DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Facility Name:	**Safety-Kleen Envirosystems Company (formerly McKesson Envirosystems Company)**
Facility Address:	**600 Doremus Avenue, Newark, New Jersey 07105**
Facility EPA ID#:	**NJD002153922**

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

Facility Information

The Safety-Kleen Envirosystems Company (Safety-Kleen) site is located on approximately 9.5 acres in a heavily industrialized area in Newark, New Jersey. The site is bounded on the west by Doremus Avenue, and on the east by the confluence of the Passaic River and Newark Bay. Industrial facilities are located both north and south of the site. The only building that remains at the site is a small pump house. The

main portion of the site is surrounded by a six-foot high fence. The site has been completely paved with asphalt or concrete (Ref. 4).

During the 1800s, this site was part of the Balbach Smelting and Refining Corporation Works, which refined lead and copper. Operations ceased in 1938 and ownership of the site was transferred to the City of Newark. The site was inactive until purchased in 1952 by Kolker Chemical Company to construct a chemical plant at the site. Operations at the chemical plant included the manufacture of chlorine, methylene chloride, methyl chloride, chloroform, and plasticizers. In 1962, the Kolker Chemical Company merged with Vulcan Materials Company. The site was purchased by Inland Chemical Corporation (Inland) in 1974, which subsequently phased out chemical manufacturing and initiated solvent recovery operations at the site in 1975. In 1976, under Inland's ownership, the southern portion of the property was sold to Darling International for rendering of animal byproducts. Inland and McKesson Envirosystems Company (McKesson) merged in 1981. On October 10, 1982, an explosion and fire destroyed much of the facility. The New Jersey Department of Environmental Protection (NJDEP) closed the site two days later and the property has been inactive and vacant since. In 1987, Safety-Kleen Corporation acquired the stock of McKesson and renamed the company Safety-Kleen Envirosystems Company.

In August 1982, McKesson signed an Administrative Consent Order (ACO) with NJDEP, requiring that a groundwater and soil investigation be performed on the subject property based on evidence from site inspections by NJDEP that frequent spills and operational losses occurred during the facility's operation. A Resource Conservation and Recovery Act (RCRA) Part B permit application was submitted to NJDEP in 1984. Subsequently, a RCRA Facility Assessment (RFA) was performed by NJDEP in November 1985 which identified a number of environmental concerns at the site. A site inspection conducted by NJDEP in 1987 indicated that a number of surface units and structures (remaining after the explosion) were deteriorating and/or leaking. In response to the RFA and site inspection, another ACO was signed by the facility in 1993 which required that a remedial investigation (RI), feasibility study (FS), and remedial action be conducted at the site. This ACO also exempted the facility from responsibility for remedying conditions resulting from the former metal refining practices at the site or any other activities which predate 1952. In accordance with the ACOs, several phases of investigation have been conducted at the site between 1984 and 1999. The initial RI was submitted in 1994. Subsequent phases of investigation (Phase II, Supplemental Phase II, and Phase III) were completed in 1995, 1996, and 1999, respectively.

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 (AEC)), 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 Areas of Environmental Concern (AECs): Seven AECs were identified during the Phase I RI, as shown in Attachment 1, which were generally associated with chemical manufacture operations at the site prior to 1974. In 1975, the operations were transferred from chemical manufacturing to solvent recovery. Solvent recovery operations were performed at the facility until the explosion in 1982. Based upon available information, AECs were only established for the chemical manufacturing activities that took place before 1974. No AECs appear to be associated with solvent recovery activities conducted at the site between 1975 and 1982. Thus, it appears that activities at the identified AECs were discontinued in 1974. Industrial activities at all units and structures at the site were discontinued when the site was closed after the fire in October 1982. Formal closure and/or cleanup of these units and areas has been ongoing per the ACOs and RCRA permitting requirements.

AEC 1: This AEC was located along the western boundary of the site, adjacent to the former process building area. This area contained several aboveground storage tanks (ASTs) which supported operations in the process building. From 1962 to 1974, the former process building housed operations to process benzoic acid and produce plasticizers (Ref. 3). The ASTs were formally decommissioned as part of a site-wide AST Decommissioning Program implemented in 1995 (Ref. 5). Surface soil sampling conducted during the Phase I RI indicated that total polychlorinated biphenyls (PCBs) were present above New Jersey Non-Residential Direct Contact Soil Cleanup Criteria (NJ NRDCSCC) (Ref. 1). In addition, volatile organic compounds (VOCs) were detected in surface and subsurface soil during the Phase II RI above NJ NRDCSCC and New Jersey Impact to Groundwater Soil Cleanup Criteria (NJ IGWSCC) (Ref. 4). Excavation of contaminated soil has not been performed in this area (Ref. 5). This AEC has been covered with an asphalt cap as part of the site-wide capping program implemented to prevent exposure to contaminated soil and prevent further infiltration of contaminants to groundwater (Ref. 8).

