DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

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

Migration of Contaminated Groundwater Under Control

Facility Name: Cytec Industries Inc. Warners Plant
Facility Address: Foot of Tremley Point Road, Linden, NJ
Facility EPA ID #: NJD 002173144

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.

Rational: 5 SWMUs and 2AOC: (Contamination refers to constituents of potential concern COC (i.e., those that exceeded either criteria (Direct Contact Screening Criteria (DCC) and Impact to Ground Water Screening Criteria (IGWC)) in samples from zero to two feet below ground surface (BGS)).

SWMU #1 Building 69: The southern side of the building is adjacent to the Rahway River and is separated by a pile bulkhead. Underneath the building the soil was contaminated and leached to the groundwater contaminating the fill unit, and the tidal marsh unit. The groundwater flow is influenced by the tide. Contaminated soil from underneath the building migrated to the Rahway River. Sediments were found to be contaminated by Building 69.

Surface Soil of Fill Material: was contaminated with chlorobenzene, xylenes, DDT, DDD, DDE, and Thimet. Concentrations above background were detected for arsenic, chromium, copper, lead, and zinc. There were no soil detections of concern two feet below the ground surface (BGS).

Groundwater: compliance wells downgradient from Building 69 indicate that the contamination did not exceed groundwater Class III-B criteria. (See page 4 of this document).

Sediments: were contaminated with volatile organics mainly DDT, pesticides and metals, at levels above NJDEP's sediment screening criteria.

Surface water was not contaminated.

Remediation: 1. Demolition of platform underneath the building 2. Installation of steel sheet pile bulkhead, to prevent the water from slushing under the building. 3. Placement of fill under the building, 4. Capping of Sediments with concrete in Rahway River adjacent to the building.

SWMU #2 Diphenylguanidine (DPG) Waste Treatment System: This unit consisted of 2 concrete tanks in which cyanide waste water was treated with alkaline chloride.

Soil was contaminated with chlorobenzene and sodium hydroxide

Groundwater: MW (DPG-1D) at the SWMU exceeded Class III-B criteria with Chlorobenzene in 1993. Sampling results taken at the compliance wells in 1997 and 1998 showed chlorobenzene concentrations to be an order of magnitude lower than the Class III-B standards.

Remediation: excavation, stockpiling, off-site treatment and disposal. The excavated area was backfilled with certified clean backfill.

SWMU # 3: Liquid Areofloats Production Area (LAP area): The LAP area had been used for the production of liquid aerofloats. The storage facility consisted of three aerofloat tanks and one cresylic acid tank, which had a rupture and spill.

Soil: was contaminated with methylene chloride, total xylenes and benzopyrene, and 2-4 dimethyl phenol. They all exceeded DCC and IGWC.

Groundwater: Monitoring wells at the SWMU (MW LAP-1 and P-7S) were contaminated with 3,4 -dimethyl phenol, 2-methyl phenol and 4-methyl phenol in 1993 and exceeded the Class II-A standards (Class III-B standards were not developed). These compounds were under detection limits in samples taken from the compliance wells (LAP-2S and LAP-2D in 1993). Sampling results taken at the compliance wells in 1997 and 1998 had slight exceedance in methylene chloride above the Class II-A standards, while Chlorobenzene contamination was one order of magnitude lower than the Class III-B standards.

Remediation: excavation, stockpiling, off-site treatment; NJDEP requires Environmental Restriction and quarterly monitoring for the first year and semiannually for the next 4 years.

SWMU #4: Laboratory Waste Sump: this unit transferred laboratory waste water from the lab to an effluent collection system.

Soil: was contaminated with mercury, toluene, Malathion/Cythion and 2,4 -dimethylphenol.

Remediation: In 1992 the sump along with the soil were removed and replaced with an above grade unit and the area was backfilled and paved.

Groundwater: MWs LWS-1 and LWS-2 were contaminated with chlorobenzene and xylene; the contamination was one and two orders of magnitude lower than groundwater Class III-B criteria.

