DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Facility Name: AlliedSignal Incorporated
Facility Address: Columbia Road and Park Avenue, Morristown, NJ 07960
Facility EPA ID#: NJD048794986

Definition of Environmental Indicators (for the RCRA Corrective Action)

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

Definition of "Current Human Exposures Under Control" EI

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

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are 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 are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action programs 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 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

Honeywell International, Inc. (formerly known as AlliedSignal Inc.) occupied a 170-acre site located in Morris Township in Morristown, New Jersey. A merger between AlliedSignal Inc. and Honeywell Inc. occurred in January 2000. For convenience, the following discussion shall use the former facility name, for much of the discussion concerns past activities. The AlliedSignal site was comprised of three areas: the AlliedSignal Headquarters Main Site, the A.M. Best Site, and the Park Avenue Facility. AlliedSignal conducted research activities at the site from 1946 to 1999. Past research operations at the Main Site included, but were not limited to, research in polymers, metals, ceramics, electronic materials and devices, biosciences, and analytical sciences. Laboratory testing associated with AlliedSignal's research generated approximately 268,500 pounds of waste per year. The wastes materials managed included solvents, flammable and reactive materials, acids, bases, and waste gases. Research activities at the A.M. Best Site were limited to metal alloys research. No research activities were conducted at the Park Avenue Facility. Waste management activities at AlliedSignal have resulted in releases of contaminants to soil, groundwater, and sediment. Fourteen SWMUs were identified at the Main Site in the Administrative Consent Order that AlliedSignal entered into with the New Jersey Department of Environmental Protection (NJDEP) on November 3, 1989. In addition, five areas of concern were identified in other facility documentation. The site is currently owned by Honeywell and similar research activities are conducted at the site. The land immediately surrounding the site is used for industrial, commercial, research, and residential purposes. An industrial area located northeast of the site includes the Morristown Municipal Airport, which is approximately ½ mile from the site. A large residential area is located north and west of the site and a smaller residential area is located southeast of the site. The Morris County Golf Club borders the site to the south-southwest.

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

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

   ____ If no - re-evaluate existing data, or

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

Summary of Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs): A SWMU and AOC map has been provided as Attachment 1.

SWMU 1, Groundwater Pumping: This unit consists of two recovery wells (Well 2 and Well 10, see Attachment 1) that collect contaminated groundwater at the AlliedSignal site. In 1976, carbon tetrachloride was detected in the groundwater northeast of the Materials Research Center. The extraction of the contaminated groundwater began at well number 2 at a rate of 400 gallons per minute. In 1981, an additional well was installed (number 10) and the two wells were pumped at a combined rate of 400 gallons per minute, and discharged to the county storm sewer in accordance with New Jersey Pollutant Discharge Elimination System Permit No. NJ0031305. Well number 2 was shut down in March, 1993.

SWMU 2A/2B, Rear Ponds: This unit consists of two interconnected retention ponds present in the western corner of the site. Pond A is approximately 1.2 million gallons in capacity and Pond B is approximately 0.75 million gallons in capacity. The ponds currently receive storm water runoff and air conditioner condensate via an interconnected storm drainage system. From 1957 to 1981 the ponds received boiler and cooling tower blowdowns. These blowdowns contained a chromate-based water treatment chemical, a slimicide, and an amine-based water treatment chemical. The ponds were treated annually with an algaecide. No documented releases have occurred in these ponds. Sampling results have indicated there has been no impact to surface water or sediment above relevant screening criteria. The ponds are currently in operation.

SWMU 3, Nichols Complex Disposal Area: This disposal site was located near the existing Solvay building. Solid wastes and drums of materials from laboratories were deposited at this location. The wastes contained cyclohexane caustic washes. The period of operation is not known. Site operations began in 1946 and the on-site disposal of waste materials stopped in 1962. In 1969, during the construction of the Solvay building, the waste materials were removed and disposed of off site. Sampling conducted as part of the Remedial Investigation indicated that soil had been impacted by SVOCs above relevant screening criteria. AlliedSignal has since installed a 3- to 4-inch sod cover over the area to reduce the potential for direct human exposure.

