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March 9, 1999

***HAND DELIVERED ON MARCH 10, 1999***

Muthu Sundram, Esq.
Assistant Regional Counsel
Office of Regional Counsel
U.S. Environmental Protection Agency
Region II
290 Broadway, 17th Floor
New York, NY 10007-1866

Re: LCP Chemical Site, Linden, New Jersey

Dear Muthu:

As you have informed me, the U.S. Environmental Protection Agency (EPA) considers Praxair, Inc. (Praxair) a potentially responsible party under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as a former operator at the LCP Chemical Site (Site), a NPL site, and the EPA intends to issue a unilateral administrative order to Praxair requiring it to perform a Remedial Investigation and Feasibility Study. We understand that EPA's position arises from Union Carbide Corporation's (UCC) operation of a hydrogen facility on a 2.1 acre former leasehold (Leasehold) at the Site for over thirty years. See Attachment 1. Praxair, Inc. has assumed the obligations, if any, of UCC at this Site and, as well, as a successor to Liquid Carbonic Carbon Dioxide Corporation (LCCD), has assumed the liabilities of LCCD, if any, for its carbon dioxide distribution terminal activities on a part of this Leasehold for approximately six years beginning in 1988. LCCD parked 6-7 trucks at its terminal area and stored carbon dioxide, not a hazardous substance under CERCLA, at its terminal. As Praxair's June 12, 1998 letter in response to EPA's information request states, Praxair has no information nor, to our knowledge does EPA have any information, regarding the

release of any hazardous substances by LCCD at, under, or around the leased terminal area or at the Site.

This letter is intended to persuade the EPA not to issue an administrative order to Praxair because UCC's, Praxair's, and LCCD's activities on the small, discrete Leasehold at the 26 acre Site: (1) did not contribute to the Site's hazardous substances requiring any response actions under CERCLA; and (2) even if any CERCLA response actions may be legally required by the EPA to be undertaken at the Leasehold by Praxair, such actions are limited by CERCLA and relevant case law to only the former Leasehold.

## I. Summary of the Facts Regarding Activities at the LCP Chemical Site

### A. Union Carbide Corporation Hydrogen Plant Operations

As Praxair has stated in its May 5, 1998 response to EPA's section 104(e) request, UCC, beginning in 1957, operated a hydrogen transfill and repackaging plant on the Leasehold. LCP Chemicals & Plastics, Inc. (LCP) was the lessor for virtually the entire duration of the various leases. In 1988, UCC transferred ownership of its hydrogen plant to Linde Gases of the Mid-Atlantic, Inc., a subsidiary of Union Carbide Industrial Gases Inc., now known as Praxair, Inc. Union Carbide Industrial Gases Inc. was a wholly owned subsidiary of UCC and was spun-off, as Praxair, Inc., from UCC as a separate corporation, unaffiliated with UCC. Operations at the hydrogen plant ceased in May 1990.

### B. UCC Cleanup of Hydrogen Plant Facility - Decontamination Project

In the late 1980's, in anticipation that the hydrogen plant operations might be relocated, UCC began planning the investigation and remediation of the hydrogen plant

buildings and equipment. Remediation of the hydrogen plant facilities was needed to address mercury contamination caused by LCP's chlorine production operations. During the hydrogen plant operations, LCP transferred to UCC, via pipeline, unpurified hydrogen gas. The hydrogen gas was tainted with mercury because of LCP's chlor-alkali production operations. UCC purified the hydrogen prior to containerizing the hydrogen gas for sale. Over many years, however, the process of hydrogen gas purification contaminated UCC's leasehold buildings and some equipment with mercury. This hydrogen gas transfer and mercury removal process terminated in 1980, yet the residual mercury needed to be removed from UCC's buildings and equipment.

In 1987 UCC estimated that a staged cleanup could be accomplished by 1990. The eventual cleanup cost was over $600,000. This extraordinary cost represents, inter alia, the work needed to decontaminate mercury from the walls, floors, ceilings, and roofs of buildings which were dismantled and removed from the Leasehold. Waste materials from this activity were disposed of, in accordance with law, at SCA Chemical Services, Inc. at Model City, NY. Mercury collected from this cleanup was transported and manifested to Bethlehem Apparatus in Hellertown, PA. In 1987 UCC excavated soil contaminated with used oil and mercury and manifested the waste to Envirosafe Services of Ohio in Oregon, OH. The New Jersey Department of Environmental Protection approved the excavation and cleanup. Attachment 2 is an April 22, 1988 letter from International Technology Corporation, UCC's environmental consultant, detailing the cleaning, and mercury removal, from an air compressor at the Leasehold.

C. <u>UCC Cleanup of the Leasehold under the New Jersey Environmental Cleanup Responsibility Act and the Industrial Site Recovery Act</u>

In May 1990 Linde Gases of the Mid-Atlantic (Linde) submitted a Site Evaluation Submission (SES) under New Jersey's Environmental Cleanup Responsibility Act

(ECRA) to the New Jersey Department of Environmental Protection & Energy (NJDEPE). The SES was submitted in accordance with State law since Linde was terminating its lease with LCP. In the next four (4) years Linde (Praxair, as of July 1992) with the assistance of the International Technology Corporation, undertook extensive soil, subsoil, and groundwater investigations, soil excavation, and other remediation to satisfy ECRA requirements.

Specifically, soil sampling and analysis was completed in June 1990 and June 1991. Additionally, remedial excavations and soil sampling and analysis were completed in April 1992. Groundwater sampling and analysis were performed in June 1991, July 1991, and April 1992. The results of the soil and groundwater sampling and analysis, prior to July 1991, were provided to the NJDEPE in two separate *Remedial Investigation Reports* in March 1991 and July 1991. The results of the July 1991 and April 1992 groundwater sampling and analysis and the April 1992 remedial excavations were provided to the NJDEPE in the May 1992 *Remedial Investigation Report.*

On November 24, 1992, Praxair met with the NJDEPE to discuss future remediation, if any. The parties agreed that capping of the unpaved areas of the Leasehold would provide a cost-effective and environmentally sound remedial option, in accordance with state law, for this case. In February 1993, Praxair submitted the ECRA Cleanup Plan based upon the conclusions reached with the NJDEPE during the November 1992 NJDEPE meeting. The draft NJDEPE Cleanup Plan approval letter was received by Praxair in September 1993 and responded to with comments in October 1993. Following the NJDEPE Cleanup Plan/Remedial Action Workplan approval in April 1994, the remedial capping and related activities were implemented in April 1994. Praxair's Remedial Action Report was filed in June 1994 (Attachment 3).

The NJDEPE provided its final approval letter to Praxair, signifying achievement by Praxair of the state of New Jersey's legally applicable and relevant and appropriate requirements, on June 20, 1995 (see Attachment 4) and a Declaration of Environmental Restrictions was made as of September 23, 1994 (Attachment 5). Attachment 6 is a September 28, 1994 letter from International Technology Corporation to Praxair providing a cost estimate for remediation of the Leasehold to NJDEPE residential cleanup criteria. The cost was $1,480,005, over 80% of which was based on excavation of the contaminated fill material provided by GAF prior to UCC's Leasehold. Since the historic contaminated fill was not provided by UCC, the NJDEPE did not require that Praxair excavate it. Because the Leasehold was also surrounded by hundreds of acres of contaminated industrial property, NJDEPE, correctly, did not apply its residential cleanup criteria. Instead, the NJDEPE applied the attached Soil Cleanup Criteria (Attachment 7) which were achieved by Praxair.

Extensive documentation of Linde's and Praxair's cleanup activities were provided to the EPA as attachments to Praxair's May 5, 1998 response to EPA's information request under CERCLA.

D. CERCLA History of the LCP Chemicals, Inc. Superfund Site

1. EPA's Site Assessments Identify No Hazardous Substances from UCC, Praxair, or LCCD.

As a result of a verbal request in January 1996 from the Pre-remedial Section of the Surveillance and Monitoring Branch, EPA, Region II, the Removal Action Branch (RAB) engaged in a Removal Site Evaluation of the LCP property. As the August 12, 1996 "Removal Site Evaluation for LCP Chemicals, Inc." from Mr. Nick Magriples, On-Scene Coordinator for the RAB, states on page 1, "the request was

focused on the former lagoon area." The former lagoon area was never a part of the Leasehold and is found approximately six hundred feet, "as the crow flies", east and north of the nearest edge of the former Leasehold. At least five sets of railroad tracks, several buildings, and a few roads separate the lagoon from the Leasehold. We have found no documents in the EPA's administrative records of the Site, nor are we aware of any documents, indicating that there (1) was or is any physical nexus between the lagoon and the Leasehold; or (2) were any transshipments of any hazardous substances or any waste materials from the Leasehold to the lagoon or any other portion of the Site. The lagoon area was used by General Aniline and Film Corporation (GAF) and LCP for many years for the disposal of various hazardous substances.

The Removal Action Branch's activities, understandably, centered on the lagoon, or impoundment, and neighboring buildings and facilities used by GAF and LCP. Apparently, neither the Removal Action Branch nor the EPA pre-remedial contractor (1995) nor any other EPA representative, ever sampled the former Leasehold or concluded that any contamination existed at or emanated from the Leasehold that required response actions under CERCLA. Moreover, Figure 2 to that Evaluation identifies *only* the "Chem-Fix Test Lagoon" and "Brine Sludge Lagoon" and adjacent facilities. The Leasehold is hundreds of feet away and not even in the diagram.

Mr. Magriples concluded in his August 1996 memorandum that the LCP Chemicals, Inc. property was not eligible for a CERCLA Removal Action. He concluded by stating that "there are no completed or anticipated human exposure pathways associated with the Site under present conditions." In 1998 EPA conducted another on-site investigation and confirmed its prior conclusion that conditions at the site did not require a removal action under CERCLA.

In February 1997 EPA issued its final Hazard Ranking System Evaluation for the LCP Chemicals, Inc. site. The evaluation concluded that there were no exposure pathways of contaminants from the Site for groundwater, soil or air. ***The sole basis for listing the Site was the potential exposure to people and the environment via a surface water pathway from the lagoon and nearby areas to South Branch Creek.*** Neither UCC nor LCCD ever discharged any wastewater, other liquids, or any other substances or materials to the South Branch Creek and we have found no documents in the EPA administrative record for this Site indicating any known or suspected nexus to the lagoon or South Branch Creek or any surface water from the former Leasehold during the tenancy of UCC or LCCD.

2. EPA's Site Assessment Identifies LCP, GAF as Sources of Hazardous Substances

The following is a very brief summary of what EPA concluded about the hazardous substances, and their sources, at the LCP Site. The Site, which occupies 26 acres on filled marshland in an industrial area, is bordered by South Branch Creek to the east, GAF Corporation to the north, and Northville Industries, BP Corporation, and Mobil to the northeast, south, and west, respectively. South Branch Creek, a tributary to the Arthur Kill, flows through a portion of the Site via engineered conveyance structures on the north side of the property. GAF purchased the land from the U.S. Government in 1950, filled an area of marshland and lowland, and developed it. GAF produced chlorine (using mercury cell electrolysis) and sodium hydroxide at this location from 1952 to 1972. LCP Chemicals Inc. (a subsidiary of the Hanlin Group, Inc.) of Edison, New Jersey purchased the property from GAF in 1972 and continued to produce chlorine until 1985, when production at the plant ceased permanently. Sludge containing mercury from the chlorine production process was discharged to a brine sludge lagoon (the lagoon referred to above) located on the property.

In 1981, the New Jersey Department of Environmental Protection ("NJDEP") entered into an Administrative Consent Order with LCP Chemicals, Inc. This Consent Order called for the closure of the brine sludge lagoon and implementation of air, soil, and groundwater monitoring. Analytical results from soil samples collected in 1982 by LCP Chemicals, Inc., revealed elevated levels of mercury at 0-2 feet in depth, with concentrations ranging from 36 milligrams per kilogram (mg/kg) to 772 mg/kg. Surface soil samples collected from the perimeter of the lagoon at that time indicated mercury levels ranging from 27 mg/kg to 1,580 mg/kg. These results are summarized in a February 1982 report, prepared by Geraghty & Miller, Inc. for LCP Chemicals, Inc., entitled *Waste Lagoon Ground-Water Monitoring*. In January 1995, EPA collected several surface soil, surface water, and sediment samples during a pre-remedial investigation, *none of which came from the Leasehold.* The average concentration of mercury in the sediments downstream of South Branch Creek, which flows east, away from the Leasehold, was 500 mg/kg, with the highest concentration being 1,060 mg/kg. Mercury was detected in the surface water at 93 micrograms per liter near the facility's outfall. Arsenic was also present in most of the samples. Arsenic concentration in the surface water and sediment were 336 mg/l and 318 mg/kg, respectively. Zinc (maximum concentration, 833 mg/kg) and lead (maximum concentration, 304 mg/kg) were also noted in these samples. These results are summarized in a June 1995 report entitled *Final Draft Site Inspection, LCP Chemicals, Inc.*, prepared by Malcolm Pirnie, Inc. for the EPA.

Leaching of contaminants into South Branch Creek is ongoing. The flow of contaminants into the Arthur Kill has not been defined as of yet. There is a potential for acute effects to aquatic biota for the length of South Branch Creek, and contamination could be introduced into the food chain via aquatic species present in the creek.

On July 27, 1998, the Site was placed on the National Priorities List ("NPL").

Through the years, there have been several documented significant releases at the Site. Overflows of supernatant material from the brine sludge lagoon to the South Branch Creek were observed by the NJDEP in 1972 and 1974. In 1975, a brine recycle pump failed and a breach in the brine sludge lagoon occurred. In 1979, a sodium chloride solution contaminated with inorganic mercury overflowed from the process and the wastewater system, resulting in a release of an estimated 10,000 to 20,000 gallons of this material into South Branch Creek. Releases from piping near a 500,000 gallon tank located on the property were observed in 1980, 1981, and 1982. The volume and nature of the released liquid are unknown.

*None of the above facts and conclusions, all stated by the EPA in its draft Administrative Order on Consent for Remedial Investigation and Feasibility Study, relate to any activities or operations that occurred on the Leasehold or were undertaken by UCC, Linde, Praxair, or LCCD.* Rather, the facts and conclusions relate solely to operations of the past owners of the Site and operators of the chlorine manufacturing operations.

In addition, during Hanlin Group, Inc.'s ownership of the Site, which began in 1972 according to its June 3, 1998 response to EPA's information request, Hanlin operated the mercury cell process for about ten (10) years and filled the lagoon "with mercury-contaminated hazardous waste generated from the chlor-alkali operations. The lagoon ...contained about 30,000 cubic yards of waste, and covered 1.5 acres. The disposal of brine muds was terminated in March 1982. The plant's waste lines were flushed to the lagoon..." The contents of an adjacent lagoon, containing wastes treated by experimental chemical fixation, were transferred to the brine sludge lagoon.

GAF purchased the land in 1950, filled the marshland with metals-contaminated soil, and developed it. From 1964 to 1972, GAF produced chlorine (using mercury cell electrolysis) and sodium hydroxide in buildings and facilities adjacent to South Branch Creek and across the street from the two lagoons.

For over one hundred years GAF has operated other facilities on a 125 acre parcel immediately north and northeast of the Site, its property boundary being less than 100 feet from the South Branch Creek located at the LCP Site. GAF was responsible for filling the marshland on this extensive parcel, as well as virtually the entire LCP Site, with fill material which contained heavy metals, including arsenic. Praxair identified GAF as the source of this material in a September 30, 1992 letter to Mr. Joseph Goliszewski of the New Jersey Department of Environmental Protection and Energy. See Attachment 8 and its attachments. Praxair had obtained the documentation supporting these conclusions from NJDEPE'S own files. ISP Environmental Services Inc., by its admission, is the successor to GAF Corporation with respect to the LCP Chemical Site.

Neither UCC, Linde, Praxair, nor LCCD was in any way responsible for the fill, which also contained slag, crushed stone, and brick, used by GAF prior to UCC's and LCCD's leases on the Site. There is no documentation in EPA's administrative record of the Site or in the NJDEPE's records demonstrating that UCC, Linde, Praxair, or LCCD was in any way responsible for this historical fill containing heavy metals -- the same heavy metals identified by EPA in its Site-related investigations. The arsenic found in Geraghty & Miller's RCRA Facility Assessment performed for LCP in 1992 may, for example, have been derived from this fill material.

## II. Why EPA Should Not Issue a CERCLA Administrative Order to Praxair

### A. EPA's Policy on Issuance of CERCLA §106 Orders

On January 31, 1990 EPA issued its "Guidance on CERCLA §106(a) Unilateral Administrative Orders for Remedial Design and Remedial Action" (Guidance). The Guidance superseded EPA's September 8, 1983 "Guidance Memorandum on Use and Issuance of Administrative Orders Under §106(a) of CERCLA". As the new title suggests, the Guidance evidences a narrowing of preferences for the use of unilateral administrative orders in the remedial process -- to compel the conduct of remedial designs or remedial actions, but impliedly not remedial investigation or feasibility studies. EPA directly confirms this preference by stating, on p. 6, n. 11, "Agency policy favors use of consent orders for RI/FSs" and refers the reader to OSWER Directive number 9835.19 ("Administrative Order on Consent for Remedial Investigation/Feasibility Study").

In paragraph II of the Guidance, the EPA states that the objective of Superfund enforcement is to "place ultimate responsibility for the costs of cleaning up Superfund sites on those who contributed to the problem". At the LCP Chemical Superfund Site, the only "problem" identified by the EPA's administrative record was created by companies other than UCC, Linde, Praxair, or LCCD.

The Guidance also provides that "before the order may be issued, the affected state must be notified." While we do not know whether the NJDEPE was advised of the EPA's intent to issue Praxair a unilateral administrative order, we believe that consultation with the NJDEPE would provide additional information to the EPA supporting Praxair's position that no order - or other enforcement action - should be taken

against Praxair. The NJDEPE intensively oversaw and approved Praxair's cleanup at the Site and can offer additional first-hand knowledge of the investigation and remediation undertaken at the Leasehold. The cleanup satisfied environmental laws of the state of New Jersey and should satisfy CERCLA's requirements. The EPA has not provided Praxair with any "legally applicable or relevant and appropriate" requirements under CERCLA that have not already been met by Praxair's remediation at the Leasehold. While the EPA has maintained that Praxair, as an "operator" under Section 107(a) of CERCLA, is jointly and severally liable for response actions at the Site, we submit that such an interpretation of "operator" status is unwarranted under the facts of this matter and that, even if Praxair were an "operator", relevant case law regarding divisibility of harm restricts Praxair's liability, if any, to the Leasehold.

Given the facts in Section I, and EPA's policy disfavoring issuance of unilateral administrative orders for performance of Remedial Investigations and Feasibility Studies, the EPA should not issue Praxair an order but await receipt of data, if any, attributing any future response actions, to UCC's or Praxair's operations.

B. The Former UCC/UCIG Hydrogen Plant Activities Do Not Give Rise to Operator Liability Under CERCLA

1. "Facility"

We have been unable to determine from the EPA administrative record why the EPA decided to define the "facility" or "Site" as the entire 26 acres owned by LCP. The effect of this convenient designation, of course, is to sweep within the coverage of CERCLA all operations at this Site, regardless of the discreteness of the activities, business ownership, or the absence of any harm attributed to such businesses. Recently, the United States Court of Appeals for the Sixth Circuit addressed the

designation of a "facility" under CERCLA. In *U.S. v. Township of Brighton*, 153 F.3d 307 (6th Circ. 1998), the Court considered the claims of the Township that it was responsible for only wastes in a three- acre corner of a larger landfill (the "facility") and that it should not be considered a section 107(a) "operator" of the much larger landfill, or CERCLA "facility". While the Court rejected the Township's claims that the three acres on which it disposed of wastes was not part of the "facility", the reasoning of Judge Moore, concurring, is noteworthy. Only because the landfill in question "operated as a single landfill", was it considered a "facility". Because the District Court record contained evidence of transshipment of waste from the three acre portion to the other portions of the "facility", and the landfill had no discrete boundaries within it, the entire landfill was held to be the "facility". The clear implication of this decision is that a discrete area of a "facility" could be "carved out" from the "facility's" jurisdiction and, therefore, not be subject to CERCLA coverage at all. Judge Dowd, dissenting, explicitly recognized this. He found that there were insufficient facts on which to hold that the property was not naturally divided into separate corners and concluded that the "facility" should not have included the Township's dumping area.

At LCP, there are no "insufficient facts" regarding segregation of activities. The Leasehold, by operation of law, was separate from the chlor-alkali operations and related operations at GAF and LCP which triggered NPL listing of the Site. There are no allegations of transshipment from the Leasehold to the rest of the Site. No facts exist, or are even suggested, that operations at the Leasehold contributed to listing of the Leasehold portion of the Site on the National Priorities List. Moreover, the contamination arising from Leasehold operations were remediated in accordance with New Jersey state law and the entire Leasehold capped and paved.

