was sought. Thus, the final extent of the remedial actions taken at the site were much more extensive than originally planned (see Attachment 3). In addition, throughout the site there were many localized or single sample locations that detected PCBs in soil in excess of 50 mg/kg. Each of these hot spot areas was excavated to achieve a cleanup level of less than 50 mg/kg and capped with clean topsoil and vegetative cover. In addition to all PCB Remedial Actions, a

majority of the site has been covered by either clean fill, asphalt roadways, and/or buildings to ensure that no residual non-PCB soil contamination is exposed at the site. There are several grassy areas (seven major areas) at the site that have not been capped during historic remedial activities (Ref. 15). Soil samples collected during the Phase I and II RI within these grassy areas did not detect contamination above the NJ RDCSCC or NJ NRDCSCC.

Groundwater: Groundwater has generally been investigated on a site-wide basis, rather than on a unit-specific or area-specific basis. Historical activities at the IFF site have impacted the non-potable shallow water table aquifer beneath the site. Previous investigations have confirmed that activities conducted at the IFF site have not impacted the deeper aquifers (lower Magothy and Raritan Formations) in the area of the site.

Groundwater investigations began in 1979 when the Coast Guard documented seepage of groundwater contamination from the brick and tile fill area at the northwest part of the site into Raritan Bay. Subsequent sampling of the discharge seeps, water collected in the trench system, and wells in the brick and tile fill area have identified groundwater contamination due to the presence of BTEX compounds, 1,2-dichloroethane (DCA), and methylene chloride. Groundwater contamination has also been detected at the area of the fire pond, located in the south-central part of the site. Contaminants detected in groundwater at this part of the site include chlorobenzene and dichlorobenzene. High concentrations of groundwater contaminants have also been detected at the northeast area of the site, including perchloroethylene, tetrachloroethylene (TCE), and trans-1,2-dichloroethene (DCE) (Ref. 6). Contaminants present at the western part of the site include benzene, chlorobenzene, xylenes, and TCE in the area of the former wastewater surface impoundments. During the most recent two monitoring events (November 2000, May 2001) benzene, chloroform, chlorobenzene, 1,2-DCA, ethylbenzene, toluene, and xylene were detected above NJ GWQC at well locations throughout the site.

An interceptor trench system was originally installed in 1979 and updated in 1997. The trench extracts shallow groundwater from the northeast, north, and northwest perimeter of the site. Water is pumped from collection sumps located at several locations along the trench system to the treatment system. The extracted groundwater is treated by granular activated carbon adsorption, and is discharged to the sanitary sewer. In 1999, a slurry wall was constructed along the northern perimeter of the collection system to control infiltration of water from Raritan Bay into the collection system. During November 2000 and May 2001 semi-annual groundwater monitoring, benzene, chloroform, and 1,2-DCA were detected at concentrations above NJ GWQC at locations downgradient of the trench collection system and slurry wall at wells MW-W1 and MW-6 (Refs. 11, 15). Contaminated groundwater is also present at areas of the site which are not within the zone of influence of the trench system (primarily in the southern and southwestern portion of the site); however, recent groundwater monitoring data (November 2000, May 2001) indicate that contaminated groundwater detected in these wells is not reaching the off-site, downgradient well located just south of the site (MW-108S/D). NJDEP has approved the final remedy for groundwater at the site based on the very low hydraulic conductivity and minimal groundwater flow rates in the shallow aquifer in the southern section of the site.

Groundwater monitoring is performed on a semi-annual basis per an NJDEP-approved groundwater monitoring program. A CEA has also been prepared for this site and transmitted to both NJDEP and the Borough of Union Beach.

As the site is no longer an active chemical manufacturing facility, most of the SWMUs and AOCs have been decommissioned and/or closed. The Stormwater Weir Box #2 is the only documented unit still in place at the site. Despite the fact that numerous SWMUs and AOCs were identified in the 1988 RFA, remedial investigations and actions have not focused on identified SMWUs and AOCs at the site. Rather, a site-wide RI/FS was performed to identify contaminants of concern above NJ NRDCSCC, per the 1986 ACO. Investigations were performed on groundwater, soil, surface water, and sediment. Based upon the results of the RI/FS, PCB Soil Contamination Areas were identified and have been remediated as described in the June 2001 RAR. Groundwater actions have been ongoing and have included the installation of an interceptor trench, slurry wall, and the performance of semi-annual groundwater monitoring. In addition, a Deed Notice is in place that restricts the site to non-residential use and prevents disturbance of the caps currently in place at the site. IFF has also prepared a CEA that outlines areas of impacted groundwater related to the IFF site.

References:

1. Memorandum from Randy England, NJDEP to Ed Stevenson, NJDEP, re IFF Industrial Survey Site Visit. Dated June 18, 1981.
2. Letter from Neil Jiorle, NJDEP to Barry Tornick, USEPA, re: RCRA Facility Assessment, IFF Facility. Dated September 23, 1988.
3. Letter from Ronald Senna, IFF to Anthony Findley, NJDEP, re: RI/FS Fragrance Ingredients Plant RCRA Closure Activities. Dated March 11, 1991.
4. Memorandum from Edward Putnam, NJDEP, to Dennis Hart, NJDEP, re: Confirmation on Issues Discussed at the Internal IFF Meeting. Dated June 24, 1991.
5. Letter from Paul Harvey, NJDEP to Ronald Senna, IFF, re: Department Approval of Lagoon Closure Certifications. Dated July 12, 1991.
6. IFF RI/FS Phase I/Phase II RI Report. Prepared by Tams Consultants, Inc. Dated May 1992.
7. Final Decision Document, IFF Site, Union Beach, Monmouth County, New Jersey. Prepared by New Jersey Department of Environmental Protection Site Remediation Program. Dated October 1995.
8. Letter from Paul Harvey, NJDEP to Ronald Senna, IFF, re: Aeration Basin Closure Plan. Dated June 9, 1998.
9. IFF Inc. Union Beach, Monmouth County, New Jersey, Classification Exception Area Request. Prepared by Camp Dresser and McKee. Dated March 1999.
10. Letter from Brian Kiel, IFF to Paul Harvey, NJDEP, re: Groundwater Monitoring Program Semi-Annual Report, Year 2000. Dated September 8, 2000.
11. Letter from Brian Kiel, IFF to Paul Harvey, NJDEP, re: Groundwater Monitoring Program November 2000 Sampling Event. Dated April 20, 2001.
12. RAR for Phase II Excavation of PCB Contaminated Soil/Wetland Areas, Capping and Aeration Basin Closure. Dated June 2001.
13. Letter from Anthony Fontana, NJDEP to Brian Kiel, IFF, re: Closure of RCRA Regulated Units. Dated August 3, 2001.
14. Letter from Brian Kiel, IFF to Paul Harvey, NJDEP, re: Groundwater Monitoring Program May 2001 Sampling Event. Dated August 31, 2001.
15. Letter from Ronald Senna, IFF, to Alan Straus, USEPA, re: Your Request for Site Plan. Dated September 5, 2001.
16. Letter from Paul Harvey, NJDEP, to Ronald Senna, IFF, re: Remedial Action Report for Phase II Soils dated June 2001, Plant Site, IFF, Union Beach. Dated September 6, 2001.

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	Yes	No	?	Rationale/Key Contaminants
Groundwater	X			VOCs
Air (indoors)[2]		X		
Surface Soil (e.g., <2 ft)	X			PCBs, VOCs, SVOCs, Metals
Surface Water		X		
Sediment		X		
Subsurface Soil (e.g., >2 ft)	X			PCBs, VOCs, SVOCs, Metals
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

The groundwater regime beneath the site is characterized by a shallow water table in sediments and fill materials surrounded by discharge zones to the north (Raritan Bay); to the east (Thorns Creek); to the south (Natco Lake); and to the west (East Creek). The shallow overburden is primarily composed of clay(s) and clayey silt(s) with very low horizontal and vertical permeabilities. A groundwater elevation high (mound) is present in the eastern portion of the site, just southeast of the former location of the

[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.

aeration basin. Natural groundwater flow is directed radially away from this mound towards the discharge zones. However, a groundwater interceptor trench and slurry wall was installed at the site which has impacted the natural flow of groundwater at the site. This groundwater extraction system captures contamination in the northern two-thirds of the site, but does not control groundwater flow south of the groundwater divide, where groundwater flow is to the southwest and southeast (See Attachment 4).

The fill and surficial sand deposits containing the shallow water table at the site are underlain by the Woodbury Clay formation, which acts as an aquitard and barrier to vertical migration at the site. The Woodbury Clay is also underlain by clay beds of the Merchantville Formation and the upper part of the Magothy formation. Groundwater monitoring has been performed in the lower aquifers and has supported the contention that the low permeability of the Woodbury clays is restricting migration to the lower groundwater zones. The historically low or undetected concentrations of contaminants in the deeper monitoring wells screened in the black micaceous silt of the Woodbury Clay, and the absence of contaminants in the three on-site production wells screened in the Raritan Formation, confirm the presence of a confining layer between the shallow water table and the deeper water bearing aquifers. In addition to the clays of the Woodbury formation, clays in the Magothy formation provide an additional barrier to vertical migration of site contaminants to the Raritan Formation, which is used as a water source at the IFF facility and in the town of Union Beach (Ref. 3). Regional groundwater flow in the deeper aquifers in the Union Beach area is to the east-southeast, eventually discharging to Raritan Bay.

According to the Final Decision Document, groundwater in the shallow unconfined water table at the IFF site has been classified as Class III-A pursuant to the NJ GWQC (N.J.A.C. 7:9-6.5 et seq.). Class III groundwater is not suitable for potable water due to natural hydrogeologic characteristics or natural water quality. This classification requires that groundwater at the IFF site cause no further degradation to existing uses of the groundwater, not violate New Jersey Surface Water Quality Criteria (NJ SWQC), and not release pollutants that pose a threat to human health and the environment. In addition, the classification states that if the groundwater releases or transmits vertically or horizontally to adjacent groundwater or surface waters with a higher classification, then it must adhere to the more stringent classification (Ref. 4). The FS indicates that the NJDEP Division of Water Resources believes that in its current status, groundwater at the site should be considered Class II-A due to its hydraulic connection to higher classification surface water bodies (e.g., Raritan Bay) (Ref. 3). The standards identified in the Final Decision document, CEA, and also presented in Table 2 below are the same as the NJ GWQC for Class II-A potable groundwater.

Table 2 presents the range of contaminants detected in shallow groundwater above the NJ Class II-A GWQC during the two most recent semi-annual groundwater monitoring events, conducted in November 2000 and May 2001 (Refs. 9, 11). Attachment 4 identifies the locations of monitoring wells at the site.

