DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Facility Name: **IBM Corporation**
Facility Address: **431 Ridge Road, Dayton, New Jersey 08810**
Facility EPA ID#: **NJD002177210**

Definition of Environmental Indicators (for the RCRA Corrective Action)

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

Definition of "Current Human Exposures Under Control" EI

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

Relationship of EI to Final Remedies

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

Duration / Applicability of EI Determinations

EI determination status codes should remain in the Resource Conservation and Recovery Information System (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 Information

The former IBM facility is located on a 66-acre parcel in a mixed residential and industrial section of South Brunswick Township, Middlesex County, New Jersey. The facility is bordered to the south by

New Jersey Railroad and Canal Co. rail lines, to the north by Monmouth Junction Road, and to the east by Culver and Ridge Roads. Residential homes are located along Monmouth Junction Road and on the opposite side of the railroad tracks. Numerous commercial properties are also present in the immediate area. The facility was purchased in the mid-1990s by Hamlin/Shidler Investment Corporation, but current property ownership and usage are unknown.

IBM's manufacturing plant was constructed in 1956 and used until 1985 for manufacturing of computer tabulation cards, printer ribbons, and other information handling machine products. These manufacturing operations, and repair and servicing functions after manufacturing activity ceased, were conducted in Building 1. Chlorinated solvents—including 1,1,1-trichloroethane (TCA), tetrachloroethylene (PCE), 1,1-dichloroethylene (1,1-DCE), and trichloroethylene (TCE)—were used at the facility, especially for punch card and ink operations. Bulk solvents were stored in a drum storage pad east of Building 1, underground storage tanks (USTs), and transfer lines along the western side of Building 1. Building 2 was primarily used for support laboratories and administrative functions. Building 3 was always used exclusively as an administrative building. A historical map of the site is provided as Figure 2 from a NJDEP Memorandum on the SI Summary Report dated October 10, 1995.

In 1977, elevated levels of site-related chlorinated volatile organic compounds (VOCs) were detected in the South Brunswick Township (SBT) supply well SB-11, located approximately 2,000 feet east of the site. To mitigate further leakage, the presumed sources (the Building 1 USTs and transfer lines) were removed in the late 1970s, and no VOCs were found in soil during later investigation efforts. To address groundwater contamination, an Administrative Consent Order (ACO) was executed between the New Jersey Department of Environmental Protection (NJDEP) and IBM on May 15, 1980. The ACO required IBM to install and operate an on-site groundwater treatment system to collect and treat impacted groundwater. This Phase I system was operational from 1978 to 1984 and resulted in decreasing contaminant concentrations levels in both the shallow Old Bridge aquifer and the deep Farrington Aquifer. In 1984, on-site groundwater treatment operations were discontinued, and IBM installed a water treatment system in SBT supply well SB-11 to more directly address residual contamination. A second phase of on-site groundwater treatment was initiated in 1989 after groundwater quality in the shallow aquifer began to show rebounding contaminant concentrations. The Phase II system consists of four on-site extraction wells, treatment in an air stripping unit, and disposal via an on-site spray irrigation field. In October 1996, IBM submitted a report to demonstrate the technical impracticability of cleaning up DNAPL source material remaining beneath the IBM Dayton site. The report also delineated the extent of the area projected to exceed groundwater quality standards in support of establishing a Classification Exception Area (CEA) for the Old Bridge and Farrington aquifers. Available file material indicates that this proposal was accepted by NJDEP. Thus, remaining groundwater efforts are focused on remediation and monitoring of dissolved phased contamination. Phase II groundwater treatment and monitoring operations are ongoing to reduce dissolved-phase contamination at the site perimeter and prevent site-related contamination from reaching SBT supply well SB-13. A proposal to revise the areal extent of the CEA to include on-site areas and only a small off-site area around well SB-23 was submitted to NJDEP in June 1999, but the status of this proposal could not be determined from available file material.

