DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Facility Name: Bell Laboratories – Alcatel-Lucent Murray Hill Facility
Facility Address: 600 Mountain Avenue, Murray Hill, New Jersey 07974
Facility EPA ID#: NJD006980924

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

Alcatel-Lucent USA, Inc. (Alcatel-Lucent), formerly known as Lucent Technologies Inc., or its predecessors in interest, including AT&T Bell Laboratories (Bell Labs), has occupied the Site since the 1940s. Alcatel-Lucent assumed responsibility for clean-up of the Site in 1996 pursuant to the requirements of the New Jersey Department of Environmental Protection (NJDEP) Industrial Site Recovery Act (ISRA), which was triggered as a result of AT&T's transfer of the property to Lucent Technologies Inc.

The Site consists of approximately 200 acres at 600 Mountain Avenue, Murray Hill, New Jersey in Union County (see Drawing 2). The majority of the Site is located in Berkeley Heights Township with the northern portion of the Site in the Borough of New Providence. The Site is comprised of laboratories, office space (for administrative and software development), and computer facilities. Support buildings (e.g., treatment and steam plants) are located throughout the Site to provide services for the daily operation of the facility. Land use within 200 feet of the Site is primarily zoned as residential to the south and east and office and research to the north and west. Sensitive property uses, as defined by NJDEP, within 200 feet of the Site consist of residential properties, typically single family homes. According to the Township of Berkeley Heights and Borough of New Providence, there are no proposed changes to land use at or within 200 feet of the Site.

As part of a New Jersey Pollutant Discharge Elimination System (NJPDES), groundwater investigations were completed in 1982 and monitoring well sampling results at the Site indicated the presence of VOCs (more specifically, chlorinated aliphatic hydrocarbons [CAHs] and predominantly trichloroethene [TCE]) at concentrations above NJDEP Standards. Because TCE was, and is, the primary constituent of concern, the groundwater contamination is referred to as the "TCE groundwater plume." Since 1982, Alcatel-Lucent has implemented numerous groundwater and soil investigations aimed at defining the extent of the TCE groundwater plume, identifying the source of the dissolved TCE in groundwater and evaluating risk to human receptors. Investigations conducted by Geraghty & Miller, Inc. (Refs. 1-4) and Eckenfelder (Ref. 5) were successful in identifying the plume and developing a preliminary conceptual model of the physical and geologic setting of the Site. A comprehensive groundwater Remedial Investigation (RI) was performed at the Site under the requirements of the ISRA and the NJDEP Technical Requirements for Site Remediation (TRSR) (Ref. 6).

The following activities were implemented to evaluate potential receptors to contamination originating from the Site:

- Baseline Ecological Evaluation (BEE) to evaluate risks to ecological receptors,
- Soil gas survey along the eastern boundary of the Site to evaluate potential risks caused by VOC vapor migration,
- Vapor intrusion investigation of all buildings (where access was granted) within 100 feet of the TCE groundwater plume,
- Surface water sampling at Salt Brook, located northeast of the Site,
- Sediment and surface water sampling at the stormwater detention basin and Blue Brook tributary, located southwest of the Site,
- Well search to evaluate drinking water receptors.

The following remedial actions have been implemented at the Site:

- Excavation and off-site disposal of 267 tons of ripable saprolite from the TCE groundwater plume source zone,
- Excavation and off-site disposal of impacted soil from a total of 31 Areas of Concern (AOCs) to mitigate soils that had constituents above the applicable NJDEP soil cleanup criteria,

- Connection of seven homes to the public water supply in 1998,
- Installation of a sub-slab mitigation system in one home in 2003,
- Dredging of sediments at the detention basin in 2000 and 2010,
- Source zone pilot study testing soil vapor extraction (SVE) and *in-situ* chemical oxidation (ISCO) technologies, and
- ISCO interim remedial measure (IRM) by injection of 27,367 pounds of potassium permanganate into blast fracture trenches for remediation of the source of the TCE groundwater plume.
- Supplemental ISCO injection of 9,151 pounds of potassium permanganate into blast fracture trenches at the former source area.

Remedial activities, pursuant to an NJDEP-approved work plan, are on-going at the Site to reduce contamination and mitigate risks to human health. Specifically, supplemental ISCO injections were performed in the former source zones in October and November 2011 and periodic dredging of sediments at the detention basin will be conducted to continue to address contaminant concentrations in groundwater, sediment and surface water.

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

Summary of Areas of Concern (AOCs):

A total of 215 AOCs have been identified at the Site (Ref. 7). Since 1996, most environmental AOCs identified at the Site have been addressed to the satisfaction of the NJDEP by various methods including excavation and off-site disposal of contaminated soil and sediment, connection of homes with domestic water wells to the public supply system and installation of a sub-slab depressurization system in a nearby residence. Pursuant to the New Jersey Site Remediation Reform Act, a Case Inventory Document summarizing each AOC status (i.e., investigation, remediation, and/or no further action [NFA] determination status) was submitted to the NJDEP and is provided in Attachment A in support of this EI determination. A Site map showing the locations of all AOCs is provided as Drawing 1. Some of the recent correspondence from NJDEP pertinent to the 'NFA determination' of select AOCs has been included on a CD attached in support of the EI determination (Refs. 17, 18, 19). A table summarizing all remaining media impacts at the Site is provided as Attachment B.

Of the 215 AOCs, six AOCs are still active (Ref. 8 & 9). Of these six AOCs, NFA determinations have been requested at the following three AOCs and are pending NJDEP approval:

- MH-173 (2500 gallon Fuel Oil UST – Building 5)
- MH-174 (Diesel Spill), and
- MH-175 (Hydraulic Lift – Building 14).

Remedial activities at the remaining three AOCs described below are on-going at the Site.