AEC 2: This AEC was located south of AEC 1 and west of the process building. AEC 2 was used as a truck transfer area associated with transport of the materials in the ASTs at AEC 1 (Ref. 3). Surface soil sampling conducted during the Phase I and Phase II RI indicated that PCBs were present above NJ NRDCSCC (Refs. 1, 4). Semi-volatile organic compounds (SVOCs) were detected in surface and subsurface soil during the Phase I RI above the NJ NRDCSCC and NJ IGWSCC (Ref. 1). VOCs and SVOCs were also detected in subsurface soil during the Phase II RI above NJ IGWSCC (Ref. 4). Excavation of contaminated soil has not been performed in this area (Ref. 5). This AEC has been covered with an asphalt cap as part of the site-wide capping program implemented to prevent exposure to contaminated soil and prevent further infiltration of contaminants to groundwater (Ref. 8). Two phases of in-situ chemical oxidation have been implemented at well MP-2S to reduce groundwater contaminant concentrations in this area; however, the results were mixed (Refs. 6, 7). Long-term monitoring

is planned for groundwater downgradient of AEC 2, and further remedial action will be completed if necessary (Ref. 5).

AEC 3: This AEC was located just northeast of the former process building and contained two cooling towers that circulated 2,400 gallons per minute (gpm) of water (Ref. 3). Surface and subsurface soil sampling conducted during the Phase II RI indicated that VOCs were present above NJ NRDCSCC and NJ IGWSCC (Ref. 4). Excavation of contaminated soil has not been performed in this area (Ref. 5). This AEC has been covered with an asphalt cap as part of the site-wide capping program implemented to prevent exposure to contaminated soil and prevent further infiltration of contaminants to groundwater (Ref. 8).

AEC 4: This area was located north of former process building and was used as a loading dock and tank storage area for empty ASTs (Ref. 3). Benzo(a)pyrene was detected in surface soil above the NJ NRDCSCC during Phase I RI (Ref. 1). Subsurface soil sampling conducted during the Phase II RI indicated that VOCs were present above NJ NRDCSCC and NJ IGWSCC (Ref. 4). Excavation of contaminated soil has not been performed in this area (Ref. 5). This AEC has been covered with an asphalt cap as part of the site-wide capping program implemented to prevent exposure to contaminated soil and prevent further infiltration of contaminants to groundwater (Ref. 8).

AEC 5: This AEC was located east of former process building and contained approximately 12 ASTs situated within two adjacent berms. From 1962 to 1974, methylene chloride manufactured at the site was stored in this area (Ref. 3). Surface soil sampling conducted during previous investigations indicated that PCBs and SVOCs were present above NJ NRDCSCC and NJ IGWSCC (Ref. 5). VOCs were detected in subsurface soil above NJ NRDCSCC and NJ IGWSCC (Ref. 4). Approximately 75 cubic yards of PCB-impacted soil was excavated from this area prior to capping. This AEC has been covered with an asphalt cap as part of the site-wide capping program implemented to prevent exposure to contaminated soil and prevent further infiltration of contaminants to groundwater (Ref. 8).

AEC 6: This AEC was located at the far eastern end of the site closest to Newark Bay, and consisted of several tanks which were associated with chemical processing (Ref. 3). Surface soil sampling conducted during the Phase I and Phase II RI indicated that PCBs were present above NJ NRDCSCC (Refs. 1, 9). VOCs were detected in subsurface soil above NJ IGWSCC (Ref. 4). Excavation of contaminated soil has not been performed in this area (Ref. 5). This AEC has been covered with an asphalt cap as part of the site-wide capping program implemented to prevent exposure to contaminated soil and prevent further infiltration of contaminants to groundwater (Ref. 8). Two phases of in-situ chemical oxidation were conducted at well MW-11S to reduce groundwater contaminant concentrations in this area. Continued long-term groundwater monitoring is planned (Refs. 6, 7).

AEC 7: This AEC was located in the southwestern portion of the property and contained a 225,000-gallon AST (Tank C-19) which contained mixed organics (Ref. 3). One surface soil sample was collected during the Phase I RI and PCBs were detected above the NJ NRDCSCC (Ref. 1). However, additional soil samples collected during Phase II RI to delineate the extent of PCB contamination indicated PCB concentrations were below NJ NRDCSCC (Ref. 4). Excavation of contaminated soil was not performed in this area (Ref. 5). This AEC has been covered with an asphalt cap as part of the site-wide capping program implemented to prevent exposure to contaminated soil and prevent further infiltration of contaminants to groundwater (Ref. 8).

Groundwater: Groundwater at the site is found in a shallow fill unit and a deeper Glacial Ground Moraine unit. VOCs have been detected in the shallow fill unit above New Jersey Ground Water Quality Criteria (NJ GWQC) for Class II-A potable groundwater, since groundwater monitoring was initiated in 1982. Based upon available data from 1994 and 1995, VOCs (chloroform, benzene, trichoroethene, and methylene chloride) have been detected in deep groundwater above NJ GWQC.