2. Divisibility of Harm

The law in the Third Circuit of the federal courts is settled on the issue of whether divisibility of harm can trump the government's claim of joint and several liability under CERCLA. It can. In *U.S. v. Alcan Aluminum Corp.*, 964 F. 3d 252 (3rd Circ. 1992), the court held that the common law principles of joint and several liability provide a necessary balance between a PRP's and the government's conflicting interests and inject fairness into the CERCLA statutory scheme. Relying on the Restatement (Second) of Torts, Section 433A, the court found that damages among joint tortfeasors causing distinct harms or a single harm should be apportioned where: 1) there are distinct harms; or 2) there is a reasonable basis for determining the contribution of each cause to a single harm. Assuming *arguendo* there is some harm attributable to Leasehold operations, it is clearly distinct and reasonably capable of being apportioned, as it is required to be by the *Alcan* court. While the alleged tortfeasor, Praxair here, carries the burden of establishing that the damages are capable of apportionment, Praxair has already met this burden. As the EPA's administrative record justifying placement of the Site on the NPL demonstrates, no harm has been attributed to Leasehold activities. To the extent that Praxair's response to EPA's information request identified prior Leasehold contamination, such contamination has already been cleaned up (as demonstrated by the NJDEPE records and attachments to this letter and Praxair's May 5, 1998 response to EPA's information request), the Leasehold has been capped by Praxair, and approval obtained by the state of New Jersey. In any event, with respect to contamination, if any, that EPA may reliably assert arose from Leasehold activities, none of it was transferred off the Leasehold to other parts of the Site, and EPA has no basis for reasonably alleging that environmental conditions on the former Leasehold require any response action under CERCLA.

We recognize, as the *Alcan* court noted, that at the typical Superfund site, e.g., a landfill where waste from dozens of generators has been mixed, determination of divisibility may require an "intensely factual" analysis. However, unlike the facts of that case, there was no commingling of wastes from the Leasehold with wastes on the other 24 acres at the Site; indeed, there were discrete and entirely separate business activities with no use by UCC, Linde, Praxair, or LCCD of other portions of the Site. Unlike Alcan at the Butler Tunnel Site, moreover, Praxair has expended hundreds of thousands of dollars to clean up the Leasehold. Prior to being determined liable and compelled by an order to investigate property already subject to extensive investigation and remediation, Praxair should be provided evidence of its contamination which requires response action under CERCLA.

As the Court held, "Alcan should be permitted this opportunity to limit or avoid liability. If Alcan succeeds in the endeavor, it should only be liable for that portion of the harm fairly attributable to it." *U.S. v. Alcan Aluminum Corp.*, 964 F.2d at 269. If the EPA were to issue a unilateral administrative order to Praxair, the Agency would contravene the mandate of the Third Circuit. Prior to having rebutted Praxair's and the state's conclusion, abundantly supported, that no further response action is needed arising from Leasehold activities, the Agency would have determined Praxair's liability under CERCLA. The *Alcan* court, in its analysis of causation, specifically rejected this approach. It injected causation into the equation. The Agency cannot and should not, by simply reciting the CERCLA "operator" mantra, order Praxair to investigate - or remediate - contamination on any part of the Site without relevant evidence that Leasehold activities have contributed or will contribute to CERCLA response costs. *Id.* at 270. See also *United States v. Township of Brighton*, 153 F. 3d 307, 318 ("[N]o causation means no liability, despite § 9607(a)'s strict liability scheme."); *United States v. Alcan Aluminum Corp.*, 990 F. 2d 711, 722 (2d Circ. 1993); *In re Bell Petroleum*

*Services, Inc.*, 3 F. 3d 889, 901 (5th Cir. 1993) ("with respect to the timing of the "divisibility" inquiry, we believe that an early resolution is preferable.")

EPA should order those persons responsible for the actual unremediated hazardous substances releases, and the threat of future releases, at the Site to investigate whether any additional cleanup at the Site is required. Then, if potential response costs can be attributed to Leasehold activities, EPA may fairly and properly consider whether to order Praxair to engage in additional response actions.

Even if apportionment were a challenging task (although we believe the Site presents little difficulty for the EPA in isolating Leasehold "harm", if any), the Courts have required the EPA to engage in this apportionment. ("The fact that apportionment may be difficult, because each defendant's exact contribution to the harm cannot be proved to an absolute certainty, or the fact that it will require weighing the evidence and making credibility determinations, are inadequate grounds upon which to impose joint and several liability.") *Id.* at 903.

The EPA has undertaken no investigation regarding environmental conditions at the Leasehold portion of the Site. The information it possesses regarding such conditions was developed by UCC and Praxair and sets forth extensively the investigation and remediation, over a period of at least seven years, completed at the Leasehold. The NJDEPE has approved the cleanup. The Leasehold has been entirely paved, and no contamination there is known to exist requiring any response actions under CERCLA. But for the overly broad "facility" or Site designation under CERCLA by EPA, -- a designation apparently based upon the convenience of property ownership and not the reality of environmental contamination -- the Leasehold would not have been part of the Site.

The known Site contamination, which caused the property to be placed on the National Priorities List, was created by GAF and LCP. The historic metals-contaminated fill was placed by GAF over the entire Site down to a level of 4-5 feet and prior to UCC's operations. The NJDEPE records confirm that GAF was responsible for this fill. Its successor, ISP Environmental, and LCP bear the liability for investigation and remediation of the Site since they are the companies (or, as the case may be, a successor to the company) responsible for owning and operating the Site and disposing the hazardous substances triggering response costs. Neither UCC, Linde, Praxair, nor LCCD is one of these companies, and Praxair should not, as the Courts have held, be ordered to perform response actions for harm unattributed to it.

Therefore, Praxair respectfully requests that the EPA not issue a unilateral administrative order to Praxair requiring it to perform any response activities with respect to the Site. Should you or Patricia Simmons have any questions with respect to this submission, please call me.

Very truly yours,

Richard G. Tisch

RGT/jm
Enclosures

cc: Patricia Simmons, EPA

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# ATTACHMENT 1

For reference

# GROUND LEASE

THIS LEASE, made as of the 1st day of May, 1985 between LCP CHEMICALS & PLASTICS, INC., a Delaware corporation, having an office located at Raritan Plaza II, Raritan Center, Edison, New Jersey 08837 (hereinafter referred to as "Landlord") and UNION CARBIDE CORPORATION, a New York corporation, having an office at Old Ridgebury Road, Danbury, Connecticut 06817 (hereinafter referred to an "Tenant");

W I T N E S S E T H:

1. Landlord hereby leases unto Tenant and Tenant hires and takes from Landlord all that parcel of land situated along Linde Road in the City of Linden, County of Union, State of New Jersey, more particularly shown on Exhibit A attached hereto, being approximately 2.102 acres (hereinafter referred to as "Leased Land"), commencing on the effective date hereof and continuing for a period of two (2) years from such date. Rent shall be payable by Tenant to Landlord at monthly rate of Fifteen Hundred Dollars ($1,500.00) in advance on the first day of each month during the term hereof.

2. Tenant has, at its cost and expense, constructed on the Leased Land a building and facilities for the compressing, purifying and shipment of hydrogen gas and storage of liquid hydrogen. Tenant will make no structural alteration, changes or modifications in the building and facilities without the prior written approval of Landlord, which approval will not be unreasonably withheld. The building, facilities, equipment and machinery placed by Tenant on the Leased Land shall remain the property of Tenant and shall be deemed to be

personal property although attached to the realty, subject, however, to all the other provisions of this Lease.

3. Tenant will use said building and facilities for the purpose of compressing, purifying and shipping hydrogen gas, the storage and shipment of liquid hydrogen and for the preparation of gas mixtures consisting chiefly of hydrogen mixed with minor amounts of other gases (which other gases shall be non-hazardous) and for no other purpose.

4. Tenant will obtain and maintain at its cost and expense, all approvals, licenses, permits and certificates required in connection with the use or operation of said building and facilities.

5. Throughout the term hereof Tenant will take good care of the Leased Land and at its own cost and expense will make as and when needed all repairs, whether such repairs are structural, ordinary or extraordinary, in and about the Leased Land necessary to keep it in good order and condition. Such repairs shall be, in quality and class, substantially equal to the original work and materials. Landlord may enter upon the Leased Land to inspect the premises during business hours. Tenant will keep the Leased Land clean and free of rubbish and refuse.

6. Tenant shall have the sole responsibility of maintaining the security of the buildings and facilities on the Leased Land and shall lock the buildings and gates during all periods when no personnel of Tenant are scheduled to be on duty. Landlord and Tenant shall arrange for Landlord's access to the property in the event of emergency during such absence of personnel.

7. Tenant will pay and discharge all mechanics liens, taxes and assessments for local improvements and payments of every nature and kind which may during the demised term be assessed, levied or imposed upon the Leased Land or any part thereof and the building and facilities located thereon. If Tenant fails to pay any such lien, tax or assessment when due, Landlord may pay the same including any interest or penalty and the same shall become due and payable as additional rent on the first day of the month after Landlord makes such payment. Landlord shall pay or reimburse Tenant the portion of all taxes and assessments on the Leased Land which are based on the unimproved value of the land itself. In the event that the improvements on the Leased Land do not constitute a separate tax lot for which a separate tax bill is rendered but forms part of a larger tax lot, which includes other property owned by the Landlord, the amount of tax or assessment or other payment attributable to the improvements on the Leased Land shall be determined in a manner reflecting proportionate share of such tax or assessment represented by such improvements.

8. Tenant will promptly comply, at its cost and expense, with all laws, ordinances, regulations and requirements of Local, State and Federal Governments, and all agencies and subdivisions thereof, and of all other departments, bureaus, officials, boards and commissions with regard to the Leased Land or the use and operation thereof by Tenant. If any such law, ordinance, regulation or requirement shall not be promptly complied with by Tenant, then Landlord may, at its option, upon reasonable prior notice to Tenant, enter upon the Leased Land to comply therewith, and should any fine or penalty be imposed for failure

to comply therewith, or cost be incurred by Landlord in complying therewith, Tenant agrees that Landlord may, at its option, pay such fine or penalty or incur such cost, which Tenant agrees to repay to Landlord with interest from the date of payment, as additional rent on the first day of the month after Landlord has paid such fine or penalty.

9. Landlord will maintain and keep Linde Road in good repair and apportion the cost of maintenance and repair among all the users thereof, except Consolidated Rail Corporation, on a fair and equitable basis having due regard to the amount of use and tonnage hauled over Linde Road by each user. Tenant will pay its proportionate share of such cost, with Tenant's share not to exceed Five Thousand Dollars ($5,000.00) in any one year, payable within ten (10) days after receipt of Landlord's invoice therefor. Landlord shall be entitled to bill annually, semi-annually or quarterly, at its option.

10. Landlord grants to Tenant the right to maintain at Tenant's cost and expense an iron pipe from the Leased Land to the existing ditch north of the Leased Land for the discharge of process water. The location of said pipeline is indicated on Exhibit A attached hereto. Tenant will maintain said pipeline and keep it in good repair at its own cost and expense and upon the termination of this Lease for any reason shall surrender the said pipeline to Landlord. If use of said pipeline or ditch is prohibited by any governmental authority or the discharge violates governmental standards, Tenant will be required to make its own provision for disposal of process water.

11. Landlord grants permission to Tenant to install and maintain a railroad siding and switch at the locations indicated on Exhibit A at

Tenant's expense. Tenant shall bear the full cost and expense of maintenance of the side-track switch. Tenant agrees to use said siding for, and only for, one liquid hydrogen car at any one time, but only during emergency periods when Landlord cannot supply hydrogen gas to Tenant. Tenant also agrees to give Landlord advance notice when it expects to bring in liquid hydrogen and to keep the liquid hydrogen car on the siding enclosed in a fenced-in area.

12. In consideration of the Landlord's weighing of the Tenant's liquid trailers, Tenant will pay Twenty Dollars ($20.00) per weigh within ten (10) days after receipt of Landlord's invoice therefor.

13. Tenant has constructed at Tenant's cost and expense a fence enclosing the Leased Land, and Tenant will not permit its employees, guests, agents, invitees, or licensees at any time to enter upon Landlord's property (other than the Leased Land and Linde Road marked on Exhibit A) without first obtaining the consent of the Landlord. If any such persons do enter upon Landlord's property, with or without Landlord's consent, Tenant will forever indemnify and save harmless Landlord from and against all liability, penalties, damages, expenses and judgments arising from injury or loss of life during the term hereof to any such persons and will forever indemnify Landlord for any damage to Landlord's property caused by any such persons while on Landlord's property.

14. Tenant will forever indemnify and save harmless Landlord from and against any and all liability, penalties, damages, expenses and judgments arising from (a) personal injury to or loss of life of third parties, (b) damage to property of third parties during the term hereof

of any nature, sustained in or about the Leased Land, and (c) and matter or thing growing out of the occupation and use of the Leased Land and asserted against Landlord by a third party by reason of its ownership of the Leased Land or for any other reason, and which is (i) not caused by negligence of Landlord, and (ii) occasioned wholly or in part by an act or omission of Tenant, or of its employees, contractors, guests, agents, invitees, licensees or assigns.

15. If at any time during the continuance of this Lease the grade of any street or highway near or adjacent to the Leased Land shall be changed pursuant to any order which may be made by the State of New Jersey or by the Board of Public Utility Commissioners or by other lawful authority, Tenant agrees to waive and release any claim or damages whatsoever which it may have by reason of any and all injury or damage caused by or resulting from said change of grade.

16. If the building and/or facilities located on the Leased Land are partially damaged by fire, explosion, flood, earthquake, riot, civil commotion, storm or other casualty, Tenant will repair such damage at its costs and expense and restore the Leased Land to its former condition as expeditiously and promptly as possible. Plans and specifications for such repairs will be submitted by Tenant to Landlord for approval prior to the work being done and Landlord shall not unreasonably withhold or delay such approval. If the Leased Land is damaged by fire, explosion, flood, earthquake, riot, civil commotion, storm or other casualty to an extent which substantially destroys the building and facilities and requires their reconstruction to permit their use as herein provided, Tenant within thirty (30) days after the occurrence of any such event will advise

Landlord in writing of its election to reconstruct the building and facilities or to vacate the Leased Land. If Tenant elects to vacate, it will remove from the Leased Land all of its property and restore the Leased Land to the condition existing prior to Tenant's construction described in Paragraph 2 hereof, except for the removal of piling, within a reasonable period after giving such notice. If Tenant elects to reconstruct the building and facilities, it will perform such work as expeditiously and promptly as possible.

17. Upon the expiration or other termination of this Lease for any reason Tenant shall vacate or surrender to Landlord free and clear of all encumbrances of liens the building and facilities (exclusive of equipment and machinery) located on the Leased Land except that Tenant will remove Tenant's equipment, machinery, personal property and tools. Tenant shall execute such instruments or writings as may be deemed necessary to properly effect the surrender of said building and facilities and their transfer to Landlord; and such building and facilities will be surrendered in good order or condition, reasonable wear and tear excepted. Upon such surrender, said building and facilities shall, without cost or charge to Landlord, become the property of Landlord, free of all liens and claims of Tenant and others.

18. In the event that Landlord elects to sell the Leased Land, Landlord shall give Tenant written notice of such intent, and if Tenant wishes to purchase the Leased Land, it shall so notify Landlord in writing within thirty (30) days after receipt of such notice, and the parties shall negotiate in good faith an acceptable purchase price and payment terms. In the event that Landlord and Tenant do not execute a suitable

agreement setting forth the conditions of sale, including price, within sixty (60) days after Landlord's notice of intent to Tenant, then Tenant's purchase rights hereunder shall automatically expire.

19. Not less than thirty (30) days prior to the expiration of the term hereof, Tenant may notify Landlord that it wishes to continue to lease the Leased Land or to purchase the Leased Land. Thereupon the parties shall negotiate in good faith such continued lease or purchase upon mutually acceptable terms. If, after good faith negotiations, the parties are unable to agree upon mutually acceptable terms for such lease or purchase prior to the expiration of the term hereof, the parties shall have no further obligations hereunder.

20. Tenant shall not, without the prior written consent of Landlord,

(a) assign or transfer, by operation of law or otherwise, this Lease or any interest therein,

(b) underlet the Leased Land or any part thereof,

(c) mortgage or encumber the same, or

(d) permit the same to be occupied by anyone other than Tenant or Tenant's officers or employees.

21. Landlord covenants that if Tenant shall duly keep and perform all the conditions hereof, Tenant shall peaceably and quietly have, hold and enjoy the Leased Land for the term hereof.

22. If there be a default in any of the covenants herein contained, upon twenty (20) days' prior written notice to Tenant specifying the nature of such default (during which period Tenant shall have the

right to cure such default) Landlord shall have the right to re-enter the Leased Land and to have, repossess and enjoy same, provided that Tenant has not duly cured said default during such notice period.

23. It is expressly understood and agreed that in case the Leased Land shall be abandoned, or if default continues in the payment of the rent or any part thereof as herein specified after fifteen (15) days' written notice from Landlord, or if, without the consent of Landlord, Tenant shall sell, assign, or mortgage this Lease or any part thereof, or underlet the Leased Land or any part thereof, or if default continues in the performance of any of the covenants and agreements in this Lease contained on the part of the Tenant to be kept and performed after twenty (20) days' prior written notice from Landlord, Landlord may, if Landlord so elects, at any time thereafter terminate this Lease and the term thereof, upon giving to Tenant five (5) days' notice in writing of Landlord's intention so to do, and upon the giving of such notice, this Lease and the term thereof shall terminate, expire and come to an end on the date fixed in such notice as if said date were the date originally fixed in this Lease for the termination or expiration thereof.

24. In the event the Leased Land or any part thereof be condemned for public use, then in that event, upon the taking of the same for such public use, this Lease, at the option of the Tenant, shall become null and void, and the term shall cease and come to an end upon the date when the same shall be taken and the rent shall be apportioned as of said date. No part of any award, however, shall belong to the Tenant, except that amount which is granted for

building and facilities constructed by Tenant.

25. This Lease is, and shall be, subject and subordinate in all respects to all mortgages and liens of any kind which may now or hereafter affect the Leased Land or the real property of which the Leased Land forms a part, and to all renewals, modifications, consolidations, replacements and extensions thereof; provided, however, that Landlord shall obtain agreement from any such mortgagee or lienor that for so long as Tenant is not in default hereunder, (i) Tenant shall peaceably and quietly have, hold and enjoy the Leased Land for the term hereof, and (ii) any such mortgagee or lienor shall have no right, lien, encumbrance or security interest in any machinery or equipment (including fixtures) which is attached or made a part of the Leased Land or any buildings or improvements constructed theron by Tenant. Tenant shall, in confirmation thereof, execute promptly any certificate or certificates Landlord may reasonably request in that connection.

26. Landlord shall have no obligation hereunder to supply, or pay for, any heat, fuel, electricity or water, or any equipment therefor, or any sewage, or other waste, disposal pipes or equipment, or any other utility or service of any kind.

27. The covenants and agreements herein contained are binding on the parties hereto and upon their respective successors and permitted assigns.

28. Words used in the singular shall include words in the plural where the text of this instrument so requires.

IN WITNESS WHEREOF, the parties have executed this Lease by their duly authorized officers and caused their corporate seals to be hereto affixed, the day and year first above written.

LCP CHEMICALS & PLASTICS, INC.

By WC Calvert Jr

Title Vice Chairman

UNION CARBIDE CORPORATION

By Paul J Bild Encl

Title Manager, Process Gases

# ATTACHMENT 2

RECEIVED
APR 27 1988
UNION CARBIDE CORP.
SOMERSET REGION OFFICE
SOMERSET, N.J

INTERNATIONAL TECHNOLOGY CORPORATION

April 22, 1988

RECEIVED
APR 27 1988
N.A. SARANCO

Mr. Scott Hickes
Union Carbide Corporation
Linde Division
308 Harper Drive
Moorestown, NJ 08057

**RE: Linden Plant No. 3 Compressor Cleaning**

Dear Mr. Hickes:

The total diassembly and cleaning of compressor No. 3 at the Linden Plant was completed on March 24, 1988. A final inspection and review of preliminary analytical data was conducted by Mr. Greg Courson, Regional Technical Consultant, La Porte Texas Plant. Prior to disassembly, mercury vapor readings were taken in the vicinity of the compressor and at various points inside the compressor. The internal measurements were obtained by removing plugs, valve port covers, and access plates. All ambient background readings obtained, prior to opening any process access ports on compressor No. 3, were nondetectable for mercury (<0.01 mg/cm). The internal mercury vapor measurements obtained varied from nondetectable to off the scale readings (>1.0 mg/cm). The ports that had high mercury readings internally diminished to nondetectable levels within inches outside the opening. These readings are attached in the "real time air monitoring log". As a result of the above observations it was determined that system encapsulation/isolation would not be required for the disassembly and cleaning, and that only the mechanics performing work on the equipment would require personnel protective equipment.

The disassembly and cleaning procedure incorporated continuous ambient air monitoring by a health and safety technician, along with vacuuming of any visible free mercury as it appeared.

Approximately thirty pounds of free mercury was collected by vacuuming during disassembly. Most of the mercury was located at the low points in the system, intercoolers, receivers, piping, etc. As parts were disassembled, they were positioned over a trough and given a thorough degreasing, using a solvent manufactured by Mantek Corp. called "Tri-Matic" (MSD sheet attached), by scrub brush, pressure washing, followed by a water rinse. The next step was to scrub and pressure wash each piece using a solution of water and HgX, a mercury absorbent material followed by a thorough water rinse. The HgX MSD sheet is attached.

