DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Current Human Exposures Under Control

Facility Name: **Ortho-Clinical Diagnostics**
Facility Address: **1001 US Route 202, Raritan, New Jersey 08869-0606**
Facility EPA ID #: **NJD068715424**

Definition of Environmental Indicators (for the RCRA Corrective Action)

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

Definition of "Current Human Exposures Under Control" EI

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

Relationship of EI to Final Remedies

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

Duration / Applicability of EI Determinations

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

Facility Description

Site Description

Ortho-Clinical Diagnostics (OCD) is an Administration and Manufacturing facility (the site) located at 1001 U.S. Route 202 North in Raritan Borough, Somerset County, New Jersey. The facility manufactures hospital and laboratory reagents used primarily for blood chemistry clinical products, which are usually packaged into "diagnostic kits." The property occupies Lot 4 on Block 31 of the Raritan Borough tax map and encompasses an area of approximately 66 acres. Approximately 9 acres are covered by buildings, 16 acres by roadways, parking lots and other paved surfaces, 11 acres by wooded areas, and 30 acres by landscaped areas. A detailed description of the site and its history is provided in the May 2, 2001 RCRA Facility Investigation Report (RFI Report) (Ref. 2). Security measures at the facility include a chain-link fence, surveillance cameras, and ongoing surveillance by security guards.

A mix of industrial and residential land usage characterizes the area surrounding the site. Route 202 is located immediately north of the site; the New Jersey Transit Raritan Maintenance Yard is located south and southeast of the site; the former North American Products (NAPA) facility and residential properties are located to the east; and the Johnson & Johnson Networking and Computer Services building is located to the west. The Raritan Industrial Park is situated south of the New Jersey Transit and south-southeast of the OCD property.

Early development of the site began shortly after Ortho Products, Inc. acquired the site from the Township of Bridgewater at a public auction in 1945. The corporate name of the company was changed to Ortho Pharmaceutical Corporation (OPC), a division of Johnson & Johnson Company (J&J), following the purchase of the property. In December 1973, Ortho Diagnostics Inc. (ODI) was formed from Ortho Pharmaceutical as a separate subsidiary of J&J. From 1972 to 1976, ODI coexisted on the property with Ortho Pharmaceutical. Ortho Pharmaceutical moved its operations to the northern side of Route 202 in 1976. ODI changed its name in July 1980 to Ortho Diagnostic Systems, Inc. (ODSI). Effective January 1, 1998, the name of the facility's operating entity was changed from ODSI to OCD with no change in ownership. Limited information is available regarding OPC's operations at the site prior to their relocation to the northern side of Route 202 in 1976. OPC reportedly conducted research and development activities on veterinary compounds and human medicinals. OCD's activities at the facility, since its onset as ODI in 1973, have historically focused on research and production operations related to transfusion medicine (donor screening and immunohematology) products.

Environmental Setting

The site is relatively flat lying with a slight slope to the south. The site is situated approximately 1.2 miles east of the North Branch of the Raritan River, which flows south to its confluence with the South Branch forming the main branch of the Raritan River. The main branch of the Raritan River flows to the east and is approximately 0.75 miles south of the site. A small drainage ditch transmits stormwater flow southward in the western portion of the site, eventually leading to an unnamed tributary of the Raritan River. Stormwater is conveyed in the eastern and central portions of the site to either the East Storm Sewer Outfall (001) or the West Storm Sewer Outfall (002), respectively. Both of these outfalls discharge into a drainage ditch that runs along the New Jersey Transit railroad tracks, immediately south of the site. A divide in the drainage ditch results in the flow of stormwater toward the west and toward the east, each pathway ultimately leading to an endpoint at the Raritan River.

The site lies within the Piedmont Physiographic Province (Triassic Lowlands) which is characterized mainly by gently rounded lowland hills separated by wide valleys. The site is underlain by the Passaic Formation, which consists of non-marine, reddish-brown mudstone, shale, siltstone, and fine-grained sandstone interbedded with a lesser amount of gray to black siltstone, shale, and mudstone. The strike of the bedrock in the vicinity of the site is due North to N10° W and the dip is approximately 8° to 11° to the east-northeast. Bedrock is encountered at an approximate depth of 3 to 12 feet below grade is composed predominantly of weathered reddish-brown shale and siltstone. More competent bedrock zones are typically encountered below a depth of 30 feet.

The Passaic Formation is composed primarily of relatively impermeable materials, and derives its water-bearing properties mostly due to secondary porosity in the form of bedding plane fractures, near-vertical joints, and weathered zones within the formation. Two water-bearing zones have been identified at the site during the RCRA

Facility Investigation (RFI). The first water-bearing zone typically occurs in the shallow weathered bedrock within a depth of approximately 40 feet. The depth to water in monitoring wells screened within this zone varies from 6 to 28 feet below grade. The predominant groundwater flow direction in the shallow bedrock zone is toward the south. The shallow water-bearing unit appears to be separated from a deeper water-bearing zone by more competent beds in the Passaic Formation as evidenced by a hydraulic head differential of approximately 40 feet between the two zones. The depth to water in monitoring wells screened in the deep bedrock zone ranges from 48 to 67 feet below grade. Where fractures are encountered, the deeper bedrock zone is typically characterized by a higher permeability than the shallower zone.

Groundwater usage in the vicinity of the OCD site has been investigated during various stages of the RFI. A detailed evaluation of groundwater usage concluded that there were no active domestic wells located within a half-mile distance downgradient of the site. The focused well search indicated that all residences were connected to the Elizabethtown Water Company's supply. No public supply wells exist within a one-mile radius of the site. One active industrial supply well was identified at a location within the Raritan Industrial Park, approximately 600 feet south of the OCD property boundary.

Site Regulatory History

Environmental conditions at the OCD site have been evaluated in conjunction with investigative and monitoring activities completed pursuant to regulatory permits issued by the New Jersey Department of Environmental Protection (NJDEP) and the United States Environmental Protection Agency (EPA). A description of the regulatory permits is provided below.