SWMU #5: Building 132: The building was used for the production of Malathion. Toluene was used in this process. The building had a cast iron floor drain system. It collected reactor and floor drain wash water from Building 132, which was transferred to the effluent collection system for subsequent discharge into the LRSA treatment system. A leak had developed. Toluene was found but not Malathion because it had volatized

Remediation: The cast iron floor was eliminated and any potential for further leaks was eliminated.

Groundwater: the Fill Unit was investigated and toluene was not present

2 AOC: Tile Leachfields, acid Spill Areas require NFA, since sampling indicated no contamination

Reference(s): **RFI Phase I Report, and CMS Report Revised**

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 Migration of Contaminated Groundwater Under Control EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "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 ground water 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).

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2. Is **groundwater** known or reasonably suspected to be **contaminated**[1] above appropriately protective "levels" (i.e., 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 - skip to #8 and enter "IN" status code.

Rationale: The Groundwater consists of three water bearing units . The *Saturated Surficial Fill Unit* is the top unconfined aquifer, with radial flow to Rahway River and Arthur Kill. There is tidal influence at the margins. The *Sand and Gravel Unit* is a confined aquifer, it is permeable with horizontal radial flow into the Rahway River, and the *Shallow Bedrock Unit* which consists of a mudstone layer and several siltstone layers, with flow direction flat, or vertical up and is influenced by tidal cycles. An aquiclude called the *Tidal Marsh Deposit* separates the Fill Unit from the Sand and gravel Unit. The aquiclude has a downard leakage next to Building 69 caused by the bulkhead perforations.

The Groundwater Flow: The gw flow in the saturated *Fill Unit* and the *Sand and Gravel Unit is* radial. The *Shallow Bedrock Unit* has convergent flow patterns, from south west toward north east. The secondary porosity due to fractures is responsible for a vertical upward component that recharges the Sand and Gravel Unit.

Cytec has installed monitoring wells addressing the SWMUs of which four were intended to be the backgound wells (Back). However based on the topographic conditions these wells are downgradient and became part of the compliance wells.

These groundwater units are monitored by twelve compliance wells . (See attached maps in this document)

Groundwater standards: The groundwater was tested for chlorine content which exceeded 3,000 mg/l chloride and the total dissolved solids (TDS) exceeded the 5,000 mg/TDS which makes the groundwater not suitable for conversion to potable uses. Therefore the groundwater is designated by NJDEP as Class III-B. The designated uses for Class III-B ground water consist of any reasonable uses for such ground water other than potable water. According to NJDEP the groundwater quality criteria for Class III-B are to be determined case by case such that: 1. Existing use of groundwater are not impaired, 2. Discharge of groundwater to surface water does not result in violation of Surface Water Quality standards, 3. Release of pollutants does not pose a threat to human health and 4. Reasonable potential for changes in hydraulic gradients would not result in contaminant migration to any classification area other than Class III-B.

For Class III-B groundwater Cytec developed site specific standards by using standard risk assessments protocols, which focus on evaluation of possible fate of residual contaminants of concern and their potential effect on receptors which may be exposed. Cytec based the risk assessments on land use, proximity of populations (nonsensitive human populations were identified), surface water use and Class III-B groundwater use.

Cytec in order to screen the contamination used GW Class II -A standards. The primary designated use for Class II-A ground water shall be potable water and conversion (through conventional water supply treatment, mixing or other similar technique) to potable water. Class II-A secondary designated uses include agricultural water and industrial water.

The groundwater standards for Class III-B developed by Cytec are 3 to 6 orders of magnitude higher than the groundwater standards for Class II-A; however the constituents of concern found in the groundwater that are above the Class II-A groundwater standards , exceed the Class II-A standards within the same order of magnitude to three orders of magnitude higher, as in the case of benzene.