Table 2 - Concentrations Detected above NJ GWQC in the November 2000 and May 2001 Semi-Annual Groundwater Monitoring Events (µg/L)

Contaminants	November 2000[1]		May 2001[2]		NJ GWQC
	Well	Concentration	Well	Concentration	
Chloroform	MW-W1	7.6	NA	BS	6.0
1,2-Dichloroethane	MW-107S	21	MW-W1	6.8	2
Benzene	MW-6, MW-W1, MW-3SR, MW-102, F-1, MW-13, AR-1, MW-12	6.3 to 6,400	MW-102, MW-AR-1, MW-6, MW-W1, MW-3SR	7.6 to 7,300	1
Toluene	MW-102	180,000	MW-102	210,000	1,000
Chlorobenzene	MW-13, AR-1, MW-12	80 to 3,700	AR-1	5,200	4
Ethylbenzene	MW-102	1,000	MW-102	1,100	700
Xylene (Total)	MW-102	2,600	MW-102	3,100	40

[1] Per the approved groundwater monitoring plan the following wells were sampled during November 2000: MW-6, MW-7, MW-8R, MW-11, MW-12, MW-13, MW-14, MW-15, MW-16, MW-102, MW-107S, MW-107D, MW-108S, MW-108D, MW-109, MW-111, MW-112, MW-130, MW-131, MW-202, MW-W1, MW-W2, MW-3SR, AR-1, F-1, and F-3 (Refs. 6, 7, 10).
[2] Per the approved groundwater monitoring plan the following wells were sampled in May 2001: MW-6, MW-8R, MW-16, MW-102, MW-109, MW-111, MW-112, MW-130, MW-131, MW-202, MW-W1, MW-W2, MW-3SR, AR-1, F-3 (Refs. 6, 7, 11).
BS - Below Standard
NA - Not Applicable

The contaminants identified in Table 2 are limited to the shallow groundwater zone (less than 25 feet below ground surface [bgs]). A majority of the highest contaminant concentrations are located in wells in the northern two-thirds of the site (MW-3SR, MW-102, AR-1). The contamination in these areas is bounded to the west, north, and east by the soil-bentonite slurry wall and groundwater extraction trench located along these property boundaries. Chloroform and benzene contamination above NJ GWQC was detected outside the slurry wall (MW-6, MW-W1) in November 2000; while 1,2-dichloroethane and benzene contamination was detected outside the slurry wall (MW-6, MW-W1) in May 2001 (Refs. 9, 11). However, the detected concentrations are most likely associated with residual contamination and reflect contaminant migration that occurred prior to the installation of the slurry wall in 1999 to further limit contaminant migration to the bay. Monitoring wells along the southern area of the site (MW-7, MW-11, MW-12, MW-13, MW-108S/D, well F-1) generally show a lack of contamination above NJ GWQC in November 2000. However, MW-13 (benzene 18 µg/L, chlorobenzene 80 µg/L), MW-12 (benzene 8.8 µg/L, chlorobenzene 300 µg/L), and well F-1 (benzene 6.3 µg/L) detected contaminants above NJ GWQC (Ref. 9). These wells were not sampled during the May 2001 semi-annual event. Based on groundwater contour maps, contamination in these wells would flow off site in a southerly direction, away from the interceptor trench. However, MW-108S/D is located downgradient of the impacted wells (MW-12, MW-13 and well F-1) and no contaminants were detected in this well during the November 2000 sampling event. 1,2-Dichloroethane was also detected above NJ GWQC in MW-107S, and groundwater in this well flows westerly towards East Creek and is not captured by the interceptor trench (Ref. 9). However, the detected concentration (21 µg/L) is below the relevant NJ SWQC of 99 µg/L for surface water bodies

in the area of the site (Refs. 4, 5, 9). The NJ SWQC relevant to this site are the carcinogenic-effect based health criteria for saline estuaries and coastal saline waters, as presented in the NJ SWQC (N.J.A.C. 7:9B, April 1998).

Air (Indoors)

The depth to the impacted water table (shallow) varies from four to eight feet bgs (Ref. 1). Given the depth to this contaminated unit, the maximum concentrations of VOCs detected in the shallow groundwater table during the recent groundwater monitoring event (May 2001) were compared to the State of Connecticut Groundwater Standards for Protection of Indoor Air under the Industrial/Commercial (CT I/C VC) scenario. This comparison is used to identify constituents that may be a concern for potential migration into indoor air. Table 3 displays those contaminants that exceed CT I/C VC and their maximum detected concentrations.

As identified in Table 3, benzene and toluene are present in the shallow water table at levels above the CT I/C VC. Thus, the maximum VOC concentrations detected above the CT I/C VC in both overburden and shallow bedrock groundwater were used to calculate the incremental risk values (IRV) and hazard quotients (HQ) associated with the potential migration of volatile contaminants into indoor air using the Johnson-Ettinger (J-E) Model. The maximum concentration of each of these contaminants was detected at MW-102. This monitoring well is not located beneath or within the vicinity of any active on-site industrial buildings. According to facility representatives, all buildings in the vicinity of this well have been demolished, and there is no current potential for exposure in the vicinity of MW-102. The closest active building to MW-102 is approximately 300 feet south-southwest. Site-specific input parameters used in the model include: the depth below grade to bottom of enclosed space floor, depth below grade to water table, soil type, and soil/groundwater temperature. Conservative default values were used for the remaining parameters for which site-specific values were not readily available. In addition, industrial exposure assumptions (i.e., exposure duration and exposure frequency) were used in the calculations due to the current industrial nature of the property.