New Jersey Department of Environmental Protection (NJDEP)
NJPDES-DGW Permit

On June 15, 1987, NJDEP Division of Water Resources issued a draft NJ Pollutant Discharge Elimination System – Discharge to Ground Water (NJPDES-DGW) permit (No. NJ0057894) to OCD. The permit required OCD to install groundwater monitoring wells in response to the closure/post-closure of the 10,000 gallon methanol UST (SWMU-7). This permit prompted the installation of monitoring wells and the initiation of a quarterly groundwater sampling program to determine the facility's potential impact on the groundwater quality underlying the site. The final NJPDES-DGW permit was issued to OCD on April 4, 1990. As indicated in a NJDEP-DGW Permit modification issued on May 1, 1992, the quarterly groundwater sampling program was expanded to include additional monitoring wells that were installed to address Solid Waste Management Units (SWMUs) identified at the site. Although this permit expired on May 31, 1997, OCD was required by EPA and NJDEP to continue the quarterly groundwater sampling program in accordance with the site's RCRA Corrective Action Program. OCD continues to monitor the groundwater quality at the site on a quarterly basis to evaluate trends in volatile organic compound (VOC) concentrations in groundwater, and additionally, to assess the effectiveness of groundwater remedial efforts initiated at the site in 2004.

Environmental Protection Agency (EPA)

OCD submitted a RCRA Part B application to EPA on December 5, 1984. In response to this application and subsequent data submissions, EPA issued a Hazardous and Solid Waste Amendment (HSWA) permit (NJD068715424) to OCD on September 19, 1988. The HSWA permit became effective on November 15, 1988 and authorized OCD to conduct business as a hazardous waste storage and incineration facility with the following regulated units: one incinerator, two container storage areas, and one aboveground vaulted tank. The four RCRA regulated units were closed as documented in a June 5, 1991 to NJDEP and subsequently delisted by NJDEP in a letter dated July 22, 1991.

A RCRA Facility Assessment (RFA) was completed for the facility in June 1987. The September 19, 1988 HSWA permit also imposed requirements under the RCRA Corrective Action Program that included a RCRA Facility Investigation (RFI), corrective actions relative to the RFI, and minimization of waste generated at the facility. Several phases of investigative work have been completed to characterize environmental conditions at Areas of Concern (AOCs) and the SWMUs. OCD submitted a comprehensive RFI Report to USEPA and NJDEP on May 2, 2001 to summarize all investigative and remedial actions completed between 1995 and 2000 (Ref. 1). OCD was proactive in initiating an enhanced reductive

dechlorination system in 2004 that has been successful in reducing VOC concentrations in groundwater at the site. OCD is in the process of conducting supplemental sampling and investigations to address the regulators' comments that were issued in 2006 in response to the May 2, 2001 RFI Report.

Corrective Actions Completed to Date

OCD has completed a number of corrective actions to date to remediate soil quality impacts, as summarized in the table below.

Corrective Actions during RCRA Facility Investigation

AOC / SWMU ID	SWMU/AOC Description	Corrective Action
AOC-1	Soil in Basement of Building G	Excavation of fuel oil-impacted soil
AOC-3	Gasoline USTs near Building D	Excavation of petroleum hydrocarbon-impacted soil
AOC-4	Fuel Oil/Motor Oil in Soil Beneath Roadway	Excavation of petroleum hydrocarbon-impacted soil
SWMU-8	Southwest Leach Field/10,000-Gallon Waste Solvent UST	Removal of the former 10,000-gallon waste solvent UST and excavation of surrounding VOC-impacted soil
SWMU-12	550-Gallon Gasoline UST	Removal of the former 550-gallon gasoline UST and excavation of surrounding gasoline-impacted soil
SWMU-13	Process/Sanitary Sewer Line System	Cleaning of manholes and subsequent abandonment of the inactive, off-site process and sanitary sewer lines

In 2004, OCD initiated an enhanced reductive dechlorination (ERD) system to remediate the TCE plume in groundwater that extends from the facility in the vicinity of Buildings J and R, southward to the NJ Transit property, located south of the OCD site. The ERD system includes 20 injection wells used for the injection of a dilute molasses/water solution to remediate the TCE concentrations in groundwater. The ERD groundwater remediation program has been successful in reducing VOC concentrations in groundwater at the site since its inception in 2004.

Environmental conditions at the site have been characterized through extensive soil and groundwater sampling conducted over the past 10 years. SWMUs and AOCs have been identified at the site and the extent of soil and groundwater quality impacts has largely been defined. There are no SWMUs or AOCs with exposed soil quality impacts that present potentially unacceptable exposure. A more detailed discussion of impacted media and potential exposure pathways is provided in the responses to questions in the remainder of this CA725 form.

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 SWMUs and AOCs

A total of 13 Solid Waste Management Units (SWMUs) and 16 Areas of Concern (AOCs) have been identified at the OCD site under the RCRA Corrective Action program, most of which have been described in the May 2, 2001 RFI Report (Ref. 1) and additionally in the October 13, 2004 RFI Report Addendum (Ref. 10). The SWMUs and AOCs are listed in the table below and their locations are shown on Figure A-1 in Attachment A. In addition to the May 2, 2001 RFI Report, groundwater quality on-site and off-site has been investigated and summarized in several reports to USEPA and NJDEP (Ref.'s 3, 6, 8, and 13). Groundwater quality has been monitored on a quarterly basis and the results have been statistically evaluated and summarized in annual reports to the regulators (Ref.'s 4, 5, 9, 11, and 14). The use of enhanced reductive dechlorination to remediate VOC concentrations has been described in report submissions to USEPA and NJDEP (Ref.'s 7, 12, and 15). As summarized in the following tables, one or more constituents are present in soil at concentrations exceeding the most stringent NJDEP Soil Cleanup Criteria at 2 of the 13 SWMUs and 4 of the 16 AOCs based on sampling and remedial actions completed to date.