MH-2B (TCE Groundwater Plume):
This AOC consists of a TCE groundwater plume, as shown in Drawings D-1 through D-4. The horizontal extent of contamination extends north from the southeast corner of the Alcatel-Lucent property (the source area) to approximately 350 feet south of the intersection of South Street and Candlewood Drive in New Providence with a maximum width of 1,400 feet along Mountain Avenue. The contaminated groundwater plume is approximately 3,100 feet in length. The source of the groundwater contamination is believed to be from historical handling of solvents. Two former proximate areas comprised of TCE with concentrations greater than 10,000 µg/L, designated as DNAPL Source Zone "A" (10,450 square ft [ft^2] and DNAPL Source Zone "B" (8,950 ft^2), were delineated during the remedial investigations. The DNAPL Source Zones were located in the southeast corner of the Site and extend partially onto the NJDOT right of way and have undergone significant remediation.

An ISCO IRM was conducted from June 2006 to October 2009 to remediate the DNAPL Source Zones. The ISCO IRM successfully eliminated the source of the dissolved TCE groundwater plume, thereby ultimately attenuating the plume and its associated impact to Salt Brook (Refs. 10, 14). On August 15, 2011, NJDEP approved a Remedial Action Work Plan for groundwater that included evaluation of remedial options whereby monitored natural attenuation (MNA) with supplemental oxidant injections was selected as the remedy for groundwater (Ref. 10). The approved work Plan included a Technical Impracticability (TI) waiver request for remediation of TCE to below its 1 microgram per liter standard (Ref. 14). Using the existing injection well network, supplemental ISCO injections were performed at the Site in October and November 2011 to mitigate TCE concentrations in the former source zones where concentrations exceed 1,000 µg/L in groundwater. The supplemental ISCO injections performed at the Site in 2011 are anticipated to further reduce TCE concentrations and promote conditions for natural attenuation of the dissolved TCE groundwater plume. If TCE concentration do not further decrease, or if concentration spike in groundwater and/or surface water, then Alcatel-Lucent will need to reevaluate the remedy (Ref. 11).

MH-2D (Stormwater Drainage Ditch Sediment):
This AOC consists of the sediment at the drainage ditch and detention basin that is impacted by stormwater runoff from the Site. The Site stormwater ultimately drains to the stormwater detention basin (AOC-61) located at the southwest portion of the Site (see Figure 3) prior to flowing into a tributary to Blue Brook. In the August 15, 2000 letter to Lucent, NJDEP agreed that because MH-2D (Stream Sediments) and MH-61 (Stormwater Detention Basin) are closely related, the AOCs would be combined and addressed as AOC MH-2D. The sediment is primarily impacted with copper and lead to approximately 575 feet and 150 feet downstream of the property boundary, respectively. The source of the copper contamination is attributed to the leaching of copper from the Site's building roofs into storm water that flows to the drainage ditch. Leaching is exacerbated by acid rain in north-central New Jersey. Copper concentrations in sediment exceed the ecological risk-based screening criteria (i.e., the NJDEP Sediment Fresh Water Criteria Lowest Effects Limit [LEL]), but are well below the human health risk-based criteria (*i.e.*, the NJDEP Non-Residential Direct Contact Soil Remediation Standards [NRDCSRS]).

Periodic dredging of the detention basin with pH buffering has been selected as the remedial approach to address the copper-impacted sediment at this AOC (Ref. 12). Because the sediment concentrations are below the NRDCSRS, the main remedial objective for this AOC is to mitigate metals concentrations in associated surface waters to prevent the off-site migration of metals (primarily copper) from the detention basin (Ref. 8). Dredging activities have been performed in 2000 and 2010, and surface water and sediments are to be sampled periodically to monitor

concentrations of copper accumulating at the drainage ditch and basin (Ref. 8). The sampling data will be used to evaluate the rate of copper accumulation in sediment and subsequently determine the dredging schedule.

MH-2J (Surface Water):
This AOC consists of surface water at the detention basin, Blue Brook tributary to the west of the Site and Salt Brook to the northeast of the Site. The source of contamination at the detention basin and Blue Brook tributary is stormwater runoff from the Site impacted with copper and lead. Salt Brook is impacted to 2,000 feet north of the culvert at Mountain Avenue with TCE from baseflow (groundwater contributions to surface water). Because the source of contamination for surface waters is attributable to the stormwater drainage ditch and the TCE groundwater plume, this AOC will be indirectly treated through the remedies for MH-2B and MH-2D, respectively.

References:

1. Geraghty & Miller, Inc., Hydrogeologic Data and Groundwater Monitoring Plan for a NJPDES Permit Application AT&T Bell Laboratories Murray Hill, New Jersey, October 1982.
2. Geraghty & Miller, Inc., Results for the First Phase (Phase I) Compliance Monitoring Program AT&T Bell Laboratories Murray Hill, New Jersey, April 1987.
3. Geraghty & Miller, Inc., Results of the Soil Gas Survey at the AT&T Bell Laboratories, Murray Hill, New Jersey Site, April 1988.
4. Geraghty & Miller, Inc., Results of the Soil Boring and Sampling Program at the AT&T Bell Laboratories, Murray Hill, New Jersey Site, July 1989.
5. Eckenfelder, Inc., Final Report Hydrogeologic Investigations AT&T Bell Laboratories Murray Hill, New Jersey, May 30, 1991.
6. McLaren/Hart, Inc., Groundwater Remedial Investigation Report, AT&T Bell Laboratories – Murray Hill Facility, July 1998.
7. Bell Laboratories, Division of Lucent Technologies Inc., Industrial Site Recovery Act (ISRA) Preliminary Assessment Report for AT&T Bell Laboratories 600 Mountain Avenue, Murray Hill, New Jersey 07974, ISRA Case Number 95514, Books 1-7, May 15, 1996.
8. Langan Engineering and Environmental Services, Inc., Initial Receptor Evaluation Report, February 2011.
9. Email from Andy Dillman, NJDEP, to Sam Abdellatif, EPA, re: Alcatel-Lucent, Murray Hill. Dated November 15, 2011.
10. New Jersey Department of Environmental Protection, Letter of Approval for Proposed Remedial Actions for MH-2B. August 15, 2011.
11. Email from Andy Dillman, NJDEP, to Sam Abdellatif, EPA, re: Alcatel-Lucent, Murray Hill. Dated November 10, 2011.