At this point post decontamination wipe samples were taken at various locations throughout the compressor, then the above cleaning procedure was repeated for the entire

compressor and piping, and another set of wipe samples were taken. A total of 29 wipe samples were taken, including Field Blanks and 24 hour soaking water from the inner cooler. The sampling procedure used is described in the attached IT procedure no. SMP4625-06. Due to the size and shape of the compressor parts a 100 square cm wipe area template was used for all samples. The analytical results, sample collection logs, and chain of custody sheets are attached.

As can be seen from the results, there were some very high mercury levels indicated, up to 160 MG/wipe, probably the result of catching some free mercury on the sample pad. All parts that indicated high mercury levels were subject to a thorough visual inspection and vacuuming followed by a third and fourth cleaning using the above procedures. While analyzing the data it is important to note that the wipe samples were not taken at the identical location for No. 1 and No. 2 analysis on each piece, but rather from immediately adjacent areas. This was done to eliminate the influence of the wipe sampling procedure on the overall cleaning procedure. By disregarding the very high analytical results the average of the second wipe results is .291 mg/wipe. It is appropriate to disregard the high results because these parts were subsequently recleaned, although, no further analytical was performed. It appears that the "level of clean" that can be achieved by this method is in the order of the .291 average, with additional cleaning yielding similar results.

The small intercooler, after the second cleaning, was filled with clean water and left to soak for a 24 hour period. This water was drained and sampled, sample #D1858, yielding a mercury content of .011 ppm, well below the .05 ppm allowable limit. The wastewater generated from the cleaning process was stored in a 5,000 gallon holding tank, the analysis from this water indicated a mercury content of 16 ppm, sample #D1864. This water will be disposed of at a proper facility.

Compressor No. 3, now located in Texas, is to be completely rebuilt, including machining of cylinders and pistons, prior to being placed into operation. There are some precautions that must be observed during this procedure to minimize worker exposure to any residual mercury present. Mechanics and helpers working on the compressor during disassembly and assembly need not be concerned with mercury vapor inhalation, but with ingestion by mouth from skin and clothing contamination from direct contact with the compressor parts. The ingestion risk can be minimized by requiring all mechanics and helpers to wear protective gloves and coveralls while working, by following strict sanitary practices, washing hands and face before eating or smoking, no eating or smoking in the work area, and by removal and disposal of protective clothing when exiting the work area. Once the compressor is completely rebuilt, reassembled, and painted, the trades performing the piping, electrical and instrumentation connection should not be required to observe the above precautions. Subsequent routine maintenance performed on the compressor internals should observe the ingestion precautions as above.

If the working surfaces of the compressor are to be machined during this rebuilding, there are some precautions to be observed by the machinists during this work. While handling, setup, and measuring of the compressor parts, the same precautions against mercury ingestion should be observed. Furthermore, depending on the method of machining to be employed, there is the possibility that the heat generated during machining will volatilize any mercury that is present on the surfaces of the parts. If a dry cut (no liquid coolant/lubricant) machining process is used, vapors and airborne particles can be captured by use of a mercury vacuum, with the pickup nozzle positioned in the vicinity of the cutting tool. The cutting chips and dust generated from this operation should be kept separate from the normal machine shop waste until a disposal method is determined. If a liquid coolant/lubricant is used during the machining process the probability of generating mercury vapors should be nonexistent, but the recirculating liquid should be drained and contained separately upon completion of work. An analysis will be required to determine proper disposal for this liquid. The machine shop performing this work should be instructed to thoroughly clean all chips, waste and oil from the machines they will be using before and after working on the compressor parts.

By following the above procedures there should be minimal risk of exposure to the machinists working on these parts, but, to be extremely conservative a mercury vapor reading could be taken in the vicinity of the cutting tool during the first cuts just to document that no vapors are being generated.

Prior to placing this compressor into operation, I would recommend that a mercury capturing filter be installed on the discharge of this unit with sample ports located on the upstream and downstream sides of the filter. This will permit an evaluation of mercury levels and filter performance, and determine whether continued use of a filter is required.

If you should have any questions or require further information, please give me a call.

Regards,

Tom Hernon

Tom Hernon

TH:sw
#305281-02-01

ENG/s521-ltr

**SUMMARY OF RESULTS**
**FOR**
**UNION CARBIDE**
**LINDEN, NEW JERSEY**

| Sample Date | Sample I.D. | Sample Type | Description/ Location | Analytical Parameter | Results mg/wipe |
|---|---|---|---|---|---|
| 3/11/88 | D1834 | Wipe | Compressor #3, 3rd stage Piston, Post Clean I; WP-1 | Hg | 0.090 |
| 3/22/88 | D1854 | Wipe | Post Clean II; WP-20 | Hg | 0.13 |
| 3/11/88 | D1835 | Wipe | Compressor #3, 1st stage suction valve, Post Clean I, WP-2 | Hg | 0.26 |
| 3/11/88 | D1836 | Wipe | Compressor #3, 1st stage valve covers, Post Clean I; WP-3 | Hg | 81 |
| 3/15/88 | D1841 | Wipe | Post Clean II; WP-8 | Hg | 8.2 |
| 3/11/88 | D1837 | Wipe | Compressor #3, 1st stage cylinder Pre Clean; WP-4 | Hg | 3.0 |
| 3/22/88 | D1855 | Wipe | Post Clean I; WP-21 | Hg | 0.62 |
| 3/11/88 | D1838 | Wipe | Compressor #3, 2nd stage cylinder Pre Clean; WP-5 | Hg | 0.068 |
| 3/22/88 | D1856 | Wipe | Post Clean; WP-22 | Hg | 0.11 |
| 3/11/88 | D1839 | Wipe | Compressor #3, Cross head Pre Clean; WP-6 | Hg | 0.19 |
| 3/15/88 | D1842 | Wipe | Compressor #3, 2nd stage valve cover, Post Clean; W-9 | Hg | 2.0 |
| 3/15/88 | D1843 | Wipe | Compressor #3, 4th stage cylinder Post Clean I; WP-10 | Hg | 2.2 |
| 3/18/88 | D1843 | Wipe | Post Clean II, WP-16 | Hg | 1.4 |
| 3/22/88 | D1857 | Wipe | Post Clean III, WP-23 | Hg | 0.23 |
| 3/18/88 | D1845 | Wipe | Compressor #3, Small cooler Post Clean; WP-12 | Hg | 0.18 |
| 3/22/88 | D1857 | Wipe | Post Clean II, WP-25 | Hg | 0.64 |
| 3/22/88 | D1858 | Water | Post Clean II, Water | Hg | 0.011 |
| 3/18/88 | D1846 | Wipe | Compressor #3, Lower heat exchanger Post Clean I; WP-13 | Hg | 0.11 |
| 3/22/88 | D1860 | Wipe | Post Clean II; WP-26 | Hg | 160 |
| 3/18/88 | D1847 | Wipe | Compressor #3, Upper heat exchanger Post Clean I; WP-14 | Hg | 5.8 |
| 3/22/88 | D1861 | Wipe | Post Clean II, WP-27 | Hg | 46 |

**SUMMARY OF RESULTS**
**FOR**
**UNION CARBIDE**
**LINDEN, NEW JERSEY**

| Sample Date | Sample I.D. | Sample Type | Description/ Location | Analytical Parameter | Results mg/wipe |
|---|---|---|---|---|---|
| 3/18/88 | D1848 | Wipe | Compressor #3, Platform | | |
| | | | Post Clean I, WP-15 | Hg | 0.16 |
| 3/22/88 | D1862 | Wipe | Post Clean II; WP-28 | Hg | 0.23 |
| 3/22/88 | D1852 | Wipe | Compressor #1, Intake valve cover | | |
| | | | Pre Clean; WP-18 | Hg | 2.6 |
| 3/22/88 | D1863 | Wipe | Post Clean I; WP-29 | Hg | 1.8 |
| 3/22/88 | D1864 | Water | 1,000 Water storage tank | Hg | 16 |
| 3/11/88 | D1840 | Wipe | Field Blank; WP-7 | Hg | <0.0002 |
| 3/15/88 | D1844 | Wipe | Field Blank; WP-11 | Hg | 0.0004 |
| 3/18/88 | D1850 | Wipe | Field Blank; WP-17 | Hg | 0.0002 |
| 3/22/88 | D1853 | Wipe | Field Blank; WP-19 | Hg | <0.0002 |
| 3/22/88 | D1865 | Water | Field Blank | Hg | 0.0006 |

U.S. DEPARTMENT OF LABOR

Form Approved
OMB No. 44-R1387

# MATERIAL SAFETY DATA SHEET

Information on this form is furnished solely for the purpose of compliance with the Occupational Safety and Health Act of 1970 and shall not be used for any other purpose. Use or dissemination of all or any part of this information for any other purpose may result in a violation of law or constitute grounds for legal action.

## SECTION I

| | |
|---|---|
| MANUFACTURER'S NAME: ACTON ASSOCIATES, INC. | EMERGENCY TELEPHONE NO.: 717 / 654-0612 |
| ADDRESS (Number, Street, City, State, and ZIP Code): 100 Thompson Street, Pittston, Pa. 18640 | |
| CHEMICAL NAME AND SYNONYMS | TRADE NAME AND SYNONYMS: HgX* Mercury Decontaminant |
| CHEMICAL FAMILY | FORMULA |

## SECTION II - HAZARDOUS INGREDIENTS

| PAINTS, PRESERVATIVES, & SOLVENTS | % | TLV (Units) | ALLOYS AND METALLIC COATINGS | % | TLV (Units) |
|---|---|---|---|---|---|
| PIGMENTS | | | BASE METAL | | |
| CATALYST | | | ALLOYS | | |
| VEHICLE | | | METALLIC COATINGS | | |
| SOLVENTS | | | FILLER METAL PLUS COATING OR CORE FLUX | | |
| ADDITIVES | | | OTHERS | | |
| OTHERS | | | | | |

| HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES | % | TLV (Units) |
|---|---|---|
| N. A. = Not Applicable | | |
| | | |
| | | |
| | | |

## SECTION III - PHYSICAL DATA

| | | | |
|---|---|---|---|
| BOILING POINT (°F.) | | SPECIFIC GRAVITY ($H_2O$=1) Est. above I | (No Data) |
| VAPOR PRESSURE (mm Hg.) | N. A. | PERCENT, VOLATILE BY VOLUME (%) | N. A. |
| VAPOR DENSITY (AIR=1) | N. A. | EVAPORATION RATE (_____ =1) | N. A. |
| SOLUBILITY IN WATER | Appreciable | | |
| APPEARANCE AND ODOR | A white granular product with no odor | | |

## SECTION IV - FIRE AND EXPLOSION HAZARD DATA

| | | | | |
|---|---|---|---|---|
| FLASH POINT (Method used) | N. A. | FLAMMABLE LIMITS Not Flammable | Lel | Uel |
| EXTINGUISHING MEDIA | N. A. | | | |
| SPECIAL FIRE FIGHTING PROCEDURES | N. A. | | | |
| UNUSUAL FIRE AND EXPLOSION HAZARDS | | | | |
| High temperatures may cause evolution of toxic $SO_2$ or $H_2S$ gases | | | | |



* Registered Trade Mark of Acton Associates

# MATERIAL SAFETY DATA SHEET

KCJ 7/82

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

NOTE: REQUIRED UNDER USDL SAFETY AND HEALTH REGULATIONS FOR SHIP REPAIRING, SHIPBUILDING AND SHIPBREAKING. (29 CFR 1915, 1916, 1917)

## SECTION I

MANUFACTURER'S NAME: Mantek; Div. of NCR Corporation

EMERGENCY TELEPHONE NUMBER: 214-438-4144 Ext.013

ADDRESS (NUMBER, STREET, CITY, STATE & ZIP CODE): P.O. Box 22263; Dallas, Tx. 75222

CHEMICAL NAME & SYNONYMS:

TRADE NAME & SYNONYMS: TRIMATIC

CHEMICAL FAMILY:

FORMULA:

## SECTION II – HAZARDOUS INGREDIENTS

| PAINTS, PRESERVATIVES & SOLVENTS | % | TLV (UNITS) | ALLOYS AND METALLIC COATINGS | % | TLV (UNITS) |
|---|---|---|---|---|---|
| PIGMENTS | | | BASE METAL | | |
| CATALYST | | | ALLOYS | | |
| VEHICLE | | | METALLIC COATINGS | | |
| SOLVENTS | | | FILLER METAL PLUS COATING OR CORE FLUX | | |
| ADDITIVES | | | OTHERS | | |
| OTHERS | | | | | |

| HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS OR GASES | % | TLV (UNITS) |
|---|---|---|
| No hazardous ingredients per 27 CFR 1910.1 | | |

## SECTION III – PHYSICAL DATA

| | | | |
|---|---|---|---|
| BOILING POINT (°F) | 210 °F | SPECIFIC GRAVITY ($H_2O$=1) | 1.090 + 1.110 |
| VAPOR PRESSURE (mm Hg.) | 20 | PERCENT, VOLATILE BY VOLUME (%) | 80 |
| VAPOR DENSITY (AIR=1) | .6 | EVAPORATION RATE (BuAc =1) | .10 |
| SOLUBILITY IN WATER | Comp. | pH=11 | |
| APPEARANCE AND ODOR | Green transparent, semi-viscous liquid with little odor | | |

## SECTION IV – FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): None

FLAMMABLE LIMITS: LEL: UEL:

EXTINGUISHING MEDIA: None necessary

SPECIAL FIRE FIGHTING PROCEDURES:

UNUSUAL FIRE & EXPLOSION HAZARDS:

## SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE

No systemic effects noted.

EMERGENCY & FIRST AID PROCEDURES

Eyes: Flush with water for 15 minutes. Then see a physician.

Skin: Flush with water 3-5 minutes.

## SECTION VI - REACTIVITY DATA

| | | |
|---|---|---|
| STABILITY | [X] STABLE [ ] UNSTABLE | CONDITIONS TO AVOID |
| INCOMPATIBILITY (MATERIALS TO AVOID) | | |
| HAZARDOUS DECOMPOSITION PRODUCTS | | |
| HAZARDOUS POLYMERIZATION | [X] WILL NOT OCCUR [ ] MAY OCCUR | CONDITIONS TO AVOID |

## SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Mop up and/or flush down drain.

WASTE DISPOSAL METHOD

Mop up and/or flush down drain.

## SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE)

| | | |
|---|---|---|
| VENTILATION | LOCAL EXHAUST | SPECIAL |
| | MECHANICAL (GENERAL) | OTHER |

| | |
|---|---|
| PROTECTIVE GLOVES<br>rubber | EYE PROTECTION<br>goggles, if spraying |

OTHER PROTECTIVE EQUIPMENT

## SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING & STORING

Follow label directions. Keep out of eyes.

OTHER PRECAUTIONS

KEEP OUT OF REACH OF CHILDREN

INTERNATIONAL TECHNOLOGY CORPORATION

# REAL TIME AIR MONITORING LOG

PROJECT NAME UNION CARBIDE LOCATION LINDEN, NEW JERSEY PROJECT NO. 305281

| Date | Analyst | Time | Instrument (Mfg/Model/ Serial No.) | Calibration Date & Cpd. | Compound Measured | Span Set or Sens. Cal. | Conc. (Units) | Location/Activity/Comments |
|---|---|---|---|---|---|---|---|---|
| /8 | W.C. HOUSEMAN | | BACHARACH MODEL MV-2 | 4/14/87 | MERCURY | 0-0.2 mg/m³ | | NO. 3 COMPRESSOR |
| | | 0900 | | | | | 0.5-0.6 | 1st STAGE SUCTION VALUE ~~COVER~~ OPENING |
| | | | | | | | 0.01-0.06 | 1st STAGE SUCTION VALUE COVER |
| | | | | | | | 0.9 -1.0 | 2nd STAGE DISCHARGE OPENING |
| | | | | | | | 0.1 | 3rd STAGE DISCHARGE VALUE PORT |
| | | | | | | | 0.05-0.06 | 4th STAGE DISCHARGE VALUE PORT |
| | | | | | | | >1.0 | BOTTOM SECTION of SNUBBER (PRIMARY RECEIVER) |
| | | | | | | | 0.05 | " " " " 1" from OPENING |
| | | | | | | | N.D. | GEAR CASE - opposite compressor |
| | | | | | | | N.D | " " - compressor side |
| | | | | | | | 0.1 | 1st STAGE SUCTION HEAD |
| | | | | | | | 0.75 | DRAIN TRAP FOR 3rd STAGE DISCHARGE (IN PIPING) |
| ✓ | | 1150 | ✓ | | | | 0.1-0.2 | 3rd STAGE COOLER |
| | | | | | | | N.D. | 5th stage WATER JACKET |
| | | | | | | | N.D | INSIDE 5th stage |
| | | | | | | | | |

INTERNATIONAL TECHNOLOGY CORPORATION

# REAL TIME AIR MONITORING LOG

PROJECT NAME: Union Carbide LOCATION: London, NS PROJECT NO. 305281

| Date | Analyst | Time | Instrument (Mfg/Model/ Serial No.) | Calibration Date & Cpd. | Compound Measured | Span Set or Sens. Cal. | Conc. (Units) | Location/Activity/Comments |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0.01 | | |
| 3-8 | Unbee Kim | 3:00 pm | Bacharach Model MV-2 | 4-14-87 | Mercury | | mg/m³ | No 3 Compressor |
| | | | | | | | 0.5 | 1st Stage suction valve opening |
| | | | | | | | 0.1 | Breathing Zone 1ft away |
| | | | | | | | 0.1 | 2nd Stage discharge opening |
| | | | | | | | 0.05-0.1 | Breathing Zone |
| | | | | | | | <0.1 | 3rd Stage discharge port valve |
| | | | | | | | 0.1 0.2 | Breathing Zone |
| | | | | | | | <0.1 | 4th stage disch port |
| | | | | | | | 0.1-0.2 | Breathing Zone |
| | | | | | | | >1.0 | Primary Receiver |
| | | | | | | | >1.0 | Top Cooler |
| | | | | | | | 0.1-0.2 | Breathing Zone near Top Cooler |
| | | | | | | | | |
| | | | | | | | 0.1-0.2 | Decon Area |
| | | | | | | | 0.1 | Breathing Zone of Decon area |
| | | 3:30 | | | | | | |

INTERNATIONAL TECHNOLOGY CORPORATION

# REAL TIME AIR MONITORING LOG

PROJECT NAME Union Carbide LOCATION Linden NJ PROJECT NO. 305281

| Date | Analyst | Time | Instrument (Mfg/Model/ Serial No.) | Calibration Date & Cpd. | Compound Measured | Span Set or Sens. Cal. | Conc. (Units) | Location/Activity/Comments |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0.01 | | |
| -9 | Unkee Kim | pm 12:30 | Bacharach MV-2 | 4-14-87 | Mercury | | mg/m³ | No. 3 Compressor |
| | | | | | | | 0.5-1.0 | 1st Stage Openings |
| | | | | | | | 0.1-0.2 | Breathing Zone |
| | | | | | | | 0.5-1.0 | 2nd Stage Openings |
| | | | | | | | 0.1-0.2 | Breathing Zone |
| | | | | | | | 0.5-1.0 | 3rd Stage Opening |
| | | | | | | | 0.1-0.2 | Breathing Zone |
| | | | | | | | 0.5 | 4th Stage Openings |
| | | | | | | | 0.1 | Breathing Zone |
| | | | | | | | >1.0 | Top Cooler Opening |
| | | | | | | | 0.1-0.2 | Breathing Zone |
| | | | | | | | >1.0 | Primary Receiver |
| | | | | | | | 0.1-0.2 | Breathing Zone |
| | | | | | | | | |
| | | | | | | | [illegible] | Decoil Area |
| | | 3:00pm | | | | | 0.1-0.2 | Breathing Zone |

INTERNATIONAL TECHNOLOGY CORPORATION

# REAL TIME AIR MONITORING LOG

PROJECT NAME Union Carbide LOCATION Linden, New Jersey PROJECT NO. 305281

| Date | Analyst | Time | Instrument (Mfg/Model/ Serial No.) | Calibration Date & Cpd. | Compound Measured | Span Set or Sens. Cal. | Conc. (Units) | Location/Activity/Comments |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0.01 | mg/m³ | |
| -90 | Ulrike Kim | 9:00 AM | Pockwatch MV-3 | 4-4-87 | Mercury | | | No. 3 Compressor |
| | | | | | | | | |
| | | | | | | | 0.5 | 4th Stage Cooler detached |
| | | | | | | | 0.5 | 3rd Stage Cooler detached |
| | | | | | | | 0.5 | Top Cooler |
| | | | | | | | 0.1 | Piston |
| | | | | | | | 0.1 | flywheel area |
| | | | | | | | 0.1-0.3 | Valve Openings |
| | | | | | | | 0.1-0.2 | Decon area |
| | | | | | | | | |
| | | | | | | | 0.1 | Breathing Zone 5ft from Compressor |
| | | | | | | | 0.2 | 1ft " " |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | 11:00 | | | | | | |

