DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Draft 7/12/07

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name: Linde SJS LP (Scott, Kimberly Clark, Linde Air Products)
Facility Address: 50 West Powhatten Avenue, Tinicum, Pennsylvania 19029
Facility EPA ID #: PAD 000798504

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, 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 #8 and enter "IN" (more information needed) status code

BACKGROUND

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 Controls" 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 "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated groundwater and contaminants within groundwater (e.g., non aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

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

2. Is **groundwater** 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 anywhere at, or from, the facility?

_____	If yes – continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.
X	If no – skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."
_____	If unknown (for any media) – skip to #8 and enter "IN" status code.

Rationale and Reference(s):

The information provided herein has been detailed in the Environmental Indicator (EI) Report, to which these checklists are an appendix. Any references to tables and figures provided in the discussion below refer to the tables and figures in the EI Report. Additionally, superscript numbers in the text herein apply to the reference documents presented in Appendix A of the EI Report.

Linde Air Products utilized the Site from 1937 to 1967 for manufacturing bottled gases and air products. From 1967 until 1972, Scott Paper Company utilized the Site for research and development of paper and paper pulp technology. From 1972 until 1980, Scott utilized the Site for development of disposable diaper covers and disposable paper cups. From 1980 until 1984, the Site was occupied by Scott's environmental and industrial hygiene laboratories. From 1984 until 1997, Scott (which was later renamed Kimberly Clark Tissue Company in 1996) utilized the Site for the development of "wet wipes".

In October 1997, the Site was sold to Linde Associates LP who owned the Site from 1997 until 2000. During this time, Linde Associates LP gutted the entire building to the outer walls and soil remediation work was completed. Once the soil remediation work was completed, the Site was sold to SJS Linde LP in July 2000. Since SJS Linde LP purchased the Site, the Site has been occupied by several office-type tenants.

Several characterization investigations have been conducted at the Site from 1996 through 1999 by Adirondack Environmental Services, Inc. (AES) and RT Environmental, Inc. (RT). These investigations included soil and groundwater sampling at selected locations throughout the Site, preparation of a Non-Use Aquifer Determination and contaminant transport modeling, and soil remediation at two areas located west of the main building. These activities resulted in submittal and subsequent approval of an Act 2 Final Report and release of liability for contaminants identified and addressed in soil and groundwater. The following is a summary of the investigations and remedial work conducted at the Site. Detailed information is presented in Section 2.5 of the EI Report.

In December 1996, a Phase II Investigation was performed AES. Thirteen AOCs were addressed, which included: a closed-in-place 5,000-gallon UST, a septic tank, the waste chip storage area, a closed-in-place 1,000-gallon UST, the former drum storage area and waste storage shed, a former liquid petroleum AST, transformers, the northern, eastern, and western property boundaries, the chemical storage room and associated closed-in-place 1,000-gallon fuel oil UST, the former garage (blue dye room), and the main building interior, which included six separate areas inside of the main building.

[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 appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

Soil and/or groundwater samples were collected at each area. The soil and groundwater samples were analyzed for volatile organic compounds (VOCs) via USEPA Method 8240, VOCs via USEPA Method 8021B and semi-volatile organic compounds (SVOCs) via USEPA Method 8270C for fuel oil parameters, and/or various metals. The soil sample results were originally compared by AES to the PADEP Non-Residential Used Aquifer Soil-to-Groundwater Medium-Specific Concentrations (MSCs). The groundwater results were compared to the PADEP Non-Residential Used Aquifer Groundwater MSCs. According to reports issued by AES, risk-based screening values were not available for metals at the time of the Phase II investigation. The soil and groundwater sample results are presented in **Tables 2 through 7** of the EI report.