SWMU 4, AB Disposal Area: This disposal site was located near where the Administration building now stands. Only nonhazardous construction materials are believed to have been disposed of at this location. The period of operation is not known. No known or documented

releases have been associated with this unit. Site operations began in 1946 and the on-site disposal of waste materials stopped in 1962.

SWMU 5, MRC Disposal Area: This disposal site is located near the Material Research Center. Only nonhazardous construction materials are believed to have been disposed of at this location. The period of operation is not known. Site operations began in 1946 and the on-site disposal of waste materials as stopped in 1962. No known or documented releases have been associated with this unit. AlliedSignal has since installed a 3- to 4-inch sod cover over the area to reduce the potential for direct human exposure.

SWMU 6, CRC Neutralization Tank: From 1947 to 1962, this below-ground concrete neutralization tank was used to neutralize dilute laboratory wastewater from the CRC's closed drainage system. The tank contained limestone and may have treated wastes that contained hazardous constituents. The size of the tank and the quantity of the waste treated is unknown. Dieldrin is the only contaminant that has been detected in surface soil above relevant screening criteria. No known or documented releases have been associated with this unit. AlliedSignal has since installed a 3- to 4-inch sod cover over the area to reduce the potential for direct human exposure.

SWMU 6A, CRC Leach Field: From 1947 to 1962, dilute chemical waste was discharged to a leach field behind the CRC/TPL buildings. The dilute laboratory wastewaters drained into the CRC Neutralization Tank prior to discharge to the CRC Leach Field. The wastewater contained pyridine and dichloroethane. The exact location and the quantity of wastewater discharged to the leach field is not known. No known or documented releases have been associated with this unit. AlliedSignal has since installed a 3- to 4-inch sod cover over the area to reduce the potential for direct human exposure. The potential exists for historical releases to groundwater from this unit. However, given the documented groundwater flow direction to the east, parallel to the southern property boundary, and the capture zone of Well 10, all historical contamination form this unit is contained within the site boundaries.

SWMU 7, MRC Neutralization Tank: From 1960 to 1962, this below-ground concrete neutralization tank was used to neutralize dilute laboratory wastewater from the MRC's closed drainage system. The tank contained limestone and treated wastes that contained pyridine and dichloroethane. The quantity of the waste treated is unknown. The tank was 4 feet by 8 feet and was removed in 1962. No known or documented releases have been associated with this unit. AlliedSignal has since installed a 3- to 4-inch sod cover over the area to reduce the potential for direct human exposure.

SWMU 7A, MRC Leach Field: From 1960 to 1962, dilute chemical waste was discharged to a leach field east of the MRC building. The dilute laboratory wastewaters drained into the MRC Neutralization Tank prior to discharge to the MRC Leach Field. The types of materials discharged to the leach field are unknown although the wastewaters may have contained hazardous waste constituents. The exact location and the quantity of wastewater discharged to the leach field is not known. No known or documented releases have been associated with this unit. AlliedSignal has since installed a 3- to 4-inch sod cover over the area to reduce the potential for direct human exposure. The potential exists for historical releases to groundwater from this area. However, SWMU 7A is directly upgradient of former extraction Well 2. This well was

shut down in 1993 due to non-detectable level of contaminants. Therefore, no historical contamination form this unit is apparent.

SWMU 8, CRL Neutralization Tank: From 1953 to 1962, this below ground concrete neutralization tank was used to neutralize dilute laboratory wastewater from the Chemical Research Laboratories. The tank contained limestone and may have treated wastes that contained hazardous constituents. The quantity of the waste treated is unknown. This tank was 10 feet in diameter. No known or documented releases have been associated with this unit. AlliedSignal has since installed a 3- to 4-inch sod cover over the area to reduce the potential for direct human exposure.

SWMU 8/9, Open Pipe Discharge From CRL/DEV: From 1953 to 1962, dilute laboratory wastewater from the CRL and DEV neutralization tanks was discharged from open pipes. The quantity of wastewater discharged at these location is not known and the pipes have been removed. Benzo[b]fluoranthene is the only contaminant that has been detected in surface soil in this area above relevant screening criteria. AlliedSignal has since installed a 3- to 4-inch thick sod cap over this unit and a portion of the Nichols Complex was constructed over this unit.