The remedial action selected for shallow groundwater includes in-situ chemical oxidation at two monitoring wells (MP-2S and MW-11S), monitored natural attenuation of the entire plume, and a contingency plan if non-aqueous phase liquid (NAPL) is encountered during monitoring. Two 10-day reagent chemical oxidation treatments (Phase I and II) were performed in May 2000 and July 2000 (Refs. 6, 7). Post-treatment groundwater sampling results show some reduction of VOC constituents in all injection wells and monitoring wells except MP-2S. The VOC results for MP-2S indicated that concentrations were increasing rather than decreasing. As a result, the injection wells were left in place during construction of the asphalt cap in the event a third chemical oxidation treatment is necessary. A long-term groundwater monitoring program is currently being established per the approved Remedial Action Work Plan (February 2000). The program has several components including: (1) monthly water level gauging and NAPL assessment, (2) monitoring for constituents of concern (COCs), and (3) natural attenuation monitoring (Ref. 5). The first component, NAPL assessment, began in February 2001, immediately after the site-wide asphalt cap was installed, and will continue monthly for one year and then quarterly for two more years. NAPL has not been encountered in the sampling conducted since February 2001. The second component, monitoring for COCs, will begin in September 2001, and calls for monitoring select shallow wells at the Safety-Kleen and Darling properties. The third component, natural attenuation monitoring, has not begun and the status of this planned component is not clear based upon available file materials. The facility is also planning to submit a Classification Exception Area (CEA) request for shallow groundwater after two sampling rounds of groundwater are collected (Ref. 9).

In summary, all AECs are currently inactive. Soil contamination has been addressed with the installation of the site-wide asphalt cap. No further remedial action is planned for soil at the site. Groundwater monitoring is ongoing in the shallow aquifer to evaluate contaminant concentrations above NJ GWQC.

References:

1. Remedial Investigation Report, Safety-Kleen Envirosystems Company, Newark, New Jersey. Prepared by Malcolm Pirnie, Inc. Dated August 1994.
2. Letter to Agi Nadai, USEPA from M. Cathy Geraci, Blasland, Bouck & Lee, Inc. re: Safety-Kleen Envirosystems Company Site. Dated November 1994.
3. Phase II Remedial Investigation Work Plan, Safety-Kleen Envirosystems Company, Newark, New Jersey. Prepared by Blasland, Bouck & Lee, Inc. Dated March 1995.
4. Phase II Remedial Investigation Report, Safety-Kleen Envirosystems Company, Newark, New Jersey. Prepared by Blasland, Bouck & Lee, Inc. Dated December 1995.
5. Remedial Action Work Plan, Safety-Kleen Envirosystems Company, Newark, New Jersey. Prepared by Blasland, Bouck & Lee, Inc. Dated February 2000.
6. Letter to Mark Walters, NJDEP from David J. Ulm, Blasland, Bouck & Lee, Inc. re: Source Area Reduction Program. Dated September 21, 2000.
7. Letter to Mark Walters, NJDEP from David J. Ulm, Blasland, Bouck & Lee, Inc. re: Source Area Reduction Program. Dated October 13, 2000.

8. Letter to NJDEP Land Use Regulation Program from David J. Ulm, Blasland, Bouck & Lee, Inc. re: Waterfront Development Permit Completion Report. Dated July 31, 2001.
9. Letter to Mark Walters, NJDEP from David J. Ulm, Blasland, Bouck & Lee, Inc. re: Quarterly Progress Report. Dated July 31, 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 AECs)?

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

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

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

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

Rationale:

Groundwater

Groundwater at the Safety-Kleen site occurs in two hydrostratigraphic units: the shallow fill and the deeper Glacial Ground Moraine. The shallow fill unit is comprised of a mix of non-native material including rubble, debris, ashes, slag, sand, and gravel. Due to its composition, the shallow fill is highly permeable, with hydraulic conductivity values ranging between 10^{-4} and 10^{-1} centimeters per second (Ref. 6). Groundwater in the shallow fill typically occurs between three and seven feet bgs at the site. The groundwater flow direction in the shallow fill is generally towards the south in the western and central

[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.

portion of the site. Shallow groundwater on the eastern portion of the site is tidally influenced and flows eastward, discharging to Newark Bay.

Beneath the shallow fill is a silt and clay unit that appears to act as an aquitard, restricting vertical groundwater flow between shallow and deep groundwater. This silt and clay layer is first encountered at approximately 10 to 15 feet bgs across the site, and is between 10 and 21 feet thick. Hydraulic conductivity in the silt and clay unit ranges between 10^{-3} and 10^{-7} centimeters per second (Ref. 3), with a mean value of 6.63×10^{-4} centimeters per second (Ref. 2).

Bedrock is encountered approximately 50 feet bgs in the southeastern corner of the site, and approximately 90 feet bgs at the western end of the site. The Glacial Ground Moraine unit, situated immediately above the bedrock, ranges in thickness from a minimum of ten feet near the Newark Bay shoreline, to a maximum of 70 feet in the northwestern corner of the site (Ref. 2). As in the shallow fill unit, the Glacial Ground Moraine unit is heterogeneous, consisting of pebbles interspersed with silt and clay. This nonuniformity causes some areas of the unit to be more permeable than others. Hydraulic conductivity in this deeper water-bearing zone ranges from 10^{-3} to 10^{-6} centimeters per second (Ref. 2). Groundwater level measurements obtained during the Phase I RI indicated northerly groundwater flow toward Newark Bay; however, observed tidal effects were large enough to cause periodic northwesterly fluctuations in the flow pattern. Tidal influence data shows that the Glacial Ground Moraine unit is hydraulically connected to Newark Bay (Ref. 1).