NJDEP and IBM signed a remediation agreement (RA) under the Industrial Site Recovery Act (ISRA) in anticipation of IBM's sale of the Dayton property in 1994. Pursuant to the RA, IBM completed a Site Investigation (SI) and Remedial Investigation (RI) between 1994 and 1996. A total of 18 soil-based areas of concern (AOCs) were identified during these efforts. A limited area of soil contaminated by polynuclear aromatic hydrocarbons (PAHs) at AOC 10 was excavated in the mid-1990s. Confirmation sampling indicated that residual concentrations did not exceed NJDEP soil cleanup criteria. Based on these data and the RI results, IBM determined that no further action was necessary to address soil quality at the Dayton facility. Consequently, ongoing corrective action focuses primarily on groundwater.

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from solid waste management units (SWMUs), regulated units (RUs), and areas of concern (AOCs)), been **considered** in this EI determination?

   _X_ If yes - check here and continue with #2 below.

   ____ If no - re-evaluate existing data, or

   ____ If data are not available skip to #6 and enter IN (more information needed) status Code

RCRA-Regulated Units

In 1980, IBM submitted a RCRA Part A permit application for the Chemical Storage Building and three hazardous waste storage tanks. The Chemical Storage Building was constructed in 1978 as a fully enclosed, corrugated steel building with a sloped concrete floor. The three tanks were constructed in 1979 with secondary containment, including concrete vaults. The storage building and three tanks were used for storage of small quantities of spent solvents and spill containment. In 1985, IBM decided to discontinue operations at the Dayton facility and requested that the facility's interim status be terminated. IBM submitted a closure plan for the RCRA-regulated units and received final NJDEP approval for closure in July 1988. Bulk hazardous wastes were removed from the site, and the Chemical Storage Building was decommissioned under NJDEP oversight. Soil samples collected from the area confirmed that there had been no releases (Ref. 10). The three tanks were excavated, along with surrounding soil containing minor levels of contamination, and properly disposed off site. Confirmation soil sampling again demonstrated no residual contamination in soil (Ref. 10). RCRA closure of these units was completed in February 1989 (Ref. 2) and approved by NJDEP on March 12, 1991 (Ref. 1). Post-closure care was not required for these units.

Soil-Based AOCs Identified During the SI and RI

As stated previously, 18 soil-based AOCs were identified at the former IBM Dayton facility in the mid-1990s. Each of these areas is listed in Table 1 below. A SWMU map was not found in the available file material, but several of the referenced site features are shown on Figure 2 from the April 2005 Vapor Intrusion Monitoring Report (Ref. 8). As a condition of the property sales agreement between IBM and Hamlin/Shidler, nonresidential soil cleanup criteria were used in evaluating the need for further action at the various soil-based AOCs (Ref. 4).