Summary of SWMUs

SWMU ID	Description	Constituents in Soil at Concentrations Above NJDEP SCC
SWMU-1	Incinerator	–
SWMU-2	5000-Gallon Aboveground Waste Methanol/Acetone Tank	–
SWMU-3	Container Storage Area - Building J Basement	–
SWMU-4	Container Storage Area - Building R Basement	–
SWMU-5	750-Gallon Aboveground Waste Acetone Tank	–
SWMU-6	750-Gallon Aboveground Waste Acid Tank	–
SWMU-7	10,000-Gallon Waste Methanol Tank	Beryllium
SWMU-8	Southwest Leach Field/10,000-Gallon Waste Solvent UST	–
SWMU-9	Northeast Leach Field	–
SWMU-10	Two 10,000-Gallon and One 20,000-Gallon No. 6 Fuel Oil USTs	–
SWMU-11	Seven 20,000-Gallon No. 6 Fuel Oil USTs	Lead
SWMU-12	550-Gallon Gasoline UST	–

SWMU ID	Description	Constituents in Soil at Concentrations Above NJDEP SCC
SWMU-13	Process/Sanitary Sewer Line System	_

NJDEP SCC May 12, 1999 New Jersey Department of Environmental Protection Soil Cleanup Criteria

The beryllium concentration (3 mg/kg) detected in soil at SWMU-7 was identified at a depth of 4 to 4.5 feet below grade, and therefore, the potential risk to human health is considered low. Furthermore, the beryllium concentration is only slightly above the 2 mg/kg NJDEP SCC, and beryllium occurs naturally at comparable concentrations in the soil and bedrock underlying the site. The lead concentration (1,160 mg/kg) detected in soil at SWMU-11 was identified at a depth of 7 to 7.5 feet below grade, and therefore, the potential risk to human health is considered low.

Summary of AOCs

AOC ID	Description	Constituents in Soil at Concentrations Above NJDEP SCC
AOC-1	Soil in Basement of Building G	_
AOC-2	Two 4,800-Gallon Methanol USTs	_
AOC-3	Two 2,000-Gallon Leaded Gasoline USTs	_
AOC-4	Fuel Oil/Motor Oil in Soil Beneath Roadway	_
AOC-5	Two 20,000-Gallon No. 6 and One 5,000-Gallon No. 2 Fuel Oil USTs	PAHs
AOC-6	Two 5,000-Gallon Unleaded Gasoline USTs	_
AOC-7	750-Gallon No. 2 Fuel Oil UST	_
AOC-8	10,000-Gallon No. 2 Fuel Oil UST	_
AOC-9	Three Waste Solvent USTs	Nickel
AOC-10	Leach Field Sewer Line	_
AOC-11	Chloroform in MW-20	_
AOC-12	Building D Floor Drain	PAHs
AOC-13	Dirt Turnaround Area	_
AOC-14	Aerial Photograph Anomaly	_
AOC-15	Ethylene Glycol Release at Building M	_
AOC-16	Soil in Building B Basement	PCBs, PAHs, Metals

NJDEP SCC May 12, 1999 New Jersey Department of Environmental Protection Soil Cleanup Criteria

The soil quality impacts listed in the table above are generally localized and have a limited potential for human exposure.

Polynuclear aromatic hydrocarbons (PAHs) were detected at low concentrations slightly exceeding the NJDEP SCC in one soil sample from AOC-5. The following PAHs were detected at the 0 to 0.5 foot depth interval in soil at AOC-5: benzo(a)anthracene (0.994 mg/kg), benzo(a)pyrene (1.25 mg/kg), benzo(b)fluoranthene (1.62 mg/kg), and benzo(k)fluoroanthene (1.19 mg/kg). PAH concentrations in shallow soil (0 to 0.5 feet) at three adjacent soil sample locations were all below the NJDEP SCC, so the PAH exceedance at AOC 5 appear to be isolated.

An isolated detection of nickel (425 mg/kg) was reported in soil at a depth of 7 to 7.5 feet at AOC-9. The potential risk to human receptors posed by the nickel concentration in soil is very low because the soil sample was collected seven feet below the paved parking lot.

A soil sample collected from the outfall of the former Building D Floor Drains (AOC-12) also had low concentrations of the following PAHs: benzo(a)anthracene (1.60 mg/kg), benzo(a)pyrene (1.3 mg/kg), and benzo(b)fluoranthene (1.7 mg/kg). The outfall is located adjacent to the southern property boundary and also receives stormwater runoff from the parking lot. The fence at the AOC-12 soil sample location limits access the area where the low concentrations of PAHs were detected.

Results from soil samples collected recently from the 0 to 0.5 foot depth interval below Building B (AOC-16) indicate the presence of several constituents at concentrations exceeding the NJDEP SCC. All of the soil samples were collected from within the crawl space below Building B. The following constituents exceeded the most stringent NJDEP SCC: PCBs at 9 locations (concentration range of 0.526 mg/kg to 2.735 mg/kg), lead at 6 locations (concentration range of 1,130 mg/kg to 11,800 mg/kg), mercury at 3 locations (concentration range of 22.5 mg/kg to 55.7 mg/kg), antimony at one location (30.6 mg/kg), beryllium at one location (2.1 mg/kg), and PAHs at one location (individual PAH concentrations ranging from 0.716 mg/kg to 5.37 mg/kg). Most of the soil quality impacts below Building B appear to be associated with the storage of old equipment, all of which has since been removed. Access to the crawl space below Building B is generally limited to facility maintenance personnel. OCD is developing a policy to educate and protect maintenance workers in Building B from potential exposure for the limited occasions that the crawl space is accessed for maintenance purposes.

Results from groundwater investigations and the ongoing quarterly groundwater monitoring program at the site indicate two primary areas of groundwater quality impacts. One area is characterized by a TCE plume that has been delineated in the shallow bedrock zone in the central portion of the site. The maximum TCE concentration is present in a monitoring well at a location immediately east of Building J, where the highest TCE concentration in 2005 was 23,000 micrograms per liter (ug/L). The TCE plume is believed to originate below the OCD facility in the area of Building G, where TCE was historically used as a secondary refrigerant in a lyophilizer, a unit used for freeze-drying to extend the shelf life of manufactured products. The TCE plume extends southward to the NJ Transit property and is delineated by monitoring wells at the JFK School property, located immediately south of NJ Transit and south of the OCD site. The groundwater remediation system initiated by OCD in 2004 has been successful in reducing TCE concentrations in monitoring wells. TCE has also been detected at an elevated concentration in one deep bedrock monitoring well at the site near the southern property boundary. A second area of groundwater quality impacts is located in the southwestern portion of the site in the area of the former 10,000-gallon waste solvent underground storage tank (UST). The 10,000-gallon waste solvent UST (SWMU-8) was removed in 1997, along with VOC-impacted soil that surrounded the former UST. The groundwater quality impacts in the southwestern portion of the site are localized and consist of persistent concentrations of benzene, TCE, tetrachloroethene (PCE), and vinyl chloride that exceed the NJDEP Class IIA Groundwater Quality Standards (GQS). The maximum VOC concentrations detected during 2005 in the southwestern portion of the site were 160 ug/L of benzene, 52 ug/L of vinyl chloride, 12 ug/L of TCE, and 4.1 ug/L of PCE.