INTERNATIONAL TECHNOLOGY CORPORATION

# REAL TIME AIR MONITORING LOG

PROJECT NAME Union Carbide LOCATION Linden NJ PROJECT NO. 305281

| Date | Analyst | Time | Instrument (Mfg/Model/ Serial No.) | Calibration Date & Cpd. | Compound Measured | Span Set or Sens. Cal. | Conc. (Units) | Location/Activity/Comments |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0.01 | mg/m³ | |
| -10 | U. Kim | 2:30 pm | Bacharach [illegible] | 4-14-87 | Mercury | | | No. 3 Compressor |
| | | | | | | | | |
| | | | | | | | 0.3 | 4th Stage Cooler |
| | | | | | | | 0.3 | 3rd Stage Cooler |
| | | | | | | | <0.2 | Breathing zone |
| | | | | | | | 0.5 | Top ~~Cover~~ Cooler |
| | | | | | | | 0.1 | Piston |
| | | | | | | | 0.1 | flywheel area |
| | | | | | | | 0.3 | Valve openings |
| | | | | | | | <0.2 | Breathing Zone |
| | | | | | | | 0.1-0.3 | Decon Area |
| | | | | | | | | |
| | | | | | | | <0.1 | Breathing Zone 5 ft from Compressor |
| | | | | | | | 0.1-0.2 | 1 ft |
| | | 3:30 pm | | | | | | |
| | | | | | | | | |

INTERNATIONAL TECHNOLOGY CORPORATION

# REAL TIME AIR MONITORING LOG

PROJECT NAME Union Carbide LOCATION Linden, NJ PROJECT NO. 305281

Piston detached at this time

| Date | Analyst | Time | Instrument (Mfg/Model/ Serial No.) | Calibration Date & Cpd. | Compound Measured | Span Set or Sens. Cal. | Conc. (Units) | Location/Activity/Comments |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0.01 | | |
| 4-11 | U.Kim | 9am 10:00 | MV2 Bacharach | 4-14-87 | Hg | | mg/m³ | No. 3 Compressor |
| | | | | | | | 0.05 0.1 | Piston |
| | | | | | | | 0.05 0.1 | Piston Casing |
| | | | | | | | 0.05 | Fly-wheel |
| | | | | | | | <0.05 | Breathing Zone casing near |
| | | | | | | | | |
| | | | | | | | 0.05 0.1 | Decon area |
| | | | | | | | 0.05 0.1 | Breathing Zone of Decon Area |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | 11:00am | | | | | | |

INTERNATIONAL TECHNOLOGY CORPORATION

# REAL TIME AIR MONITORING LOG

PROJECT NAME Union Carbide LOCATION Linden, NJ PROJECT NO. 305281

| Date | Analyst | Time | Instrument (Mfg/Model/ Serial No.) | Calibration Date & Cpd. | Compound Measured | Span Set or Sens. Cal. | Conc. (Units) | Location/Activity/Comments |
|---|---|---|---|---|---|---|---|---|
| | | | | | | 0.01 | mg/m³ | #3 Compressor |
| 3-14 | U. Kim | Am 11:00 | Bacharach MV-2 | 4-14-87 | Mercury | | | |
| | | | | | | | >1.0 | Cooler #2 opening |
| | | | | | | | >1.0 | " " exhaust |
| | | | | | | | <0.2 | all other parts |
| | | | | | | | 0.05-0.2 | 1-2 ft around |
| | | | | | | | <0.05 | background (around |
| | | | | | | | | contamination zone line) |
| | | | | | | | | |
| | | | | | | | ≥0.0 | Outside air |
| | | | | | | | | |
| | | | | | | | | |
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INTERNATIONAL TECHNOLOGY CORPORATION

# REAL TIME AIR MONITORING LOG

PROJECT NAME Union Carbide LOCATION Linden, NJ PROJECT NO. 305281

| Date | Analyst | Time | Instrument (Mfg/Model/ Serial No.) | Calibration Date & Cpd. | Compound Measured | Span Set or Sens. Cal. | Conc. (Units) | Location/Activity/Comments |
|---|---|---|---|---|---|---|---|---|
| 15 | U. Kim | 2:30pm | Bacharach MV-2 | 4-14-87 | Mercury | 0.01 | mg/m³ | Compressor No. 3 |
| | | | | | | | 0.1 | 2nd stage cooler opening |
| | | | | | | | 0.2 | " exhaust |
| | | | | | | | 0.05 0.15 | Dismantling work area |
| | | | | | | | 0.05 0.05 | Decontamination area |
| | | | | | | | 0.05 0.04 | Cleaned Equipment Parts Area |
| | | | | | | | 0.01 | Outside the hot zone background |
| | | | | | | | ≤0.01 | Outside bldg background |
| | | | | | | | | |
| | | | | | | | | |
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INTERNATIONAL TECHNOLOGY CORPORATION

# REAL TIME AIR MONITORING LOG

PROJECT NAME Union Carbide LOCATION Linde NJ PROJECT NO. 305281

| Date | Analyst | Time | Instrument (Mfg/Model/ Serial No.) | Calibration Date & Cpd. | Compound Measured | Span Set or Sens. Cal. | Conc. (Units) | Location/Activity/Comments |
|---|---|---|---|---|---|---|---|---|
| -16 | U. Kim | 2:30pm | Bachach MV 2 | 4-14-87 | Mercury | 0.01 | mg/m³ | Compressor #3 |
| | | | | | | | 0.7 | 2nd Stage Cooler Opening |
| | | | | | | | 0.1 | " " exhaust |
| | | | | | | | 0.03-0.12 | Dismantling Work Area |
| | | | | | | | 0.03-0.05 | Decontamination Work Area |
| | | | | | | | 0.02-0.05 | Cleaned Equip & Pad Area |
| | | | | | | | 0.01 w/ | Outside hotzone taped area |
| | | | | | | | 0.02 w/o | w/ and w/o door open |
| | | | | | | | | |
| | | | | | | | <0.01 | Outside Bldg Bkgd |
| | | | | | | | | |
| | | | | | | | | |
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INTERNATIONAL TECHNOLOGY CORPORATION

# ANALYTICAL SERVICES
# FIELD ANALYTICAL AND SAMPLING

# STANDARD OPERATING PROCEDURE

| TITLE: | PROCEDURE NO. SHP4625-06 |
|---|---|
| WIPE SAMPLE COLLECTIONS | REVISION NO. 0 |
| | DATE 12/17/86 |
| | PAGE 1 OF 6 |

| PREPARED BY: | REVIEWED BY: | APPROVED BY: |
|---|---|---|
| | Director, F.A.S. | Quality Assurance, I.T.A.S. |
| | Vice President, I.T.A.S. | Corporate Director, Q.A. |

## I. PURPOSE

Wipe samples are taken to assess the presence of contaminants on various types of hard surfaces. The major objectives for wipe or surface samples are:

1. To establish whether or not a contaminant is present.
2. To determine the level and extent of surficial contamination.
3. To establish a database to be used for assessment of potential health risks.
4. To measure decontamination efficiencies and/or effectiveness.

## II. SCOPE/APPLICATION

This procedure is applicable to the collection of wipe samples to determine contamination levels on hard surfaces such as floors, walls and equipment. Wipes are an effective means for collecting a specimen of ambient constituents deposited or settled out on surfaces as a result of some contaminant-releasing incident. Surface areas of personnel contact or those areas associated with air handling systems are highly desirable locations to sample. A thorough understanding of all factors contributing to the condition of contamination, possible sources and the intended use of the data must be taken into account in making appropriate decisions concerning sample location.

## III. EQUIPMENT AND SUPPLIES

- Hexane - pesticide grade
- 4 x 4" 100% cotton sterile gauze pads individually wrapped
- wide mouth glass jar with teflon lined lid for solvent/pad reservoir
- Forceps, stainless steel
- Appropriately sized sample bottles and screw caps with teflon liners
- Custody tape - wide/narrow
- Disposable gloves (appropriate to particular situation)
- Unique pre-printed sample number label tape
- "zip-lock" bags - quart and gallon sizes
- 35 mm automatic camera with data back and color print film - extra batteries
- Aluminum foil
- Packing material - bubble wrap, styro-peanuts, vermiculite
- Masking tape
- Duct tape
- Stainless steel template
- Carpenter's square
- Metric tape measure
- Black indelible pen
- Black ball point pen
- Black felt tip pen
- Pocket calculator
- Field log book
- Chain-of-custody forms
- Request For Analysis forms
- Case for sampling equipment
- Shipping containers
- Shipping labels
- Trash bags
- Work cart or tray to work from and transport sampling equipment
- Strapping tape
- Flashlight with extra batteries
- Mobile radios, if applicable, with chargers
- Safety glasses, ear protection, etc.
- 7-x-omatic detergent
- Extension cord with GFI
- Paper towels
- 25', 100' tape measures
- Pencils

DRAFT

## VI. PROCEDURE

A. Sample Location: Can be selected prior to arrival on-site based on previous site visits, maps, etc., or immediately prior to collection based on observations. The following are specific goals for use of wipe sample data, which can dictate the approach used in selecting sample locations.

1. Worst-case contamination sample - determination of area of highest contamination probability.

2. Extent of contamination sample - determination of how large an area over which the contamination has been dispersed.

3. Post-decontamination sample - determination of any residual contamination in an area after clean-up and decontamination work.

4. Toxicological assessment - determining if an area is safe from a public health and exposure standpoint.

B. Wipe Area: Past experience has shown that a 2500 $cm^2$ (0.25 $m^2$) area is appropriate for most wipe sample applications. For specific projects, the following guidelines must be addressed:

1. The actual area to be wiped is largely determined by available analytical method sensitivity for target parameters and the target concentration(s) that define allowable exposure levels.

2. Required risk assessment data may further impact the size of wipe sample areas.

3. If a single surface area does not provide sufficient area for sample representation, smaller areas from the same general location may be sampled and composited to form one sample for analysis.

C. Solvent Selection

1. When sampling for particulates, the wipe efficiency is improved by saturating the pad with solvent. While solubility is not the concern in this case, the presence of moisture on the wipe encourages the particulates to cling to the gauze.

2. When the surface contaminant is in a phase other than particulate (e.g., mist, oil layer, etc.), an appropriate solvent must be used to remove the contamination. Routinely sampled contaminant/solvent combinations are listed below:

| | |
|---|---|
| Polychlorinated Biphenyl (PCB) | Hexane, Methanol, Acetone |
| Tetrachlorodibenzodioxin (TCDD) | Hexane |
| Tetrachlorodibenzofuran (TCDF) | Hexane |
| Chlorinated Pesticides | Hexane, Methanol, Methylene Chloride |
| Phenol | Methanol, Acetone |
| Oils | Methylene Chloride, Carbon Tetrachloride[1], Hexane |
| Metals | Nitric Acid Solution-10% typical |
| Pentachlorophenol (PCP) | Methanol |

[1]Known carcinogenic material. Use extreme caution. Consider alternatives.

D. Taking The Wipe Sample

1. Prepare wipe collection pads by placing 4 x 4 inch, 100% cotton sterile gauze pads into the wide mouth reservoir jar with gloved hands. Saturate the pads with the appropriate solvent for extraction of contaminant of interest (see Section C.2, above).

Each pad is saturated just prior to sampling each location.

2. Begin the sampling procedure by collecting a field blank by wiping a pair of disposable gloves with a prepared gauze pad. The field blank will determine if specific analytical interferences may be present in either the sorbent pads, solvent or the gloves. This procedure is repeated at a frequency of 5% of samples collected (1 per 20 samples), or at least once for each day that samples are collected.

3. Specifically locate and measure the area to be sampled and mark it with pencil or a non-interfering tape (e.g., masking tape) or utilize a pre-measured, decontaminated template.

4. Put on a new pair of gloves and press the sampling pad within the designated sample area. With straight, even strokes, draw the pad across the area, slightly overlapping each stroke. Change the wiping direction with a clean pad and repeat the pattern until confident that all of the surface contaminant has been removed.

5. As each wipe pad is used, place it in the appropriate pre-labeled sample container. When all pads for a sample have been completed, apply custody tape at the closure area of the container.

6. Prepare sample documentation per SOP # SMP4625-10, "Field Sampling Documentation". Label the sample area and take a photograph that is representative of the sample area and the location proximity, with reference points when possible.

7. The person in charge of field data should ensure the following information is accurately recorded:

   - Sample number on bottle and data sheet
   - Sample location (include floor number)
   - Sample description (e.g., wet wipe of vinyl-covered wallboard)
   - Sample date and time
   - Area sampled in square centimeters
   - Observations/problems, if pertinent
   - Names of sampling personnel

8. Upon removal of samples from site, a chain-of-custody form shall be established for the samples. The chain-of-custody will act as a transmittal form from sampling personnel to laboratory personnel and will be signed at this time to document that samples are properly relinquished and received by appropriate staff members.

## V. QA/QC

A. A wipe field blank is collected at a frequency of 5% of samples collected (1 per 20 collected) or at least daily to verify lack of interferences or cross-contamination during sample collection and handling. Collection procedure is described in Section IV, D.2.

B. Re-wipe samples may be collected to evaluate the contaminant removal efficiency from the sampled surface. Re-wipes are collected as follows: The exact area which has just been wiped is wiped again using the same technique as for the original sample. The re-wipe pads are placed in a separate sample collection jar and analyzed as a distinct sample. The original and re-wipe results are used to determine the relative effectiveness of the original wipe in removing the contaminant from the surface.

C. Duplicate - an area immediately adjacent to a previously sampled area is sampled using analogous techniques. Note that this is not a "true" duplicate, in the sense that it is not possible to actually split a wipe sample. There is no guarantee, therefore, that wipe duplicates will or should provide comparable results. The data may be used as a general indication of the homogeneity of the contamination across a particular surface.

D. Spikes - may be prepared in the field or laboratory. A standard solution of known concentration levels is injected onto prepared gauze pads and sent for analysis as a typical sample. Recovery efficiency, after the handling and analysis procedures, can then be assessed.

## VI. REFERENCES

A. Sampling For Surface Contamination. Industrial Hygiene Technical Manual No. 680, May 24, 1984. U.S. Department of Labor: OSHA, p. VIII-1.

B. Standard Operating Procedure: Wipe Sampling Technique. IT Corporation, 1984.

C. Protocol For Heavy Equipment PCB Clean-up Verification Sampling. Field Analytical Resource Management, IT Corporation.

INTERNATIONAL TECHNOLOGY CORPORATION

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| | |
|---|---|
| DATE | 3 / 11 / 88 |
| TIME | 12:50 |
| PAGE | 1 OF 7 |
| PAGE | |
| PROJECT NO. | 305281 |

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D 1834 Post Clean from Compressor #3

SAMPLE LOCATION Piston WP1 Post Clean

SAMPLE TYPE Wipe Test

COMPOSITE ____ YES ✓ NO

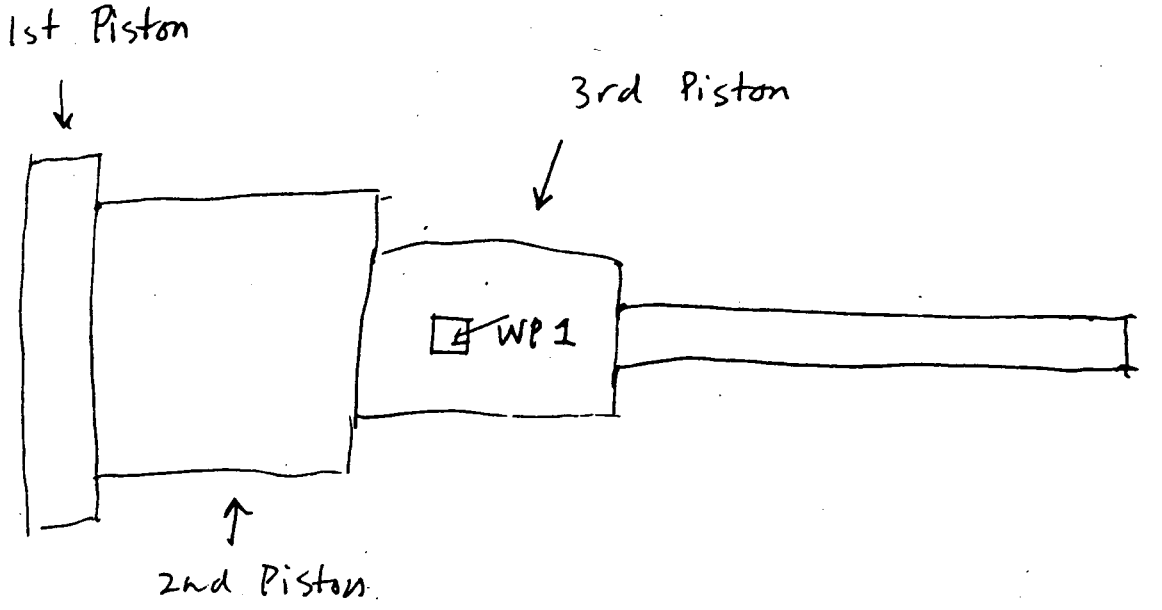
COMPOSITE TYPE

DEPTH OF SAMPLE

WEATHER

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 1 8oz jar | 1 Gauze Pad |
| | |
| | |

COMMENTS:




PREPARED BY: J.M. Hill

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|---|---|---|---|---|---|
| DATE | 5 | 11 | 88 | | |
| TIME | 12 | 55 | | | |
| PAGE 2 OF 7 | | | | | |
| PAGE | | | | | |
| PROJECT NO. 305281 | | | | | |

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## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linde

SAMPLE NO. D 1835 from Compressor #3

SAMPLE LOCATION 1st Stage Suction Valve WP 2 Post Clean

SAMPLE TYPE Wipe Test

COMPOSITE ____ YES ✓ NO

COMPOSITE TYPE ____

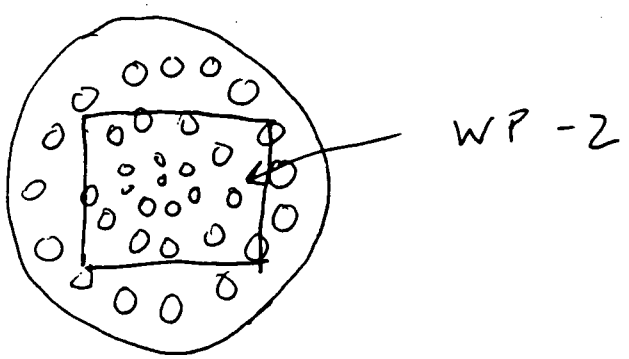
DEPTH OF SAMPLE ____

WEATHER ____

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 1 8oz jar | 1 gauze Pad |
| | |
| | |

COMMENTS:

1st Stage Suction Valve




PREPARED BY: ____

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|---|---|---|---|---|---|
| DATE | 3 | 11 | 88 | | |
| TIME | 13 | 10 | | | |
| PAGE 3 OF 7 | | | | | |
| PAGE | | | | | |
| PROJECT NO. 305281 | | | | | |

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide

SAMPLE NO. D 1836 from Compressor #3

SAMPLE LOCATION 1st Stage Valve Covers Post Clean (2 plates)

SAMPLE TYPE Wipe Test

COMPOSITE ✓ YES ___ NO

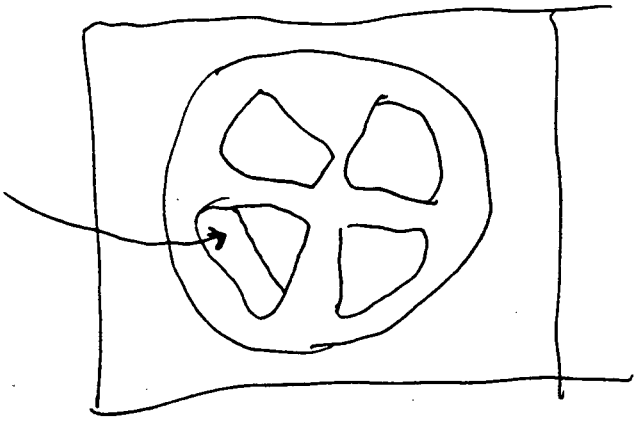
COMPOSITE TYPE ___

DEPTH OF SAMPLE ___

WEATHER ___

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 1 8oz jar | 2 pads |
| | |
| | |

COMMENTS:




2 plates from 1st Stage Value cover.