Based on the Phase II investigation conducted by AES, soil and/or groundwater sample results collected from the targeted areas indicated that the constituents analyzed for were either not detected or were detected below the selected MSCs, with the exception of:

- VOCs detected in soil and groundwater collected at the former drum storage area and waste storage shed;
- VOCs detected in soil and groundwater collected along the eastern property boundary (thought to be from the neighboring property, Esschem);
- Vinyl chloride detected in groundwater along the western property boundary;
- Trichloroethylene (TCE) detected in groundwater at the chemical storage room (1,000-gallon fuel oil UST); and
- Vinyl chloride and TCE detected in groundwater at the former garage (blue dye room).

URS compared the available soil and groundwater results to the most current PADEP Non-Residential Direct Contact and Non-Use Aquifer Soil-to-Groundwater MSCs (RT submitted and PADEP approved a Non-Use Aquifer Determination for the Site in June 1999, Section 2.5.10, EI Report). The groundwater samples were compared to the PADEP Non-Residential Non-Use Aquifer Groundwater MSCs. Based on these comparisons, only two groundwater samples contained site-related constituents that were above the selected MSCs. The groundwater sample (with a concentration of 130 ug/L) collected from the chemical storage room (1,000-gallon fuel oil UST) was above the MSC for TCE (50 ug/L), as was the groundwater sample collected from the former garage (blue dye room) where TCE was detected at 59 ug/L.

According to a January 1998 Phase III Investigation Report, six monitoring wells (MW-1 through MW-6) were installed on-site in September 1997. The wells were first sampled in October 1997 and analyzed for VOCs. The results were originally compared by RT to the PADEP Non-Residential Non-Use Aquifer Groundwater MSCs. TCE was detected above the MSC at MW-4 and MW-6, and vinyl chloride was detected above the MSC at MW-6 (**Table 8, EI Report**).

URS compared the groundwater results to the most current Residential (a residential area is located south of the Site) and Non-Residential Non-Use Aquifer Groundwater MSCs. TCE was detected above the selected MSCs (residential and non-residential MSC is 50 ug/L) at MW-4 (250 ug/L) and MW-6 (190 ug/L).

Soil remediation was performed by RT in October 1997. Approximately 753 tons of impacted soils were removed from the Site from the area of the closed-in-place 1,000-gallon UST located next to the former garage and from the former storage shed area. The 1,000-gallon UST was also removed during the excavation. Soil samples were collected from both areas (**Tables 9 and 10, EI Report**) and grab groundwater samples were collected from the UST excavation (**Table 9**). The soils and groundwater collected from the UST excavation were analyzed for PADEP no. 2 fuel oil parameters. RT originally compared the analytical results to the PADEP Non-Residential Used and Non-Use Aquifer Soil-to-Groundwater MSCs. None of the samples, with the exception of naphthalene in the grab groundwater samples, were above the MSCs. It was believed that the naphthalene detected in the grab groundwater samples was due to contact of the pit water with localized impacted soil during excavation.

URS compared these excavation soil and groundwater analytical results to the most current PADEP Non-Residential Direct Contact and Non-Use Aquifer Soil-to-Groundwater MSCs. None of the results exceeded the MSCs. URS compared the grab groundwater samples to the Non-Residential Non-Use Aquifer Groundwater MSCs. Naphthalene was detected (39,000 and 83,000 ug/L) above the MSCs (30,000 ug/L) in both samples.

Eight soil samples were collected from the storage shed excavation. The samples were analyzed for VOCs. RT originally compared the soil sample results to the PADEP Non-Residential Used and Non-Use Aquifer Soil-to-Groundwater MSCs. None of the samples were above the MSCs. URS compared these results to the most current PADEP Non-Residential Direct Contact and Non-Use Aquifer Soil-to-Groundwater MSCs. None of the results were above these MSCs.

An aquifer use determination was performed in March 1998 and June 1999 by RT for Scott. The determination concluded that the Site aquifer met the Act 2 criteria for a non-used aquifer under the PADEP Land Recycling Program regulations. In June 1999, PADEP approved the Non-Use Aquifer Determination for the Site. RT also conducted transport modeling in June 1999 for the compounds of concern identified in site groundwater, which included: 1,1-dichloroethane (1,1-DCA), cis-1,2-dichloroethene (cis-1,2-DCE), and TCE. Wells MW-4 and MW-6 were used as calibration points for the model. The modeling indicated that cis-1,2-DCE and 1,1-DCA would attenuate below their respective MSCs within 300 feet downgradient of the Site, and that TCE would attenuate below its MSC within 900 to 1,000 feet downgradient of the Site.