12. Langan Engineering and Environmental Services, Inc., Remedial Action Selection Report/Remedial Action Work Plan Addendum for Sediment Area of Concern MH-2D, November 2008.

13. Langan Engineering and Environmental Services, Inc., IRM Completion Report, July 2010.

14. Langan Engineering and Environmental Services, Inc., Remedial Action Selection Report and Remedial Action Work Plan AOC MH-2B (TCE Groundwater Plume), May 2011.

15. New Jersey Department of Environmental Protection, Comment Letter for Remedial Investigation Report (RIR) dated October 5, 2004 – Pilot Test Report. May 5, 2005.

16. New Jersey Department of Environmental Protection, Letter of Approval for Remedial Investigation Report (RIR) dated November 2, 2006. June 20, 2007.

17. New Jersey Department of Environmental Protection, Comment Letter for Various Remedial Investigation Reports (RIR). May 7, 2003.

18. New Jersey Department of Environmental Protection, Letter of Approval for Remedial Investigation Workplan (RIW) dated July 7, 2003. January 29, 2004.

19. New Jersey Department of Environmental Protection, Notice of Deficiency for Remedial Investigation Report (RIR) dated November 18, 2004. September 10, 2007.

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

Media	Yes	No	?	Rationale/Key Contaminants
Groundwater	X			VOCs, mainly Trichloroethene
Air (indoors)[2]		X		
Surface Soil (e.g., <2 ft)		X		
Surface Water	X			Trichloroethene, Copper, Lead
Sediment		X		
Subsurface Soil (e.g., >2 ft)		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:

Comprehensive environmental investigations have been conducted at the Site and have determined that groundwater, indoor air, surface and subsurface soil, and surface water have been contaminated. However, remedial actions have been implemented at the Site to address the contamination in each media of concern. As a result of the implemented remedial actions, there is currently no contamination in indoor air, surface and subsurface soils at the Site. A description of the levels of contamination and remedial actions taken in each media is provided below. A summary of the media impacts from each active AOC and the corrective action measures taken is provided in Attachment B.

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[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.

Groundwater (MH-2B)

A 3,100 feet long TCE groundwater plume exists along the eastern portion of the Site, extending north from the former DNAPL Source Zones located at the southeast corner of the Site (see Drawings D-1 through D-4).

An *in-situ* chemical oxidation (ISCO) interim remedial measure (IRM) was implemented in the DNAPL Source Zones "A" and "B" from June 2006 to October 2009, which successfully mitigated the source of the TCE groundwater plume (i.e., the area where concentrations in groundwater were greater than 10,000 µg/L). A total of approximately 27,367 pounds of potassium permanganate ($KMnO_4$), equivalent to approximately 55,019 gallons of 2.5% $KMnO_4$ solution, was injected in the subsurface as part of the ISCO IRM. Two years of quarterly post-ISCO injection monitoring results has demonstrated that there has been minimal rebound of TCE levels in those wells that contained the highest concentrations of TCE. The IRM Completion Report (Ref. 1) that presented the post-ISCO injection monitoring results was approved by NJDEP in a letter dated February 22, 2011 (Ref. 2).

The contaminants present in groundwater above the NJDEP Ground Water Quality Standards (GWQS) and their maximum concentrations in micrograms per liter (µg/L) from the December 2009 sampling event following the IRM are provided below. The most recent groundwater sampling event was conducted in September 2011 to evaluate baseline concentrations prior to the supplemental ISCO injections. However, the groundwater data have not been fully analyzed during the compilation of this document. The results from the September 2011 groundwater sampling event will be included and submitted to NJDEP and EPA in a progress report following the first round of post-ISCO groundwater monitoring that is tentatively scheduled to be conducted in December 2011.

Constituent	Maximum Concentration	GWQS	Well Location
Benzene	83.8 µg/L	1 µg/L	MW-46D1
Bromodichloromethane	1.4 µg/L	1 µg/L	MW-45I
Carbon Tetrachloride	9.4 µg/L	1 µg/L	MW-2
Chloroform	112 µg/L	70 µg/L	MW-46I
1,1,-Dichloroethane	63.8 µg/L	50 µg/L	MW-46I
1,1-Dichloroethene	42.9 µg/L	1 µg/L	MW-46I
1,2-Dichloroethane	15.6 µg/L	2 µg/L	MW-46I
cis-1,2-Dichloroethene	3610 µg/L	70 µg/L	MW-46I
Methylene Chloride	168 µg/L	3 µg/L	MW-46D1
1,1,1-Trichloroethane	218 µg/L	30 µg/L	MW-36IR
1,1,2-Trichloroethane	20.6 µg/L	1 µg/L	MW-46I
Tetrachloroethene	17.7 µg/L	1 µg/L	MW-46D1
Trichloroethene	7825 µg/L	1 µg/L	MW-35D2
Vinyl Chloride	11.4 µg/L	1 µg/L	MW-46I

While the TCE levels in the former DNAPL Source Zones "A" and "B" have been significantly remediated (*i.e.*, TCE concentrations in the source area have been reduced by 94%), the groundwater concentrations present at the Site continue to exceed the NJDEP GWQS of 1 µg/L. The TCE groundwater plume occupies an area of approximately 3 million square feet, which is about 73 times greater in aerial extent than the former DNAPL Source Zones. Due to the large area of the TCE plume and the complex and heterogeneous nature of the subsurface geologic substrate, a remedial alternative that will result in the

restoration of groundwater to meet the NJDEP GWQS is not technically or economically feasible (Refs. 3, 4).