50 cm² ea

2 pads

50 cm² from ea of two of these

PREPARED BY: ___

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| | | | | | |
|---|---|---|---|---|---|
| DATE | 3 | 11 | 88 | | |
| TIME | 13 | 25 | | | |
| PAGE 4 OF 7 | | | | | |
| PAGE | | | | | |
| PROJECT NO. 305281 | | | | | |

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## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide Linden

SAMPLE NO. D 1837 from Compressor #3

SAMPLE LOCATION 1st ~~+ 2nd~~ Stage Cylinder W-P4 Pre Clean

SAMPLE TYPE Wipe

COMPOSITE ___ YES ✓ NO

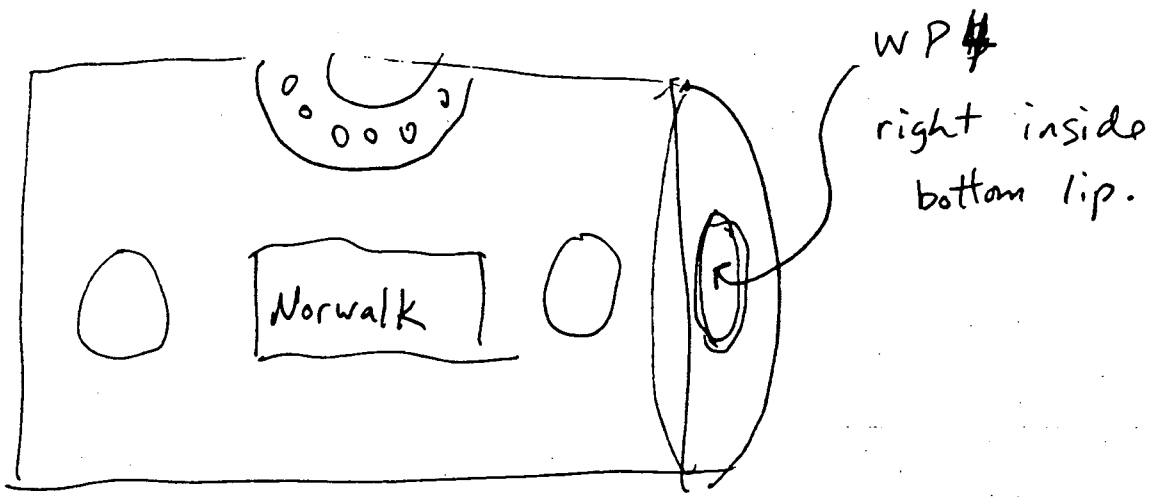
COMPOSITE TYPE

DEPTH OF SAMPLE

WEATHER

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 1 8oz jar | 1 gauze pad |
| | |
| | |

COMMENTS:




PREPARED BY: _____

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|---|---|---|---|---|---|
| DATE | 3 | 11 | 88 | | |
| TIME | 13 | 30 | | | |
| PAGE 5 OF 7 | | | | | |
| PAGE | | | | | |
| PROJECT NO. 305281 | | | | | |

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## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D 1838 from Compressor #3

SAMPLE LOCATION 2nd Stage Cylinder WP 5 Preclean

SAMPLE TYPE Wipe

COMPOSITE ____ YES ✓ NO

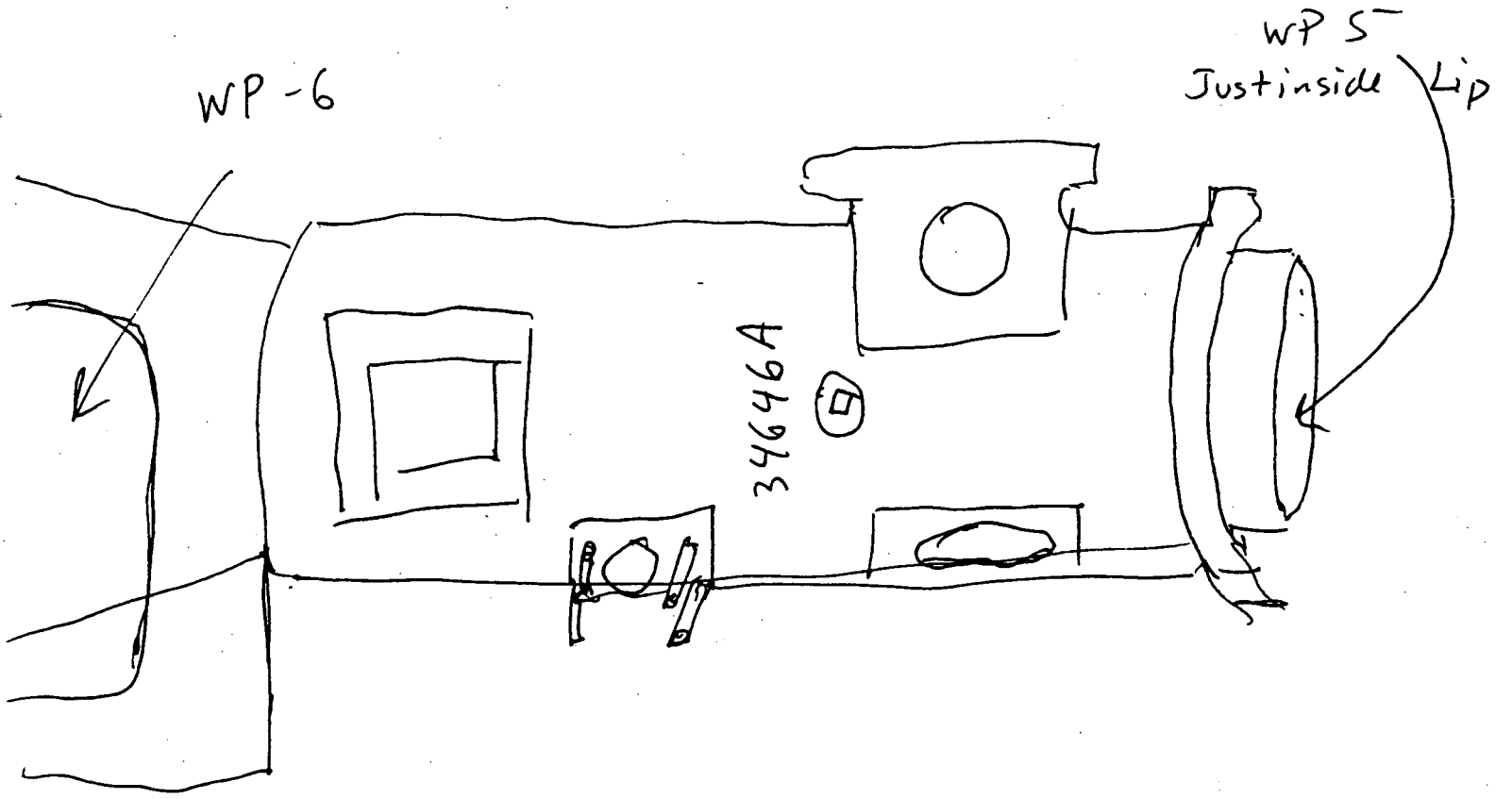
COMPOSITE TYPE

DEPTH OF SAMPLE

WEATHER

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 1 8oz jar | 1 gauze pad |
| | |
| | |

COMMENTS:

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INTERNATIONAL TECHNOLOGY CORPORATION

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| DATE | 3 | 11 | 88 | | |
| TIME | 13 | 35 | | | |
| PAGE 6 OF 7 | | | | | |
| PAGE | | | | | |
| PROJECT NO. 305281 | | | | | |

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide Linden

SAMPLE NO. D 1839 from Compressor #3

SAMPLE LOCATION Cross Head Wp 6 Pre Clean

SAMPLE TYPE Wipe

COMPOSITE ____ YES ✓ NO

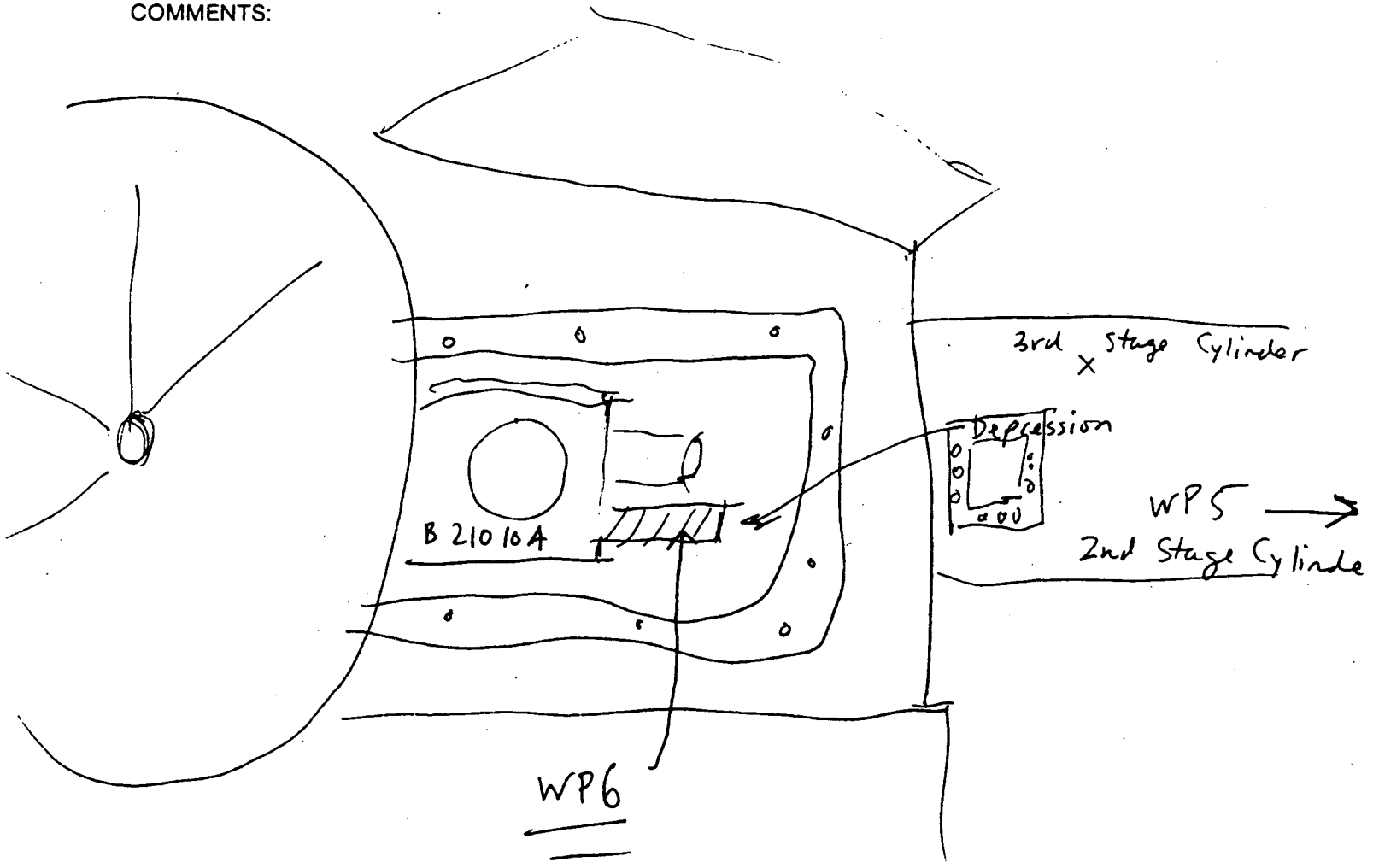
COMPOSITE TYPE

DEPTH OF SAMPLE

WEATHER

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 1 8oz jar | 1 gauze pad |
| | |
| | |

COMMENTS:




PREPARED BY: _____

INTERNATIONAL TECHNOLOGY CORPORATION

| | | | | | |
|---|---|---|---|---|---|
| DATE | 3 | 11 | 88 | | |
| TIME | 13 | 48 | | | |
| PAGE 7 OF 7 | | | | | |
| PAGE | | | | | |
| PROJECT NO. 305281 | | | | | |

[redacted]

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide Linden

SAMPLE NO. D 1840

SAMPLE LOCATION Field Blank

SAMPLE TYPE Wipe

COMPOSITE ____ YES ✓ NO

COMPOSITE TYPE ____

DEPTH OF SAMPLE ____

WEATHER ____

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 1 8oz Jar | 1 pad |
| | |
| | |

COMMENTS:

1 gauze pad was moiste w/ $HNO_3$ from spray bottle

PREPARED BY: ____

IT

# ANALYSIS DATA SHEET

[redacted]

DATE RECEIVED 3/11/88

| JOB # | LOT # | SAMPLE DATE | SAMPLE # | BOTTLE # |
|---|---|---|---|---|
| 305281 | 6216 | 031188 | D134 | - |

LOT NUMBER 6216

PROJECT NAME: Union Carbide – Linden

NO. OF BOTTLES: 1

DESCRIPTION: Wipe Samples for Hg in 8oz glass jars

PAGE 1 OF 7

## RESULTS (as ppm unless specified)

☐ WET WT. ☐ DRY WT.

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| 24-HOUR ANALYSIS | Acidity (as $CaCO_3$) | | | | |
| | Alkalinity (as $CaCO_3$) | | | | |
| | Ammonia-N | | | | |
| | $BOD_5$ | | | | |
| | Chlorine Demand (at 15 min) | | | | |
| | Chlorine Residual | | | | |
| | Coliform-Fecal (# col. 100ml) | | | | |
| | Coliform-Total (# col. 100ml) | | | | |
| | Color (Pt Co. units) | | | | |
| | Cyanide (Total) | | | | |
| | Dissolved Oxygen | | | | |
| | Hexavalent Chromium | | | | |
| | Nitrate-N | | | | |
| | Nitrite-N | | | | |
| | Nitrogen-Kjeldahl | | | | |
| | Nitrogen-Organic | | | | |
| | Oil & Grease Gr.☐ IR☐ | | | | |
| | Petro. Hydrocarbon Gr.☐ IR☐ | | | | |
| | Phosphate-P (Ortho) | | | | |
| | pH (units) | | | | |
| | Phenols (Total) | | | | |
| | Settleable Solids | | | | |
| | Specific Conductance (umhos) | | | | |
| | Sulfite | | | | |
| | Surfactants | | | | |
| | TOC | | | | |
| | TOX | | | | |
| WET CHEMISTRY | Boron | | | | |
| | Chloride | | | | |
| | COD | | | | |
| | Fluoride | | | | |
| | Hardness (as $CaCO_3$) | | | | |
| | Phosphate-P (Total) | | | | |
| | Silica | | | | |
| | Sulfate | | | | |
| | Sulfide | | | | |
| | Total Ash | | | | |
| | Total Dissolved Solids | | | | |
| | Total Solids | | | | |
| | Total Suspended Solids | | | | |
| | Total Volatile Solids | | | | |
| | Turbidity (NTU) | | | | |
| | | | | | |
| MISC. | Flash Point (°F) | | | | |
| | Heating Value (BTU) | | | | |
| | Organic Chloride (%) | | | | |
| | Organic Sulfur (%) | | | | |
| | Specific Gravity (g/ml) | | | | |
| | Viscosity (cp units) | | | | |

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INIT. |
|---|---|---|---|---|---|
| METALS | Aluminum (Al) | | | | |
| | Antimony (Sb) | | | | |
| | Arsenic (As) | | | | |
| | Barium (Ba) | | | | |
| | Beryllium (Be) | | | | |
| | Cadmium (Cd) | | | | |
| | Calcium (Ca) | | | | |
| | Chromium (Cr) | | | | |
| | Cobalt (Co) | | | | |
| | Copper (Cu) | | | | |
| | Iron (Fe) | | | | |
| | Lead (Pb) | | | | |
| | Magnesium (Mg) | | | | |
| | Manganese (Mn) | | | | |
| | Mercury (Hg) | ✓ | 0.090 mg/wipe | 3/12 | R |
| | Molybdenum (Mo) | | | | |
| | Nickel (Ni) | | | | |
| | Potassium (K) | | | | |
| | Selenium (Se) | | | | |
| | Silver (Ag) | | | | |
| | Sodium (Na) | | | | |
| | Thallium (Tl) | | | | |
| | Tin (Sn) | | | | |
| | Titanium (Ti) | | | | |
| | Vanadium (V) | | | | |
| | Zinc (Zn) | | | | |
| | | | | | |
| EP. TOXICITY | Arsenic | | | | |
| | Barium | | | | |
| | Cadmium | | | | |
| | Chromium | | | | |
| | Lead | | | | |
| | Mercury | | | | |
| | Selenium | | | | |
| | Silver | | | | |
| | Endrin | | | | |
| | Lindane | | | | |
| | Methoxychlor | | | | |
| | Toxaphene | | | | |
| | 2.4 - D | | | | |
| | 2.4.5 - TP | | | | |
| OTHER | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

PROJECT MANAGER:

# ANALYSIS DATA SHEET

305281 | 6 2 1 6 | 0 3 1 1 8 8 | D 9 3 5 |
LOT # | SAMPLE DATE | SAMPLE # | BOTTLE #

DATE RECEIVED 3/11/88

LOT NUMBER 6216

PROJECT NAME Union Carbide - Linden NO OF BOTTLES 1

DESCRIPTION Wipe Samples for Hg in 8oz glass jars PAGE 2 OF 7

**RESULTS (as ppm unless specified)** ☐ WET WT. ☐ DRY WT

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| 24-HOUR ANALYSIS | Acidity (as $CaCO_3$) | | | | |
| | Alkalinity (as $CaCO_3$) | | | | |
| | Ammonia-N | | | | |
| | $BOD_5$ | | | | |
| | Chlorine Demand (at 15 min) | | | | |
| | Chlorine Residual | | | | |
| | Coliform-Fecal (# col 100ml) | | | | |
| | Coliform-Total (# col 100ml) | | | | |
| | Color (Pt Co units) | | | | |
| | Cyanide (Total) | | | | |
| | Dissolved Oxygen | | | | |
| | Hexavalent Chromium | | | | |
| | Nitrate-N | | | | |
| | Nitrite-N | | | | |
| | Nitrogen-Kjeldahl | | | | |
| | Nitrogen-Organic | | | | |
| | Oil & Grease Gr ☐ IR ☐ | | | | |
| | Petro. Hydrocarbon Gr ☐ IR ☐ | | | | |
| | Phosphate-P (Ortho) | | | | |
| | pH (units) | | | | |
| | Phenols (Total) | | | | |
| | Settleable Solids | | | | |
| | Specific Conductance (umhos) | | | | |
| | Sulfite | | | | |
| | Surfactants | | | | |
| | TOC | | | | |
| | TOX | | | | |
| WET CHEMISTRY | Boron | | | | |
| | Chloride | | | | |
| | COD | | | | |
| | Fluoride | | | | |
| | Hardness as $CaCO_3$ | | | | |
| | Phosphate-P (Total) | | | | |
| | Silica | | | | |
| | Sulfate | | | | |
| | Sulfide | | | | |
| | Total Ash | | | | |
| | Total Dissolved Solids | | | | |
| | Total Solids | | | | |
| | Total Suspended Solids | | | | |
| | Total Volatile Solids | | | | |
| | Turbidity (NTU) | | | | |
| | | | | | |
| MISC | Flash Point (°F) | | | | |
| | Heating Value (BTU) | | | | |
| | Organic Chloride (%) | | | | |
| | Organic Sulfur (%) | | | | |
| | Specific Gravity (g/ml) | | | | |
| | Viscosity (cp units) | | | | |

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INIT |
|---|---|---|---|---|---|
| METALS | Aluminum (Al) | | | | |
| | Antimony (Sb) | | | | |
| | Arsenic (As) | | | | |
| | Barium (Ba) | | | | |
| | Beryllium (Be) | | | | |
| | Cadmium (Cd) | | | | |
| | Calcium (Ca) | | | | |
| | Chromium (Cr) | | | | |
| | Cobalt (Co) | | | | |
| | Copper (Cu) | | | | |
| | Iron (Fe) | | | | |
| | Lead (Pb) | | | | |
| | Magnesium (Mg) | | | | |
| | Manganese (Mn) | | | | |
| | Mercury (Hg) | ✓ | 0.26 mg/wipe | | |
| | Molybdenum (Mo) | | | | |
| | Nickel (Ni) | | | | |
| | Potassium (K) | | | | |
| | Selenium (Se) | | | | |
| | Silver (Ag) | | | | |
| | Sodium (Na) | | | | |
| | Thallium (Tl) | | | | |
| | Tin (Sn) | | | | |
| | Titanium (Ti) | | | | |
| | Vanadium (V) | | | | |
| | Zinc (Zn) | | | | |
| | | | | | |
| EP. TOXICITY | Arsenic | | | | |
| | Barium | | | | |
| | Cadmium | | | | |
| | Chromium | | | | |
| | Lead | | | | |
| | Mercury | | | | |
| | Selenium | | | | |
| | Silver | | | | |
| | Endrin | | | | |
| | Lindane | | | | |
| | Methoxychlor | | | | |
| | Toxaphene | | | | |
| | 2,4 - D | | | | |
| | 2,4,5 - TP | | | | |
| OTHER | | | | | |
| | | | | | |
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PROJECT MANAGER _____

# ANALYSIS DATA SHEET

| JOB # | LOT # | SAMPLE DATE | SAMPLE # | BOTTLE # |
|---|---|---|---|---|
| 305281 | 6216 | 031188 | D1836 | |

DATE RECEIVED 3/11/88

LOT NUMBER 6216

PROJECT NAME Union Carbide - Linden

NO OF BOTTLES 1

DESCRIPTION Wipe Samples for Hg in 8oz glass jars

PAGE 3 OF 7

**RESULTS (as ppm unless specified)** ☐ WET WT ☐ DRY WT

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| 24-HOUR ANALYSIS | Acidity (as $CaCO_3$) | | | | |
| | Alkalinity (as $CaCO_3$) | | | | |
| | Ammonia-N | | | | |
| | $BOD_5$ | | | | |
| | Chlorine Demand (at 15 min) | | | | |
| | Chlorine Residual | | | | |
| | Coliform-Fecal (# col 100ml) | | | | |
| | Coliform-Total (# col 100ml) | | | | |
| | Color (Pt Co units) | | | | |
| | Cyanide (Total) | | | | |
| | Dissolved Oxygen | | | | |
| | Hexavalent Chromium | | | | |
| | Nitrate-N | | | | |
| | Nitrite-N | | | | |
| | Nitrogen-Kjeldahl | | | | |
| | Nitrogen-Organic | | | | |
| | Oil & Grease Gr.☐ IR☐ | | | | |
| | Petro. Hydrocarbon Gr.☐ IR☐ | | | | |
| | Phosphate-P (Ortho) | | | | |
| | pH (units) | | | | |
| | Phenols (Total) | | | | |
| | Settleable Solids | | | | |
| | Specific Conductance (umhos) | | | | |
| | Sulfite | | | | |
| | Surfactants | | | | |
| | TOC | | | | |
| | TOX | | | | |
| WET CHEMISTRY | Boron | | | | |
| | Chloride | | | | |
| | COD | | | | |
| | Fluoride | | | | |
| | Hardness (as $CaCO_3$) | | | | |
| | Phosphate-P (Total) | | | | |
| | Silica | | | | |
| | Sulfate | | | | |
| | Sulfide | | | | |
| | Total Ash | | | | |
| | Total Dissolved Solids | | | | |
| | Total Solids | | | | |
| | Total Suspended Solids | | | | |
| | Total Volatile Solids | | | | |
| | Turbidity (NTU) | | | | |
| | | | | | |
| MISC. | Flash Point (°F) | | | | |
| | Heating Value (BTU) | | | | |
| | Organic Chloride (%) | | | | |
| | Organic Sulfur (%) | | | | |
| | Specific Gravity (g ml) | | | | |
| | Viscosity (cp units) | | | | |