Groundwater is not contaminated: GW contamination in the Fill, Sand and Gravel and Shallow Bedrock Unit are monitored by the compliance monitoring wells and the results are screened against Class II-A groundwater standards. Three subsequent years of groundwater monitoring reports (References 11, 12, and 13) containing analytical results obtained since the CMS Report indicate that the concentrations of COCs in all the compliance wells sampled are below the Class III-B standards. The contamination in the Shallow Bedrock unit does not exceed the Class II-A Standards. (See summary table attached to this document)

As approved by NJDEP, the "Results of Perimeter Groundwater Monitoring for 1996" Report (Reference 11) narrowed the constituent list for future sampling events to include:

six inorganic compounds (aluminum, arsenic, iron, lead, manganese, and sodium); and
six (VOCs) (carbon disulfide, methylene chloride, acetone, benzene, chlorobenzene, and xylenes).

References (s): Unless otherwise noted, all references are to the NJDEP-approved "Corrective Measures Study Report" (CMS Report) prepared for Cytec Industries, Inc. by Blasland, Bouck, & Lee (BBL) in July 1994. The CMS Report summarizes the findings of the three-phased Remedial Investigation (RI) process performed at the Site, explains the development of the site-specific Class III-B groundwater standards and presents remedial alternatives.

Footnotes:

[1]"Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

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3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

__X__ 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):. One year of quarterly ground water monitoring (1996) and two years of semi-annual ground water monitoring (1997 and 1998) within the three units have been completed for ten site perimeter MWs and other 2 wells previously used as background wells were sampled in 1993. Analytical results for constituents of concern (COCs) are contained in References 11 through 13. These results indicate, that the concentrations of COCs in the perimeter wells sampled, are below the Class III-B groundwater standards.

Migration of contaminants (at concentrations below Class III-B standards) vertical and horizontal within the 3 groundwater units: The 'Contamination' from the Fill Unit flows horizontally out toward the Rahway River and Arthur Kill and discharges vertically downward toward the Tidal Marsh aquiclude, from where it leaks vertically downward toward the Sand and Gravel Unit. The groundwater in the Sand and Gravel Unit flows into the Rahway River. The Shallow Bedrock Unit discharges vertically upward into the Sand and Gravel Unit. No contaminants in this unit exceed the Class II-A groundwater standards.

Migration of groundwater contaminants to surface water: Since all the SWMUs with the contaminated soils have been remediated, there is no potential for additional contamination to the groundwater derived from soil. Therefore no additional contamination will migrate from groundwater to surface water. (See page 1).

Migration of groundwater contaminants to sediments: There has been no evidence for sediment contamination from groundwater. (Remedial Action Report Building 69 and Rahway River Area Closure Certification, April 1997).

Migration of groundwater constituents is fully described in Section 3.3.2 of the Corrective Measures Study (CMS) Report.

[2] "Existing area of contaminated ground water" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant ground water 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" ground water remains within this area, and that the further migration of "contaminated" ground water 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.

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

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

__X__ 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): Although groundwater from the site discharges into the Rahway River and the Arthur Kill (CMS Report, Section 3.6.2.1), the concentrations of the constituents of concern (COCs) are below the Class III-B groundwater standards developed for the site, therefore much lower than 10X the groundwater standards.

RFI Phase I Report, and CMS Report Revised. Unless otherwise noted, all references are NJDEP-approved "Corrective Measures Study Report" (CMS Report) prepared for Cytec Industries, Inc. by Blasland, Bouck, & Lee (BBL) in July 1994. The CMS was approved by NJDEP as communicated in a letter dated May 26, 1995. The CMS Report summarizes the findings of the three-phased Remedial Investigation (RI) process performed by BBL at the Site, explains the development of the site-specific Media Cleanup Standards.

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5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **insignificant** (i.e., the maximum concentration[3] 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)?