Table 3 - Groundwater Exceedences of the CT I/C VC (µg/L) and Calculated Incremental Risk Values and Hazard Quotients

Contaminant	CT I/C VC	Concentration	Calculated IRVs/HQs
Benzene	530	7,300 (MW-102)	1.3E-05 (IRV)
Toluene	50,000	210,000 (MW-102)	3.4E-01 (HQ)

The calculated IRV for benzene and HQ for toluene, as shown in Table 3 above, are within the USEPA acceptable risk range of 1.0E-4 to 1.0E-6 and below the target HQ of 1.0. Based upon the current information available regarding the status and activities at the site and considering the results of the J-E Model, volatilization of groundwater contaminants into indoor air at the IFF facility does not appear to be a concern at this time. See Attachment 5 for J-E Model results.

Surface/Subsurface Soil

Soil contamination has been characterized through several phases of remedial investigation and delineation sampling, including a Phase I and II RI. In addition to soil investigations, several areas of contaminated

tidal wetlands outside the western, northwestern and northeastern fenceline at the site have been considered areas of impacted soil. The areas of contaminated wetlands were addressed as their own area and cleanup was based upon a site-specific ecological screening criterion (0.75 mg/kg) for PCBs, established by NJDEP based upon results of an Environmental Assessment performed in 1992 (Refs. 2, 3).

The Final Decision Document and Deed Notice presented the ranges of predominant soil contamination that were detected above NJ NRDCSCC and New Jersey Impact to Groundwater Soil Cleanup Criteria (NJ IGWSCC) at the IFF site during the Phase I and Phase II RI. This data is outlined in Table 4, below.

Table 4 - Predominant Soil Contamination at the IFF Site (mg/kg)

Constituent	NJ NRDCSCC	NJ IGWSCC	Range of Soil Concentrations Detected at IFF
VOCs			
Benzene	13	1.0	1.1 to 22
Toluene	1,000	500	1,100 to 4,800
Xylenes	6,300	10	12.5 to 190
SVOCs			
Benzo(a)anthracene	2.5	500	0.66 to 9.4
Benzo(a)pyrene	0.66	100	1.8 to 7.6
Benzo(k)flouranthene	2.5	500	3.6 to 4.6
Benzo(g,h,i)perylene	2.5	500	3.4 to 4.4
Chrysene	2.5	500	0.77 to 11
Indeno(1,2,3-cd)pyrene	2.5	500	3.4 to 4.4
Pesticides/PCBs			
PCBs (total)	2.0	50	0.6 to 5,000
Inorganics			
Arsenic	2.0	NA	2.7 to 30
Beryllium	2.0	NA	2.7 to 30
Wetland Area			
PCBs	Site Specific Criteria (Ecological Based Risk) 0.75 (Ambient Level)		0.8 to 100

As discussed earlier, the remedial action associated with the Final Remedy for the soil included excavation of PCB-impacted soil above 0.75 mg/kg in the wetlands areas, 50 mg/kg in a majority of the on-site impacted areas, and 100 mg/kg in the former transformer area (PCB Soil Contamination Area 4).

Based upon current information, the highest residual levels of PCBs (100 mg/kg) at the site are present in the former transformer area (PCB Soil Contamination Area 4). The Final Remedy for the site focused on PCB contamination only, as PCBs were identified as the primary contaminants of concern in soil at the site. Based upon the extent of PCB contamination in soils at the site delineated during the RI/FS, NJDEP determined that it was not practicable to address limited volumes of non-PCB soil contamination. NJDEP determined that excavating and capping PCB soil contamination areas at the site, along with other access controls in place at the site, would be protective for any potential soil exposure to non-PCB contamination. As discussed in the response to Question No. 3, a majority of the site is capped by either asphalt, concrete, buildings, or a soil/vegetative cover, thus preventing exposure to any on-site residual non-PCB contamination. There are several grassy areas (seven major areas) at the site that have not been capped during historic remedial activities. However, soil samples collected during the Phase I and II RI within these grassy areas did not detect contamination above the NJ RDCSCC or NJ NRDCSCC. Thus, all residual contamination is currently covered by engineering controls and not exposed at the surface (Ref. 12).

Surface Water/Sediment

The IFF site is located on the shore of the Raritan Bay, which borders the site to the north. Surface water drainage paths in the area of the site generally follow a northern surface gradient towards Raritan Bay. In addition, groundwater at the site discharges into the various surface water bodies that surround the site, including Raritan Bay to the north, Thorns Creek to the east, Natco Lake to the south, and East Creek to the west. The surface water bodies adjacent to the IFF property are classified as FW2-NT/SE1 (fresh water-nontrout/saline water of estuaries). Furthermore, the adjacent surface water bodies have been identified and listed by the State as impaired surface water bodies which should not accept additional toxic contaminant loading (Ref. 4). The relevant surface water quality standards for the site are the carcinogenic-effect based health criteria for saline estuaries and coastal saline waters, as presented in the NJ SWQC (N.J.A.C. 7:9B, April 1998) (Ref. 4).