SWMU 9, DEV Neutralization Tank: From 1957 to 1962, this below-ground concrete neutralization tank was used to neutralize dilute laboratory wastewater from the Development Building. The tank contained limestone and may have treated wastes that contained hazardous constituents. The size of the tank is unknown. No known or documented releases have been associated with this unit. A 3- to 4-inch thick sod cap covers this unit and a portion of the Nichols Complex was constructed over this unit.

SWMU 10, Toxicology Underground Storage Tank: From 1979 to 1982, dilute wastewaters containing silica, toluene, hexane, hydrochloric acid, ethyl ether, ethanol, formalin, animal urine/feces, ammoniate zinc nitrate, NFE (nitrogen iron fertilizer containing ammonium nitrate, ferric ammonium citrate, and urea), and boron trifluoride were stored in the 3,000-gallon fiberglass underground storage tank located near the Toxicology Building. During the period of operation, 2000 to 3000 gallons of waste were handled in the tank. No known or documented releases have been associated with this unit. The tank was emptied and the waste was disposed of off site. The tank was removed in 1985 and no evidence of leaks was detected. AlliedSignal has since installed a 3- to 4-inch sod cover over the area to reduce the potential for direct human exposure.

SWMU 11, CRL Underground Storage Tank: From 1979 to 1983, dilute wastewaters containing fish wastes, aldicarbe oxime, acid aldehydeoxime, solid waste extracts, chlorine and sodium hypochlorite were stored in the 1,000-gallon fiberglass underground storage tank located near the Aquatics Laboratory. During the period of operation less than 5,000 gallons of waste were handled in the tank. No known or documented releases have been associated with this unit. The tank was removed in 1985 and no evidence of leaks was detected. AlliedSignal has since installed a 3- to 4-inch sod cover over the area to reduce the potential for direct human exposure.

SWMU 12, CRC Open Pipe Discharge: From 1947 to 1962, dilute laboratory wastewater from the CRC neutralization tank was discharge from an open pipe. The quantity of wastewater

discharged at this location is not known and the pipe has been removed. Dieldrin is the only contaminant that has been detected in surface soil in this area above relevant screening criteria. AlliedSignal has since installed a 3- to 4-inch sod cover over the area to reduce the potential for direct human exposure.

SWMU 13, Permitted Waste Storage Facility: A permitted waste storage facility is located northwest of the Development building. The facility has operated since 1981. The quantity of waste stored at this location is not known and no releases have been reported.

SWMU 14, Be/Cu (A.M. Best) Proposed Discharge Location: This unit consists of an area at the A.M. Best site where, during a NJDEP field visit in 1980, a NJDEP representative observed what appeared to be a ponding of discharge from a beryllium/copper waste stream from the pilot plant. Based upon available documentation, the entire A.M. Best site received a No Further Action determination on December 27, 1994, from NJDEP and this portion of the site was removed from the Administrative Consent Order. This portion of the property has since been transferred.

AOC A, UST E-4: This unit was located in a paved parking lot near the PTL building and consisted of a 7,500-gallon UST which was used to store No. 2 fuel oil. During tank closure activities on August 24, 1994 contaminated soils were detected both visually and with field monitoring equipment. The UST was excavated, cleaned, and disposed with any contaminated soils also taken off site. Confirmatory sampling results were collected and the excavation was backfilled with clean fill. NJDEP approved a No Further Action Recommendation for this unit on June 14, 1995.

AOC B, UST E-7: This unit was located at the Park Avenue facility and consisted of a 10,000 gallon UST used to store No. 2 heating oil. During excavation of the tank, visual contamination was observed which indicated that overfill of the tank may have occurred. The tank was excavated, visually contaminated soil removed, and confirmatory samples collected. Once results were received the excavation was backfilled with clean soil. NJDEP approved the Remedial Investigations and Remedial Actions undertaken at this unit and extended a No Further Action Recommendation on November 14, 1996.

AOC C, UST E-8, E-9, E-10, and E-11: This unit was a tank system consisting of four tanks used to store gasoline near the Facilities and Services (F&S) building on site. During closure of these tanks in 1993, some visual signs of staining were observed. The tanks were excavated, contaminated soils removed, and confirmatory samples collected. Once results were received, the excavation was backfilled with clean soils. NJDEP approved the Remedial Investigations undertaken at this unit and extended a No Further Action Recommendation on February 17, 1994.