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| METALS | Aluminum (Al) | | | | |
| | Antimony (Sb) | | | | |
| | Arsenic (As) | | | | |
| | Barium (Ba) | | | | |
| | Beryllium (Be) | | | | |
| | Cadmium (Cd) | | | | |
| | Calcium (Ca) | | | | |
| | Chromium (Cr) | | | | |
| | Cobalt (Co) | | | | |
| | Copper (Cu) | | | | |
| | Iron (Fe) | | | | |
| | Lead (Pb) | | | | |
| | Magnesium (Mg) | | | | |
| | Manganese (Mn) | | | | |
| | Mercury (Hg) | ✓ | 81mg/wipe | | |
| | Molybdenum (Mo) | | | | |
| | Nickel (Ni) | | | | |
| | Potassium (K) | | | | |
| | Selenium (Se) | | | | |
| | Silver (Ag) | | | | |
| | Sodium (Na) | | | | |
| | Thallium (Tl) | | | | |
| | Tin (Sn) | | | | |
| | Titanium (Ti) | | | | |
| | Vanadium (V) | | | | |
| | Zinc (Zn) | | | | |
| | | | | | |
| EP. TOXICITY | Arsenic | | | | |
| | Barium | | | | |
| | Cadmium | | | | |
| | Chromium | | | | |
| | Lead | | | | |
| | Mercury | | | | |
| | Selenium | | | | |
| | Silver | | | | |
| | Endrin | | | | |
| | Lindane | | | | |
| | Methoxychlor | | | | |
| | Toxaphene | | | | |
| | 2.4 - D | | | | |
| | 2.4.5 - TP | | | | |
| OTHER | | | | | |
| | | | | | |
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PROJECT MANAGER:

# ANALYSIS DATA SHEET

305281 | 6216 | 031188 | D937

LOT # | SAMPLE DATE | SAMPLE # | BOTTLE #

DATE RECEIVED 3/11/88

LOT NUMBER 6216

PROJECT NAME: Union Carbide - Linden

NO OF BOTTLES 1

DESCRIPTION: Wipe Samples for Hg in 8oz glass jars

PAGE 4 OF 7

**RESULTS (as ppm unless specified)** ☐ WET WT. ☐ DRY WT.

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| 24-HOUR ANALYSIS | Acidity (as $CaCO_3$) | | | | |
| | Alkalinity (as $CaCO_3$) | | | | |
| | Ammonia-N | | | | |
| | $BOD_5$ | | | | |
| | Chlorine Demand (at 15 min) | | | | |
| | Chlorine Residual | | | | |
| | Coliform-Fecal (# col 100ml) | | | | |
| | Coliform-Total (# col 100ml) | | | | |
| | Color (Pt.Co units) | | | | |
| | Cyanide (Total) | | | | |
| | Dissolved Oxygen | | | | |
| | Hexavalent Chromium | | | | |
| | Nitrate-N | | | | |
| | Nitrite-N | | | | |
| | Nitrogen-Kjeldahl | | | | |
| | Nitrogen-Organic | | | | |
| | Oil & Grease Gr.☐ IR☐ | | | | |
| | Petro. Hydrocarbon Gr.☐ IR☐ | | | | |
| | Phosphate-P (Ortho) | | | | |
| | pH (units) | | | | |
| | Phenols (Total) | | | | |
| | Settleable Solids | | | | |
| | Specific Conductance (umhos) | | | | |
| | Sulfite | | | | |
| | Surfactants | | | | |
| | TOC | | | | |
| | TOX | | | | |
| WET CHEMISTRY | Boron | | | | |
| | Chloride | | | | |
| | COD | | | | |
| | Fluoride | | | | |
| | Hardness (as $CaCO_3$) | | | | |
| | Phosphate-P (Total) | | | | |
| | Silica | | | | |
| | Sulfate | | | | |
| | Sulfide | | | | |
| | Total Ash | | | | |
| | Total Dissolved Solids | | | | |
| | Total Solids | | | | |
| | Total Suspended Solids | | | | |
| | Total Volatile Solids | | | | |
| | Turbidity (NTU) | | | | |
| | | | | | |
| MISC. | Flash Point (°F) | | | | |
| | Heating Value (BTU) | | | | |
| | Organic Chloride (%) | | | | |
| | Organic Sulfur (%) | | | | |
| | Specific Gravity (g ml) | | | | |
| | Viscosity (cp units) | | | | |

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INIT |
|---|---|---|---|---|---|
| METALS | Aluminum (Al) | | | | |
| | Antimony (Sb) | | | | |
| | Arsenic (As) | | | | |
| | Barium (Ba) | | | | |
| | Beryllium (Be) | | | | |
| | Cadmium (Cd) | | | | |
| | Calcium (Ca) | | | | |
| | Chromium (Cr) | | | | |
| | Cobalt (Co) | | | | |
| | Copper (Cu) | | | | |
| | Iron (Fe) | | | | |
| | Lead (Pb) | | | | |
| | Magnesium (Mg) | | | | |
| | Manganese (Mn) | | | | |
| | Mercury (Hg) | ✓ | 3.0 mg/wipe | | |
| | Molybdenum (Mo) | | | | |
| | Nickel (Ni) | | | | |
| | Potassium (K) | | | | |
| | Selenium (Se) | | | | |
| | Silver (Ag) | | | | |
| | Sodium (Na) | | | | |
| | Thallium (Tl) | | | | |
| | Tin (Sn) | | | | |
| | Titanium (Ti) | | | | |
| | Vanadium (V) | | | | |
| | Zinc (Zn) | | | | |
| | | | | | |
| EP. TOXICITY | Arsenic | | | | |
| | Barium | | | | |
| | Cadmium | | | | |
| | Chromium | | | | |
| | Lead | | | | |
| | Mercury | | | | |
| | Selenium | | | | |
| | Silver | | | | |
| | Endrin | | | | |
| | Lindane | | | | |
| | Methoxychlor | | | | |
| | Toxaphene | | | | |
| | 2.4 - D | | | | |
| | 2.4.5 - TP | | | | |
| OTHER | | | | | |
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PROJECT MANAGER:

# ANALYSIS DATA SHEET

| 6 | 2 | 6 | 0 | 3 | 1 | 8 | 8 | D | L | 8 | 3 | 8 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOT | | | SAMPLE DATE | | | | SAMPLE | | | | | BOTTLE | |

305281

DATE RECEIVED 3/11/98

LOT NUMBER 6216

PROJECT NAME Union Carbide - Linden

NO OF BOTTLES 1

DESCRIPTION Wipe Samples for Hg in 8oz glass jars

PAGE 5 OF 7

**RESULTS (as ppm unless specified)** ☐ WET WT. ☐ DRY WT.

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| 24-HOUR ANALYSIS | Acidity (as $CaCO_3$) | | | | |
| | Alkalinity (as $CaCO_3$) | | | | |
| | Ammonia-N | | | | |
| | $BOD_5$ | | | | |
| | Chlorine Demand (at 15 min) | | | | |
| | Chlorine Residual | | | | |
| | Coliform-Fecal (# col./100ml) | | | | |
| | Coliform-Total (# col./100ml) | | | | |
| | Color (Pt Co. units) | | | | |
| | Cyanide (Total) | | | | |
| | Dissolved Oxygen | | | | |
| | Hexavalent Chromium | | | | |
| | Nitrate-N | | | | |
| | Nitrite-N | | | | |
| | Nitrogen-Kjeldahl | | | | |
| | Nitrogen-Organic | | | | |
| | Oil & Grease Gr.☐ IR☐ | | | | |
| | Petro. Hydrocarbon Gr.☐ IR☐ | | | | |
| | Phosphate-P (Ortho) | | | | |
| | pH (units) | | | | |
| | Phenols (Total) | | | | |
| | Settleable Solids | | | | |
| | Specific Conductance (umhos) | | | | |
| | Sulfite | | | | |
| | Surfactants | | | | |
| | TOC | | | | |
| | TOX | | | | |
| WET CHEMISTRY | Boron | | | | |
| | Chloride | | | | |
| | COD | | | | |
| | Fluoride | | | | |
| | Hardness (as $CaCO_3$) | | | | |
| | Phosphate-P (Total) | | | | |
| | Silica | | | | |
| | Sulfate | | | | |
| | Sulfide | | | | |
| | Total Ash | | | | |
| | Total Dissolved Solids | | | | |
| | Total Solids | | | | |
| | Total Suspended Solids | | | | |
| | Total Volatile Solids | | | | |
| | Turbidity (NTU) | | | | |
| | | | | | |
| MISC. | Flash Point (°F) | | | | |
| | Heating Value (BTU) | | | | |
| | Organic Chloride (%) | | | | |
| | Organic Sulfur (%) | | | | |
| | Specific Gravity (g/ml) | | | | |
| | Viscosity (cp units) | | | | |

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INIT |
|---|---|---|---|---|---|
| METALS | Aluminum (Al) | | | | |
| | Antimony (Sb) | | | | |
| | Arsenic (As) | | | | |
| | Barium (Ba) | | | | |
| | Beryllium (Be) | | | | |
| | Cadmium (Cd) | | | | |
| | Calcium (Ca) | | | | |
| | Chromium (Cr) | | | | |
| | Cobalt (Co) | | | | |
| | Copper (Cu) | | | | |
| | Iron (Fe) | | | | |
| | Lead (Pb) | | | | |
| | Magnesium (Mg) | | | | |
| | Manganese (Mn) | | | | |
| | Mercury (Hg) | ✓ | 0.068 mg/wipe | | |
| | Molybdenum (Mo) | | | | |
| | Nickel (Ni) | | | | |
| | Potassium (K) | | | | |
| | Selenium (Se) | | | | |
| | Silver (Ag) | | | | |
| | Sodium (Na) | | | | |
| | Thallium (Tl) | | | | |
| | Tin (Sn) | | | | |
| | Titanium (Ti) | | | | |
| | Vanadium (V) | | | | |
| | Zinc (Zn) | | | | |
| | | | | | |
| EP. TOXICITY | Arsenic | | | | |
| | Barium | | | | |
| | Cadmium | | | | |
| | Chromium | | | | |
| | Lead | | | | |
| | Mercury | | | | |
| | Selenium | | | | |
| | Silver | | | | |
| | Endrin | | | | |
| | Lindane | | | | |
| | Methoxychlor | | | | |
| | Toxaphene | | | | |
| | 2,4-D | | | | |
| | 2,4,5-TP | | | | |
| OTHER | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

PROJECT MANAGER: _____

# ANALYSIS DATA SHEET

305281 | 6 | 2 | 1 | 6 | 0 | 3 | 1 | 1 | 8 | 8 | D | 9 | 3 | 9 |
LOT # SAMPLE DATE SAMPLE # BOTTLE #

DATE RECEIVED 3/11/88

LOT NUMBER 6216

PROJECT NAME Union Carbide - Linden

NO OF BOTTLES 1

DESCRIPTION Wipe Samples for Hg in 8oz glass jars

PAGE 6 OF 7

**RESULTS (as ppm unless specified)** ☐ WET WT. ☐ DRY WT.

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| 24-HOUR ANALYSIS | Acidity (as $CaCO_3$) | | | | |
| | Alkalinity (as $CaCO_3$) | | | | |
| | Ammonia-N | | | | |
| | $BOD_5$ | | | | |
| | Chlorine Demand (at 15 min) | | | | |
| | Chlorine Residual | | | | |
| | Coliform-Fecal (# col. 100ml) | | | | |
| | Coliform-Total (# col. 100ml) | | | | |
| | Color (Pt Co units) | | | | |
| | Cyanide (Total) | | | | |
| | Dissolved Oxygen | | | | |
| | Hexavalent Chromium | | | | |
| | Nitrate-N | | | | |
| | Nitrite-N | | | | |
| | Nitrogen-Kjeldahl | | | | |
| | Nitrogen-Organic | | | | |
| | Oil & Grease Gr.☐ IR☐ | | | | |
| | Petro. Hydrocarbon Gr.☐ IR☐ | | | | |
| | Phosphate-P (Ortho) | | | | |
| | pH (units) | | | | |
| | Phenols (Total) | | | | |
| | Settleable Solids | | | | |
| | Specific Conductance (umhos) | | | | |
| | Sulfite | | | | |
| | Surfactants | | | | |
| | TOC | | | | |
| | TOX | | | | |
| WET CHEMISTRY | Boron | | | | |
| | Chloride | | | | |
| | COD | | | | |
| | Fluoride | | | | |
| | Hardness (as $CaCO_3$) | | | | |
| | Phosphate-P (Total) | | | | |
| | Silica | | | | |
| | Sulfate | | | | |
| | Sulfide | | | | |
| | Total Asn | | | | |
| | Total Dissolved Solids | | | | |
| | Total Solids | | | | |
| | Total Suspended Solids | | | | |
| | Total Volatile Solids | | | | |
| | Turbidity (NTU) | | | | |
| | | | | | |
| MISC. | Flash Point (°F) | | | | |
| | Heating Value (BTU) | | | | |
| | Organic Chloride (%) | | | | |
| | Organic Sulfur (%) | | | | |
| | Specific Gravity (g/ml) | | | | |
| | Viscosity (cp units) | | | | |

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| METALS | Aluminum (Al) | | | | |
| | Antimony (Sb) | | | | |
| | Arsenic (As) | | | | |
| | Barium (Ba) | | | | |
| | Beryllium (Be) | | | | |
| | Cadmium (Cd) | | | | |
| | Calcium (Ca) | | | | |
| | Chromium (Cr) | | | | |
| | Cobalt (Co) | | | | |
| | Copper (Cu) | | | | |
| | Iron (Fe) | | | | |
| | Lead (Pb) | | | | |
| | Magnesium (Mg) | | | | |
| | Manganese (Mn) | | | | |
| | Mercury (Hg) | ✓ | 0.19 mg/wipe | | |
| | Molybdenum (Mo) | | | | |
| | Nickel (Ni) | | | | |
| | Potassium (K) | | | | |
| | Selenium (Se) | | | | |
| | Silver (Ag) | | | | |
| | Sodium (Na) | | | | |
| | Thallium (Tl) | | | | |
| | Tin (Sn) | | | | |
| | Titanium (Ti) | | | | |
| | Vanadium (V) | | | | |
| | Zinc (Zn) | | | | |
| | | | | | |
| EP. TOXICITY | Arsenic | | | | |
| | Barium | | | | |
| | Cadmium | | | | |
| | Chromium | | | | |
| | Lead | | | | |
| | Mercury | | | | |
| | Selenium | | | | |
| | Silver | | | | |
| | Endrin | | | | |
| | Lindane | | | | |
| | Methoxychlor | | | | |
| | Toxaphene | | | | |
| | 2.4 - D | | | | |
| | 2.4.5 - TP | | | | |
| OTHER | | | | | |
| | | | | | |
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PROJECT MANAGER

# ANALYSIS DATA SHEET

| JOB # | LOT # | SAMPLE DATE | SAMPLE # | BOTTLE # |
|---|---|---|---|---|
| 305281 | 6216 | 031188 | D1840 | - |

DATE RECEIVED 3/11/88

LOT NUMBER 6216

PROJECT NAME Union Carbide - Linden

NO OF BOTTLES: 1

DESCRIPTION Wipe Samples for Hg in 8oz glass jars

PAGE 7 OF 7

**RESULTS (as ppm unless specified)** ☐ WET WT. ☐ DRY WT.

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| 24-HOUR ANALYSIS | Acidity (as $CaCO_3$) | | | | |
| | Alkalinity (as $CaCO_3$) | | | | |
| | Ammonia-N | | | | |
| | $BOD_5$ | | | | |
| | Chlorine Demand (at 15 min) | | | | |
| | Chlorine Residual | | | | |
| | Coliform-Fecal (# col. 100ml) | | | | |
| | Coliform-Total (# col. 100ml) | | | | |
| | Color (Pt Co units) | | | | |
| | Cyanide (Total) | | | | |
| | Dissolved Oxygen | | | | |
| | Hexavalent Chromium | | | | |
| | Nitrate-N | | | | |
| | Nitrite-N | | | | |
| | Nitrogen-Kjeldahl | | | | |
| | Nitrogen-Organic | | | | |
| | Oil & Grease Gr.☐ IR☐ | | | | |
| | Petro Hydrocarbon Gr.☐ IR☐ | | | | |
| | Phosphate-P (Ortho) | | | | |
| | pH (units) | | | | |
| | Phenols (Total) | | | | |
| | Settleable Solids | | | | |
| | Specific Conductance (umhos) | | | | |
| | Sulfite | | | | |
| | Surfactants | | | | |
| | TOC | | | | |
| | TOX | | | | |
| WET CHEMISTRY | Boron | | | | |
| | Chloride | | | | |
| | COD | | | | |
| | Fluoride | | | | |
| | Hardness (as $CaCO_3$) | | | | |
| | Phosphate-P (Total) | | | | |
| | Silica | | | | |
| | Sulfate | | | | |
| | Sulfide | | | | |
| | Total Ash | | | | |
| | Total Dissolved Solids | | | | |
| | Total Solids | | | | |
| | Total Suspended Solids | | | | |
| | Total Volatile Solids | | | | |
| | Turbidity (NTU) | | | | |
| | | | | | |
| MISC. | Flash Point (°F) | | | | |
| | Heating Value (BTU) | | | | |
| | Organic Chloride (%) | | | | |
| | Organic Sulfur (%) | | | | |
| | Specific Gravity (g/ml) | | | | |
| | Viscosity (cp units) | | | | |

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INI |
|---|---|---|---|---|---|
| METALS | Aluminum (Al) | | | | |
| | Antimony (Sb) | | | | |
| | Arsenic (As) | | | | |
| | Barium (Ba) | | | | |
| | Beryllium (Be) | | | | |
| | Cadmium (Cd) | | | | |
| | Calcium (Ca) | | | | |
| | Chromium (Cr) | | | | |
| | Cobalt (Co) | | | | |
| | Copper (Cu) | | | | |
| | Iron (Fe) | | | | |
| | Lead (Pb) | | | | |
| | Magnesium (Mg) | | | | |
| | Manganese (Mn) | | | | |
| | Mercury (Hg) | ✓ | <0.0002 mg/wipe | | |
| | Molybdenum (Mo) | | | | |
| | Nickel (Ni) | | | | |
| | Potassium (K) | | | | |
| | Selenium (Se) | | | | |
| | Silver (Ag) | | | | |
| | Sodium (Na) | | | | |
| | Thallium (Tl) | | | | |
| | Tin (Sn) | | | | |
| | Titanium (Ti) | | | | |
| | Vanadium (V) | | | | |
| | Zinc (Zn) | | | | |
| | | | | | |
| EP. TOXICITY | Arsenic | | | | |
| | Barium | | | | |
| | Cadmium | | | | |
| | Chromium | | | | |
| | Lead | | | | |
| | Mercury | | | | |
| | Selenium | | | | |
| | Silver | | | | |
| | Endrin | | | | |
| | Lindane | | | | |
| | Methoxychlor | | | | |
| | Toxaphene | | | | |
| | 2,4 - D | | | | |
| | 2,4,5 - TP | | | | |
| OTHER | | | | | |
| | | | | | |
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PROJECT MANAGER:

INTERNATIONAL TECHNOLOGY CORPORATION

# CHAIN-OF-CUSTODY RECORD

R/A Control No. 63349

C/C Control No. A 76234

PROJECT NAME/NUMBER Union Carbide-Linden # 305281

LAB DESTINATION Edison

SAMPLE TEAM MEMBERS Jacques Hill + Tom Daniels

CARRIER/WAYBILL NO.

| Sample Number | Sample Location and Description | Date and Time Collected | Sample Type | Container Type | Condition on Receipt (Name and Date) | Disposal Record No. |
|---|---|---|---|---|---|---|
| D1834 | Compressor #3 Piston PostClean Wp1 | 3/11/88 12:50 | WIPE | 1 8oz Jar | | |
| D1835 | Comp # 3 1st Stage Suction Valve PostClean | 3/11/88 12:55 | " | " | | |
| D1836 | Comp # 3 1st Stage Valve Covers PostClean WP3 | 3/11/88 13:10 | " | " | | |
| D1837 | Comp # 3 1st Stage Cylinder PreClean WP4 | 3/11/88 13:25 | " | " | | |
| D1838 | Comp #3 2nd Stage Cylinder PreClean WP5 | 3/11/88 13:30 | " | " | | |
| D1839 | Comp #3 Cross Head PreClean WP6 | 3/11/88 13:35 | " | " | | |
| D1840 | ~~Comp #3~~ Field Blank WP7 | 3/11/88 13:48 | " | " | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Special Instructions:

Possible Sample Hazards: Hg

SIGNATURES: (Name, Company, Date and Time)

1. Relinquished By: Jacques G. Hill I.T. Edison 3/11/88 e

   Received By: Judy Vergara 3/11/88 3:35

2. Relinquished By:

   Received By:

3. Relinquished By:

   Received by:

4. Relinquished By:

   Received By:

WHITE - To accompany samples
YELLOW - Field copy

INTERNATIONAL TECHNOLOGY CORPORATION

# REQUEST FOR ANALYSIS

R/A Control No. 63349
C/C Control No. A76234

PROJECT NAME: Union Carbide ~~Edi~~ Linden
PROJECT NUMBER: 305 281
PROJECT MANAGER: Tom Hernon
BILL TO: PC 3811 Edison

PURCHASE ORDER NO.:

DATE SAMPLES SHIPPED: 3/11/88
LAB DESTINATION: I.T. Edison
LABORATORY CONTACT:
SEND LAB REPORT TO:

DATE REPORT REQUIRED:
PROJECT CONTACT:
PROJECT CONTACT PHONE NO.:

| Sample No | Sample Type | Sample Volume | Preservative | Requested Testing Program | Special Instructions |
|---|---|---|---|---|---|
| D1834 | WIPE | 1 gauze pad | NONE | Hg | RUSH 24 Hr. |
| D1835 | WIPE | " | | Hg | RUSH 24 Hr. |
| D1836 | WIPE | 2 gauze pads | | Hg | Rush 24 Hr |
| D1837 | WIPE | 1 gauze pad | | Hg | RUSH 24 Hr |
| D1838 | WIPE | 1 gauze Pad | | Hg | RUSH 24 HR. |
| D1839 | WIPE | 1 Gauze Pad | | Hg | RUSH 24 HR. |
| ~~D1840~~ | ~~Field Blank WP7~~ | ~~1 gauze pad~~ | | ~~Hg~~ | ~~RUSH 24 HR~~ |
| D1840 | WIPE | 1 gauze pad | | Hg | RUSH 24 HR. |
| | | | | | |
| | | | | | |

TURNAROUND TIME REQUIRED: (Rush must be approved by the Project Manager.) 24 Hours

Normal _____ Rush X (Subject to rush surcharge)

POSSIBLE HAZARD IDENTIFICATION: (Please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances)

Nonhazard _____ Flammable _____ Skin Irritant _____ Highly Toxic _____ Other Hg (Please Specify)

SAMPLE DISPOSAL (Please indicate disposition of sample following analysis. Lab will charge for packing, shipping, and disposal.)