During the Phase I investigation surface water and sediment samples were collected from Natco Lake, East Creek, and Thorns Creek, as well as from areas of presumed runoff discharge zones. One surface water sample, downstream of East Creek near the IFF facility, detected benzene (6 µg/L) and methyl isobutyl ketone (20 µg/L) at levels below NJ SWQC designated for surface water bodies adjacent to IFF. Detected constituents in sediment were also below the NJ NRDCSCC for soil (Refs. 1, 4). Thirteen sediment samples were collected during the Phase II RI in Natco Lake and Raritan Bay. The sediment samples revealed low levels of SVOCs such as phthalates and PAHs below NJ NRDCSCC, and thus are not a concern. In addition, two of the bay sediment samples adjacent to IFF detected PCBs at concentrations of 0.85 mg/kg and 0.39 mg/kg, both below the NJ NRDCSCC (Refs. 1, 4). In addition to the sediment samples, high levels of PCBs were detected in wetland soil areas surrounding the facility to the west, north, and east. However, the impacts to wetlands soil were addressed with PCB soil remedial actions and are thus discussed under in the surface/subsurface soil sections of this EI.

The remedial actions associated with groundwater at the site are also in place to address historical impacts to surrounding surface water bodies and to address any potential current and future impacts to surface water bodies and associated sediment through groundwater to surface water discharge. Surface water quality is addressed in the FS by considering steps for the reduction or elimination of ongoing migration of contaminants from the site to surrounding surface water bodies, and the long-term effect of these steps on surface water quality (Ref. 3). Recently detected (November 2000, May 2001)

contaminant concentrations in monitoring wells immediately upgradient (MW-W1, MW-6, MW-107S) of surface water bodies at the site (Raritan Bay and East Creek) are well below the relevant NJ SWQC designated for surface water bodies adjacent to the site. Table 5 presents the detected concentrations in these three wells during the November 2000 and May 2001 monitoring events, and the relevant SWQC.

Table 5. Contaminant Concentrations Detected in Groundwater Wells Adjacent to the Raritan Bay (µg/L)

Well	Contaminant	November 2000	May 2001	NJ SWQC
MW-6	Benzene	21	7.6	71
MW-W1	Benzene	46	58	71
	Chloroform	7.6	2.8	470
	1,2-Dichloroethane	ND	6.8	99
MW-107S	1,2-Dichloroethane	21	NS	99

NS - well not sampled during the May 2001 sampling event
ND - not detected

Based upon the detected concentrations presented in Table 5 above, the current concentrations present in groundwater wells adjacent to the river do not pose a potential threat to surface water quality of Raritan Bay or East Creek.

An environmental assessment and biological monitoring study was also conducted in the areas immediately adjacent to the IFF facility, including Raritan Bay, East Creek, and Natco Lake in December 1992. PCBs were detected in aquatic organisms captured near the site. Levels in organisms (killfish) were compared to background samples collected from a control area in Keyport Harbor near Conaskonk Point, as well as to literature values from previous studies in the Raritan Bay area. PCB concentrations were found to exceed control area concentrations, but were within the range of PCB concentrations reported in the literature for Raritan Bay. Based upon the ecological evaluation performed as part of the environmental assessment, bioaccumulation and biomagnification were not expected to present a significant risk to aquatic organisms, wildlife, or possible human receptors. (Ref. 3).

Air (Outdoors)

No assessment of outdoor air has been conducted at this property. However, migration of contaminants into outdoor air is not expected to be a concern at this site given that nearly the entire site has been capped with either asphalt, clean soil/vegetative cover, concrete, or buildings. Remaining grassy areas that have not been capped did not contain contaminants above the NJ RDCSCC or NJ NRDCSCC. The cap prevents migration of particulates entrained on dust and/or volatile emissions into outdoor air, eliminating outdoor air as an exposure medium of concern.

References:

1. IFF RI/FS Phase I/Phase II RI Report. Prepared by TAMS Consultants, Inc. Dated May 1992.
2. Environmental Assessment, Final. Prepared by TAMS Consultants, Inc. Dated December 1992.

3. Final FS, Task 4 and 5 Final Report. Prepared by TAMS Consultants. Dated February 1995.
4. Final Decision Document, International Flavors and Fragrances Site, Union Beach, Monmouth County, New Jersey. Prepared by New Jersey Department of Environmental Protection Site Remediation Program. Dated October 1995.
5. CEA Request. Prepared by Camp Dresser & McKee, Inc. Dated March 1999.
6. Letter from Ron Senna, IFF, to Paul Harvey, NJDEP, re: Groundwater Performance Groundwater Monitoring Program (Revised Proposal). Dated February 7, 2000.
7. Letter from Paul Harvey, NJDEP, to Ron Senna, IFF, re: Revised Ground Water Performance Monitoring Plan Dated February 7, 2000. Dated March 7, 2000.
8. Letter from Ronald Senna, IFF, to Paul Harvey, NJDEP, re: Draft Deed Notice. Dated July 5, 2000.
9. Letter from Brian Kiel, IFF to Paul Harvey, NJDEP, re: Groundwater Monitoring Program November 2000 Sampling Event. Dated April 20, 2001.
10. RAR for Phase II Excavation of PCB Contaminated Soil/Wetland Areas, Capping and Aeration Basin Closure. Prepared by International Flavors and Fragrances. Dated June 2001.
11. Letter from Brian Kiel, IFF to Paul Harvey, NJDEP, re: Groundwater Monitoring Program May 2001 Sampling Event. Dated August 31, 2001.
12. Letter from Ronald Senna, IFF, to Alan Straus, USEPA, re: Your Request for Site Plan. Dated September 5, 2001.
13. Letter from Paul Harvey, NJDEP, to Ronald Senna, IFF, re: Remedial Action Report for Phase II Soils dated June 2001, Plant Site, IFF, Union Beach. Dated September 6, 2001.