AOC D, UST E-2, E-3: This unit consisted of two USTs, one 20,000 gallon (E-2) and one 1,500 gallon (E-3), which were used to store No. 2 and No. 6 fuel oil, respectively. These tanks were located near the Administration building on site. During closure activities for these tanks in 1998, visual signs of contamination were observed. The tanks were excavated, contaminated soil removed, and confirmatory samples collected. Once results were received, the excavation was backfilled with clean soil. No further action was recommended for this area.

AOC E, A.M. Best Building Excavation: This area consisted of petroleum contaminated soils beneath a parking lot which were discovered during routine geotechnical work. The source of this contamination was unknown. Contaminated soil in the area was excavated and analyzed until the vertical and horizontal extent of the contamination was delineated. Contaminated soil was disposed of off site and the excavation was backfilled with clean fill. No further action was recommended for this area.

All SWMUs/AOCs at the AlliedSignal site, with the exception of SWMUs 1, 2A, 2B, and 13, are no longer in operation and have either been designated as requiring no further action or have been taken out of operation and covered with a 3- to 4-inch sod layer. SWMUs 1, 2A, 2B, and 13, still exist at the site. SWMU 2A/2B is two storm water retention ponds that do not manage waste materials, and therefore do not require additional action at this time. SWMUs 1 and 13 managed hazardous wastes. However, they are currently operated in compliance with relevant permits and do not require any additional action at this time.

References:

(1) RCRA Preliminary Assessment, prepared by NJDEP - September 1987.
(2) Administrative Consent Order, prepared by NJDEP - November 1989.
(3) Remedial Investigation, prepared by Geraghty & Miller - October 1991.
(4) Site Assessment Report for UST Nos. E-8, E-9, E-10, E-11, prepared by Storch Engineers - October 6, 1993.
(5) Feasibility Study, prepared by Geraghty & Miller - January 1994.
(6) Letter from Bruce Venner, NJDEP to David Paley, AlliedSignal, re: Approval of Remedial Investigation and Closure of USTs E-8, E-9, E-10, E-11 - February 17, 1994.
(7) Remedial Investigation Report for UST E-4, prepared by Storch Engineers - December 1994.
(8) Letter form Pamela Lange, NJDEP, to Pamela Cissik, AlliedSignal, re: No Further Action decision for the A.M. Best Property and Removal of the A.M. Best property from the ACO - December 27, 1994.
(9) Letter from Pamela Lange, NJDEP, to David Paley, AlliedSignal, re: Approval of closure for UST E-4 - June 14, 1995.
(10) Letter from Robert Savarese, AlliedSignal, to Bureau of UST, NJDEP re: UST E-7 Tank Closure - July 17, 1995.
(11) Remedial Investigation Report for the A.M. Best Building, prepared by Storch Engineers - February 1996.
(12) Letter from Pamela Lange, NJDEP, to David Paley, AlliedSignal, re: Approval of Remedial Investigation/Remedial Actions for UST E-7 - November 14, 1996.
(13) Site Investigation Report for AlliedSignal Inc. Administration Building (UST E-2 and E-3), prepared by Storch Environmental - November 1998.
(14) RCRA Corrective Action Site Fact Sheet, prepared by USEPA - date unknown.

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, metals, pesticides
Air (indoors)[2]		X		
Surface Soil (e.g., <2 ft)	X			SVOCs, dieldrin
Surface Water		X		
Sediment		X		
Subsurface Soil (e.g., >2 ft)	X			SVOCs, dieldrin
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: Numerous wells are in place to assess groundwater contamination at the site. These wells include background wells, off-site downgradient wells, on-site production wells, and on-site monitoring wells. Documentation indicates that in the past, AlliedSignal disposed of

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[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

laboratory wastes directly onto or into the ground surface in different areas of the facility (i.e., SWMU 3). Two aquifers exist beneath the site: the terminal moraine and the outwash deposits. The terminal moraine is a poorly yielding aquifer, while the outwash deposits, which underlie the terminal moraine, is the only glacial unit that yields a significant quantity of groundwater at the site.