Table 1. Soil-Based AOCs at the former IBM Dayton Facility

AOC	Description	Status Upon Completion of RI
1	5,000-gallon UST U-4 used to store ethanol. Removed in 1982. No contamination reported above applicable New Jersey Non-Residential Direct Contact Soil Cleanup Criteria (NJ NRDCSCC).	No further action
2	Two 750-gallon USTs used to store ethanol or TCA. Removed in the late-1970s. No contamination reported above applicable NJ NRDCSCC.	No further action
3	5,000-gallon UST U-7 used to store waste acid. Removed in the late-1970s. Elevated cadmium levels attributed to background. No other contamination reported above applicable NJ NRDCSCC.	No further action
4	550-gallon UST U-16 that received wastewater from the ball mill floor drain in the early 1980s. Elevated cadmium levels attributed to background. No other contamination reported above applicable NJ NRDCSCC.	No further action
5	5,000-gallon UST U-17 used for storage of heating oil. No contamination reported above applicable NJ NRDCSCC.	No further action
6	Surface impoundment and emergency fire reservoir. Previously used to aerate TCA-contaminated groundwater. No contamination reported above applicable NJ NRDCSCC.	No further action
7	Drainage swale that accepted discharges from an IBM incinerator operated between 1969 and 1982. Elevated cadmium levels attributed to background. No other contamination reported above applicable NJ NRDCSCC.	No further action
8	Drainage swale that accepted stormwater runoff from Building 1. Elevated cadmium levels attributed to background. No other contamination reported above applicable NJ NRDCSCC.	No further action
9	Drainage swale that accepted boiler blowdown from Building 1. De minimis benzo(a)pyrene contamination identified. No other contamination reported above applicable NJ NRDCSCC.	No further action
10	Drainage swale that accepted runoff from the roof of Building 2. Laboratory hoods vented to the roof. PAH-contaminated soils excavated. Confirmation sampling indicated compliance with NJ NRDCSCC.	No further action
11	Drainage swale used for electrical/generator substation runoff. No contamination reported above applicable NJ NRDCSCC.	No further action
12	Septic system that accepted wastewater from Building 1 until 1966. Elevated cadmium levels attributed to background. No other contamination reported above applicable NJ NRDCSCC.	No further action
13	Dry Well A. Received discharges from a former drum storage pad in the 1970s. No contamination reported above applicable NJ NRDCSCC.	No further action
14	Dry Well B. Received discharges from a dye room throughout the 1970s. No contamination reported above applicable NJ NRDCSCC.	No further action
15	Dry Well C. Received discharges from a tinting room in the 1970s. No contamination reported above applicable NJ NRDCSCC.	No further action
16	Dry Well D. Accepted discharges from a plating/etching room in the 1970s. Elevated cadmium levels attributed to background. No other contamination reported above applicable NJ NRDCSCC.	No further action
17	Dry Well E. Used between 1966 and 1985 to receive wash water from steam cleaning operations. Elevated cadmium levels attributed to background. No other contamination reported above applicable NJ NRDCSCC.	No further action
18	Soil piles associated with on-site landscaping activities. De minimis beryllium contamination identified. Elevated cadmium levels attributed to background. No other contamination reported above applicable NJ NRDCSCC.	No further action

Source: References 2 through 5

On-Site and Off-Site Groundwater Contamination

As stated previously, elevated levels of chlorinated VOCs were detected in SBT supply well SB-11 in 1977. Investigation of the former IBM property and off-site areas indicated the presence of DNAPL and dissolved-phase contamination in shallow and deep groundwater. This contamination is believed to be associated with leakage from USTs and transfer lines formerly present at the southwestern corner of Building 1 (Ref. 9). A Phase I groundwater treatment system was operational from 1978 to 1984 and resulted in decreasing contaminant concentrations levels in both the shallow Old Bridge aquifer and the deep Farrington Aquifer. A second phase of on-site groundwater treatment was initiated in 1989 after groundwater quality in the shallow aquifer began to show rebounding contaminant concentrations (Ref. 9). The Phase II system consists of four on-site extraction wells, treatment in an air stripping unit, and disposal via an on-site spray irrigation field. In October 1996, IBM submitted a report to demonstrate the technical impracticability of cleaning up DNAPL source material remaining beneath the IBM Dayton site; available file material indicates that this proposal was accepted by NJDEP (Ref. 7).

References:

1. Letter from Thomas Sherman, NJDEP, to Karen Majchrzak, IBM, re: Delisting of IBM Corporation from Treatment, Storage, and Disposal Status to Generator Only Status. Dated March 12, 1991.
2. Memorandum from Yang Cao, NJDEP, to Bruce Venner, NJDEP, re: IBM Case Transfer. Dated January 12, 1995.
3. Memorandum from Andrew Marinucci, NJDEP, to Carol Graubart, NJDEP, re: RI Report. Dated October 19, 1995.
4. Memorandum from Andrew Marinucci, NJDEP, to Carol Graubart, NJDEP, re: RI Report. Dated January 26, 1996.
5. Letter from Carol Graubart, NJDEP, to Karen Majchrzak, IBM, re: SI Summary Report and RI Summary Report. Dated March 15, 1996.
6. Memorandum from Frank McLaughlin, NJDEP, to Carol Graubart, NJDEP, re: RI Addendum Summary Report. Dated February 28, 1997.
7. Memorandum from Frank McLaughlin, NJDEP, to Carol Graubart, NJDEP, re: Demonstration of Technical Impracticability and Delineation of CEAs. Dated April 10, 1997.
8. Vapor Intrusion Monitoring Report for 431 Ridge Road, South Brunswick, New Jersey. Prepared by the Whitman Companies, Inc. Dated April 2005.
9. Memorandum from Laurie Whitesell, NJDEP, to Thomas Grzymski, NJDEP, re: IBM Corporation (Site Summary and Groundwater Data). Dated August 18, 2005.
10. Letter from Michael Kominek, IBM, to Barry Tornick, USEPA, re: Environmental Indicators. Dated June 1, 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)?