References:

(1) 1993 Draft RCRA Facility Investigation Report. Prepared by Dames & Moore. Dated June 30, 1993.

(2) RCRA Facility Investigation Report. Prepared by Langan Engineering & Environmental Services, Inc. Dated May 2, 2001.

(3) Sampling Results for Industrial Well at 2 Johnson Drive. Report prepared by Langan Engineering & Environmental Services, Inc. Dated March 8, 2002.

(4) 2001 Annual Groundwater Monitoring Report. Prepared by Langan Engineering & Environmental Services, Inc. Dated June 3, 2002.

(5) 2002 Annual Groundwater Monitoring Report. Prepared by Langan Engineering & Environmental Services, Inc. Dated April 8, 2003.

(6) PDB Results for the April 2003 Groundwater Sampling Event. Report prepared by Langan Engineering & Environmental Services, Inc. Dated July 11, 2003.

(7) Enhanced Bioremediation Pilot Study Report and Full-Scale Design. Prepared by ARCADIS G&M, Inc. Dated July 21, 2003.

(8) Off-Site Groundwater Investigation Results for NJ Transit Property. Report prepared by Langan Engineering & Environmental Services, Inc. Dated December 30, 2003.

(9) 2003 Annual Groundwater Monitoring Report. Prepared by Langan Engineering & Environmental Services, Inc. Dated April 28, 2004.

(10) RCRA Facility Investigation Report Addendum. Prepared by Langan Engineering & Environmental Services, Inc. Dated October 13, 2004.

(11) 2004 Annual Groundwater Monitoring Report. Prepared by Langan Engineering & Environmental Services, Inc. Dated February 24, 2005.

(12) Report Addendum on Full-Scale Enhanced Reductive Dechlorination Activities. Prepared by ARCADIS. Dated February 2005.

(13) Off-Site Groundwater Investigation Results for the JFK School Property. Report prepared by Langan Engineering & Environmental Services, Inc. Dated October 20, 2005.

(14) 2005 Annual Groundwater Monitoring Report. Prepared by Langan Engineering & Environmental Services, Inc. Dated January 23, 2006.

(15) 2005 Report Addendum on Full-Scale Enhanced Reductive Dechlorination Activities. Prepared by ARCADIS. Dated March 2006.

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

	Yes	No	?	Rationale / Key Contaminants
Groundwater	**X**	___	___	TCE, benzene, vinyl chloride, PCE
Air (indoors) [2]	___	X	___	
Surface Soil (e.g., <2 ft)	**X**	___	___	PAHs (AOC-5, AOC-12, AOC-16) PCBs (AOC-16 Metals (AOC-16)
Surface Water	___	X	___	
Sediment	___	X	___	
Subsurf. Soil (e.g., >2 ft)	**X**	___	___	Lead (SWMU-11) Nickel (AOC-9)
Air (outdoors)	___	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 and Reference(s):

Groundwater

Groundwater conditions at the site have been described in the May 2, 2001 RFI Report (Ref. 2). Groundwater is encountered in two distinct zones within the bedrock (Passiac Formation) underlying the site. Because of the shallow depth to bedrock (3 to 15 feet), groundwater is not typically encountered in the thin overburden zone. The Passaic Formation is composed primarily of relatively impermeable materials, and derives its water-bearing properties mostly due to secondary porosity in the form of bedding plane fractures, near-vertical joints, and weathered zones within the formation. The first water-bearing zone occurs in the shallow weathered bedrock within a depth of approximately 40 feet. The depth to water in monitoring wells screened within this zone varies from 6 to 28 feet below grade. Monitoring wells screened within the shallow weathered bedrock zone have a characteristically low yield. Water level measurement data from the shallow bedrock zone are not contoured because the groundwater elevations are highly variable and non-uniform across the site. However, a general evaluation of the groundwater elevations in the shallow bedrock zone indicates a predominant hydraulic gradient toward the south. Other indicators that support the groundwater flow direction toward the south include the TCE plume configuration, the sloping topography toward the south, and the location of the major surface water body (Raritan River) south of the site.

The shallow water-bearing unit appears to be separated from a deeper water-bearing zone by more competent beds in the Passaic Formation as evidenced by a hydraulic head differential of approximately 40 feet between the two zones. The depth to water in monitoring wells screened in the deep bedrock zone ranges from 48 to 67 feet below

grade. The monitoring wells in the deep bedrock zone generally extend to depths of 75 to 100 feet. Where fractures are encountered, the deeper bedrock zone is characterized by a higher permeability than the shallower zone. Groundwater flow in the deep bedrock zone is toward the south-southeast, which is consistent with the apparent migration pattern of VOCs in groundwater toward the south-southeast along the bedrock strike. Investigations have shown that potentiometric surface elevations in certain deep bedrock monitoring wells at the OCD site are influenced by pumping at an industrial supply well located approximately 600 feet south of the OCD property boundary. The industrial supply well is located in the Raritan Industrial Park and the pumping of this well is believed to exert an influence on groundwater flow in the deep bedrock zone.

Groundwater usage in the vicinity of the OCD site has been investigated during various stages of the RFI. A detailed evaluation of groundwater usage concluded that there were no active domestic wells located within a half-mile distance downgradient of the site. The focused well search indicated that all residences were connected to the Elizabethtown Water Company's potable supply. No public supply wells exist within a one-mile radius of the site.