Monitoring of groundwater quality at the Safety-Kleen site has been ongoing as part of various investigations since 1982. A map showing well locations on and off site is presented with this EI determination as Attachment 2. Groundwater data generated during each investigation has been compared to NJ GWQC for Class II-A potable groundwater to determine the severity of impacts because the shallow fill is still formally classified as a Class II-A unit and because NJ GWQC for Class III-B units have not been established.

VOCs and polycyclic aromatic hydrocarbons have been reported in shallow groundwater beneath the Safety-Kleen site since investigation of the medium began in 1982. Shallow groundwater samples collected during the Phase I RI indicated a total of 16 VOCs, 7 SVOCs, and 2 PCBs above NJ GWQC. Although PCBs are no longer reported in the shallow groundwater, a total of 17 VOCs and SVOCs remained above applicable NJ GWQC in Phase III RI samples collected in October 1998 (the latest period for which site-wide contaminant-specific groundwater data was available in the file material). The most significant contamination was detected in wells on the eastern portion of the site near Newark Bay (MP-8S, MW-11S, and MW-12S), but well MP-2S in the center of the site also exhibited significant impacts. Maximum contaminant concentrations observed during the Phase III RI effort are shown in Table 1 below, along with the applicable NJ GWQC (Ref. 4).

Table 1 - Maximum Concentrations of Contaminants Detected Above NJ GWQC in Shallow Groundwater Samples during the Phase III RI [1]

Contaminant	NJ GWQC [2] (µg/L)	Well	Phase III Concentration (µg/L)
Carbon Tetrachloride	0.4	MW-11S	310
Chloroform	6	MW-11S	7,000
Methylene Chloride	2	MW-12S	4,800 B
Tetrachloroethylene	1	MW-11S	660
Trichloroethylene (TCE)	1	MW-12S	2,800
1,1,2-Trichloroethane	3	MW-12S	470
1,1,2,2-Tetrachloroethane	2	MW-12S	410
Vinyl Chloride	5	MW-12S	200
1,1-Dichloroethane	70	MW-11S	1,300
cis-1,2-Dichloroethene	10	MW-12S	8,200
1,2-Dichloroethane	2	MW-12S	460
1,1,1-Trichloroethane	30	MW-12S	2,300
Benzene	1	MW-12S	170
Ethylbenzene	700	MW-12S	1,100
Total Xylenes	40	MW-12S	6,600
Chlorobenzene	4	MW-12S	39
1,1-Dichloroethene	2	MW-12S	110

[1] Shallow groundwater results are from the Phase III RI (October 1998) after the second oxidation treatment. This is the latest period for which site-wide contaminant-specific groundwater data for the shallow unit was available in the file material.
[2] The NJ GWQC is the higher of the GWQC or the Practical Quantitation Level.
B - Detected in blank

Deep groundwater samples from the Phase I RI showed that, while the overall water quality in this unit was better than that in the shallow fill unit, five VOCs and two SVOCs were found at levels exceeding NJ GWQC. However, samples collected from the Glacial Ground Moraine unit during the Phase II RI contained only two VOCs above NJ GWQC, methylene chloride in well MP-1D and TCE in well MP-4D. Neither of these constituents were reported in the co-located shallow wells. No SVOCs were detected above applicable NJ GWQC during the Phase II deep groundwater sampling effort. The deep groundwater impacts were generally isolated and appeared to be declining as a result of natural attenuation. Furthermore, the lack of corresponding VOC contamination between co-located shallow and deep wells suggests that the aquitard between the shallow and deep groundwater units effectively hinders downward vertical contaminant migration, and that observed deep groundwater contamination may be associated with the industrialized nature of the area rather than the Safety-Kleen site alone. All of the deep monitoring wells have since been abandoned, and no additional monitoring of the deep aquifer has

been conducted since the Phase II RI effort. However, monitoring of groundwater quality in the Glacial Ground Moraine unit is expected to resume in the near future in association with RCRA closure and post-closure activities at the site (Ref. 8).

NJDEP has found that Safety-Kleen has adequately delineated the leading edge of the VOC plume migrating from the property. The leading edge of the VOC plume has not yet reached the off-site, downgradient Darling well MW-5 (Ref. 5). NJDEP will require ongoing monitoring of well MW-5 as a sentinel well. It should be noted that Safety-Kleen has historically performed investigations at the Darling site which have shown VOCs and benzene, toluene, ethylbenzene and xylene (BTEX) contamination in groundwater at the Darling site (Ref. 5). However, NJDEP has determined that Darling is responsible for both the VOC and BTEX contamination beneath the site (Ref. 8).