Media	Yes	No	?	Rationale/Key Contaminants
Groundwater	X			1,1-DCE, PCE, TCA, and TCE
Air (indoors)[2]		X		
Surface Soil (e.g., <2 ft) and Subsurface Soil (e.g., >2ft)		X		
Surface Water		X		
Sediment		X		
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

Hydrogeological Background

The former IBM Dayton facility is located in the New Jersey Coastal Plain Physiographic Province, which contains important water supply aquifers. The sands and gravels of the Pennsauken Formation and the Old Bridge Sand Member of the Magothy Formation average 50 to 60 feet thick at the site, forming the shallow aquifer. The water table is encountered at depths between 30 and 35 feet below ground surface (bgs), with flow generally to the east at an estimated velocity of 3 to 4 feet per day. Groundwater flow near the suspected DNAPL source area is generally to the northwest. The underlying Woodbridge Clay Member of the Magothy Formation averages a few feet thick in the area, but is discontinuous across

[1] "Contamination" and "contaminated" describe 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 Department 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.

the site and absent near SBT supply well SB-11. Where present, this clay layer acts as a leaky aquitard, impeding vertical groundwater flow (Ref. 8). However, a vertical downward head is present in the Old Bridge unit, where it recharges the deeper Farrington Sand Aquifer in the site vicinity. This deep aquifer is used locally for the SBT water supply. Groundwater flow in the Farrington Aquifer is also generally eastward, but withdrawal from nearby wells influences groundwater flow in both aquifers, as indicated by shallow and deep groundwater well location and contour maps presented in the November 2005 Sampling Event Groundwater Monitoring Report (Ref. 9). Weathered, red shale bedrock of the Passaic Formation is located beneath the deep aquifer at depths greater than 110 feet bgs.

Groundwater Quality

The plume of contamination in the Old Bridge Aquifer consists primarily of TCA and PCE, with lower concentrations of TCE and 1,1-DCE. The Phase I extraction system resulted in widespread improvement in groundwater quality in the shallow groundwater. PCE isopleth maps from 1978 indicated an extensive area of contamination originating from the west side of Building 1 in the vicinity of the former solvent USTs and Dry Wells B and D (Ref. 8). Currently, the bulk of shallow groundwater contamination is centered around monitoring well GW-06 in the historical source area.

Groundwater quality in the Farrington Aquifer has improved with continued operation of the groundwater extraction and treatment systems, specifically at well SB-11. Whereas the deep groundwater solvent plume of contamination extended off site to the north in 1978, the plume footprint has been largely reduced to the vicinity of monitoring well GW-18B, which is located just inside the northern property boundary northeast of the shallow groundwater source area (Ref. 8). Contaminant levels in the SBT supply well (SB-11) have also decreased by over an order of magnitude since treatment was initiated in 1978 and are now approaching applicable drinking water and groundwater quality standards (Ref. 8).

IBM conducts quarterly monitoring of VOC concentrations in both the shallow and deep aquifers at the former Dayton facility and off-site areas to the north and east. The most recent sampling round for which data are available was conducted in November 2005. Table 2 below presents the maximum reported VOC concentrations exceeding applicable New Jersey Groundwater Quality Criteria (NJ GWQC) during this round, but results from that round were only reported for TCA and PCE. Maximum concentrations of these and other VOCs exceeding applicable NJ GWQC in May 2005 are presented in Table 3.