The groundwater quality at the site has been characterized in great detail from quarterly monitoring of existing monitoring wells over the past seven years, and additionally from a focused groundwater investigation during the RFI as summarized in the May 2, 2001 RFI Report (Ref. 2). VOC concentrations in the shallow bedrock zone represent the predominant groundwater issue of concern at the site. VOCs in groundwater within the deep bedrock zone are significantly lower in concentration and very limited in extent based on results from groundwater investigations and monitoring at the site (Ref.'s 2, 8, and 14).

The focused groundwater investigation completed by OCD during 1998 involved the installation and sampling of 27 temporary bedrock wells. The results of the 1998 groundwater investigation were effective in delineating a TCE plume in the shallow bedrock zone, and additionally in identifying a localized area of elevated chloroform concentrations. Three of the temporary bedrock wells were converted into permanent monitoring wells for subsequent monitoring. Chloroform concentrations in groundwater have attenuated significantly over the past several years, and chloroform is no longer an issue of concern, as all concentrations are either non-detectable or well below the NJDEP Class IIA Groundwater Quality Standards (GQS). The TCE plume in groundwater has persisted over the years, although remedial efforts initiated by OCD in 2004 have been very successful in reducing TCE concentrations in groundwater.

OCD has completed off-site groundwater investigations to evaluate the extent of TCE concentrations in groundwater as summarized in several reports to USEPA and NJDEP (Ref.'s 3, 8, and 13). TCE has been detected in off-site shallow bedrock monitoring wells south of OCD on the NJ Transit Property, at a distance approximately 320 feet downgradient from the southern OCD property boundary (Ref. 8). The off-site well locations are shown on Figure B-5 in Attachment B. Results from a 2005 investigation indicated no detections of TCE in monitoring wells on the JFK School property, which are located at distances approximately 600 feet from the OCD southern property boundary and south of NJ Transit (Ref. 13). Only trace concentrations of TCE have been detected in the off-site deep bedrock monitoring installed by OCD on the NJ Transit Property. TCE was detected at a relatively low concentration in the industrial supply well located southeast of OCD (Ref. 3), which is within proximity to other known off-site sources of TCE in the area.

As summarized in Attachment B and reported in the 2005 Annual Groundwater Monitoring Report, dated January 23, 2006 (Ref. 14), the predominant groundwater quality impacts are elevated concentrations of TCE in monitoring wells within the southern portion of the site. TCE was detected at concentrations exceeding the 1 ug/L NJDEP Class IIA GQS in 13 of the 20 monitoring wells sampled during the 2005 quarterly groundwater monitoring program as illustrated on Figure B-1 in Attachment B. TCE impacts are the most extensive in the shallow bedrock zone. The maximum TCE concentration (23,000 ug/L) in 2005 was detected in a source area monitoring well located immediately east of Building J. Along the centerline of the TCE plume within the shallow bedrock zone, concentrations of TCE in 2005 ranged from 1.8 ug/L to 120 ug/L at the southern property boundary, and from 33 to 37 ug/L at the NJ Transit property. The groundwater remediation system initiated by OCD in 2004 has been effective in reducing TCE concentrations at the site, including at the southern property boundary where TCE concentrations declined from 120 ug/L to 1.8 ug/L during 2005. Concentrations of TCE in one deep bedrock monitoring well near the southern property boundary ranged from 46 ug/L to 70 ug/L during 2005. A second area of more localized groundwater quality impacts exists in the southwestern portion of the site. The maximum VOC concentrations detected in this area of the site during 2005 were: 160 ug/L of benzene, 52 ug/L of vinyl chloride, 12

ug/L of TCE, and 4.1 ug/L of PCE. The distributions of TCE, benzene, vinyl chloride, and PCE in monitoring wells at the site over the past seven years are illustrated in Figures B-1 through B-4 in Attachment B.

The migration of VOCs in groundwater will be addressed in the Environmental Indicator CA750 evaluation, and the conceptual site model will be refined, as appropriate, as new information is obtained from the ongoing groundwater monitoring program at the site.

Indoor Air

The distribution of VOCs in groundwater was reviewed to evaluate the potential for vapor intrusion into on-site and off-site buildings. The extent of VOC concentrations in groundwater has been defined through investigative activities completed at the site and surrounding area. The predominant VOCs in groundwater are shown on Figures B-1 through B-5 in Attachment B. The most extensive VOC in groundwater is TCE, which extends from the area of Buildings G and J southward to the NJ Transit property. The only on-site buildings that have the potential for impact by vapor intrusion are Buildings G, J, and R as shown on Figure B-1. None of the other on-site buildings are in the pathway of the TCE plume. Buildings G and J are used for manufacturing purposes and workers in these buildings are trained in the use of chemicals which are used in the manufacturing processes. Building J has a full basement and Building G has a partial basement in the western portion. The eastern wall of the Building G basement is in alignment with the eastern wall of the Building J basement. Building R is used for storage and has no basement.

The monitoring well (MW-36) with the highest concentrations of TCE is located approximately ten feet east of Building J, as shown on Figure B-1 in Attachment B. The TCE in groundwater is believed to have originated below the basement of Building G in the area of a former lyophilizer in which TCE was used. The basement of Building G occupies an expansive open area with high ceilings that houses machinery and equipment. The Building G basement is not occupied continuously by workers, but rather only on an as-needed basis for the maintenance of equipment or as a transport route to access other portions of the facility. The eastern side of the Building J basement nearest to monitoring well MW-36 is occupied by several small laboratories, which are no longer in use with the exception of limited activities by one or two personnel approximately four times per month. One room along the eastern side of the Building J basement is also used on a limited basis (10 - 30% of the day) by maintenance personnel as a break room and for computer access. Building R does not support continuous occupancy because it is used solely for storage purposes.

As a conservative measure, OCD conducted indoor air sampling to assess the potential for vapor intrusion in the basements of Buildings G and J during 2001, and again in Building J during 2006. The indoor air sampling was conducted to ensure that TCE was below the protective guidelines set forth by the Occupational Safety & Health Administration (OSHA) for the occupational settings of Buildings G and J. As summarized in Attachment C, TCE was not detected in any of the indoor air samples at concentrations exceeding the referenced reporting limits, which were all well below the OSHA Permissible Exposure Levels (PELs).