To address the TCE groundwater plume, supplemental ISCO injections were performed at the Site in 2011 and monitored natural attenuation and institutional controls are planned to be implemented at the Site. These plans are discussed in detail in the Remedial Action Selection Report and Remedial Action Work Plan (RASR/RAWP) dated May 2011 (Ref. 3) that was approved by the NJDEP in a letter dated August 15, 2011 (Ref. 4). Supplemental injections of potassium permanganate ($KMnO_4$) were performed in the former DNAPL Source Zones where residual source area TCE impacts were greater than 1,000 µg/L. A total of approximately 9,151 pounds of $KMnO_4$, equivalent to approximately 43,000 gallons of 2.5% $KMnO_4$ solution, were injected into the subsurface in October and November 2011 as part of the supplemental injection program (Refs. 4, 19). Monitored natural attenuation will be used to demonstrate the reduction in mass of organic contaminants and institutional controls (*i.e.*, a Classification Exception Area [CEA] and Well Restriction Area [WRA]) have been established over the "footprint" of the plume to restrict groundwater use within the area of groundwater contamination, thereby preventing direct contact with groundwater contaminants. The establishment of a CEA/WRA is a public notification mechanism indicating that an aquifer does not satisfy water quality standards and restricting aquifer use until standards are achieved. Formal public notification relating to the CEA/WRA was sent to 46 individual recipients whose property overlies the "footprint" of the TCE groundwater plume (Refs. 5, 20).

Air (Indoors)

On-site

The on-site Vapor Intrusion (VI) investigations are summarized in a letter from Alcatel-Lucent to NJDEP dated January 14, 2010 (Ref. 6). The following table summarizes the vapor intrusion evaluation for all Site buildings above or within 100 feet of the TCE groundwater plume. The locations of the on-site buildings are shown in Drawing 2 attached.

Building No.	Use	Comments
5	Labs and Offices	This building is the closest occupied structure to the TCE source zone. The building is slab on grade construction. An indoor air sample obtained in the southeast corner of the building (closest to the TCE source) in January 2003 was non-detect for TCE. Although TCE was not previously detected in Building 5, a confirmatory indoor air sample will be collected during the second quarter of 2012 to verify that vapor intrusion is not a concern.
12	Pump Station	Unoccupied structure containing pumps associated with the sewage lift station
14	Firehouse and Maintenance Garage/ Facility	This building is well ventilated with large bay doors and houses fire trucks, a limousine fleet, and property grounds maintenance equipment and supplies.
23	Wireless Communication Electronics	This unoccupied, well ventilated, slab on grade structure contains electronic equipment associated with wireless communications devices on the Microwave Tower.
28	Waste Water Treatment Plant	This structure has been renovated to include office and laboratory space. The laboratories (vibration testing labs) required that the foundation be modified. During this process, a liquid boot moisture barrier was installed to preclude vapor intrusion.

The only occupied building with a potential for indoor air impacts is Building 5. An indoor air sample obtained in the southeast corner of the building (closest to the TCE source) in January 2003 was non-detect for TCE. Given the nature of construction (e.g., concrete floor slabs with good integrity) and the non-detect of TCE in the indoor air sample collected within Building 5, it is determined that no indoor air contamination is present on-site. The conclusions of all the VI investigations performed at the Site to date are provided in the Initial Receptor Evaluation Report dated February 2011 (Ref. 12). NJDEP has verbally approved the on-site and off-site VI intrusion investigation related findings as included in the Initial Receptor Evaluation Report. Based upon the verbal feedback provided by NJDEP, a confirmatory indoor air sample will be collected from Building 5 during the second quarter of 2012 to verify that vapor intrusion is not a concern.

Off-site

The TCE groundwater plume at the Site and the detection of TCE in the on-site soil gas samples collected in July 2001 (Ref. 7) triggered the need to conduct an assessment of the potential for VI into off-site structures within or immediately adjacent to the edge of the plume. The soil gas survey was conducted to determine soil gas concentrations at 19 points spanning approximately 1200 feet along the eastern edge of the site bordering the properties at Roland Road. The soil gas concentrations were used to develop the human health risk assessment for vapor intrusion (Ref. 7) to determine if VI investigations are warranted at the adjacent off-site residences. Extensive VI investigations (i.e., sub-slab soil gas surveys and indoor air sample) have been conducted at off-site properties since 2003, as summarized below:

- January 2003 – Indoor Air Quality Sampling at 16 Residential Properties: Alcatel-Lucent implemented a VI evaluation which consisted of an indoor air and sump sampling program in the residential area to the east of the Site. The evaluation detected TCE at one residential property. A VI mitigation system (sub-slab ventilation system) was installed on January 8, 2003 to assist in the removal of potential VOC containing vapors below the residence (Ref. 8). NJDEP approved the VI related remedial investigation report deliverables on August 16, 2007 (Ref. 9) and the effectiveness of the sub-slab mitigation system on October 26, 2007 (Ref. 10).
- July 2003 – Indoor Air Quality Sampling at three Residential Properties: Alcatel-Lucent implemented a VI evaluation which consisted of an indoor air sampling program in the residential area to the east of the Site. The evaluation detected no Site contaminants in the indoor air samples.
- January 2008 – VI Evaluation for Off-Site Properties: Alcatel-Lucent implemented a VI evaluation for four properties, including the Faith Lutheran Church and parsonage, the 546 South Street Private residence and the commercial building at 535 Mountain Avenue (Drawing 3 Vapor Intrusion Investigation Summary). The evaluation was based on the comprehensive indoor air sampling program already conducted for the Site and a review of New Providence Building Department records.
- September 2008 – Sampling of Residential Property on Johnson Drive: During the implementation of off-site groundwater delineation activities at Johnson Drive, a homeowner requested a VI evaluation be performed to determine if TCE vapors had the potential to migrate into the residence. No volatile organic compounds were detected above the NJDEP Residential Soil Gas Screening Level (RSGSL) in the sub-slab soil gas sample collected from beneath the concrete slab of the building at the property. The vapor migration pathway was found to be incomplete at this property; therefore, no further VI investigation was recommended (Ref. 11).
- November 2010 through January 2011 – Supplemental VI Investigation: A VI evaluation was performed for all off-site structures within 100 feet of the TCE plume. A total of 12 sub-slab samples were collected from 10 off-site properties and a total of six indoor air samples were collected at three off-site properties to evaluate vapor intrusion impacts. TCE was not detected in

the soil vapor or indoor air at any of the above-referenced structures above the NJDEP's RSGSL or Residential Indoor Air Screening Levels (RIASL).