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[3]
Groundwater	No	No	No	No	–	–	No
Air (indoor)							
Surface Soil (e.g. < 2 ft)	No	No	No	No	No	No	No
Surface Water							
Sediment							
Subsurface Soil (e.g., > 2 ft)	–	–	–	No	–	–	No
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

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

Rationale:

Groundwater

The shallow groundwater table, which is the only aquifer beneath the site impacted by contaminants associated with the IFF facility at levels above the NJ GWQC, is not a potable aquifer (Refs. 4, 6). Thus, there is no potential for exposure to contaminants in this unit via ingestion of contaminated groundwater. This water table unit is underlain by the clays of the Woodbury formation and Magothy formation. These formations act as aquitards preventing vertical migration of contaminants into lower Raritan formation, which is used as a water source for the IFF facility (production wells) and Union Beach.

The most recent documented survey of existing wells within three miles of the site was conducted in 1988 and found a total of 13 wells present in the area, including the production wells at IFF. Two wells, located approximately one mile southeast of the site, are domestic wells that have total depths of 35 and 50 feet, and yields of 10 gallons per minute or less. All of the other wells are constructed with total depths greater than 300 feet. None of these wells obtain groundwater from the non-potable shallow water table aquifer. In addition, based upon current groundwater monitoring data, contamination is not migrating off site past the southern property boundary (Ref. 6). This is confirmed by the absence of contamination in off-site well MW-108S/D.

Although site operations ceased in 1997, IFF intends to continue to use a portion of the site for office use, bulking operations, and internal storage. With the exception of the active groundwater pollution remedy, IFF does not intend to use the shallow groundwater zone for any purpose now or in the future (Ref. 6).

Groundwater monitoring is performed on a semi-annual basis per an NJDEP-approved groundwater monitoring program (Refs. 7, 8). A CEA has been established for this site, as depicted in Attachment 6. The CEA boundaries were developed to include both the current and projected future extent of the plume. The effectiveness of the slurry wall and upgradient groundwater collection trench were considered when developing the CEA boundaries, which are roughly defined by the site lot and block. The vertical extent of the CEA is only attributed to the shallow groundwater zone, to a depth of 25 feet bgs. A well restriction area was not required for this site because the impacted shallow groundwater zone is a non-potable Class III-A aquifer (Ref. 6).

Given that the shallow unconfined aquifer is present at depths approximately four to eight feet bgs, constructions workers could potentially come in contact with contaminated groundwater during intrusive activities. However, this pathway is not considered complete at this time given that a Deed Notice is in place for the entire site which restricts any intrusive activities at the IFF site. Intrusive activities cannot occur without prior notification to NJDEP and use of appropriate personal protective equipment (PPE) per Occupational Safety and Health Administration (OSHA) regulations.

Recent groundwater data shows that groundwater contamination is not migrating to off-site adjacent properties, thus off-site construction worker and off-site residential exposure to contaminated shallow groundwater is also not currently considered a concern.

Surface/Subsurface Soil

As discussed in response to Question No. 1, 11 PCB Contamination Areas were identified during the Phase I and II RI/FS. PCB Remediation efforts focused on nine areas of contamination (PCB Soil

Contamination Areas 1, 2, 4, 6, 7, 7a, 8, 10 and 12 as identified in the Phase I and II RI/FS) which were addressed by different remedial approaches. Specific remedial approaches were outlined in the RAR, the Deed Notice, and are also described in Question No. 1. A majority of the PCB contamination was within the facility fenceline; however, some wetlands contamination (PCB Soil Contamination Area 7a) was outside the fenceline. The contamination detected in the wetlands areas is the only contamination detected outside of the facility fenceline above NJ soil cleanup criteria. PCB Soil Contamination Areas 1, 2, and 7 were excavated to 50 mg/kg and a clean soil/vegetative cover was installed. PCB Area 4 and 6 were excavated to 100 mg/kg and an asphalt cap was installed. PCB Area 7a, 12, and portions of area 10 were excavated to 0.75 mg/kg (or to saturated zone) and a soil/vegetative cover was installed. PCB Area 8 was addressed as a hot spot excavation area and backfilled with clean soil. In addition to these PCB remediation areas, the former Aeration Lagoon (SWMU 4) was backfilled and a soil/geomembrane cap was installed over this area. Attachment 3 depicts areas addressed by the different remedial approaches (Ref. 11).

Given that all off-site wetlands soil contamination has been addressed by excavation and capping, there is currently no potential for exposure to off-site soil contamination for any on- or off-site receptor group. In addition, the IFF facility is surrounded by an eight-foot high chain link fence, thus preventing exposure for off-site receptors to any on-site contamination.

In addition to the PCB remediation efforts undertaken at the site to prevent direct exposure to PCB soil contamination, a majority of the IFF site has been covered with either asphalt, clean soil/vegetative cover, concrete, or buildings (see Attachment 7). These engineering controls prevent direct exposure for on-site receptors to any non-PCB surface contamination that may be remaining at the site. There are several grassy areas (seven major areas) at the site that have not been capped during historic remedial activities. However, soil samples collected during the Phase I and II RI within these grassy areas did not detect contamination above the NJ RDCSCC or NJ NRDCSCC. Thus, potential exposure for on-site receptors to residual on-site soil contamination is not currently a concern.