The potential for vapor intrusion associated with the off-site TCE plume was also evaluated and summarized in the October 20, 2005 report, entitled `Off-Site Groundwater Investigation Results for the JFK School Property' (Ref. 13). The 2005 off-site investigation concluded that the off-site TCE plume poses no vapor intrusion risk to the JFK School because: (1) the results of the August 2004 soil gas sampling conducted by OCD at locations adjacent to MW-39 on the NJ Transit Property did not identify TCE or its degradation products in any soil gas samples (Ref. 10); (2) results from the groundwater investigation completed at the JFK School property did not identify TCE or its degradation products in any groundwater samples; and (3) the nearest building of the JFK School is equipped with a vapor barrier that would prevent organic vapors, if present, from entering the building interior.

Surface Soil

AOC-5 Two 20,000-Gallon No. 6 and One 5,000-Gallon No. 2 Fuel Oil USTs

Soil sampling was recently performed in June 2006 to characterize the quality of backfill that was placed into the UST excavation. The soil sampling at AOC-5 identified one sample with PAHs concentrations slightly above the most stringent NJDEP Soil Cleanup Criteria (SCC). The following PAHs were detected at the 0 to 0.5 foot depth interval in soil at AOC-5: benzo(a)anthracene (0.994 mg/kg), benzo(a)pyrene (1.25 mg/kg), benzo(b)fluoranthene (1.62 mg/kg), and benzo(k)fluoroanthene (1.19 mg/kg). PAH concentrations in shallow soil (0 to 0.5 feet) at three

adjacent soil sample locations were all below the NJDEP SCC, so the PAH exceedance at AOC 5 appears to be localized. The soil sampling location and results for the soil sample from AOC-5 are provided in Attachment D.

AOC-12 Building D Floor Drain
A soil sample was collected at the East Outfall (Outfall 001) in April 1997 to investigate the discharge point of the Building D Floor Drains. The investigation results were provided in the May 2, 2001 RFI Report (Ref. 2) and the soil sampling location and results are provided in Attachment D. The soil sample collected from the 0 to 0.5 foot depth at the outfall had the following PAHs at concentrations slightly exceeding the NJDEP SCC: benzo(a)anthracene (1.60 mg/kg), benzo(a)pyrene (1.3 mg/kg), and benzo(b)fluoranthene (1.7 mg/kg). The outfall is located adjacent to the southern property boundary and also receives stormwater runoff from the parking lot. The fence at the AOC-12 soil sample location limits access to the area where the low concentrations of PAHs were detected.

AOC-16 Soil in Building B Basement
Soil sampling was conducted during 2006 to characterize the quality of soil in a crawl space below Building B, which was previously used for the storage of old equipment. Results from soil samples collected from the 0 to 0.5 foot depth interval below Building B indicate the presence of several constituents at concentrations exceeding the NJDEP SCC. The following constituents exceeded the most stringent NJDEP SCC: PCBs at 9 locations (concentration range of 0.526 mg/kg to 2.735 mg/kg), lead at 6 locations (concentration range of 1,130 mg/kg to 11,800 mg/kg), mercury at 3 locations (concentration range of 22.5 mg/kg to 55.7 mg/kg), antimony at one location (30.6 mg/kg), beryllium at one location (2.1 mg/kg), and PAHs at one location (individual PAH concentrations ranging from 0.716 mg/kg to 5.37 mg/kg). Access to the crawl space below Building B is generally limited to facility maintenance personnel. OCD is developing a policy to educate and protect maintenance workers in Building B from potential exposure for the limited occasions that the crawl space is accessed for maintenance purposes. The soil sampling locations and results are provided in Attachment D, and will be presented in a forthcoming report submission to USEPA and NJDEP.

Surface Water

There are no surface water bodies on the OCD site and no risk of discharge of VOC-impacted groundwater to surface water bodies in the area downgradient of the OCD site.

Sediment

Sediment sampling was conducted during 1990 at several locations along the drainage ditch that runs southward from US Route 202 to the southern property boundary within the western portion of the site (Ref. 1). Results of the sampling did not identify any constituents at concentrations exceeding the Residential NJDEP SCC.

Subsurface Soil

SWMU 7 10,000-Gallon Underground Waste MethanolTank
Soil sampling was recently performed in 2006 to characterize the backfill that was placed into the UST excavation. Results from the sampling identified the presence of beryllium in soil at a depth of 4 to 4.5 feet below grade at a concentration (3 mg/kg) exceeding the most stringent NJDEP SCC. Beryllium occurs naturally at comparable concentrations in the soil and bedrock underlying the site. The soil sampling location and result is provided in Attachment D, and will be presented in a forthcoming report submission to USEPA and NJDEP.

SWMU 11 Seven 20,000-Gallon No. 6 Fuel Oil USTs
Soil sampling was performed in June 2006 to characterize the backfill that was placed into the UST excavations. Results from the sampling identified the presence of lead in soil at a depth of 7 to 7.5 feet below grade at a concentration (1,160 mg/kg) exceeding the most stringent NJDEP SCC. The soil sampling location and result is provided in Attachment D, and will be presented in a forthcoming report submission to USEPA and NJDEP.

AOC 9 Three Waste Solvent USTs
Soil sampling was performed in 2004 to characterize the backfill that was placed into the UST excavation. The sampling is detailed in the October 13, 2004 RFI Report Addendum. Results from the sampling identified the

presence of nickel in soil at a depth of 7 to 7.5 feet below the paved parking lot at a concentration (425 mg/kg) exceeding the most stringent NJDEP SCC. The soil sampling location and result is provided in Attachment D.

Outdoor Air

Outdoor air quality has not been investigated as there are no known or reasonably suspected concerns with respect to the quality of outdoor air.

Footnotes:

[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.