In conclusion, after comprehensive VI intrusion investigations, indoor air impacts were determined to be present only at one off-site residence (130 Roland Road). However, a sub-slab mitigation system was installed at this private residence in January 2003 and has since mitigated the detected off-site indoor air impacts. The conclusions of all the VI investigations performed at the Site to date are provided in the Initial Receptor Evaluation Report dated February 2011 (Ref. 12). As discussed previously, NJDEP has verbally approved the on-site and off-site VI investigation related findings as included in the Initial Receptor Evaluation Report; however, NJDEP will evaluate if additional VI investigation is warranted based on future groundwater and/or soil gas sampling results that may become available (Ref. 22).

Surface/Subsurface Soil

To address all the known surface and subsurface soil impacts at the Site related to the TCE groundwater plume (MH-2B), a soil remedy was implemented in the source area to remove contaminated soil from the Site (Ref. 13). In October 1998, approximately 267 tons of ripable saprolite (from the DNAPL "entry zone") with TCE concentrations observed above 1 milligram per kilogram (mg/kg) were excavated and disposed off-site. The 1 mg/kg excavation extent was more stringent than the current NJDEP Residential and Non-Residential Direct Contact Soil Remediation Standards of 7 and 20 mg/kg for TCE, respectively. No off-site soil impacts related to the TCE groundwater plume are known to be present.

Additionally, excavation and off-site disposal of impacted soil from a total of 31 AOCs was performed to mitigate soils that had constituents above the applicable NJDEP soil cleanup criteria. A description of these AOCs and the implemented soil removal actions is provided in the Case Inventory Document that is enclosed as Attachment A in support of this EI determination. The soil removal activities performed at the Site to date have been reported to the NJDEP in various submittals. A list of these submittals/deliverables to NJDEP through July 2010 is provided in Appendix B of the ISCO IRM Completion Report, dated July 2010 (Ref. 1). In conclusion, Alcatel-Lucent has addressed all of the impacted soil on site and there are no off site soil AOCs (Ref. 21).

Surface Water/Sediment

Surface Water (MH-2J)
Surface water impacts have been detected at the detention basin for stormwater (MH-61), Blue Brook tributary just downgradient of the basin, and Salt Brook (see Drawing 2 and Figure 3).

The detention basin and Blue Brook tributary at the west of the Site are impacted by storm water runoff from the on-site building roofs. The contaminants present in surface water within and downstream of the detention basin above the NJDEP Surface Water Quality Standards (SWQS) for Fresh Water in parts per billion (ppb) from the most recent sampling event in July 2008 is provided below.

Constituent	Surface Water Concentration Range	SWQS
Copper (On-site)	88 to 191 ppb	29.2 ppb
Lead (On-site)	11 to 34 ppb	5 ppb
Lead (Off-site)	ND to 5.3 ppb	5 ppb

These sample locations can be found in Figure 3 of the November 2008 RASR/RAWP Addendum for Sediment AOC MH-2D (Ref.14). Copper was detected above the SWQS at the on-site sampling locations. Lead concentrations exceeded the SWQS on-site and marginally exceeded the standard at one off-site location. The concentrations provided above are from the unfiltered samples; no copper or lead were detected in any of the filtered surface water samples. The results suggest that the metals detected in surface water are sorbed onto the suspended solids and not dissolved in the water. The source for the metals contamination is storm water runoff from the copper building roofs. Alcatel-Lucent plans to continue implementation of a surface water/ sediment sampling and dredging plan in the detention basin to limit the mass of contaminants present on-site and to decrease the potential for off-site migration via surface water (Ref. 15).

Salt Brook, a stream to the northeast of the property, is impacted by TCE to approximately 2,000 feet north of the culvert at Mountain Ave (see Drawing 2). The source of the surface water TCE contamination in Salt Brook is from the base flow contribution of the TCE impacted groundwater. Surface water sampling was conducted from 1998 to 1999 as part of the ecological and human health evaluations (Refs. 16, 7) and again from 2005 to 2009 to evaluate the effect of the ISCO IRM on surface water concentrations (Ref. 1). The objective of the ISCO IRM was to eliminate the source of the dissolved TCE groundwater plume, thereby ultimately attenuating the plume and its associated impact to Salt Brook. During the most recent surface water sampling event conducted in December 2009, TCE concentrations ranged from non-detect to 21.3 µg/L in Salt Brook, exceeding the NJDEP SWQS of 1 µg/L. A stand-alone remedy for Salt Brook is not proposed because isolating or mitigating the groundwater contribution to Salt Brook is technically impracticable. The surface water at Salt Brook will be addressed in conjunction with the remedy for the TCE groundwater plume (MH-2B).

Sediment (MH-2D)
This section discusses the sediment associated with the surface water bodies discussed above.

The contaminants present in sediments within the stormwater detention basin and drainage ditch are above the LEL but below the NRDCSRS. Results from the most recent sediment sampling event conducted in July 2008 are provided below. The sediment sample locations can be found in Figure 3 (attached) of the November 2008 RASR/RAWP Addendum for Sediment AOC MH-2D (Ref.14).