In September 1999, RT submitted a Notice of Intent to Remediate (NIR) for the Site on behalf of Scott. Site characterization activities confirmed the presence of both VOCs and SVOCs in the soil and groundwater at the former storage shed area, the former chemical storage room (near the 1,000-gallon closed in place UST), and near the 1,000-gallon no. 2 fuel oil UST located near the former garage. The owners of the property (Linde Associates LP) planned to remediate the soil by excavation and off-site disposal and the groundwater by natural attenuation.

Groundwater samples were collected in October 1997, January 1998, April 1998, August 1998, November 1998, June 1999, and September 1999 (**Table 8, EI Report**). RT originally compared the results to the PADEP Non-Residential Non-Use Aquifer Groundwater MSCs. The results indicated that constituents analyzed for either were not detected or were detected below the selected MSCs, with the exception of TCE detected at MW-4 in October 1997 and at MW-6 in October 1997, January 1998, and April 1998. Vinyl chloride was detected above the standard in MW-6 in October 1997. Subsequent sampling events showed that TCE and vinyl chloride were below the MSC at these two wells.

URS compared the groundwater results to the most current PADEP Residential and Non-Residential Non-Use Aquifer Groundwater MSCs. The results of the screening agreed with the screening conducted by RT (as described in the previous paragraph). The only detections above the MSCs were at MW-4 and MW-6. MW-4 contained TCE (concentration of 250 ug/L) above both the residential and non-residential MSCs (50 ug/L) in October 1997. MW-6 contained TCE at 140 ug/L, 69 ug/L, and 66 ug/L in October 1997, January 1998, and April 1998, respectively, above both residential and non-residential MSCs (50 ug/L) and vinyl chloride at 82 ug/L above both the residential and non-residential MSCs (20 ug/L). All of the other detected constituents were below both the residential and non-residential MSCs. However from 1998 to 1999 (five sampling events) all concentrations were well below the most current standards and natural attenuation has likely decreased the concentrations even further over the years.

As a result of a comment letter received from PADEP in May 1998 (letter not observed by URS), RT installed 14 additional soil borings in areas identified for further investigation. Soil samples were collected in July 1998 from three areas, which included: outside the chemical storage area near the closed-in-place 1,000-gallon UST; near the former storage shed area; and the near the former 1,000-gallon UST located next to the former garage. The soil samples were analyzed for VOCs (including benzene, toluene, ethylbenzene, and xylenes (BTEX), naphthalene, and no. 2 fuel oil parameters). The analytical results were originally compared by RT to the PADEP Non-Residential Non-Use Aquifer Soil-to-Groundwater MSCs. None were found to be above these MSCs. URS compared the results to the most current PADEP Non-Residential Direct Contact and Non-Use Aquifer Soil-to-Groundwater MSCs (**Table 11, EI Report**). None of the detections were above the current MSCs.

In February 2000, RT submitted an Act 2 Final Report Summary to PADEP. In March 2000, RT submitted an Act 2 Final Report to PADEP. Both reports summarized the previous investigative activities performed at the Site. Both reports indicated that a Release of Liability was requested for the following compounds identified in soil and groundwater at the Site:

- BTEX compounds.
- No. 2 fuel oil compounds.

- VOCs that included chloroethane, chloromethane, cumene, 1,1-DCA, 1,2-DCA, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, methylene chloride, methyl tert butyl ether (MTBE), naphthalene, tetrachloroethylene (PCE), TCE, trichloroacetic acid (TCA), and vinyl chloride.
- RCRA metals that included arsenic, chromium, and lead.