VOCs have been detected in both the terminal moraine and outwash deposits at levels above the NJ Groundwater Classification Criteria for Class II-A, potable groundwater. The predominant VOCs detected in the terminal moraine deposit, in order of decreasing concentrations, include carbon tetrachloride, chloroform, trichloroethene, 1,1-dichloroethane, and 1,2-dichloroethane. The predominant VOCs detected in the outwash deposits, in order of decreasing concentrations, include carbon tetrachloride, trichloroethene, and toluene. VOCs were not detected in wells completed in the bedrock. Routine groundwater monitoring has been conducted since 1976. Recovery of contaminated groundwater from SWMU 1 has also been occurring since 1976. Since the Feasibility Study in 1994, semi-annual groundwater monitoring has been conducted.

The concentrations of metals reported in groundwater samples from wells screened in the terminal moraine and outwash deposits are below the N.J. Groundwater Quality Standards with the exception of total chromium. The concentrations of total chromium ranged from nondetectable to 1750 ug/L (Well 17S).

Tests conducted as part of the 1991 Remedial Investigation have shown that the groundwater recovery system (SWMU 1), consisting of Wells 2 and 10, extends beyond the eastern site boundary and is sufficient to contain VOCs in both the terminal moraine and outwash deposits, and control migration of contaminants in groundwater. This conclusion is supported by the absence of VOCs in Well 12, which is screened in the terminal moraine downgradient from Well 10, and the A.M. Best Well, and Well 18, which are completed in the outwash deposits, and are downgradient of Wells 2 and 10. Additionally, sampling results from the semi-annual groundwater monitoring show stability in all contaminant levels in the monitoring wells that are part of the semi-annual groundwater monitoring program.

Therefore, it appears, based upon the current information available, that the current monitoring and extraction program in place is sufficient to control the migration of contaminant to off-site locations. It also appears that contaminant levels in groundwater have been stabilized.

Air (Indoors): Groundwater beneath the site is contaminated with elevated levels of VOCs (e.g., carbon tetrachloride, chloroform, trichloroethane, 1,1-dichloroethane, 1,2-dichlrooethane, and toluene). Therefore, contaminant volatilization into indoor air may be of concern. However, based upon the review of available documentation, potential VOC migration to indoor air is not a concern at the AlliedSignal site for the following reasons.

There are no distinct groundwater contamination plumes beneath the site, but rather localized areas of contamination that are generally related to SWMUs/AOCs locations. The majority of these hot spots are not located near current buildings on site and no off-site residences are affected. Additionally, depth to groundwater at the site ranges from approximately 50 to 150 feet below ground surface (bgs). Typically the frequency of contaminant migration to indoor air decreases as the depth to groundwater increases.

The Johnson and Ettinger Screening Level Model for Groundwater Contamination was used to obtain an estimation of the incremental risk associated with the concentrations of volatile hazardous constituents detected by the groundwater monitoring program. The input parameters used and the result are included as Attachment 5. The result indicates that the incremental risks for the various constituents ranged from 1×10^{-9} to 9.9×10^{-7}.

Based upon the depth of the aquifer beneath the site and application of the Johnson and Ettinger Model, volatile contaminant migration from soil and groundwater into indoor air does not appear to be of concern.

Surface/Subsurface Soil: During the Remedial Investigation, conducted by Geraghty & Miller, Inc. between November 1990 and July 1991, soil samples were collected from 66 soil borings in areas throughout the site. Soil samples collected at depths less than or equal to four feet were designated as surficial soil samples; therefore, for the purposes of this EI determination, results encompass contaminant concentrations in surface and subsurface soil. The analytical results were compared to the New Jersey Soil Cleanup Criteria (NJSCC) for residential surface soil and the Impact to Ground Water Criteria for subsurface soil. Soils in SWMUs 5, 6A, 7, 7A, and 11 were found to be in compliance with the NJSCC for residential soil. Detected concentrations in SWMUs 3, 6, 8/9 and 12, were found to exceed the NJSCC for residential surface soil as follows:

- **SWMU 3, Nichols Complex Disposal Area:** Results indicated the following SVOCs were above the NJSCC for residential surface soil: benz[a]anthracene, benzo[a]pyrene, chrysene, and indeno[1,2,3-cd]pyrene.

- **SWMU 6, CRC Neutralization Tank:** Only dieldrin was detected above the NJSCC for residential surface soil.

- **SWMU 8/9, Open Pipe Discharge From CRL/DEV:** Only benzo[b]fluoranthene was detected above the NJSCC for residential surface soil.