Return to Client _____ Disposal by Lab _____

FOR LAB USE ONLY

Received By _____ Date/Time _____

WHITE - Original, to accompany samples
YELLOW - Field copy

INTERNATIONAL TECHNOLOGY CORPORATION

| | | | | | |
|---|---|---|---|---|---|
| DATE | 3 | 15 | 88 | | |
| TIME | 08 | 45 | | | |
| PAGE 1 OF 4 | | | | | |
| PAGE | | | | | |
| PROJECT NO. 305281 | | | | | |

[redacted]

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D 1841 WP 8

SAMPLE LOCATION ~~Barrier~~ Compress. # 3 First Stage valve cover (same as sample D 1836) after 2nd Cleani

SAMPLE TYPE WIPE

COMPOSITE ✓ YES ___ NO

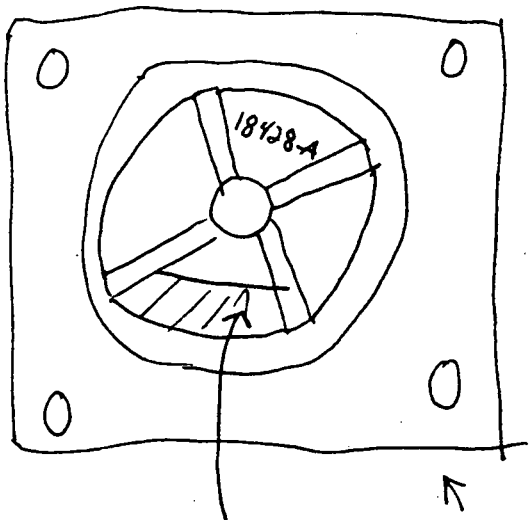
COMPOSITE TYPE

DEPTH OF SAMPLE

WEATHER

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8 oz jar | 2 gauze pad |
| | |
| | |

COMMENTS:




D 1841 (50 cm² from ea. of 2 of these
WP 8

PREPARED BY: _____

INTERNATIONAL TECHNOLOGY CORPORATION

| | | | | | |
|---|---|---|---|---|---|
| DATE | 3 | 15 | 88 | | |
| TIME | 08 | 55 | | | |
| PAGE 2 OF 4 | | | | | |
| PAGE | | | | | |
| PROJECT NO. 305291 | | | | | |

[redacted]

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D 1842 Compressor #3

SAMPLE LOCATION 2nd(?) stage valve cover after 2nd cleaning WP9

SAMPLE TYPE WIPE

COMPOSITE ✓ YES ____ NO

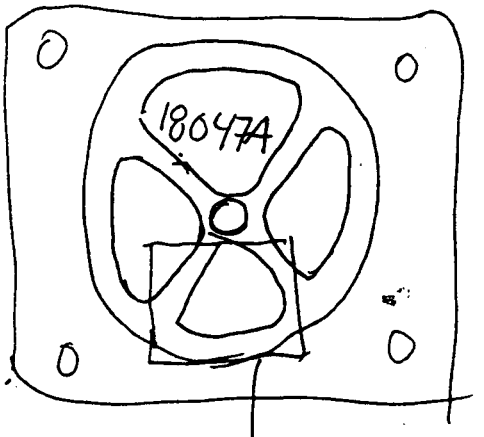
COMPOSITE TYPE ____

DEPTH OF SAMPLE ____

WEATHER ____

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8oz glass jar | 2 gauze pads |
| | |
| | |

COMMENTS:




These are smaller than 1st stage covers (D 1841 samples)

WP9 50 cm² from ea. of 2 of these

PREPARED BY: ____

INTERNATIONAL TECHNOLOGY CORPORATION

| | | | | | |
|---|---|---|---|---|---|
| DATE | 3 | 15 | 88 | | |
| TIME | 09 | 11 | | | |
| PAGE 3 OF 4 | | | | | |
| PAGE | | | | | |
| PROJECT NO. 305281 | | | | | |

[redacted]

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D1843 Compressor #3

SAMPLE LOCATION 4th Stage Cylinder - Post Clean WP10

SAMPLE TYPE WIPE

COMPOSITE ____ YES ✓ NO

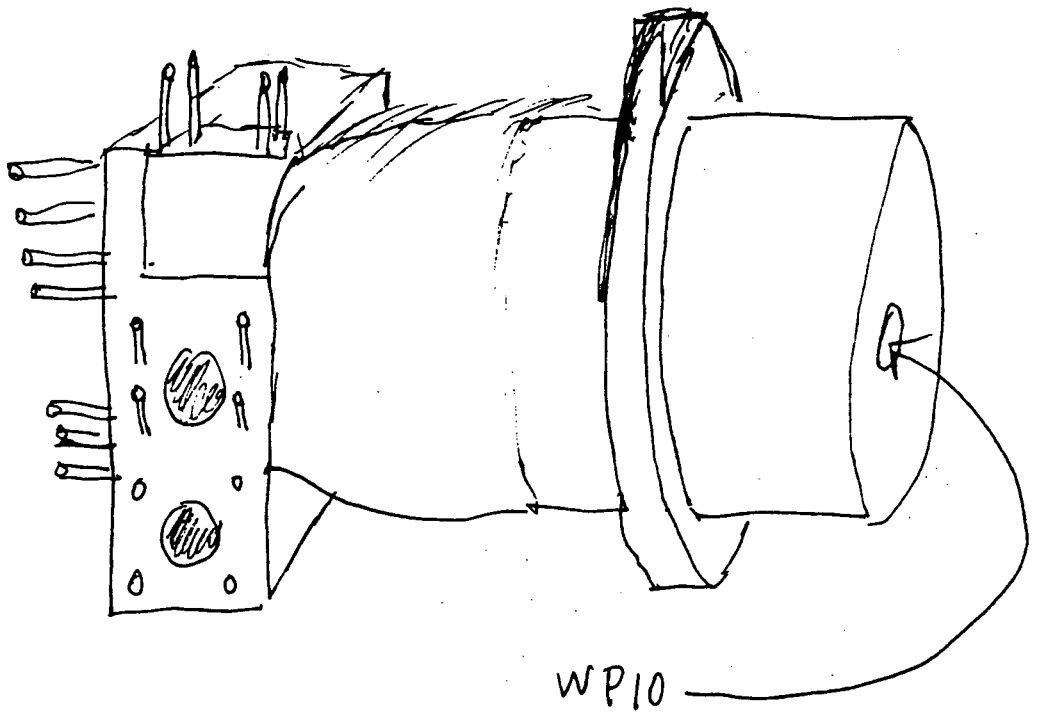
COMPOSITE TYPE

DEPTH OF SAMPLE

WEATHER

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8oz glass jar | 1 gauze pad |
| | |
| | |

COMMENTS:




Taken from inside lip

PREPARED BY: _____

INTERNATIONAL TECHNOLOGY CORPORATION

| | |
|---|---|
| DATE | 3 15 88 |
| TIME | 09 18 |
| PAGE | 4 OF 4 |
| PAGE | |
| PROJECT NO. | 305281 |

[redacted]

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D1844

SAMPLE LOCATION WP 11 Field Blank

SAMPLE TYPE WIPE

COMPOSITE ____ YES ✓ NO

COMPOSITE TYPE

DEPTH OF SAMPLE

WEATHER

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8 oz glass jar | 1 gauze pad |
| | |
| | |

COMMENTS:

1 gauze pad was moistened w/ HNO3 from spray bottle

PREPARED BY: _____

# ANALYSIS DATA SHEET

IT

| JOB # | LOT # | SAMPLE DATE | SAMPLE # | BOTTLE #'s |
|---|---|---|---|---|
| 305281 | 6231 | 031588 | D184 | - |

DATE RECEIVED 3/15/88

LOT NUMBER 6231

PROJECT NAME: Union Carbide - Linden

NO. OF BOTTLES: 1

DESCRIPTION: WP 8 Compressor #3 1st Stage Valve cover after 2nd Cleaning

PAGE 1 OF 4

**RESULTS (as ppm unless specified)** ☐ WET WT. ☐ DRY WT.

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| 24-HOUR ANALYSIS | Acidity (as $CaCO_3$) | | | | |
| | Alkalinity (as $CaCO_3$) | | | | |
| | Ammonia-N | | | | |
| | $BOD_5$ | | | | |
| | Chlorine Demand (at 15 min) | | | | |
| | Chlorine Residual | | | | |
| | Coliform-Fecal (# col./100ml) | | | | |
| | Coliform-Total (# col./100ml) | | | | |
| | Color (Pt.Co. units) | | | | |
| | Cyanide (Total) | | | | |
| | Dissolved Oxygen | | | | |
| | Hexavalent Chromium | | | | |
| | Nitrate-N | | | | |
| | Nitrite-N | | | | |
| | Nitrogen-Kjeldahl | | | | |
| | Nitrogen-Organic | | | | |
| | Oil & Grease Gr ☐ IR ☐ | | | | |
| | Petro. Hydrocarbon Gr ☐ IR ☐ | | | | |
| | Phosphate-P (Ortho) | | | | |
| | pH (units) | | | | |
| | Phenols (Total) | | | | |
| | Settleable Solids | | | | |
| | Specific Conductance (umhos) | | | | |
| | Sulfite | | | | |
| | Surfactants | | | | |
| | TOC | | | | |
| | TOX | | | | |
| WET CHEMISTRY | Boron | | | | |
| | Chloride | | | | |
| | COD | | | | |
| | Fluoride | | | | |
| | Hardness (as $CaCO_3$) | | | | |
| | Phosphate-P (Total) | | | | |
| | Silica | | | | |
| | Sulfate | | | | |
| | Sulfide | | | | |
| | Total Ash | | | | |
| | Total Dissolved Solids | | | | |
| | Total Solids | | | | |
| | Total Suspended Solids | | | | |
| | Total Volatile Solids | | | | |
| | Turbidity (NTU) | | | | |
| | | | | | |
| MISC. | Flash Point (°F) | | | | |
| | Heating Value (BTU) | | | | |
| | Organic Chloride (%) | | | | |
| | Organic Sulfur (%) | | | | |
| | Specific Gravity (g/ml) | | | | |
| | Viscosity (cp units) | | | | |

PRELIMINARY

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| METALS | Aluminum (Al) | | | | |
| | Antimony (Sb) | | | | |
| | Arsenic (As) | | | | |
| | Barium (Ba) | | | | |
| | Beryllium (Be) | | | | |
| | Cadmium (Cd) | | | | |
| | Calcium (Ca) | | | | |
| | Chromium (Cr) | | | | |
| | Cobalt (Co) | | | | |
| | Copper (Cu) | | | | |
| | Iron (Fe) | | | | |
| | Lead (Pb) | | | | |
| | Magnesium (Mg | | | | |
| | Manganese (Mn | | | | |
| | Mercury (Hg) | ✓ | 8.2 mg/w.pe | 3/16 | DM |
| | Molybdenum (Mo) | | | | |
| | Nickel (Ni) | | | | |
| | Potassium (K) | | | | |
| | Selenium (Se) | | | | |
| | Silver (Ag) | | | | |
| | Sodium (Na) | | | | |
| | Thallium (Tl) | | | | |
| | Tin (Sn) | | | | |
| | Titanium (Ti) | | | | |
| | Vanadium (V) | | | | |
| | Zinc (Zn) | | | | |
| | | | | | |
| EP. TOXICITY | Arsenic | | | | |
| | Barium | | | | |
| | Cadmium | | | | |
| | Chromium | | | | |
| | Lead | | | | |
| | Mercury | | | | |
| | Selenium | | | | |
| | Silver | | | | |
| | Endrin | | | | |
| | Lindane | | | | |
| | Methoxychlor | | | | |
| | Toxaphene | | | | |
| | 2,4 - D | | | | |
| | 2,4,5 - TP | | | | |
| OTHER | | | | | |
| | | | | | |
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| | | | | | |
| | | | | | |

MC 3/15 15:24

R Rubas 3/16/88

PROJECT MANAGER:

# ANALYSIS DATA SHEET

-02

DATE RECEIVED 3/15/88

LOT NUMBER 6231

| JOB # | LOT # | SAMPLE DATE | SAMPLE # | BOTTLE # |
|---|---|---|---|---|
| 305281 | 623 | 103158 | D1942 | - |

PROJECT NAME: Union Carbide - Linden

NO. OF BOTTLES: 1

DESCRIPTION: WP 9 2nd Stage valve cover after 2nd Cleaning Compressor #3

PAGE 2 OF 4

## RESULTS (as ppm unless specified)

☐ WET WT. ☐ DRY WT

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| 24-HOUR ANALYSIS | Acidity (as $CaCO_3$) | | | | |
| | Alkalinity (as $CaCO_3$) | | | | |
| | Ammonia-N | | | | |
| | $BOD_5$ | | | | |
| | Chlorine Demand (at 15 min) | | | | |
| | Chlorine Residual | | | | |
| | Coliform-Fecal (# col. 100ml) | | | | |
| | Coliform-Total (# col. 100ml) | | | | |
| | Color (Pt.Co units) | | | | |
| | Cyanide (Total) | | | | |
| | Dissolved Oxygen | | | | |
| | Hexavalent Chromium | | | | |
| | Nitrate-N | | | | |
| | Nitrite-N | | | | |
| | Nitrogen-Kjeldahl | | | | |
| | Nitrogen-Organic | | | | |
| | Oil & Grease Gr.☐ IR☐ | | | | |
| | Petro Hydrocarbon Gr.☐ IR☐ | | | | |
| | Phosphate-P (Ortho) | | | | |
| | pH (units) | | | | |
| | Phenols (Total) | | | | |
| | Settleable Solids | | | | |
| | Specific Conductance (umhos) | | | | |
| | Sulfite | | | | |
| | Surfactants | | | | |
| | TOC | | | | |
| | TOX | | | | |
| WET CHEMISTRY | Boron | | | | |
| | Chloride | | | | |
| | COD | | | | |
| | Fluoride | | | | |
| | Hardness (as $CaCO_3$) | | | | |
| | Phosphate-P (Total) | | | | |
| | Silica | | | | |
| | Sulfate | | | | |
| | Sulfide | | | | |
| | Total Ash | | | | |
| | Total Dissolved Solids | | | | |
| | Total Solids | | | | |
| | Total Suspended Solids | | | | |
| | Total Volatile Solids | | | | |
| | Turbidity (NTU) | | | | |
| | | | | | |
| MISC. | Flash Point (°F) | | | | |
| | Heating Value (BTU) | | | | |
| | Organic Chloride (%) | | | | |
| | Organic Sulfur (%) | | | | |
| | Specific Gravity (g/ml) | | | | |
| | Viscosity (cp units) | | | | |

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| METALS | Aluminum (Al) | | | | |
| | Antimony (Sb) | | | | |
| | Arsenic (As) | | | | |
| | Barium (Ba) | | | | |
| | Beryllium (Be) | | | | |
| | Cadmium (Cd) | | | | |
| | Calcium (Ca) | | | | |
| | Chromium (Cr) | | | | |
| | Cobalt (Co) | | | | |
| | Copper (Cu) | | | | |
| | Iron (Fe) | | | | |
| | Lead (Pb) | | | | |
| | Magnesium (Mg) | | | | |
| | Manganese (Mn) | | | | |
| | Mercury (Hg) | ✓ | 2.0 mg/w.p. | 3/16 | [illegible] |
| | Molybdenum (Mo) | | | | |
| | Nickel (Ni) | | | | |
| | Potassium (K) | | | | |
| | Selenium (Se) | | | | |
| | Silver (Ag) | | | | |
| | Sodium (Na) | | | | |
| | Thallium (Tl) | | | | |
| | Tin (Sn) | | | | |
| | Titanium (Ti) | | | | |
| | Vanadium (V) | | | | |
| | Zinc (Zn) | | | | |
| | | | | | |
| EP. TOXICITY | Arsenic | | | | |
| | Barium | | | | |
| | Cadmium | | | | |
| | Chromium | | | | |
| | Lead | | | | |
| | Mercury | | | | |
| | Selenium | | | | |
| | Silver | | | | |
| | Endrin | | | | |
| | Lindane | | | | |
| | Methoxychlor | | | | |
| | Toxaphene | | | | |
| | 2,4 - D | | | | |
| | 2,4,5 - TP | | | | |
| OTHER | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | RR 3/16/88 | | | | |

PRELIMINARY

PROJECT MANAGER: _____

# ANALYSIS DATA SHEET

IT

-05

| JOB # | LOT # | SAMPLE DATE | SAMPLE # | BOTTLE #'s |
|---|---|---|---|---|
| 305281 | 6231 | 031588 | D1943 | - |

DATE RECEIVED 3/15/88

LOT NUMBER 6231

PROJECT NAME: Union Carbide - Linden

DESCRIPTION: WP10 - 4th stage cylinder Post-Clean (Compressor #3)

NO. OF BOTTLES: 1

PAGE 3 OF 4

**RESULTS (as ppm unless specified)** ☐ WET WT. ☐ DRY WT.

PRELIMINARY

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| 24-HOUR ANALYSIS | Acidity (as $CaCO_3$) | | | | |
| | Alkalinity (as $CaCO_3$) | | | | |
| | Ammonia-N | | | | |
| | $BOD_5$ | | | | |
| | Chlorine Demand (at 15 min) | | | | |
| | Chlorine Residual | | | | |
| | Coliform-Fecal (# col. 100ml) | | | | |
| | Coliform-Total (# col. 100ml) | | | | |
| | Color (Pt Co units) | | | | |
| | Cyanide (Total) | | | | |
| | Dissolved Oxygen | | | | |
| | Hexavalent Chromium | | | | |
| | Nitrate-N | | | | |
| | Nitrite-N | | | | |
| | Nitrogen-Kjeldahl | | | | |
| | Nitrogen-Organic | | | | |
| | Oil & Grease Gr.☐ IR☐ | | | | |
| | Petro. Hydrocarbon Gr.☐ IR☐ | | | | |
| | Phosphate-P (Ortho) | | | | |
| | pH (units) | | | | |
| | Phenols (Total) | | | | |
| | Settleable Solids | | | | |
| | Specific Conductance (umhos) | | | | |
| | Sulfite | | | | |
| | Surfactants | | | | |
| | TOC | | | | |
| | TOX | | | | |
| WET CHEMISTRY | Boron | | | | |
| | Chloride | | | | |
| | COD | | | | |
| | Fluoride | | | | |
| | Hardness (as $CaCO_3$) | | | | |
| | Phosphate-P (Total) | | | | |
| | Silica | | | | |
| | Sulfate | | | | |
| | Sulfide | | | | |
| | Total Ash | | | | |
| | Total Dissolved Solids | | | | |
| | Total Solids | | | | |
| | Total Suspended Solids | | | | |
| | Total Volatile Solids | | | | |
| | Turbidity (NTU) | | | | |
| | | | | | |
| MISC. | Flash Point (°F) | | | | |
| | Heating Value (BTU) | | | | |
| | Organic Chloride (%) | | | | |
| | Organic Sulfur (%) | | | | |
| | Specific Gravity (g/ml) | | | | |
| | Viscosity (cp units) | | | | |

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| METALS | Aluminum (Al) | | | | |
| | Antimony (Sb) | | | | |
| | Arsenic (As) | | | | |
| | Barium (Ba) | | | | |
| | Beryllium (Be) | | | | |
| | Cadmium (Cd) | | | | |
| | Calcium (Ca) | | | | |
| | Chromium (Cr) | | | | |
| | Cobalt (Co) | | | | |
| | Copper (Cu) | | | | |
| | Iron (Fe) | | | | |
| | Lead (Pb) | | | | |
| | Magnesium (Mg) | | | | |
| | Manganese (Mn) | | | | |
| | Mercury (Hg) | ✓ | 2.2 mg/wipe | 3/16 | D.M. |
| | Molybdenum (Mo) | | | | |
| | Nickel (Ni) | | | | |
| | Potassium (K) | | | | |
| | Selenium (Se) | | | | |
| | Silver (Ag) | | | | |
| | Sodium (Na) | | | | |
| | Thallium (Tl) | | | | |
| | Tin (Sn) | | | | |
| | Titanium (Ti) | | | | |
| | Vanadium (V) | | | | |
| | Zinc (Zn) | | | | |
| | | | | | |
| EP. TOXICITY | Arsenic | | | | |
| | Barium | | | | |
| | Cadmium | | | | |
| | Chromium | | | | |
| | Lead | | | | |
| | Mercury | | | | |
| | Selenium | | | | |
| | Silver | | | | |
| | Endrin | | | | |
| | Lindane | | | | |
| | Methoxychlor | | | | |
| | Toxaphene | | | | |
| | 2,4 - D | | | | |
| | 2,4,5 - TP | | | | |
| OTHER | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | RR 3/16/88 | | | | |

PROJECT MANAGER ______________________

IT

# ANALYSIS DATA SHEET

-04

DATE RECEIVED 3/15/88

| JOB # | LOT # | SAMPLE DATE | SAMPLE # | BOTTLE # |
|---|---|---|---|---|
| 305281 | 6231 | 031588 | D1944 | - |

LOT NUMBER 6231

PROJECT NAME Union Carbide - Linden

NO. OF BOTTLES: 1

DESCRIPTION WP11 Field Blank

PAGE 4 OF 4

## RESULTS (as ppm unless specified)

☐ WET WT. ☐ DRY WT.