_X_ 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 judgement/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[3] 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 groundwater "levels," the 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): Groundwater flow to surface water: The Saturated Surficial Till unit has a horizontal flow toward the Arthur Kill and Rahway River and the Sand and Gravel unit has a horizontal flow toward the Rahway River. (CMS Report, Section 3.6.2.1) The groundwater which is discharged into the surface water is not considered "contaminated" because the concentrations of COCs are less than the Class III-B groundwater site specific standards.

The attached tables present the summary of results taken from background monitoring wells in 1993and compliance wells in 1993, 1997 and 1998. All constituent concentrations at the compliance wells are below Class III-B site specific groundwater standards. Groundwater which is discharged into the Rahway River and Arthur Kill is not considered "contaminated" because the concentrations of COCs are consistently less than the Class III-B site specific groundwater standards.

(Unless otherwise noted, all references are to the NJDEP-approved "Corrective Measures Study Report" (CMS Report) prepared for Cytec Industries, Inc. by Blasland, Bouck, & Lee (BBL) in July 1994. The CMS was approved by NJDEP as communicated in a letter dated May 26, 1995. The CMS Report summarizes the findings of the three-phased Remedial Investigation (RI) process performed by BBL at the Site, explains the development of the site-specific Class III-B standards, and presents remedial alternatives.)

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

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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[4])?

_X__ 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,[5] 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 "NO" status code, 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): Although groundwater from the Site discharges into the Rahway River and the Arthur Kill (CMS Report, Section 3.6.2.1), the concentrations of the constituents of concern (COCs) are below the Class III-B site specific groundwater standards.

Arthur Kill and Rahway River have NJDEP's SE3 designated uses which limit potential receptors. The site specific groundwater standards were developed considering the surface water uses:

- limited uses of the surface waters (boating and recreational fishing, not swimming and edible fishing);
- upstream quality of the surface waters; and
- mixing and dilution of groundwater in the receiving surface waters.

Human consumption of certain fish and shellfish is banned in the Hudson-Raritan estuary.

Surface water examples were screened against SE3 NJDEP's surface water quality standards and were found not to be contaminated.

The sediments under Building 69 were contaminated by the leaking of waste from the basement of Building 69 and not via contaminated groundwater.

(Unless otherwise noted, all references are to the NJDEP-approved "Corrective Measures Study Report" (CMS Report) prepared for Cytec Industries, Inc. by Blasland, Bouck, & Lee (BBL) in July 1994. The CMS was approved by NJDEP as communicated in a letter dated May 26, 1995. The CMS Report summarizes the

findings of the three-phased Remedial Investigation (RI) process performed by BBL at the Site, explains the development of the site-specific Class III-B site specific standards and presents remedial alternatives.

[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refuge) 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.

[5] 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.

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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 ground water?"

X 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): The NJDEP-approved "Corrective Measures Study Report (revised)" contained a plan for five years of ground water monitoring at the Site. The plan included:

Five years of monitoring including one year of quarterly monitoring (1996) and four years of semi-annual monitoring (1997 through 2000);
Analysis of all samples for constituents of concern (COCs), including volatile organic compounds and TAL metals; and

- Preparation of annual reports which provide a summary of the data, comparisons to appropriate criteria, and a quality assurance / quality control (QA/QC) summary.

As approved by NJDEP, the "Results of Perimeter Groundwater Monitoring for 1996" Report (Reference 11) narrowed the constituent list for future sampling events to include:

six inorganic compounds (aluminum, arsenic, iron, lead, manganese, and sodium); and
six (VOCs) (carbon disulfide, methylene chloride, acetone, benzene, chlorobenzene, and xylenes).

For each sampling event, ten compliance (perimeter) monitoring wells are identified for sampling as follows: See map with compliance (peripheral) monitoring wells attached to this document. The map has an additional 2 MWs in the Fill Unit MW-LWS-1 and MW-LWS-2. These are compliance wells that were last tested in 1993.