Table 2. Maximum Contaminant Concentrations Reported in Groundwater During the November 2005 Sampling Event (reported in µg/L)

Constituent	NJ GWQC	On-Site Maximum		Off-Site Maximum	
		Concentration	Well	Concentration	Well
Shallow Old Bridge Aquifer					
PCE	1	162	GW-06	1.95	CCS
TCA	30	294	GW-06	ND	---
Deep Farrington Aquifer					
PCE	1	63.7	GW-18B	33.2	JJD

ND: Constituent not detected
Source: Reference 9

Table 3. Maximum Contaminant Concentrations Reported in Groundwater During the May 2005 Sampling Event (reported in µg/L)

Constituent	NJ GWQC	On-Site Maximum		Off-Site Maximum	
		Concentration	Well	Concentration	Well
Shallow Old Bridge Aquifer					
1,1-DCE	1	328	GW-06	NE	---
PCE	1	168	GW-06	1.74	CCS
TCA	30	174	MW-32R	ND	---
Deep Farrington Aquifer					
1,1-DCE	1	49.2	GW-18B	13.3	JJD
PCE	1	79.6	GW-18B	45.7	BBD
TCE	1	1.33	GW-18B	ND	---

ND: Constituent not detected; NE: Constituents not detected above applicable NJ GWQC levels
Source: Reference 8

The record file does not specifically outline concentrations of semi-volatile organic compounds or metals in groundwater at the IBM Dayton facility, but NJDEP does not require ongoing groundwater monitoring for these constituents. In a letter to the facility dated January 19, 2000 (Ref. 4), NJDEP specifically indicated that relaxation of the monitoring requirements is appropriate because groundwater contamination and source areas are well characterized by the extensive set of groundwater data collected over the past 21 years. Current groundwater monitoring parameters include the key chlorinated solvents (identified in Tables 2 and 3 above), pH, and specific conductance. Consequently, only these contaminants will be considered further in this EI determination.

Air (Indoors)

An air quality assessment was completed at the former IBM Dayton facility in April 2005 to evaluate potential vapor intrusion associated with VOCs in underlying shallow groundwater (Ref. 7). Indoor air sampling was conducted at office spaces within Building 1 (a two-story cinderblock building surrounded by paved areas) and the associated Butler Building chemical storage warehouse. These locations were selected based on their locations relative to well GW-06, where the most significant shallow groundwater contamination has been reported. It is expected that results collected in this area represent worst-case indoor air quality concerns. As shown on Figure 2 from the Vapor Intrusion Monitoring Report (Ref. 7), five indoor air samples were collected from the offices, and one sample was collected from the warehouse area.

Vapor intrusion monitoring results indicate that air quality in the office building is acceptable, as all contaminant concentrations were well below NJDEP residential indoor air screening levels. These results indicate that indoor air quality at the former IBM Dayton facility and the surrounding area is acceptable and is not adversely affected by potential vapor intrusion from underlying shallow groundwater. The Vapor Intrusion Monitoring Report (Ref. 7) also concluded that there were no significant worker safety issues associated with exposure to hazardous VOCs in indoor air.

Surface/Subsurface Soil

As indicated in the response to Question 1, NJDEP determined that no further action was necessary to address surface or subsurface soil quality at the Dayton facility. Consequently, these media will not be carried forward for further evaluation in this EI determination.

Surface Water/Sediment

Surface water and sediment adjacent to the facility could be impacted by contamination entrained in storm water runoff, or by groundwater discharges into surface water. Both of these potential contaminant migration pathways were considered for purposes of this EI determination.

A firewater reservoir and several drainage swales are present at the former IBM Dayton facility. The reservoir and several drainages were specifically evaluated as AOCs during the SI and RI, and IBM determined that no further action was required (Refs. 2 and 3). IBM also maintained a New Jersey Pollutant Discharge Elimination System (NJPDES) permit to allow for discharge of surface water runoff from parking lots into an earthen swale, through an off-site pond, and eventually to Devil's Brook approximately one mile south of the site (Ref. 1). Because soil quality is not a concern at the site, surface water runoff entering these drainage systems is not expected to be impacted. IBM also applied for and received an NJPDES permit for discharge of treated groundwater to an unnamed tributary of Lawrence Brook west of the site (Ref. 5). However, modifications to the site's remedial system were not implemented, and use of the spray field continues for disposal of treated effluent (Ref. 6).