Air (Indoors)

Based on the volatile nature of the contaminants detected on site, migration of contaminants in groundwater to indoor air is a potential exposure pathway. The maximum detected VOC concentrations were compared to the State of Connecticut Groundwater Standards for the Protection of Indoor Air under the Industrial/Commercial Scenario (CT I/C VC) to determine whether migration of VOCs to indoor air may be of concern. Table 2 identifies the contaminants that exceeded the CT I/C VC in the shallow unit during the most recent sampling event (1998) (Ref. 4).

Table 2 - Groundwater Exceedences of the CT I/C VC (µg/L)

Contaminant	CT I/C VC	Maximum Detection
Carbon tetrachloride	40	310 (MW-11S)
Chloroform	710	7,000 (MW-11S)
1,2-Dichloroethane	90	460 (MW-12S)
1,1-Dichloroethene	6	110 (MW-12S)
Methylene chloride	50,000	4,800 B (MW-12S)
Trichloroethene	540	2,800 (MW-12S)
1,1,2,2-Tetrachloroethane	100	410 (MW-12S)
Vinyl chloride	2	200 (MW-12S)
Vinyl chloride	2	290 (MP-2S)

B - Contaminant detected in blank.

Although there are several VOCs that exceed the CT I/C VC, indoor air is currently not a medium of concern at the site. All facility buildings have been demolished, and currently, only remedial activities are being performed at the site. The only structure that is present on site is a small pump house, which is not manned by industrial personnel. Because there are no receptors utilizing building above the plumes associated with this site, VOC migration from the groundwater into indoor air is not currently of concern at the site.

Surface/Subsurface Soil

Surface and subsurface soil at the site have been impacted by VOCs above NJ NRDCSCC and/or NJ IGWSCC. In addition, SVOCs and PCBs have been detected in surface soil above NJ NRDCSCC. Table 3 presents the contaminants that exceeded relevant criteria (Refs. 1, 2).

Surface soil contamination also extends slightly off site to the north of the site onto the Cardolite Corporation property. Surface soil in this off-site area has been impacted by VOCs above NJ NRDCSCC and/or NJ IGWSCC (Ref. 3); however, the impacted area is located beneath asphalt pavement. The contaminants exceeding the NJ NRDCSCC and/or NJ IGWSCC in surface soil at the Cardolite Corporation property are also presented in Table 3. It should be noted that the VOC concentrations detected in off-site samples are generally higher than the VOC concentrations detected on site, which implies that VOC contamination in off-site surface soil may not be solely related to the Safety-Kleen site.

Table 3 - Contaminants Present in Soil Above NJ Soil Cleanup Criteria (mg/kg)

AEC	Contaminant	NJ NRDCSCC	NJ IGWSCC	Surface Soil Maximum Detection	Subsurface Soil Maximum Detection
AEC 1	Chloroform	28	1	10	**53**
	Methylene chloride	210	1	4.2	76
	Tetrachloroethane	6	1	**66**	**17**
	1,1,2,2-Tetrachloroethane	70	1	58	39
	TCE	54	1	31	9
	PCBs	2	5	**5.7**	–
AEC 2	Benzene	13	1	--	**430**
	Chloroform	28	1	--	**60**
	1,2-Dichlorobenzene	10,000	50	--	2,300
	1,3-Dichlorobenzene	10,000	100	--	910
	1,4-Dichlorobenzene	10,000	100	--	960
	1,1-Dichloroethene	150	10	--	**360**
	1,1,2,2-Tetrachloroethane	70	1	--	32
	Tetrachloroethene	6	1	--	**680**
	TCE	54	1	--	**740**
	1,1,1-Trichloroethane	1,000	50	--	56
	Benzo(a)anthracene	4	500	--	**17**
	Benzo(a)pyrene	0.66	100	**27**	**7.3**
	Benzo(b)fluoranthene	4	50	3.4	**26**
	Benzo(k)fluoranthene	4	500	--	**12**
	Dibenzo(a,h)anthracene	0.66	100	--	**6.1**

AEC	Contaminant	NJ NRDCSCC	NJ IGWSCC	Surface Soil Maximum Detection	Subsurface Soil Maximum Detection
	PCBs	2	50	**34**	–
AEC 3	Benzene	13	1	--	**110**
	Chlorobenzene	680	1	--	140
	Chloroform	28	1	**31**	2.2
	Methylene Chloride	210	1	37	26
	1,1,2,2-Tetrachloroethane	70	1	1.4	11
	Tetrachloroethene	6	1	**21**	**8.9**
	TCE	54	1	7.3	**110**
AEC 4	Chloroform	28	1	--	27
	1,1,2,2-Tetrachloroethane	70	1	--	27
	Tetrachloroethene	6	1	--	**30**
	TCE	54	1	--	51
	Benzo(a)pyrene	0.66	100	**1.4**	–
AEC 5	Chloroform	28	1	--	11
	Methylene chloride	210	1	--	15
	1,1,2,2-Tetrachloroethane	70	1	--	1.9
	Tetrachloroethene	6	1	--	**61**
	TCE	54	1	--	22
	Hexachlorobenzene	2	100	**2.3**	--
	N-Nitrosodi-n-propylamine	0.66	10	**1.6**	--
	PCBs	2	50	<50[1]	–
AEC 6	Carbon tetrachloride	4	1	--	**4.5**
	Chloroform	28	1	--	**34**
	1,1-Dichloroethane	1,000	10	--	3.6
	Methylene chloride	210	1	--	18
	Tetrachloroethene	6	1	--	**88**
	TCE	54	1	--	51
	PCBs	2	50	14	--
AEC 7	PCBs	2,000	50,000	3,200	–