Hydrogeological Unit	Well Name
Fill	MW-Back-1S
	MW-Back-2S
	MW-DPG-2S
	MW-LAP-2S
Sand and Gravel	MW-Back-2D
	MW-DPG-2D
	MW-LAP-2D
Shallow Bedrock	MW-Back-2R
	MW-DPG-2R
	MW-LAP-2R

To date, the required reports for 1996, 1997, and 1998 have been submitted.

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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 a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the **Cytec Industries Inc. Warners Plant** facility, EPA ID # **NJD 002173144** , located **at the Foot of Tremley Road in Linden, NJ**. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated 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: _____ **Date:**

Agathe Nadai, Project Manager
RCRA Programs Branch
EPA Region 2

Barry Tornick, Section Chief
RCRA Programs Branch
EPA Region 2

Date : 9/30/99

Approved by: R. Basso

Date: 9/30/99

Raymond Basso, Chief
RCRA Programs Branch
EPA Region 2

Locations where References may be found:

The following documents have been prepared by Blasland, Bouck, & Lee for the Site:

(1) Remedial Investigation Work Plan – Vol. 1, Vol. 2 – January 1991
(2) Remedial Investigation Phase I Report (Revised) – August 1992
(3) Corrective Measures Study Work Plan – July 1994
(4) Corrective Measures Study Report – July 1994 (Revised 1995)
(5) Data Review For Supplemental Investigation and Supplemental Corrective Measures Study Investigation – March 1995
(6) Remedial Action Plan Addendum for Building 69 and Rahway River – March 1996
(7) Remedial Action Report Building 69 and Rahway River Area Closure Certification – April 1997
(8) Remedial Action Plan – July 25, 1995
(9) Liquid Aerofloats Production Area Closure Certification – October 4, 1995
(10) Diphenylguandine Area Closure Certification – November 9, 1995
(11) Results of Perimeter Ground-water Monitoring for 1996 – February 27, 1997
(12) Annual Monitoring Report for 1997 – January 15, 1998
(13) Annual Monitoring Report for 1998 – January 25, 1999
(14) Phase II Remedial Investigation Report (Revised) – September 1993

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CYTEC

Table I

SUMMARY OF RESULTS OF SELECTED CONSTITUENTS OF CONCERN
COMPLIANCE WELLS (PERIMETER WELLS)

Units UG/L

Well Id	Year	Arsenic Class II-A 8 Class III-B 16,000	Lead Class II-A 10 Class III-B 3,825	Methylene - chloride Class II-A 2 Class III-B 218,000	Benzene Class II-A 1 Class III-B 3,200	Chloro-benzene Class II-A 4 Class III-B 47,000	Total Xylene Class II-A 40 Class III-B 9,000
Back-1S	1997 jan jul	bst II 20	bst II bst II	bst II bst II	bst II bst II	bst II bst II	bst II bst II
Back-1S	1998 jan jul	bst III 24	bst II 237	bst II bst II	bst II bs II	bst II 35	bst II 1
Back-2S	1997 jan jul	bst II bst II	19 34	bst II bst II	bst II bst II	bst II bst II	bst II bst II
Back-2S	1998 jan jul	bst III 35	35 451	bst II bst II	bst II bst II	bst II bst II	bst II bst II
Back-2D	1997 jan jul	10 bst II	bst II bst II	bst II bst II	bs II bst II	bst II bst II	bst II bst II
Back-2D	1998 jan jul	bst III 11	bst II 4	bst II 1	bst II bst III	bst II bst II	bst II bst II
Back-2R	1997 jan jul	bst III bst III	bst II bst II	bst II bst II	bst II bst II	bst II bst II	bst II bst II