- **SWMU 12, CRC Open Pipe Discharge:** Only dieldrin was detected above the NJSCC for residential surface soil.

Based upon materials reviewed, the presence of dieldrin, a pesticide, is thought to be due to horticultural activities at the site. Also, the presence of PAHs is thought to be related to asphalt covering that was located in the area where these samples were collected.

Surface Water: During the Remedial Investigation studies conducted between November 1990 to July 1991, surface water data were collected from the three stormwater retention ponds at the Main Site, Pond A (SWMU 2A), Pond B (SWMU 2B), and Pond 1 (not designated as a SWMU/AOC). Only dieldrin was detected in Pond 1 at 0.011 ug/L, which was slightly above the New Jersey Surface Water Criteria (0.0019 ug/L) (New Jersey Water Pollution Control Act (NJAC 7:9-4).

Contaminated groundwater retrieved from SWMU 1 (Recovery Wells 2 and 10) is also discharged through a NPDES permit to Black Brook, a small brook which is located approximately one mile east of the property. (Only Recovery well 10 is currently operating.) Per NPDES requirements, samples have been collected at this outfall for over 10 years. With the exception of two anomalous sampling rounds, no constituents have been detected in the discharge. The two incidents were chloroform being reported in one sampling round at 1 ug/L, and carbon tetrachloride in a different sampling round at levels below the method detection limit. Based upon this information, on- and off-site surface water does not appear to be significantly impacted by contamination from this facility.

Sediment: During the Remedial Investigation studies conducted between November 1990 to July 1991, and further remedial investigations conducted in 1993, sediment samples were collected from the three retention ponds at the Main Site, Pond A (SWMU 2A), Pond B (SWMU 2B), and Pond 1 (not designated as a SWMU/AOC). Sediment results from Pond A and B did not indicate any significant contaminant levels. However, due to results from the initial investigations indicating elevated levels of PAHs, metals, and PCBs in Pond 1, sediments in Pond 1 were dredged and analyzed.

During the second sampling round of sediments in Pond 1 in 1993, the detected concentrations of metals, pesticides, and PCBs were below the NOAA Effects Range-Low (ER-L), the chosen benchmark for this analysis due to the limited sediment exposure to humans on site. Additionally, dredged soils were found to have concentrations of metals, PAHs, and pesticides below the NJSCC residential soil criteria. Slightly elevated levels of PCBs were found in a small amount of the dredged materials. This PCB-contaminated soil was shipped off site for treatment. All remaining clean soils were used as fill material at the site. Therefore, no further action was recommended for sediments in Ponds A, B, and 1.

Air (Outdoors): There is no reason to believe outdoor air has been contaminated based on the levels of contaminants detected and the mixing that would occur due to normal air flow. Additionally, a soil-gas survey conducted at the site indicated that "soil conditions at the [site] are not conducive to the active transport of soil gas because of the moist and clayey nature of soil in the unsaturated zone" (Reference No. 1).

References:

(1) Remedial Investigation, prepared by Geraghty & Miller - October 1991.
(2) Feasibility Study, prepared by Geraghty & Miller - January 1994.
(3) Supplemental Remedial Investigation Report for Surface Water and Sediment at the AlliedSignal Inc. Facility, prepared by Geraghty & Miller - January 1994.
(4) Letter from David Paley, AlliedSignal, to Carol Graubart, NJDEP, re: Most Recent Semi-Annual Groundwater Monitoring Reports - April 16, 1999
(5) Letter from David Paley, Honeywell, to Carol Graubart, NJDEP, re: Most Recent Semi-Annual Groundwater Monitoring Reports - December 16, 1999.
(6) State of Connecticut Regulation of the Department of Environmental Protection concerning Remediation Standard, Section 22a-133k-1 through 22a-133k-3, updated July 1996.