AEC	Contaminant	NJ NRDCSCC	NJ IGWSCC	Surface Soil Maximum Detection	Subsurface Soil Maximum Detection
Cardolite Corporation Property	**Off-Site Area**				
	Carbon tetrachloride	4	1	**17**	--
	Chloroform	28	1	**79**	--
	Methylene chloride	210	1	2.3	--
	Tetrachloroethene	6	1	**21**	--
	TCE	54	1	**74**	--

-- indicates that the contaminant was not detected above NJ Soil Criteria

[1] All PCB impacted soil above 50 mg/kg was excavated from this AEC; however, confirmatory sample results were not available. Thus, it is assumed that PCBs remain in this AEC at levels below 50 mg/kg.

In summary, the majority of AECs have VOC contamination above NJ NRDCSCC and NJ IGWSCC in both surface and subsurface soil. A few AECs have detection of PCBs and SVOCs above NJ NRDCSCC and NJ IGWSCC primarily in surface soil.

Surface Water

Newark Bay, located on the eastern border of the site, is the only surface water body adjacent to the site. The Passaic River enters the Newark Bay approximately one-quarter of a mile north (upgradient) of the site. Surface water samples collected from Newark Bay during the Phase II RI (1995) detected no VOCs. Thus, no further sampling of Newark Bay has been conducted or required.

The facility has utilized fate and transport models to calculate projected surface water concentrations from detected groundwater concentrations. The projected surface water concentrations were compared to appropriate screening criteria in order to determine if surface water could be a potential concern. Surface water concentrations for Newark Bay were calculated by using VOC concentrations detected in on-site shallow groundwater during the Phase II Supplemental RI (August 1996), during the April 1997 sampling event, during the Phase III RI (October 1998), and most recently following completion of the in-situ chemical oxidation treatment program (September 2000). The results of each of these analyses indicates that the discharge of impacted site groundwater from the shallow fill unit, under average flow conditions, should not result in surface water concentrations in the Newark Bay that exceed New Jersey Surface Water Quality Criteria (NJ SWQC) (Ref. 6). Therefore, surface water impacts to the Newark Bay are not currently considered a concern.

Sediment

Natural sediment is not present along the shoreline of the eastern property boundary in Newark Bay. Newark Bay sediments are physically isolated from the shoreline along the site by approximately 16 feet of rip rap (see to Attachment 3) (Ref. 2). Thus, sediments have not been considered a concern at the site and are not expected to be an impacted media.

Air (Outdoors)

No assessment of the impacts to outdoor air has been conducted at the site. Migration of VOCs in soil and groundwater into outdoor air in not expected to be of concern due to the presence an asphalt cap which

has been installed over the entire site. The cap also restricts potential particulate migration into outdoor air. Thus, the migration of contaminated particulates and/or volatile emissions are not expected to be significant exposure pathways.

References:

1. Remedial Investigation Report, Safety-Kleen Envirosystems Company, Newark, New Jersey. Prepared by Malcolm Pirnie, Inc. Dated August 1994.
2. Phase II Remedial Investigation Report, Safety-Kleen Envirosystems Company, Newark, New Jersey. Prepared by Blasland, Bouck & Lee, Inc. Dated December 1995.
3. Letter to Michael Rosenberg, McKesson, from Mark Walters, NJDEP, re: Phase II RI Report. Dated April 16, 1996.
4. Phase III Remedial Investigation Report, Safety-Kleen Envirosystems Company, Newark, New Jersey. Prepared by Blasland, Bouck & Lee, Inc. Dated February 1999.
5. Letter from Mark Walters, NJDEP, from David Ulm, Blasland, Bouck & Lee, Inc., re: Safety-Kleen Envirosystems Site (NJDEP Comments on Draft Remedial Action Work Plan). Dated January 24, 2000.
6. Remedial Action Work Plan, Safety-Kleen Envirosystems Company, Newark, New Jersey. Prepared by Blasland, Bouck & Lee, Inc. Dated February 2000.
7. Letter to Agi Nadai, USEPA from Cathy Geraci, Blasland, Bouck & Lee, Inc. re: Safety-Kleen Envirosystems Company Site. Dated November 14, 2000.
8. Personal communication between Agi Nadai, USEPA, and Michele Benchouk, Booz·Allen & Hamilton, re: Status Update from Mark Walters of NJDEP. Dated August 22, 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

Rationale:

Groundwater

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

Groundwater beneath the Safety-Kleen site is not currently used as a potable water source, nor is it considered a viable future source for drinking water. Shallow groundwater at the Safety-Kleen site is currently classified by NJDEP as Class II-A (potable) groundwater, but the facility has long maintained that classification as Class III-B (non-potable) unit would be more appropriate. Groundwater in the shallow fill unit contains naturally high concentrations of chloride and total dissolved solids (TDS), up to 9,400 and 3,400 parts per million, respectively (Ref. 4). These concentrations are high enough to meet NJDEP's definition of a Class III-B groundwater formation and prohibit conversion of the groundwater formation into a potable water source, as outlined in N.J.A.C. 7:9-6.7 (Ref. 2). The Glacial Ground Moraine unit has similarly elevated levels of chloride and TDS and is already formally classified as a Class III-B unit in accordance with N.J.A.C. 7:9-6.5(f)(3) (Ref. 2). In addition to natural water quality concerns, the shallow fill unit is of limited saturated thickness and cannot be classified as an "aquifer" as defined in N.J.A.C. 7:9-6.1; as such, the shallow unit does not constitute a viable source of potable water (Ref. 2). In 1994, NJDEP concurred that groundwater quality beneath the Safety-Kleen site is unlikely ever to meet NJ GWQC for Class II-A potable water supplies due to salt water intrusion and regional impacts related to widespread industrial operations (Ref. 1).

Due to naturally occurring conditions in the groundwater, the City of Newark obtains its public water from surface water supplies in northern New Jersey. The only wells in the city are privately owned and designated for wash water use only. The City of Newark has no future plans to install groundwater wells for public drinking water supplies, and has not had such wells in use since approximately 1900. A well search conducted as part of the Phase II RI indicated that the only wells within a one mile radius of the site were used for monitoring of industrial and commercial sites. No potable or municipal wells were identified within one mile of the site (Ref. 3). Therefore, there is no complete pathway for contaminated groundwater in the shallow or deep aquifers.

The installation of the site-wide cap also prevents direct exposure of a construction worker to contaminated groundwater as it limits intrusive activities at the site. Thus, direct exposure for a construction worker is not a concern. Remedial workers involved with groundwater monitoring are expected to wear personal protective equipment (PPE) per Occupational Safety and Health Administration (OSHA) regulations, thus direct exposure to impacted groundwater for this receptor group is also not a concern.

A long-term groundwater monitoring program is currently being established per the approved Remedial Action Work Plan (February 2000). The program has several components including: (1) monthly water level gauging and NAPL assessment, (2) monitoring for COCs, and (3) natural attenuation monitoring (Ref. 5). The first component, NAPL assessment, began in February 2001, immediately after the site-wide asphalt cap was installed, and will continue monthly for one year and then quarterly for two more years. NAPL has not been encountered in the sampling conducted since February 2001. The second component, monitoring for COCs, will begin in September 2001, and calls for monitoring select shallow wells at the Safety-Kleen and Darling properties. The third component, natural attenuation monitoring, has not begun and the status of this planned component is not clear based upon available file materials. The facility is also planning to submit a CEA for shallow groundwater after two sampling rounds of groundwater are collected. The CEA will cover the entire Safety-Kleen site and the western portion of the Darling property. Vertically, the CEA will extend through the entire depth of the shallow fill unit (approximately 6.6 feet bgs).

Surface/Subsurface Soil

A six-foot high chain link fence surrounds the site and restricts access to the site for all off-site receptors. In addition, Safety-Kleen has installed a concrete and asphalt cap over the entire site to address the

remaining residual COCs. Attachment 3 visually presents the area where the cap was installed (Ref. 6). Due to the presence of this cap, no contaminated surface soil is exposed. The cap has also been installed over all impacted subsurface soil areas to prevent exposure to contaminated subsurface soil. Thus, no complete exposure pathways exist for any potential on-site receptors. Furthermore, no industrial activities are taking place at this site; thus, no potential receptors are present on site. Remedial activities associated with groundwater are ongoing; however, remedial workers wear PPE in accordance with the OSHA regulations, thus preventing exposure to contaminated soil.

The facility intends to submit a Declaration of Environmental Restrictions (DER) by the end of 2001, which will include all contaminant concentrations remaining at the site underneath the cap (Ref. 5). The DER will also dictate routine maintenance and monitoring of the cap to ensure it remains in good condition and is not disturbed without prior notification of NJDEP.

As indicated in the results of the Phase III RI, VOC contamination in surface soil (1.5 to 2.0 ft. bgs) extends onto the edge of the Cardolite Corporation Property. However, this area is paved with asphalt (Ref. 3); thus, contaminated surface soil is not currently exposed. Exposure to potential off-site receptors (i.e., trespassers, off-site workers, off-site construction workers) is not currently considered a concern for this off-site impacted area. As discussed in the previous response, VOC detections in off-site samples are generally higher than the VOC concentrations detected on site, which implies that VOC contamination in off-site surface soil may not be solely related to the Safety-Kleen site.