Surface water bodies in the site vicinity also include Deans Pond approximately one mile to the north-northwest, Davidsons Mill Pond approximately two miles to the north-northeast, and Pigeon Swamp approximately two miles to the east. Available file material does not include an assessment of potential groundwater discharges to these surface water bodies. However, the footprint of groundwater contamination in shallow and deep groundwater extends across a much more limited area (Ref. 9). With flow generally to the east, contamination in shallow groundwater appears to be bounded by clean monitoring wells SB-01, SB-15, and SB-22, located less than 2,000 feet from the eastern property line. Furthermore, well CCS, located approximately 500 feet northeast of the eastern property line and the primary area of shallow groundwater contamination, reported only a minor exceedance of the NJ GWQC for PCE during the November 2005 sampling round. Nearby well BBS reported no detections of chlorinated VOCs. Although a component of shallow groundwater also flows northwestward from the western portion of the former IBM property, the two on-site wells in this area, GW-03 and GW-09, do not report chlorinated VOC exceedances. With flow again toward the east, groundwater contamination in the deeper Farrington aquifer appears to be limited by minor PCE exceedances in wells HHD, EED, FFD, and SB-07. Well TWP2, located approximately 2,000 feet east of the property line, shows no chlorinated VOC contamination. Furthermore, it should be noted that any contamination reported along Ridge Road east of the site is expected to be captured by pumping and treatment at SBT well SB-11. Consequently, contaminated groundwater from the former IBM facility is not expected to discharge to surface water in the vicinity of the site.

Because these media are not expected to be impacted by contaminated stormwater runoff or groundwater discharges, neither surface water nor sediment will be considered further in this EI determination.

Air (Outdoors)

Outdoor air quality is not expected to be of concern at the former IBM Dayton facility. As stated in the response to Question 1, soil quality was found to be acceptable upon completion of RI and excavation efforts in the mid-1990s. Consequently, the possibility of dust-borne contamination is not a concern. Migration of VOC vapors from shallow groundwater to outdoor air is also not expected to be of concern. As part of the April 2005 indoor air quality assessment discussed above, three samples of outdoor air were collected around the site, as shown on Figure 2 from the Vapor Intrusion Monitoring Report (Ref. 7). All contaminant concentrations in these outdoor air samples were well below NJDEP residential indoor air screening levels and EPA Region 3 RBCs for ambient air. Thus, outdoor air quality will not be considered further in this EI determination.

References:

1. Memorandum from Yang Cao, NJDEP, to Bruce Venner, NJDEP, re: IBM Case Transfer. Dated January 12, 1995.
2. Letter from Carol Graubart, NJDEP, to Karen Majchrzak, IBM, re: SI Summary Report and RI Summary Report. Dated March 15, 1996.
3. Memorandum from Frank McLaughlin, NJDEP, to Carol Graubart, NJDEP, re: RI Addendum Summary Report. Dated February 28, 1997.
4. Letter from Carol Graubart, NJDEP, to Mitchell Meyers, IBM, re: Proposed Changes to Groundwater Monitoring Program. Dated January 19, 2000.
5. Letter from Melisse Auriti, NJDEP, to Mitchell Meyers, IBM, re: Draft Surface Water New Permit Action for Industrial Wastewater. Dated March 26, 2002.
6. Letter from Tom Grzymski, NJDEP, to Mitchell Meyers, IBM, re: Quarterly Groundwater Monitoring/Transmittal Reports Dated December 28, 2000 through March 22, 2004. Dated August 10, 2004.
7. Vapor Intrusion Monitoring Report for 431 Ridge Road, South Brunswick, New Jersey. Prepared by the Whitman Companies, Inc. Dated April 2005.
8. Memorandum from Laurie Whitesell, NJDEP, to Thomas Grzymski, NJDEP, re: IBM Corporation (Site Summary and Groundwater Data). Dated August 18, 2005.
9. Letter from Mitchell Meyers, IBM, to Tom Grzymski, NJDEP, re: Groundwater Monitoring/Transmittal Reports – November 2005 Sampling Event. Dated December 21, 2005.