Well Id	Year	Arsenic Class II-A 8 Class III-B 16,000	Lead Class II-A 10 Class III-B 3,825	Methylene - chloride Class II-A 2 Class III-B 218,000	Benzene Class II-A 1 Class III-B 3,200	Chloro-benzene Class II-A 4 Class III-B 47,000	Total Xylene Class II-A 40 Class III-B 9,000
Back-2R	1998 jan jul	bst III bst II	bst II 8	bst II bst II	bst II bst II	bst II bst II	bst II bst II
DPG-2S	1997 jan jul	bst II bst II	bst II bst II	bst II bst II	bst II bst II	bst II bst II	bst II bst II
DPG-2S	1998 jan jul	bst III bst II	bst II 53	bst II bst II	bst II bst II	bs tII bst II	bst II 3
DPG-2D	1997 jan jul	bst II bst II	bst II bst II	bst II bst II	bst II 15	12 9	82 53
DPG-2D	1998 jan jul	bst II bst II	bst II bst II	bst II bst II	2 12	bst II bst II	1 3
DPG-2R	1997 jan jul	bst II bst II	bst II bst II	1 2	bst II bst II	bst II bst II	bst II bst II
DPG-2R	1998 jan jul	bst III bst II	bst II bst II	bst II bst II	bst II 2	bst II bst II	bst II 2
LAP-2S	1997 jan jul	bst II bst II	bst II 27	bst II bst II	bst II bst II	bst II bst II	bst II bst II
LAP-2S	1998 jan jul	bst III bst II	bst II bst II	bst II 2	bst II bst II	bst II bst II	bst II bst II
LAP-2D	1997 jan jul	bst III bst III	bst II bst II	10 bst II	44 24	NA NA	14 7
LAP-2D	1998 jan jul	bst III bst II	bst II bst II	7 8	33 38	1,700 3,800	10 30

Well Id	Year	Arsenic Class II-A 8 Class III-B 16,000	Lead Class II-A 10 Class III-B 3,825	Methylene - chloride Class II-A 2 Class III-B 218,000	Benzene Class II-A 1 Class III-B 3,200	Chloro-benzene Class II-A 4 Class III-B 47,000	Total Xylene Class II-A 40 Class III-B 9,000
LAP-2R	1997 jan jul	bst II bst II	bst II bst II	bst II bst II	bst II bst II	bst II bst II	bst II bst II
LAP-2R	1998 jan jul	bst III bst II	bst II bst II	bst II bst II	bst II bst II	bst II bst II	bst II bst II
LWS-1	1993	NA	NA	NA	NA	52	160
LWS-2	1993	NA	NA	NA	NA	6	4

Compliance (Perimeter) Monitoring wells:
S in Fill Unit, D in Sand and Gravel Unit, R in Shallow Bedrock Unit

bst II (below standard II), represent qualified U, J, B data which values are below applicable ClassII-A standards.
bst III (below standard III), represent qualified U, J, B data which values are below applicable ClassIII-B standards.

NA: not applicable, measurments for the other constituents are not available. The groundwater samples were only tested for the compounds that were spilled at the laboratory waste sump.