References:

1. Phase II Remedial Investigation Work Plan. Prepared by Blasland, Bouck & Lee, Inc. Dated March 1995.
2. Phase II Remedial Investigation Report, Safety-Kleen Envirosystems Company, Newark, New Jersey. Prepared by Blasland, Bouck & Lee, Inc. Dated December 1995.
3. Phase III Remedial Investigation Report, Safety-Kleen Envirosystems Company, Newark, New Jersey. Prepared by Blasland, Bouck & Lee, Inc. Dated February 1999.
4. Groundwater Remedial Action Selection Report. Prepared by BBL. Dated February 1999.
5. Remedial Action Work Plan, Safety-Kleen Envirosystems Company, Newark, New Jersey. Prepared by Blasland, Bouck & Lee, Inc. Dated February 2000.
6. Letter to Mark Walters, NJDEP from David J. Ulm, Blasland, Bouck & Lee, Inc. re: Safety-Kleen Envirosystems Company Site. Dated July 31, 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 Safety-Kleen Envirosystems Company, EPA ID # NJD002153922, located at 600 Doremus Avenue, in Newark, 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:_____

Angela Sederquist
Risk Assessor
Booz·Allen & Hamilton

Reviewed by: _____ Date:_____

Kristin McKenney
Senior Risk Assessor
Booz·Allen & Hamilton

Also Reviewed by: _____ Date:_____

Agathe Nadai, RPM
RCRA Programs Branch
USEPA Region 2

_____ Date:_____

Barry Tornick, Section Chief
RCRA Programs Branch
USEPA Region 2

Approved by: Original signed by: Date: September 27, 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:

Sameh , Abdellatif
(212) 637-4103
abdellatif.sameh@epa.gov

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

Attachments

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

- Attachment 1 - AEC Map
- Attachment 2 - Groundwater Sampling Locations
- Attachment 3 - As-Built Figure of Asphalt Cap
- Attachment 4 - Summary of Media Impact Table

Attachment 1 - AEC Map

(Source: Phase II Supplemental Remedial Investigation Report. Prepared by Blasland, Bouck & Lee. Dated October 1996.)

Attachment 2 - Groundwater Sampling Locations

(Source: Remedial Action Work Plan. Prepared by Blasland, Bouck & Lee. Dated February 2000.)

Attachment 3 - As-Built Figure of Asphalt Cap

(Source: Letter to Mark Walters, NJDEP from David J. Ulm, Blasland, Bouck & Lee, Inc. re: Safety-Kleen Envirosystems Company Site. Dated July 31, 2001.)

Attachment 4 - Summary of Media Impacts Table
Safety-Kleen Envirosystems Company, Newark, New Jersey

AEC	GW [1]	AIR (Indoors)	SURF SOIL	SURF WATER	SED	SUB SURF SOIL	AIR (Outdoors)	CORRECTIVE ACTION MEASURE	KEY CONTAMINANTS
AEC 1	NA	No	Yes	No	No	Yes	No	▸ Installation of site-wide asphalt cap. ▸ DER will be established.	PCBs, VOCs
AEC 2	NA	No	Yes	No	No	Yes	No	▸ Installation of site-wide asphalt cap. ▸ DER will be established.	PCBs, SVOCs, VOCs
AEC 3	NA	No	Yes	No	No	Yes	No	▸ Installation of site-wide asphalt cap. ▸ DER will be established.	VOCs
AEC 4	NA	No	Yes	No	No	Yes	No	▸ Installation of site-wide asphalt cap. ▸ DER will be established.	VOCs, SVOCs
AEC 5	NA	No	Yes	No	No	Yes	No	▸ Excavation of PCB contaminated soil. ▸ Installation of site-wide asphalt cap. ▸ DER will be established	PCBs, VOCs, SVOCs
AEC 6	NA	No	Yes	No	No	Yes	No	▸ Installation of site-wide asphalt cap. ▸ DER will be established.	PCBs, VOCs
AEC 7	NA	No	Yes	No	No	No	No	▸ Installation of site-wide asphalt cap. ▸ DER will be established.	PCBs

AEC	GW [1]	AIR (Indoors)	SURF SOIL	SURF WATER	SED	SUB SURF SOIL	AIR (Outdoors)	CORRECTIVE ACTION MEASURE	KEY CONTAMINANTS
Site- Wide Groundwater	Yes	No	NA	NA	NA	NA	No	▸ Implementation of two phases of in-situ chemical oxidation treatment to reduce source area contamination around shallow wells MP-2S and MW-11S. ▸ Operation of a shallow groundwater extraction system in the vicinity of on-site well MW-6 to reduce VOC. Contamination associated with the AST farm. ▸ Capping of site to reduce infiltration of precipitation and further leaching of contaminants to groundwater. ▸ Implementation of a monitored natural attenuation to address residual contamination in shallow groundwater. ▸ Ongoing shallow groundwater monitoring program approved and being implemented. ▸ Monitoring of the deep groundwater unit to be established as a condition of RCRA closure. ▸ Groundwater CEA proposed for the site and portions of the adjacent Darling property.	VOCs

[1] Groundwater has generally been evaluated on a site-wide basis, even though two primary areas of groundwater contamination have been identified in AEC 2 (MP-2S) and AEC 6 (MW-11S).