Constituent	Sediment Concentration Range	LEL	NRDCSRS
Copper (On-site)	62.5 to 417 ppm	16 ppm	45,000 ppm
Copper (Off-site)	63.9 to 278 ppm	16 ppm	45,000 ppm

Although the copper concentrations detected in sediment are above the ecological risk-based screening criteria (LEL), they are well below the NRDCSRS, which is based on the human health risk from ingestion or dermal contact. Therefore, copper
concentrations in the sediments at the stormwater detention basin do not pose a health risk via direct contact (Ref.21).

Alcatel-Lucent has implemented remedial actions in this area to limit the ecological impacts from the sediment at this AOC and control off-site migration of contaminants. Dredging was conducted in May 2000 and consisted of the removal of approximately 145 tons of sediment from the detention basin. Post-dredging metals concentrations were significantly lower than the original samples. Recently, dredging was conducted in August 2010 and approximately 150 tons of dredged sediment was disposed off-site. The extent of dredging activities is shown in the Wetland Permitting Plan (Drawing 42.01 attached).

Additional details regarding the extent of dredging can be found in the Freshwater Wetlands General Permit dated December 2009 (Ref. 17).

The potential for sediment contamination in Salt Brook was evaluated in the Baseline Ecological Evaluation of Salt Brook completed in June 1998 (Ref. 16). The water in the brook is shallow (3-4 inches), flowing rapidly over exposed bedrock, cobbles, and pebbles with little silt. The potential for TCE to be present in surface sediments within the brook is limited. The chemical characteristics of TCE and the physical characteristics of sediments at the Site suggest that the potential for sorption of TCE is low. Although TCE may be detected in the sediments, it is likely to be present at low levels and will not pose a significant risk (Ref.21). No sediment samples could be collected in Salt Brook, since the streambed mainly consists of exposed bedrock, cobbles, and pebbles with no sediment present.

Air (Outdoors)

Migration of volatile organic compounds (VOCs) potentially bound to airborne particulate matter is expected to be insignificant at this Site because surface and subsurface soils are not impacted above the applicable NJDEP NRDCSRS. In addition, volatile emissions of detected VOCs from groundwater to outdoor air are not expected to be of concern due to the natural dispersion of VOCs once they reach the surface. This assessment is supported by ambient air sampling conducted on-site as part of the vapor intrusion investigations in 2002 (Ref. 18). From October to December 2002, six ambient air samples were collected at the eastern edge of the property just east of East Parking Lot No. 2. No VOCs were detected in any of the ambient samples collected.

References:

1. Langan Engineering and Environmental Services, Inc., IRM Completion Report, July 2010.
2. New Jersey Department of Environmental Protection, Letter of Approval for IRM Completion Report. February 22, 2011.
3. Langan Engineering and Environmental Services, Inc., Remedial Action Selection Report and Remedial Action Work Plan AOC MH-2B (TCE Groundwater Plume), May 2011.
4. New Jersey Department of Environmental Protection, Letter of Approval for Proposed Remedial Actions for MH-2B. August 15, 2011.
5. Langan Engineering and Environmental Services, Inc., Notification of Ongoing Environmental Activities at the Alcatel-Lucent USA Inc. – Murray Hill Facility, August 26, 2011.
6. Alcatel-Lucent USA Inc., (January 2010) Letter from Gary Fisher to Andrew Dillman (Case Manager – NJDEP), regarding response to NOD, dated December 7, 2009, January 14, 2010.
7. AMEC Earth & Environmental, Inc., Human Health Risk Assessment for Lucent Technologies Murray Hill Facility, 600 Mountain Avenue, Murray Hill, New Jersey, November 2001.
8. Weston Solutions, Inc., Residential Indoor Air Quality Sampling Report For Select Homes Adjacent to the Lucent Murray Hill, NJ ISRA Site. January 2003.
9. New Jersey Department of Environmental Protection, Remedial Investigation Report Approval. August 16, 2007.
10. New Jersey Department of Environmental Protection, Letter to Mr. & Mrs. Robert Vogt of 130 Roland Road. October 26, 2007.

11. Langan Engineering and Environmental Services, Inc., Off-Site Delineation Report, September 2008.

12. Langan Engineering and Environmental Services, Inc., Initial Receptor Evaluation Report, February 2011.

13. Langan Engineering and Environmental Services, Inc., DNAPL Source Zone Pre-Design Investigation Work Plan. November 2001.

14. Langan Engineering and Environmental Services, Inc., Remedial Action Selection Report and Remedial Action Work Plan Addendum for Sediment AOC MH-2D, November 2008.

15. Langan Engineering and Environmental Services, Inc., Remedial Action Work Plan for Sediment Area of Concern MH-2D, November 2007.

16. McLaren/Hart, Inc., Baseline Ecological Evaluation (BEE) (Appendix D of the Site Investigation/Remedial Investigation Report for Soils, AT&T Bell Laboratories -- Murray Hill Facility, June 1998.

17. Langan Engineering and Environmental Services, Inc., Application for Freshwater Wetlands General Permit No. 1, December 14, 2009.

18. Weston Solutions, Inc., Residential Indoor Air Quality Sampling Report for Select Homes Adjacent to the Lucent Murray Hill, NJ ISRA Site, January 2003.

19. New Jersey Department of Environmental Protection, Letter of Approval for Additional Oxidant Injections and Modification of NJPDES Discharge to Groundwater Permit by Rule. November 2, 2011.