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

Summary Exposure Pathway Evaluation Table
*Potential **Human Receptors** (Under Current Conditions)*

"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespasser	Recreation	Food[3]
Groundwater	No	No	No	No	--	--	No
~~Air (indoor)~~							
~~Surface Soil (e.g. < 2 ft)~~	~~No~~	~~No~~	~~No~~	~~No~~	~~No~~	~~No~~	~~No~~
Surface Water							
~~Sediment~~							
Subsurface Soil (e.g., > 2	--	--	--	No	--	--	No
Air (outdoors)							

Instruction for Summary Exposure Pathway Evaluation Table:

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

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

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

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

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

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

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

Rationale:

Groundwater: The Risk Assessment Report, submitted as part of the 1991 Remedial Investigation, indicates that there are no risks associated with contaminated groundwater in the terminal moraine because this deposit generally cannot yield sufficient quantities of water to be regarded as an aquifer. Additionally, there are no risks associated with the groundwater in the outwash deposits while Well 10 continues to pump and the water continues to be discharged to the storm sewer. Also, the facility no longer obtains potable water from wells on site. AlliedSignal purchases potable water from Southeast Morris County Municipal Utility Authority for use at the site.

Tests conducted as part of the 1991 Remedial Investigation have shown that the groundwater recovery system (SWMU 1) capture zone, which then consisted of Wells 2 and 10, extends beyond the eastern site boundary and is sufficient to contain VOCs in the both the terminal moraine and outwash deposits from moving off site. Groundwater studies and measurements, documented in the Remedial Investigation report, indicate that groundwater flow in both the terminal moraine and outwash deposits is eastwardly, and parallel to the boundary between the AlliedSignal property and the Morris County Golf Club. With respect to contamination in the outwash deposits, the highest detections of groundwater contaminants in the outwash deposits have been detected in the area of Well 10. Therefore, because of the placement of Well 10 (see Attachment 2), and the capture zone associated with groundwater extraction in this well (radius of approximately 300 feet), it has been determined that contaminant levels in the outwash deposits are not migrating to off-site locations. This has been supported by the absence of VOCs in Well 12, which is screened in the terminal moraine downgradient from Well 10, and Well 18, which are completed in the outwash deposits (approximately 500 feet off-site), and downgradient of Wells 2 and 10. See Attachment 4 for the historical and most recent groundwater monitoring data. Based upon the available information, it appears that no current direct exposure to groundwater is occurring on- or off-site.

Surface/Subsurface Soil: All soil contamination exists on site and within the facility boundaries. Documentation indicates that all areas of residual contaminated soil on site have been covered by an approximately 3- to 4-inch thick layer of sod to reduce the potential for direct exposure to contaminated soils. The site also maintains a fence that completely surrounds the facility, and a 24-hour security system. Any intrusive activities at the site are conducted under the facility's health and safety plan to mitigate potential exposure to contaminated soils at the facility.

Additionally, the Risk Assessment Report calculated risk to a potential landscape worker at the site, and reported a calculated cancer risk for exposure to soil as 8.0×10^{-6} and a non cancer Hazard Index (HI) of 0.2 (including dermal, ingestion, and inhalation [particulates and vapors] pathways). Both of these estimates are within or below EPA's acceptable risk range of 1.0×10^{-4} to 1.0×10^{-6} for excess lifetime cancer risk (ELCR), and HI of 1.0.

Reference(s):

(1) Remedial Investigation, prepared by Geraghty & Miller - October 1991.
(2) Feasibility Study, prepared by Geraghty & Miller - January 1994.

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 and Reference(s):

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

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

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

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

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

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

Rationale and Reference(s):

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

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

__X__ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the AlliedSignal, Inc. facility EPA ID# NJD048794986, located at Columbia Road and Park Avenue, in Morristown, 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: original signed by Date: 09/27/00
Kristin McKenney
Risk Assessor
Booz Allen & Hamilton

Reviewed by: original signed by Date: 09/27/00
Kathy Rogovin
Sr. Risk Assessor
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original signed by Date: 09/27/00
Clifford Ng, RPM
RCRA Programs Branch
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original signed by Date: 09/27/00
Barry Tornick, Section Chief
RCRA Programs Branch
EPA Region 2

Approved by: original signed by Date: 09/28/00
Raymond Basso, 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.

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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 - SWMU/AOC Map (taken from the Administrative Consent Order, November 2, 1989).

Attachment 2 - Location of Existing Wells, Well 10 Capture Zone, Groundwater Flow Direction, and Areas of Soil Contamination.

Attachment 3 - Summary of Media Impacts Table

Attachments truncated, see facility file (MSS, 06/13/02)