Eight rounds of groundwater sampling had been conducted and contaminant concentrations were found to be declining. There had been no exceedances of the Non-Residential Non-Use Aquifer MSCs during the last five rounds of sampling (August 1998 through September 1999). RT further indicated that the paved/covered surfaces (greater than 85 percent of the Site) at the Site had eliminated pathways for migration of contaminants remaining in the soil and groundwater as well as direct contact by receptors with impacted soil or groundwater. In addition, RT concluded that the bulk of the contaminated soils had been excavated; therefore, no further soil remediation was necessary. Based on these conclusions, RT indicated that no post-remedial care was proposed at the Site.

RT was requesting that liability protection afforded under Act 2 be granted to the Site since attainment of the specified standards (Non-Residential Non-Use Aquifer Soil and Groundwater MSCs under the Statewide Health Standards [SWHS]) was demonstrated for soil and groundwater.

PADEP believed that all recognized AOCs were adequately addressed, and that no further investigation was necessary. PADEP approved the Final Report on May 26, 2000. Scott received release of liability using the SWHS for chlorinated solvents, inorganics (particularly lead), and polynuclear aromatic hydrocarbons (PAHs). No further investigative activities have been performed on-site. The Site is identified on the "completed sites" list issued by the PADEP Land Recycling Program.

It should be noted that because groundwater on-site is approximately five feet to seven feet bgs (based on RT's identification of a sump in the basement of the building, Section 2.5.5 of the EI Report, and depth to groundwater measurements measured by RT in 1997, Section 2.5.6 of the EI Report), there is the potential for on-site or nearby off-site receptors to come in contact with impacted groundwater during excavation activities (for instance during future construction or utility work)., particularly in uninvestigated areas such as the solvent dip tank area.

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[1] as defined by the monitoring locations designated at the time of this determination)?

_____ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"[2])

_____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[2]) - skip to #8 and enter "NO" status code, after providing an explanation.

_____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

No rationale warranted.

[1] "Existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all “contaminated” groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

_____ If yes - continue after identifying potentially affected surface water bodies.

_____ If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

_____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

No rationale warranted.

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration [2] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

_____ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgment/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

_____ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate "level(s)," and if estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing. .

_____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

No rationale warranted.

[2] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be **"currently acceptable"** (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[3])?

_____ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment[4] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

_____ If no - (the discharge of "contaminated" groundwater can not be shown to be **"currently acceptable")** – skip to #8 and enter a "NO" status, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

_____ If unknown – skip to 8 and enter "IN" status code.

Rationale and Reference(s):

No rationale warranted.

[3] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[4] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

_____ If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

_____ If no - enter "NO" status code in #8.

_____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

No rationale warranted.

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

X — YE – Yes, "Migration of contaminated Groundwater Under Control" has been verified. Based on review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater is "Under Control" at the **Linde SJS LP (Scott, Kimberly Clarke, Linde Air Products)** facility, EPA ID # **PAD 000798504**, located at **50 West Powhatten Avenue, Tinicum, PA 19029**. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and the monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be revaluated when the Agency becomes aware of significant changes at the facility.

_____ NO – Unacceptable migration of contaminated groundwater is observed or expected.

_____ IN – More information is needed to make a determination.

Completed by: signed Date 6-21-10

Hon Lee

Project Manager – 3CL30

Supervisor: signed Date 6-21-10

Paul Gotthold,

Associate Director, Office of PA Remediation (3CL30)

US EPA Region III

Locations where References may be found:

A list of all reference documents is appended to the EI Report. Copies of these reference documents can be found at USEPA's Region III office in Philadelphia or PADEP's Southeast Regional office in Norristown, PA.

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Facility Name: SJS Linde LP, Scott, Kimberly Clark, Linde Air Products
EPA ID #: PAD000798504
Location: 50 West Powhatten Avenue, Tinicum, Pennsylvania

MIGRATION OF CONTAMINATED GROUNDWATER UNDER CONTROL (CA 750)