20. New Jersey Department of Environmental Protection, Remedial Investigation Work Plan (RIW) Approval. June 3, 2008.

21. Email from Andy Dillman, NJDEP, to Sam Abdellatif, EPA, re: Alcatel-Lucent, Murray Hill. Dated November 10, 2011.

22. Email from Andy Dillman, NJDEP, to Sam Abdellatif, EPA, re: Alcatel-Lucent, Murray Hill. Dated June 1, 2012.

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	Yes	--	--	No
~~Air (indoor)~~							
~~Surface Soil (e.g. <2 ft)~~							
Surface Water	Yes	Yes	--	--	Yes	No	No
~~Sediment~~							
~~Subsurface Soil (e.g., > 2 ft)~~							
~~Air (outdoors)~~							

Instruction for Summary Exposure Pathway Evaluation Table:

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

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

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

___ 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

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

Rationale:

Groundwater (MH-2B)

Because the depth to groundwater in the delineated TCE plume area ranges between approximately 25 feet and 50 feet below grade at the Site (Ref. 1), direct contact of the groundwater is unlikely except through the use of wells. To evaluate the use of groundwater surrounding the Site, a receptor evaluation consisting of a well search was conducted in accordance with N.J.A.C. 7:26E-1.17 (Ref. 2). The search included a review of all monitoring well records for domestic and monitoring wells within ½ mile of the extent of ground water contamination and for irrigation, industrial, public supply, and other wells with water allocation permits within one mile of the extent of groundwater contamination. Well records were requested from the NJDEP Bureau of Water Systems and Well Permitting.

The well search identified a total of 131 wells as follows:

- 5 domestic wells within one-half mile (2 additional domestic wells were identified during a door-to-door survey that was conducted circa 1998);
- 76 monitoring wells within one-half mile;
- 2 piezometers within one-half mile;
- 35 gas vents within one-half mile;
- 4 recovery wells within one mile;
- 5 industrial wells within one mile; and,
- 4 withdraw wells with unknown use.

In October 1998, the seven homes in the vicinity of the Site that had potable wells were connected to the public water supply (provided by the New Jersey American Water Company) to preclude any potential exposure of TCE to those users of groundwater. In accordance with N.J.A.C. 7:26E-1.17(a)1v, the area of groundwater contamination was determined to not be located within a Tier 1 or Tier 2 well head protection area. A review of public supply wells on the NJDEP I-Map was performed. According to the NJDEP I-Map, there are no public supply wells within one mile of the Site. As a result, no wells within the vicinity of the Site are utilized for potable uses, so there are no complete pathways to residents, workers or day-cares.

No irrigation wells were found in the well search, so there are no complete pathways to impact food.

Because remedial activities are on-going at the Site, there is a potential for remedial workers to come into contact with contaminated groundwater during sampling and remedial activities. Thus, dermal contact with groundwater is considered a potentially complete exposure pathway for remedial workers.

Future construction activities on-site and off-site pose a potential for construction workers to come into contact with contaminated groundwater. Although, most of the TCE plume located on-site and off-site is deeper than the typical extent of excavation (i.e., 10 feet below ground surface), dermal contact with groundwater is considered a potentially complete exposure pathway for construction workers, but these exposures are highly limited in frequency and duration. The concentration of TCE found in groundwater is not high enough to cause acute health effects from such limited exposure.

Surface Water (MH-2J)

The surface water at the detention basin and Blue Brook to the west of the Site contains copper and lead contamination at both on-site and off-site locations. By definition, a detention basin's purpose is to hold storm water after rainfall events to prevent downstream flooding or erosion. Given the basin's seasonal

saturation, it is unlikely that the water would be used to cultivate food or provide recreation. However, since access to the basin and Blue Brook are not fenced, a complete pathway to workers, residents, and trespassers are possible.

Salt Brook is a first order stream derived, in part, from on-site drainage and groundwater base flow. The stream bottom consists of exposed bedrock, cobbles, and pebbles with little silt, so there is minimal risk for contaminants to be sorbed to sediment. According to the Human Health Risk Assessment (Ref. 3), Salt Brook is not used for water supply purposes. Since Salt brook is a first order stream, it is not likely to attract adults or adults with children because it does not support fishing or swimming due to shallow water depths (3-4 inches) (Ref. 4). Potential receptors of surface water are limited to adolescents because busy roads and steep stream banks likely preclude children less than 10 years of age from playing in the stream on a regular basis. Adolescents from nearby homes and trespassers have potential complete pathways to surface water from Salt Brook and thus may have incidental ingestion and dermal contact with the contaminated surface water.

References:

1. Langan Engineering and Environmental Services, Inc., Remedial Action Selection Report and Remedial Action Work Plan AOC MH-2B (TCE Groundwater Plume), May 2011.

2. Langan Engineering and Environmental Services, Inc., Initial Receptor Evaluation Report, February 2011.

3. AMEC Earth & Environmental, Inc., Human Health Risk Assessment for Lucent Technologies Murray Hill Facility, 600 Mountain Avenue, Murray Hill, New Jersey, November 2001.

4. McLaren/Hart, Inc., Baseline Ecological Evaluation (BEE) (Appendix D of the Site Investigation/Remedial Investigation Report for Soils, AT&T Bell Laboratories – Murray Hill Facility, June 1998.

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 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:

Groundwater (MH-2B)

Future construction activities on-site and off-site pose a potential for construction workers to come into contact with contaminated groundwater. Although, most of the TCE plume located on-site and off-site is deeper than the typical extent of excavation (i.e., 10 feet below ground surface), dermal contact with groundwater is considered a potentially complete exposure pathway for construction workers, but these exposures are highly limited in frequency and duration. The concentration of TCE found in groundwater is not high enough to cause acute health effects from such limited exposure. Remedial activities which have the potential to result in exposures to contaminated groundwater are performed in accordance with project-specific Health and Safety Plans. On-site remediation workers are required to have environmental health and safety training certification to ensure that they are familiar with both general and site-specific hazards, including on-going remediation activities. On-site remediation workers adhere to strict Occupational Safety and Health Administration (OSHA) to take proper safeguards (e.g., wearing personal protective equipment [PPE]) as required to prevent potential exposure to contamination. Thus, direct exposure to contaminated groundwater for remediation workers is not expected to pose a significant risk. Additionally, institutional controls (i.e., a Classification Exception Area [CEA] and a Well Restriction Area [WRA]) have been established over the "footprint" of the plume to restrict groundwater use within the area of groundwater contamination and thereby, preventing potential direct contact with groundwater contaminants.