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

Summary Exposure Pathway Evaluation Table

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

Instructions for Summary Exposure Pathway Evaluation Table:

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

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

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

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

__X__ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination) - continue after providing supporting explanation.

_____ If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

Groundwater

Although groundwater quality impacts are present at the OCD site, a complete pathway for human exposure does not exist based on the results of investigative work completed at the site to date. VOC-impacted groundwater does not represent a risk to residential receptors for several reasons. First, the site is used solely for industrial purposes and there is no residential usage within the site boundaries. Second, a detailed evaluation of groundwater usage concluded that there were no active domestic wells located within a half-mile distance downgradient of the site. The focused well search indicated that all residences were connected to the Elizabethtown Water Company's supply. In addition, there are no public-supply wells within a one-mile radius of the site. There are also no known discharges of impacted groundwater to surface water. Furthermore, the VOC plumes in groundwater have been delineated and there are no residences within proximity to the VOC plumes. Consequently, there is no known or reasonably suspected risk of vapor intrusion to residential receptors.

Investigative results obtained to date show no complete exposure pathways to workers. Groundwater is not used for potable purposes at the OCD facility and there are no active production wells at the site. TCE-impacted groundwater is encountered at depths of 10 to 17 feet below grade, and VOC-impacted groundwater is typically encountered at depths greater than 6 feet below grade in the southwestern portion of the site. Vapor intrusion in Buildings G and J from the nearby TCE plume represents a potential route of worker exposure. However, results from indoor air sampling conducted by OCD in the basements of Buildings G and J during 2001 did not identify any measurable TCE concentrations, and TCE concentrations in groundwater have declined since 2001.

There are no day-care facilities at the OCD site or in the vicinity of the off-site portion of the plume. As a result, there is no exposure pathway to day-care facilities.

As referenced under Item 2, the potential for vapor intrusion concerns at the JFK School property from the TCE plume was evaluated and determined to be non-existent because: (1) the results of the August 2004 soil gas sampling conducted by OCD at locations adjacent to MW-39 on the NJ Transit Property did not identify TCE or its degradation products in any soil gas samples (Ref. 10); (2) results from the groundwater investigation completed at the JFK School property did not identify TCE or its degradation products in any groundwater samples; and (3) the nearest building of the JFK School is equipped with a vapor barrier that would prevent organic vapors, if present, from entering the building interior.

The potential risk to construction workers from VOC-impacted groundwater is considered to be low as a result of the depth to groundwater. The depth to groundwater within the area of the TCE plume ranges from 10 to 17 feet below grade, so the potential for exposure during normal construction activities is considered to be very low. The shallowest known VOC-impacted groundwater occurs in a relatively localized area within the southwest parking lot, where the depth to water ranged from approximately 6.5 to 9 feet below grade during 2005. As reported in the May 2, 2001 RFI Report (Ref. 2), groundwater was not encountered in this portion of the site (SWMU-8) during the advancement of seven shallow direct-push borings, which encountered refusal at depths of 3 to 9 feet below grade. Consequently, the potential for exposure to construction workers from impacted groundwater at the site and off-site is unlikely. The depth to water along the centerline of the TCE in the off-site area (NJ Transit) ranged from 15 to 17 feet below grade.

There are no known exposure pathways to trespassers, recreational usage, or food associated with the groundwater quality impacts at the site and nearby off-site area.

Surface Soil

As referenced in Item 2, surface soil quality impacts (0 to 2 feet) were identified at the following three areas:

AOC-5	PAHs (1 location)	
	benzo(a)anthracene	0.994 mg/kg
	benzo(a)pyrene	1.25 mg/kg
	benzo(b)fluoranthene	1.62 mg/kg
	benzo(k)fluoroanthene	1.19 mg/kg
AOC-12	PAHs (1 location)	
	benzo(a)anthracene	1.6 mg/kg
	benzo(a)pyrene	1.3 mg/kg
	benzo(b)fluoranthene	1.7 mg/kg

AOC-16 PCBs (9 locations)
Total PCBs ranging from 0.526 mg/kg to 2.735 mg/kg

Lead (6 locations)
1,130 mg/kg to 11,800 mg/kg

Mercury (3 locations)
22.5 mg/kg to 55.7 mg/kg

Antimony (1 location)
30.6 mg/kg

Beryllium (1 location
2.1 mg/kg

PAHs (1 location)
6 PAHs ranging from 0.716 mg/kg to 5.37 mg/kg

The potential exposure route from impacted surface soil to residents is incomplete because the OCD facility is an industrial facility and there is no residential usage at the site or in the vicinity of the surface soil quality impacts.

The relatively low PAH concentrations in surface soil at AOC-5 and AOC-12 represent a low risk to workers because the magnitude of the PAH concentrations is very low and the locations of the PAH-impacted soil are not readily accessible. A fence exists at the southern OCD property boundary, which prevents access to the outfall where the soil sample was collected from AOC-12. Although the location of soil sample AOC-5 on the eastern side of the facility is in a more accessible area, the PAHs in soil are limited in extent and relatively low in concentration. The PAH concentrations in soil at AOC-5 and AOC-12 are significantly lower than what would be expected in any asphalt road surface or parking lot, which contain high concentrations of PAHs. As a result, the potential risk to workers from the PAHs in surface soil at AOCs 5 and 12 is considered negligible.

The elevated concentrations of PCBs, metals, and PAHs in surface soil in the crawl space below Building B represent a potential risk to workers. However, there is no continuous occupancy of this area by workers and access to this portion of the site is limited to a small number of workers for maintenance purposes in relatively short durations of time. Furthermore, sampling results indicate that the PCB concentrations in soil are less than the NJDEP Non-Residential SCC, with the exception of one location where PCB concentrations were marginally above the NJDEP Non-Residential SCC. The elevated mercury concentrations in soil are limited to three isolated locations, and the concentrations are all less than the NJDEP Non-Residential SCC. In addition, the entire crawl space below Building B was field screened with a Jerome 431-X Mercury Vapor Analyzer and all readings were below the 0.1 mg/m^3 Occupational Safety & Health Administration (OSHA) Permissible Exposure Limit (PEL). Lead concentrations in soil exceed the NJDEP Non-Residential SCC at 6 locations in the crawl space below Building B. The elevated PAH concentrations are limited to only one location and three of the six individual PAHs are below the NJDEP Residential and Non-Residential SCC. The isolated detection of beryllium (2.1 mg/kg) in soil marginally exceeds the 2 mg/kg NJDEP Residential and Non-Residential SCC, but is believed to be naturally occurring. Although lead and several PAHs exist in surface soil below Building B at concentrations exceeding the NJDEP Non-Residential SCC, the potential risk to workers is considered to be low because the area is accessed on a limited basis only. OCD is developing a policy to educate and protect maintenance workers in Building B from potential exposure for the limited occasions that the crawl space is accessed for maintenance purposes.