A Deed Notice was also prepared by IFF and approved by NJDEP on June 5, 2001 (Ref. 12). The Deed Notice is in place for the entire IFF site and restricts the site to non-residential use. In addition, the Deed Notice restricts any disturbance of impacted areas at the site, thus preventing potential exposure to contaminated surface and subsurface soil during intrusive activities. The Deed Notice requires that if intrusive activities must take place, appropriate measure must be taken to ensure that workers are wearing PPE and following OSHA guidelines. If intrusive activities take place, the deed notice requires that the impacted area's engineering control must be restored to its original state immediately upon completion of the activity (Ref. 9). Thus, exposure to on-site construction and/or remedial workers is not considered a potentially complete exposure pathway.

The Deed Notice provides the range of detected contaminants found at the IFF site, and the controls in place relative to PCB impacts at the site. Per N.J.S.A. 58:10B-13, a Deed Notice must provide record of the type, concentration and specific location of the contaminants present at the site. This information is described on one or more diagrams, maps and/or table in Exhibit B of the Deed Notice. The current Deed Notice for IFF does not provide all the necessary information, especially regarding non-PCB residual contamination. Thus, the Deed Notice should be revised to include distinct locations of residual contamination above NJ NRDCSCC, and the controls in place to address residual concentration above NJ NRDCSCC.

References:

1. IFF Interim Background Investigation Report. Prepared by Tams Consultants, Inc. Dated May 11, 1988.
2. IFF RI/FS Phase I/Phase II RI Report. Prepared by TAMS Consultants, Inc. Dated May 1992.
3. Environmental Assessment, Final. Prepared by TAMS Consultants, Inc. Dated December 1992.
4. Final FS, Task 4 and 5 Final Report. Prepared by TAMS Consultants. Dated February 1995.
5. Final Decision Document, International Flavors and Fragrances Site, Union Beach, Monmouth County, New Jersey. Prepared by New Jersey Department of Environmental Protection Site Remediation Program. Dated October 1995.
6. CEA Request. Prepared by Camp Dresser & McKee, Inc. Dated March 1999.
7. Letter from Ron Senna, IFF, to Paul Harvey, NJDEP, re: Groundwater Performance Groundwater Monitoring Program (Revised Proposal). Dated February 7, 2000.
8. Letter from Paul Harvey, NJDEP, to Ron Senna, IFF, re: Revised Ground Water Performance Monitoring Plan Dated February 7, 2000. Dated March 7, 2000.
9. Letter from Ronald Senna, IFF, to Paul Harvey, NJDEP, re: Draft Deed Notice. Dated July 5, 2000.
10. Letter from Brian Kiel, IFF to Paul Harvey, NJDEP, re: Groundwater Monitoring Program November 2000 Sampling Event. Dated April 20, 2001.
11. RAR for Phase II Excavation of PCB Contaminated Soil/Wetland Areas, Capping and Aeration Basin Closure. Prepared by International Flavors and Fragrances. Dated June 2001.
12. Letter from Paul Harvey, NJDEP, to Ron Senna, IFF, re: Draft Deed Notice. Dated June 5, 2001.
13. Letter from Brian Kiel, IFF to Paul Harvey, NJDEP, re: Groundwater Monitoring Program May 2001 Sampling Event. Dated August 31, 2001.
14. Letter from Ronald Senna, IFF, to Alan Straus, USEPA, re: Your Request for Site Plan. Dated September 5, 2001.
15. Letter from Paul Harvey, NJDEP, to Ronald Senna, IFF, re: Remedial Action Report for Phase II Soils dated June 2001, Plant Site, IFF, Union Beach. Dated September 6, 2001.

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

____ If no (exposures 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:

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

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

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

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

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

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

Rationale:

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 International Flavors and Fragrances Site, EPA ID# NJD002194843, located at 800 Rose Lane, Union Beach, 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:_____

Kristin McKenney
Risk Assessor
Booz·Allen & Hamilton

Reviewed by: _____ Date:_____

Kathy Rogovin
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: Original signed by: Date: 9/28/2001

Raymond Basso, 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.

Attachment - Summary of Media Impacts Table[1]

International Flavors and Fragrances

AEC	AIR (Indoors)	SURF SOIL	SURF WATER	SED	SUB SURF SOIL	AIR (Outdoors)	CORRECTIVE ACTION MEASURE	KEY CONTAMINANTS
SWMU 1. Oil/Water Separator #1	No	No	No	No	No	No	7. Site-wide RI/FS 8. Unit removal 9. Area covered with pavement 10. Deed Notice	NA
SWMU 2. Oil/Water Separator #2	No	No	No	No	No	No	11. Site-wide RI/FS 12. Unit removal 13. Area covered with pavement 14. Deed Notice	NA
SWMU 3. Equalization Basin	No	No	No	No	No	No	15. Site-wide RI/FS 16. Unit decommissioned 17. Basin backfilled and capped 18. Deed Notice	NA
SWMU 4. Aeration Basin	No	Yes	No	No	Yes	No	19. Site-wide RI/FS 20. Unit decommissioned 21. Basin backfilled, geomembrane liner installed, capped with topsoil 22. Deed Notice	PCBs
SWMU 5. Sludge Lagoon	No	No	No	No	No	No	23. Site-wide RI/FS 24. Unit decommissioned 25. Lagoon backfilled, capped 26. Deed Notice	NA
SWMU 6. Drum Storage Area	No	Yes	No	No	Yes	No	27. Site-wide RI/FS 28. Closed under RCRA 29. Area covered by concrete pad 30. Deed Notice	Ethylbenzene
SWMU 7. Waste Solvent Tank 320 A	No	Yes	No	No	Yes	No	31. Site-wide RI/FS 32. Closed under RCRA 33. Area covered with pavement 34. Deed Notice	PCBs