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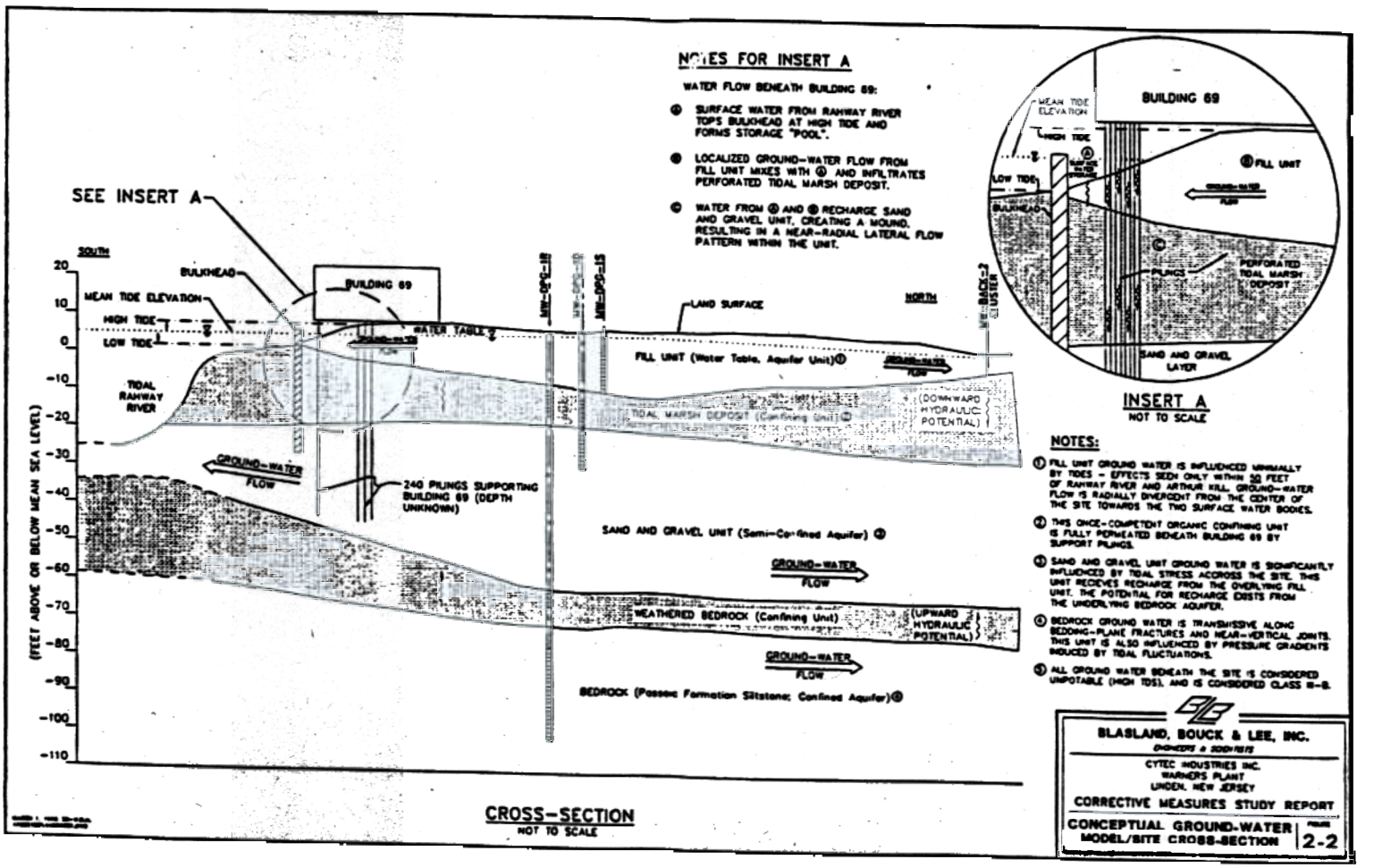
Table II
SUMMARY OF RESULTS OF SELECTED CONSTITUENTS OF CONCERN
BACKGROUND WELLS

Units UG/L

Well Id	Year	2, 4 - Dimethyl - phenol Class II-A 3,500 Class III-B –	2-Methyl-phenol Class II-A 3,500 Class III-B –	4-Methyl-phenol Class II-A 3,500 Class III-B –	Chloro-benzene Class II-A 4 Class III-B 47,000	Total Xylene Class II-A 40 Class III-B 9,000
DPG-P6-S	1993	NA	NA	NA	9,300	NA
DPG-1	1993	NA	NA	NA	21,000	NA
DPG-1D	1993	NA	NA	NA	57,000	NA
LAP - 1S	1993	2,900	bst II	bst II	NA	NA
LAP -P-7S	1993	18,000	bst II	bst II	NA	NA
LAP - 3D	1993	exceeds II-A	bst II	exceeds II-A	NA	NA
LAP - 3R	1993	bst II	bst II	bst II	NA	NA

NA: not applicable, 1993 measurments for Dimethyl Phenols and Methyl Phenols are only available for the Liquid Aeroflot Production Area SWMU.