There are no day-care facilities at the OCD site so there is no exposure pathway from the surface soil impacts to day-care facilities.

The only realistic potential exposure pathway from surface soil impacts to construction workers would be at AOC-5 in the eastern portion of the facility. However, as previously referenced, the PAHs in soil are limited in extent and relatively low in concentration. Any asphalt road surface or parking lot would have significantly higher PAH concentrations than what was detected in the soil at AOC-5. As a result, the potential risk to construction workers from the PAHs in surface soil at AOCs-5 is considered negligible. The soil impacts at AOC-12 (Building D outfall) and AOC-16 (Building B Basement) are not in an area where construction activities are likely to occur. The OCD environmental engineering manager is notified of all construction activities prior to initiation to ensure that the potential for environmental risks is minimized.

The potential exposure pathway from impacted surface soil to trespassers is very unlikely because the OCD site has security measures in place that would reduce the likelihood of trespassers. The security measures include a chain-link fence, surveillance cameras, and ongoing surveillance by security guards.

There are no known exposure pathways from the three areas of surface soil impacts to recreational usage or food. None of three surface soil impact areas are in proximity to recreational usage or areas where exposure to food could potentially occur.

Subsurface Soil

As referenced in Item 2, subsurface soil quality impacts (> 2 feet) are limited to three areas, each with an isolated metal detection at a concentration exceeding the most stringent NJDEP SCC:

SWMU-7	Beryllium	3 mg/kg (4 to 4.5 feet)
SWMU-11	Lead	1,160 mg/kg (7 to 7.5 feet)
AOC-9	Antimony	425 mg/kg (7 to 7.5 feet)

A potential exposure pathway exists between subsurface soil impacts and construction workers. As previously noted, beryllium occurs naturally at concentrations comparable to that which was detected in soil at SWMU-7. The depths of the lead and antimony impacts (7 to 7.5 feet) are relatively deep and there are no construction activities planned by OCD in these areas in the foreseeable future. Consequently, the potential for exposure to construction workers is considered to be low. Furthermore, the metals concentrations at each of these locations will be addressed by OCD during the RCRA Corrective Action program. There are no known exposure pathways from the three areas of subsurface soil impacts to food as the metals concentrations exist at a depth of four to seven feet below grade and are not in proximity areas where exposure to food could potentially occur. As an added measure of protection, the OCD environmental engineering manager is notified of all construction activities prior to initiation to ensure that the potential for environmental risks is minimized.

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

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)?

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

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

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

Rationale:

The evaluation of exposure pathways presented in Item 3 indicates the following potentially complete exposure pathways:

- Impacted Surface Soil to Workers
- Impacted Surface Soil to Construction Workers
- Impacted Subsurface Soil to Construction Workers

As described in Item 3, none of the potentially complete exposure pathways referenced above are considered to be "significant" as defined in the Environmental Indicator CA 725 guidance.

Impacted Surface Soil to Workers

A potential complete exposure pathway to workers exists for the soil impacts (PCBs, lead, mercury, antimony, beryllium, PAHs) in the crawl space below Building B. However, as previously described under Item 3, there is no continuous occupancy of this area by workers and access to this portion of the site is limited to a small number of workers for maintenance purposes for relatively short durations of time. The mercury, antimony, and all but one of the PCB concentrations are below the NJDEP Non-Residential SCC. The entire crawl space below Building B was field screened with a Jerome 431-X Mercury Vapor Analyzer and all readings were below the 0.1 mg/m^3 OSHA PEL. Potential worker exposure to the soil quality impacts in soil below Building B is not considered to be a significant exposure pathway. Furthermore, OCD is developing a policy to educate and protect maintenance workers in Building B from potential exposure for the limited occasions that the crawl space is accessed for maintenance purposes.

Impacted Surface Soil to Construction Workers

The only realistic potential exposure pathway from surface soil impacts to construction workers would be at AOC-5 in the eastern portion of the facility. However, as previously referenced, the PAHs in soil are limited in extent and relatively low in concentration. Any asphalt road surface or parking lot would have significantly higher PAH concentrations than what was detected in the soil at AOC-5. As a result, the potential risk to construction workers from the PAHs in surface soil at AOCs-5 is not considered to be a significant exposure pathway.

Impacted Subsurface Soil to Construction Workers

The isolated concentration of beryllium in subsurface soil at SWMU-7 is believed to be naturally occurring. The lead concentration in subsurface soil at SWMU-11 and antimony in subsurface soil at AOC-9 do not represent a significant exposure route to construction workers for the following reasons: 1) there are no construction activities planned by OCD in these areas in the foreseeable future; 2) the metals concentrations appear to be localized in nature; and 3) the metals concentrations at each of these locations will be addressed by OCD during the RCRA Corrective Action program. As an added measure of protection, the OCD environmental engineering manager is notified of all construction activities prior to initiation to ensure that the potential for environmental risks is minimized.

[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 to the OCD site as no exposures were determined to be significant as discussed in Item 4.

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

__X__ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the **Ortho-Clinical Diagnostics** facility, EPA ID # **NJD068715424**, located at **1001 US Route 202, Raritan, 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: _____

Richard P. LoCastro
Project Manager

Reviewed/modified by: _____ Date:_____

Clifford Ng, RPM
RCRA Programs Branch
US EPA Region 2

_____ Date:_____

Barry Tornick, New Jersey Section Chief
RCRA Programs Branch
US EPA Region 2

Approved by: Signed:_____ Date: 9/29/2007

Adolph Everett, Chief
RCRA Programs Branch
US EPA 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 U.S. EPA, Region 2.

Contact telephone numbers and e-mail: Clifford Ng
(212) 637-4113
ng.clifford@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.

List of Attachments