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~~							
~~Surface Water~~							
~~Sediment~~							
~~Subsurface Soil~~							
~~Air (outdoors)~~							

Instruction for Summary Exposure Pathway Evaluation Table:

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

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

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

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

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

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

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

Rationale :

Groundwater

As stated previously, groundwater contamination associated with the former IBM Dayton facility is limited, in both the shallow and deep aquifers, to an area extending less than a half mile around the property (particularly eastward). No private wells are located within one mile of the former IBM site (Ref. 1). There are approximately 15 to 20 private domestic wells along Fresh Ponds Road, but these are located approximately 1.5 miles north of the site and are not expected to be impacted by site-related groundwater contamination. Four municipal wells are located within a four-mile radius of the former IBM site, including well SB-11 where groundwater contamination was initially identified. This well, and wells further downgradient, are used by SBT and the Elizabeth Water Company to provide potable water to over 23,000 people (Ref. 1). As stated previously, IBM constructed a water treatment system at this well in 1984; SBT took over operation of the treatment system in May 1985 (Ref. 1). Water quality in SBT wells SB-11 and SB-13 is monitored quarterly for VOC content in the effluent drinking water supply and supervised by the NJDEP Bureau of Safe Drinking Water (Ref. 2). Post-treatment water samples routinely report nondetected VOC concentrations and would be shut down if sampling revealed contamination levels above applicable drinking water criteria (Ref. 2). Thus, ingestion or direct contact with impacted groundwater via water supplies is not a concern for on-site workers, residents, or other off-site receptors.

Given that shallow groundwater is encountered at depths between 30 and 35 feet bgs (Ref. 3), it is unlikely that construction workers would come into contact with impacted groundwater during intrusive activities such as construction on or around the former IBM facility.

No pathways between contaminated groundwater and potential human receptors are considered complete at this time.

References:

1. Memorandum from Yang Cao, NJDEP, to Bruce Venner, NJDEP, re: IBM Case Transfer. Dated January 12, 1995.
2. E-mail from Dhruva Kanjarpane, NJDEP, to Barry Tornick, USEPA, re: Requested Summaries of the EI Status of the New Government Performance Results Act Facilities (IBM Dayton). Dated June 22, 2005.
3. Memorandum from Laurie Whitesell, NJDEP, to Thomas Grzymski, NJDEP, re: IBM Corporation (Site Summary and Groundwater Data). Dated August 18, 2005.

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:

Not applicable. Refer to the 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 :

Not applicable. Refer to the 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 former IBM Corporation site, EPA ID# NJD002177210, located at 431 Ridge Road in Dayton, 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:_____
Michele Benchouk
Environmental Consultant
Booz Allen Hamilton

Reviewed by: _____ Date:_____
Amy Brezin
Environmental Consultant
Booz Allen Hamilton

Also reviewed by: _____ Date:_____
Sameh Abdellatif, RPM
RCRA Programs Branch
EPA Region 2

_____ Date:_____
Barry Tornick, New Jersey Section Chief
RCRA Programs Branch
EPA Region 2

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

Attachments

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

- Attachment 1 - Summary of Media Impacts Table
- Attachment 2 - Figures

Attachment 1: Summary of Media Impacts Table

AOC	GW	AIR (Indoors)	SURF SOIL	SURF WATER	SED	SUB SURF SOIL	AIR (Outdoors)	CORRECTIVE ACTION MEASURE	KEY CONTAMINANTS
AOC 10	No	No	Yes	No	No	Yes	No	Excavation and off-site disposal of contaminated soil; confirmation sampling to confirm residual concentrations were in compliance with NJ NRDCSCC.	PAHs
Groundwater	Yes	No	No	No	No	No	No	Two phases of on-site groundwater extraction, air stripping, and disposal via a spray field at the western edge of the property. Wellhead treatment at off-site municipal drinking water supply well SB-11. Ongoing groundwater monitoring. Placement of a CEA across the site and extending off site to include the area around wells SB-11 and SB-13. A proposal to reduce the off-site CEA area to include only a small area around well SB-23 was submitted in June 1999; the status of this proposed modification is unclear.	1,1-DCE, PCE, TCA, and TCE