Concetrations of Di-Methyl and Methylene Compounds at the compliance wells in 1993 were all below Class II-A Standards.


NOTES FOR INSERT A
WATER FLOW BENEATH BUILDING 69:
A SURFACE WATER FROM RAHWAY RIVER TOPS BULKHEAD AT HIGH TIDE AND FORMS STORAGE "POOL".
B LOCALIZED GROUND-WATER FLOW FROM FILL UNIT MIXES WITH A AND INFILTRATES PERFORATED TIDAL MARSH DEPOSIT.
C WATER FROM A AND B RECHARGE SAND AND GRAVEL UNIT, CREATING A MOUND, RESULTING IN A NEAR-RADIAL LATERAL FLOW PATTERN WITHIN THE UNIT.
SEE INSERT A
SOUTH
NORTH
BULKHEAD
BUILDING 69
MEAN TIDE ELEVATION
HIGH TIDE
LOW TIDE
WATER TABLE
LAND SURFACE
FILL UNIT (Water Table, Aquifer Unit) ①
TIDAL RAHWAY RIVER
TIDAL MARSH DEPOSIT (Confining Unit) ②
(DOWNWARD HYDRAULIC POTENTIAL)
GROUND-WATER FLOW
240 PILINGS SUPPORTING BUILDING 69 (DEPTH UNKNOWN)
SAND AND GRAVEL UNIT (Semi-Confined Aquifer) ③
WEATHERED BEDROCK (Confining Unit) ④
(UPWARD HYDRAULIC POTENTIAL)
BEDROCK (Passaic Formation Siltstone; Confined Aquifer) ⑤
(FEET ABOVE OR BELOW MEAN SEA LEVEL)
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
CROSS-SECTION
NOT TO SCALE
BUILDING 69
MEAN TIDE ELEVATION
HIGH TIDE
LOW TIDE
BULKHEAD
FILL UNIT
PILINGS
PERFORATED TIDAL MARSH DEPOSIT
SAND AND GRAVEL LAYER
INSERT A
NOT TO SCALE
NOTES:
① FILL UNIT GROUND WATER IS INFLUENCED MINIMALLY BY TIDES - EFFECTS SEEN ONLY WITHIN 50 FEET OF RAHWAY RIVER AND ARTHUR KILL. GROUND-WATER FLOW IS RADIALLY DIVERGENT FROM THE CENTER OF THE SITE TOWARDS THE TWO SURFACE WATER BODIES.
② THIS ONCE-COMPETENT ORGANIC CONFINING UNIT IS FULLY PERMEATED BENEATH BUILDING 69 BY SUPPORT PILINGS.
③ SAND AND GRAVEL UNIT GROUND WATER IS SIGNIFICANTLY INFLUENCED BY TIDAL STRESS ACCROSS THE SITE. THIS UNIT RECEIVES RECHARGE FROM THE OVERLYING FILL UNIT. THE POTENTIAL FOR RECHARGE EXISTS FROM THE UNDERLYING BEDROCK AQUIFER.
④ BEDROCK GROUND WATER IS TRANSMISSIVE ALONG BEDDING-PLANE FRACTURES AND NEAR-VERTICAL JOINTS. THIS UNIT IS ALSO INFLUENCED BY PRESSURE GRADIENTS INDUCED BY TIDAL FLUCTUATIONS.
⑤ ALL GROUND WATER BENEATH THE SITE IS CONSIDERED UNPOTABLE (HIGH TDS), AND IS CONSIDERED CLASS III-B.
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WARNERS PLANT
LINDEN, NEW JERSEY
CORRECTIVE MEASURES STUDY REPORT
CONCEPTUAL GROUND-WATER MODEL/SITE CROSS-SECTION
FIGURE 2-2