AEC	AIR (Indoors)	SURF SOIL	SURF WATER	SED	SUB SURF SOIL	AIR (Outdoors)	CORRECTIVE ACTION MEASURE	KEY CONTAMINANTS
SWMU 8. Waste Solvent Tank 320 B	No	Yes	No	No	Yes	No	35. Site-wide RI/FS 36. Closed under RCRA 37. Area covered with pavement 38. Deed Notice	PCBs
SWMU 9. Waste Solvent Holding Tank	No	No	No	No	No	No	39. Site-wide RI/FS 40. Unit decommissioned 41. Area covered with pavement 42. Deed Notice	NA
SWMUs 10 through 13. Acid Chromium Storage Tanks	No	No	No	No	No	No	43. Site-wide RI/FS 44. Unit decommissioned 45. Area covered with pavement 46. Deed Notice	NA
SWMU 14. Waste Transfer Area	No	Yes	No	No	Yes	No	47. Site-wide RI/FS 48. Unit decommissioned 49. Area covered by asphalt 50. Deed Notice	PCBs
SWMU 15. Underground Storage Tank T-32	No	Yes	No	No	Yes	No	51. Site-wide RI/FS 52. Closed under RCRA 53. Soil excavated and area capped with soil/vegetative cover 54. Deed Notice	Xylene
SWMU 16. Incinerator	No	Yes	No	No	Yes	No	55. Site-wide RI/FS 56. Closed under RCRA 57. Soil excavated 58. Area covered by soil/vegetative cover 59. Deed Notice	PCBs
SWMU 17. Sludge Disposal Area	No	Yes	No	No	Yes	No	60. Site-wide RI/FS 61. Area covered by soil/vegetative cover 62. Deed Notice	PCBs

AEC	AIR (Indoors)	SURF SOIL	SURF WATER	SED	SUB SURF SOIL	AIR (Outdoors)	CORRECTIVE ACTION MEASURE	KEY CONTAMINANTS
SWMU 18. Stormwater Weir Box #1	No	Yes	No	No	Yes	No	63. Site-wide RI/FS 64. Unit removed 65. Soil excavated 66. Capped with asphalt 67. Deed Notice	PCBs
SWMU 19. Stormwater Weir Box #2	No	Yes	No	No	Yes	No	68. Site-wide RI/FS 69. Soil excavated 70. Capped with clean soil/vegetative cover 71. Deed Notice	PCBs
SWMU 20. Stormwater Weir Box #3	No	Yes	No	No	Yes	No	72. Site-wide RI/FS 73. Soil excavated 74. Capped with clean soil/vegetative cover 75. Deed Notice	PCBs
AOC A. Railroad Transfer Area	No	No	No	No	No	No	76. Site-wide RI/FS 77. Deed Notice	NA
AOC B. Primary Clarifier	No	Yes	No	No	Yes	No	78. Site-wide RI/FS 79. Soil excavated 80. Capped with clean soil/vegetative cover 81. Deed Notice	PCBs
AOC C. Final Clarifiers	No	Yes	No	No	Yes	No	82. Site-wide RI/FS 83. Soil excavated 84. Capped with clean soil/vegetative cover 85. Deed Notice	PCBs
AOC D. Drum Wash Area	No	No	No	No	No	No	86. Site-wide RI/FS 87. Area covered by clean soil/vegetative cover 88. Deed Notice	NA

AEC	AIR (Indoors)	SURF SOIL	SURF WATER	SED	SUB SURF SOIL	AIR (Outdoors)	CORRECTIVE ACTION MEASURE	KEY CONTAMINANTS
AOC E. Temporary Drum Storage Areas	No	Yes	No	No	Yes	No	89. Site-wide RI/FS 90. Soil excavated 91. Capped with clean soil/vegetative cover or asphalt cover 92. Deed Notice	PCBs, VOCs, PAHs
AOC F. Underground Effluent Pipeline	No	No	No	No	No	No	93. Site-wide RI/FS 94. Deed Notice	NA
PCB Soil and Wetlands Contamination Areas	No	Yes	No	No	Yes	No	95. Site-wide RI/FS 96. Soil excavation to appropriate cleanup level 97. Capping with either soil/vegetative cover or asphalt 98. Deed Notice	PCBs
Groundwater[2]							99. Site-wide RI/FS 100. Installed slurry wall 101. Installed interceptor trench and extraction system 102. Perform semi-annual groundwater monitoring 103. Implemented CEA	Benzene, Chloroform, Chlorobenzene, 1,2-Dichloroethane, Ethylbenzene, Toluene, and Xylene

1. An RFA was performed in 1988 which identified numerous SWMU/AOCs at the site. However, per the 1986 ACO, the site moved into a site-wide RI/FS investigation which did not correlate media investigations to particular SWMUs and AOCs. Thus it is difficult to determine, with the information currently available, what media have been impacted at the various AOCs. When possible, specific media impacts have been documented in the table above. However, the site has generally been investigation on a site-wide investigation focusing on PCB-contaminated Soil and Wetlands Areas.
2. Groundwater has been evaluated on a site-wide basis and has not been specifically related back to specific SWMUs and AOCs at the site.
NA - Not applicable