[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.

Surface Water (MH-2J)

Alcatel-Lucent has implemented sediment dredging (AOC MH-2D) in 2000 and 2010 to address the detected metal impacts in surface water within the stormwater detention basin and Blue Brook tributary at the west of the site. Periodic surface water and sediment sampling and dredging of sediments in the detention basin is planned to be continued to prevent direct contact and off-site migration of metal impacts (Ref. 1). As discussed in Question No. 2, no copper or lead were detected in any of the filtered surface water samples collected in July 2008. These data indicate that the metals detected in the unfiltered samples are sorbed on the suspended sediment and not dissolved in the water. Therefore, the removal of contaminated sediment will provide a direct benefit to the metals concentration in surface water. Additionally, the detention basin is located at the northwest corner of the Site, separated from the main Alcatel-Lucent facility buildings and parking areas by a densely wooded area, and workers, residents, and/or trespassers are unlikely to access the detention basin and drainage ditch because of steep slope and dense vegetation. Based on the diminished concentrations as a result of dredging and limited exposure scenarios, the surface water at the detention basin and Blue Brook tributary are not deemed a significant exposure.

At Salt Brook, concentrations of TCE in surface water detected during the most recent sampling event conducted in December 2009 (ranging from non-detect to 21.3 µg/L) are higher than the NJDEP SWQS of 1 µg/L. Therefore, dermal or incidental ingestion of surface water at Salt Brook can be considered potentially significant exposures. However, due to the stream's limited accessibility because of steep embankments, exposure of adolescents and potential trespassers to the impacted surface water would be limited and is not expected to pose a significant risk.

References:

1. Langan Engineering and Environmental Services, Inc., Remedial Action Work Plan for Sediment Area of Concern MH-2D, November 2007.

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

__X__ 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] See response to question #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 Bell Laboratories – Alcatel-Lucent Murray Hill Facility site, EPA ID# NJD006980924, located at 600 Mountain Avenue in Murray Hill, 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: Omer Uppal Date: Submitted on 9/26/11, Revised on 01/16/12, 02/23/12

Omer Uppal
Senior Project Engineer
Langan Engineering & Environmental Services

Reviewed by: Brian A. Blum Date: Submitted on 9/26/11, Revised on 01/16/12, 02/23/12

Brian A. Blum, CPG, LSRP
Associate
Langan Engineering & Environmental Services

Also reviewed by: Date: 6/5/12

Sameh Abdellatif, RPM
RCRA Programs Branch
EPA Region 2

Ildefonso Acosta Date: 6/5/12

Ildefonso Acosta, Acting Chief
Corrective Action and Program Management Section
RCRA Programs Branch
EPA Region 2

Approved by: Date: 6/18/12

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 the USEPA Region 2, RCRA Records Center, located at 290 Broadway, 15th Floor, New York, New York, and the New Jersey Department of Environmental Protection Office located at 401 East State Street, Records Center, 6th Floor, Trenton, New Jersey.

Contact telephone and e-mail numbers: Sameh Abdellatif
(212) 637-4103
abdellatif.sameh@epamail.epa.gov

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

Attachments

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

- Attachment A – Case Inventory Document
- Attachment B – Summary of Media Impacts Table

- Drawing 2 – Site Plan and Groundwater Monitoring Locations
- Drawing 1 – Case Inventory Document, Location of AOCs
- Drawing D-1 – TCE Isoconcentration Map, December 2009 (Shallow Zone)
- Drawing D-2 – TCE Isoconcentration Map, December 2009 (Intermediate Zone)
- Drawing D-3 – TCE Isoconcentration Map, December 2009 (Deep 1 Zone)
- Drawing D-4 – TCE Isoconcentration Map, December 2009 (Deep 2 Zone)
- Figure 3 – MH-2D Surface water and Sediment Sample Locations
- Drawing 3 – Vapor Intrusion Investigation Summary
- Drawing 42.01 – Wetland Permitting Plan
- Drawing A-1 – Well Search

Attachment B: Summary of Media Impacts Table

AOC or SWMU	GW	AIR (Indoors)	SURF SOIL	SURF WATER	SED	SUB SURF SOIL	AIR (Outdoors)	CORRECTIVE ACTION MEASURE	KEY CONTAMINANTS
AOC MH-2B (TCE Groundwater Plume)	Y	Y	N	Y	N	N	N	TCE Groundwater Plume: In-situ chemical oxidation by injection of approximately 27,367 pounds of potassium permanganate ($KMnO_4$) through blast fracture trenches in the two source zones from June 2006 to October 2009. Supplemental injections of approximately 9,151 pounds of $KMnO_4$ performed in the two former source zones in October and November 2011. Indoor air at 130 Roland Road: Sub slab mitigation system installed on January 8. 2003 and was approved by NJDEP. Drinking Water: Seven off-site residences connected to the public water supply (New Jersey American Water) in October 1998.	TCE
AOC MH-2D (Stormwater Drainage Ditch Sediment)	N	N	N	Y	Y	N	N	Dredging of approximately 145 tons of sediment in 2000 and approximately 150 tons of sediment in 2010 from the detention basin. Planned periodic sampling and dredging of sediment at the drainage ditch and stormwater detention basin. Planned use of limestone as a pH buffering technique in order to precipitate Copper from surface water and prevent off-site migration of contaminants.	Copper
AOC MH-2J (Surface Water)	N	N	N	Y	N	N	N	The stormwater detention Basin and Blue Brook Tributary will be mitigated through sediment dredging and pH buffering activities discussed under the MH-2D corrective action measures section above. Salt Brook will be mitigated over time as the TCE groundwater plume attenuates following source reduction using supplemental ISCO injections (MH-2B).	TCE, Copper