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| 24-HOUR ANALYSIS | Acidity (as $CaCO_3$) | | | | |
| | Alkalinity (as $CaCO_3$) | | | | |
| | Ammonia-N | | | | |
| | $BOD_5$ | | | | |
| | Chlorine Demand (at 15 min) | | | | |
| | Chlorine Residual | | | | |
| | Coliform-Fecal (# col 100ml) | | | | |
| | Coliform-Total (# col. 100ml) | | | | |
| | Color (Pt Co units) | | | | |
| | Cyanide (Total) | | | | |
| | Dissolved Oxygen | | | | |
| | Hexavalent Chromium | | | | |
| | Nitrate-N | | | | |
| | Nitrite-N | | | | |
| | Nitrogen-Kjeldahl | | | | |
| | Nitrogen-Organic | | | | |
| | Oil & Grease Gr ☐ IR ☐ | | | | |
| | Petro Hydrocarbon Gr ☐ IR ☐ | | | | |
| | Phosphate-P (Ortho) | | | | |
| | pH (units) | | | | |
| | Phenols (Total) | | | | |
| | Settleable Solids | | | | |
| | Specific Conductance (umhos) | | | | |
| | Sulfite | | | | |
| | Surfactants | | | | |
| | TOC | | | | |
| | TOX | | | | |
| WET CHEMISTRY | Boron | | | | |
| | Chloride | | | | |
| | COD | | | | |
| | Fluoride | | | | |
| | Hardness (as $CaCO_3$) | | | | |
| | Phosphate-P (Total) | | | | |
| | Silica | | | | |
| | Sulfate | | | | |
| | Sulfide | | | | |
| | Total Ash | | | | |
| | Total Dissolved Solids | | | | |
| | Total Solids | | | | |
| | Total Suspended Solids | | | | |
| | Total Volatile Solids | | | | |
| | Turbidity (NTU) | | | | |
| | | | | | |
| MISC. | Flash Point (°F) | | | | |
| | Heating value (BTU) | | | | |
| | Organic Chloride (%) | | | | |
| | Organic Sulfur (%) | | | | |
| | Specific Gravity (g/ml) | | | | |
| | Viscosity (cp units) | | | | |

PRELIMINARY

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INI |
|---|---|---|---|---|---|
| METALS | Aluminum (Al) | | | | |
| | Antimony (Sb) | | | | |
| | Arsenic (As) | | | | |
| | Barium (Ba) | | | | |
| | Beryllium (Be) | | | | |
| | Cadmium (Cd) | | | | |
| | Calcium (Ca) | | | | |
| | Chromium (Cr) | | | | |
| | Cobalt (Co) | | | | |
| | Copper (Cu) | | | | |
| | Iron (Fe) | | | | |
| | Lead (Pb) | | | | |
| | Magnesium (Mg) | | | | |
| | Manganese (Mn) | | | | |
| | Mercury (Hg) | ✓ | 0.0004 mg/wipe | 3/16 | DM |
| | Molybdenum (Mo) | | | | |
| | Nickel (Ni) | | | | |
| | Potassium (K) | | | | |
| | Selenium (Se) | | | | |
| | Silver (Ag) | | | | |
| | Sodium (Na) | | | | |
| | Thallium (Tl) | | | | |
| | Tin (Sn) | | | | |
| | Titanium (Ti) | | | | |
| | Vanadium (V) | | | | |
| | Zinc (Zn) | | | | |
| | | | | | |
| EP. TOXICITY | Arsenic | | | | |
| | Barium | | | | |
| | Cadmium | | | | |
| | Chromium | | | | |
| | Lead | | | | |
| | Mercury | | | | |
| | Selenium | | | | |
| | Silver | | | | |
| | Endrin | | | | |
| | Lindane | | | | |
| | Methoxychlor | | | | |
| | Toxaphene | | | | |
| | 2,4 - D | | | | |
| | 2,4,5 - TP | | | | |
| OTHER | | | | | |
| | | | | | |
| | | | | | |
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| | | | | | |
| | | | | | |
| | | | | | |
| | RR 3/16/88 | | | | |

PROJECT MANAGER:

INTERNATIONAL TECHNOLOGY CORPORATION

# REQUEST FOR ANALYSIS

R/A Control No. 63350
C/C Control No. 4 [illegible]

PROJECT NAME: Union Carbide Linden
PROJECT NUMBER: 305281
PROJECT MANAGER: Tom Hernon
BILL TO: PC 3011 Edison

DATE SAMPLES SHIPPED: 4/1/88
LAB DESTINATION: I.T. Edison
LABORATORY CONTACT:
SEND LAB REPORT TO:

PURCHASE ORDER NO.:

DATE REPORT REQUIRED:
PROJECT CONTACT:
PROJECT CONTACT PHONE NO.:

| Sample No. | Sample Type | Sample Volume | Preservative | Requested Testing Program | Special Instructions |
|---|---|---|---|---|---|
| D 1841 | WIPE | 2 gauze pad | | Hg | Rush 24 hr |
| D 1842 | WIPE | 2 gauze pad | | Hg | Rush 24 hr |
| D 1843 | WIPE | 1 gauze pad | | Hg | Rush 24 hr |
| D 1844 | WIPE | 1 gauze pad | | Hg | Rush 24 hr |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

TURNAROUND TIME REQUIRED: (Rush must be approved by the Project Manager.) 24 Hour turnaround

Normal _____ Rush X (Subject to rush surcharge)

POSSIBLE HAZARD IDENTIFICATION: (Please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances)

Nonhazard _____ Flammable _____ Skin Irritant _____ Highly Toxic _____ Other Hg (Please Specify)

SAMPLE DISPOSAL: (Please indicate disposition of sample following analysis. Lab will charge for packing, shipping, and disposal.)

Return to Client _____ Disposal by Lab _____

FOR LAB USE ONLY

Received By _____ Date/Time _____

WHITE - Original, to accompany samples
YELLOW - Field copy

INTERNATIONAL TECHNOLOGY CORPORATION

# CHAIN-OF-CUSTODY RECORD

R/A Control No. 63350

C/C Control No. A 76321

PROJECT NAME/NUMBER Union Carbide - Linden 305281

LAB DESTINATION I. T. Edison

SAMPLE TEAM MEMBERS J G. Hill

CARRIER/WAYBILL NO.

| Sample Number | Sample Location and Description | Date and Time Collected | Sample Type | Container Type | Condition on Receipt (Name and Date) | Disposal Record No. |
|---|---|---|---|---|---|---|
| D1841 | WP8 ~~Boiler~~ Compressor #3 - 1st Stage Valve Cover clean | 3/15/88 0845 | WIPE | 8 oz glass jar | | |
| D1842 | WP9 ~~Boiler~~ Compressor #2 - 2nd Stage Valve Cover - clean | 3/15/88 0855 | WIPE | " | | |
| D1843 | WP10 ~~Boiler~~ Compressor #3 - 4th Stge. Cylinder Post clean | 3/15/88 0911 | WIPE | " | | |
| D1844 | WP11 Field Blank | 3/15/88 0918 | WIPE | " | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Special Instructions: Rush 24 hr.

Possible Sample Hazards: Hg

SIGNATURES: (Name, Company, Date and Time)

1. Relinquished By: Jacques G Hill III

   Received By: [illegible]

2. Relinquished By:

   Received By:

3. Relinquished By:

   Received by:

4. Relinquished By:

   Received By:

WHITE - To accompany samples
YELLOW - Field copy

INTERNATIONAL TECHNOLOGY CORPORATION

[redacted]

| | | | | | |
|---|---|---|---|---|---|
| DATE | 3 | 18 | 88 | | |
| TIME | 13 | 15 | | | |
| PAGE 1 OF | | | | | |
| PAGE | | | | | |
| PROJECT NO. 305281 | | | | | |

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D1845 - WP 12

SAMPLE LOCATION Compress. #3, Small inner cooler - Post Clean Inside

SAMPLE TYPE WIPE

COMPOSITE ____ YES ✓ NO

COMPOSITE TYPE ____

DEPTH OF SAMPLE ____

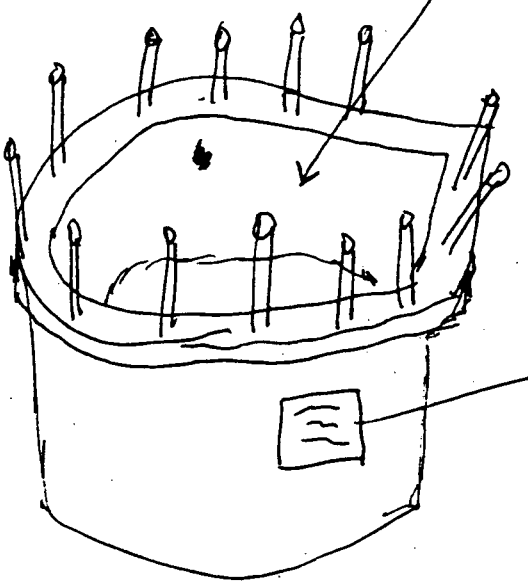
WEATHER ____

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8oz glass jar | 1 gauze pad |
| | |
| | |

COMMENTS:

There are

WP 12 - 1st Sample taken on this piece. Taken on side wall inside.



serial # 50495-1

|— ~ 2" —|

PREPARED BY: ____

INTERNATIONAL TECHNOLOGY CORPORATION

| | | | | | |
|---|---|---|---|---|---|
| DATE | 3 | 18 | 88 | | |
| TIME | 13 | 43 | | | |
| PAGE 2 OF | | | | | |
| PAGE | | | | | |
| PROJECT NO. 305281 | | | | | |

[redacted]

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D 1847 WP14

SAMPLE LOCATION Compressor #3 Upper Heat Exchanger Post Clean Inside

SAMPLE TYPE WIPE

COMPOSITE ____ YES ✓ NO

COMPOSITE TYPE

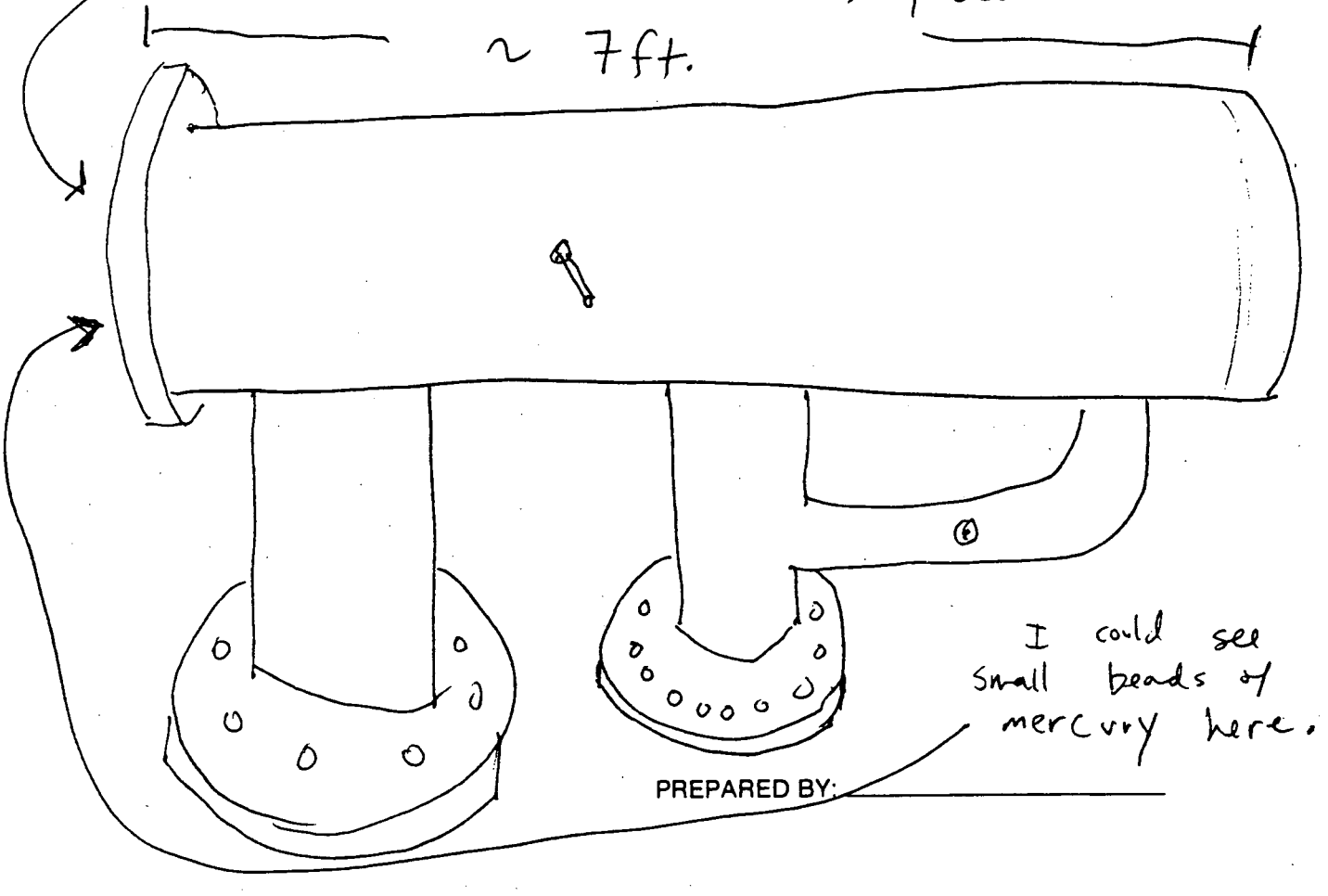
DEPTH OF SAMPLE

WEATHER

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8oz glass jar | 1 gauze pad |
| | |
| | |

COMMENTS:

WP 14 Taken just inside lip.
1st sample from this piece




PREPARED BY:

INTERNATIONAL TECHNOLOGY CORPORATION

| | | | | | |
|---|---|---|---|---|---|
| DATE | 3 | 18 | 88 | | |
| TIME | 13 | 30 | | | |
| PAGE 3 OF ____ | | | | | |
| PAGE | | | | | |
| PROJECT NO. 305281 | | | | | |

[redacted]

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D 1846 WP-13

SAMPLE LOCATION Compress. #3 Lower Heat Exchanger Post Clean Inside

SAMPLE TYPE WIPE

COMPOSITE ____ YES ✓ NO

COMPOSITE TYPE

DEPTH OF SAMPLE

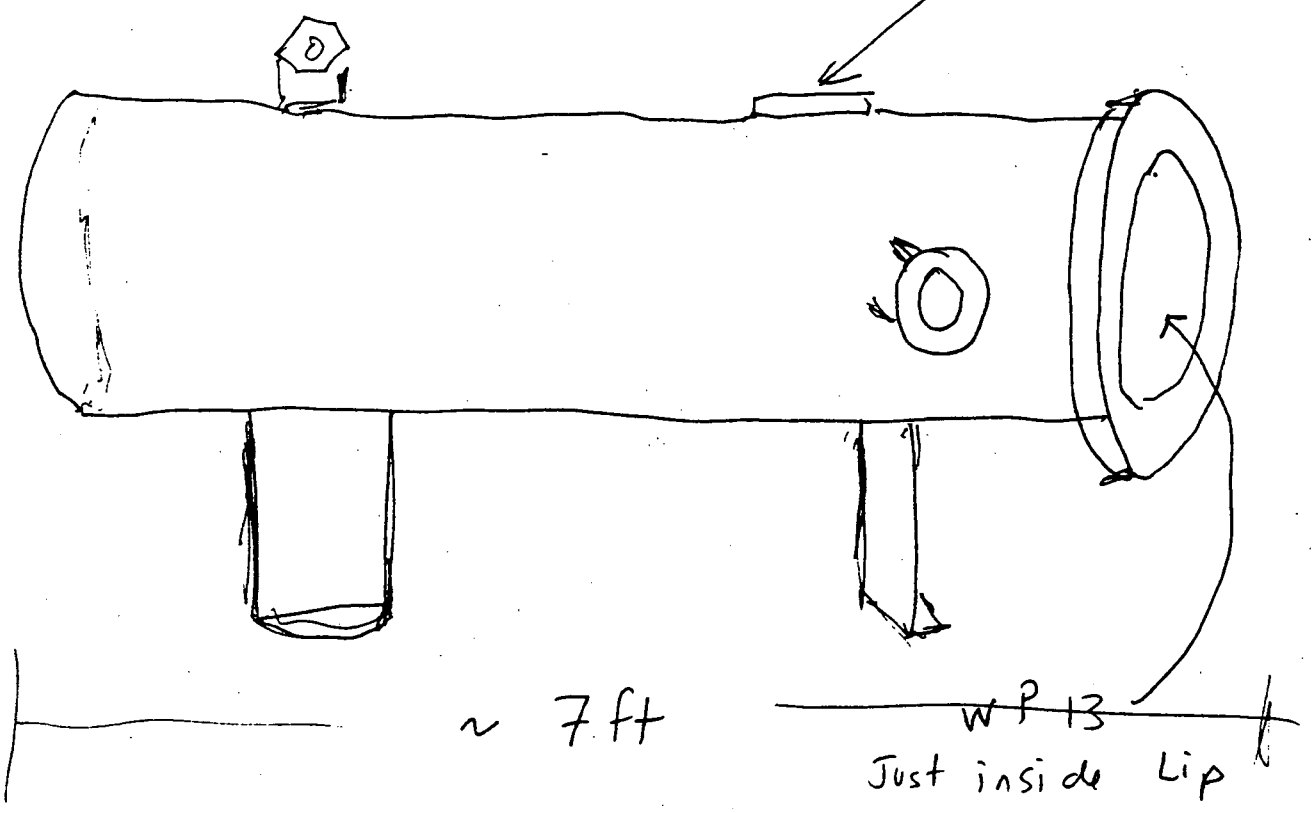
WEATHER

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8oz glass jar | 1 gauze pad |
| | |
| | |

COMMENTS:

1st Sample taken on this piece

Serial # U-451




PREPARED BY: _____

INTERNATIONAL TECHNOLOGY CORPORATION

| | | | | | |
|---|---|---|---|---|---|
| DATE | 3 | 18 | 88 | | |
| TIME | 14 | 05 | | | |
| PAGE ____ OF ____ | | | | | |
| PAGE | | | | | |
| PROJECT NO. 305281 | | | | | |

[redacted]

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D1848 WP 15

SAMPLE LOCATION Compress. # 3, Platform, Post Clean, may have degreaser on

SAMPLE TYPE

COMPOSITE ____ YES ____ NO

COMPOSITE TYPE

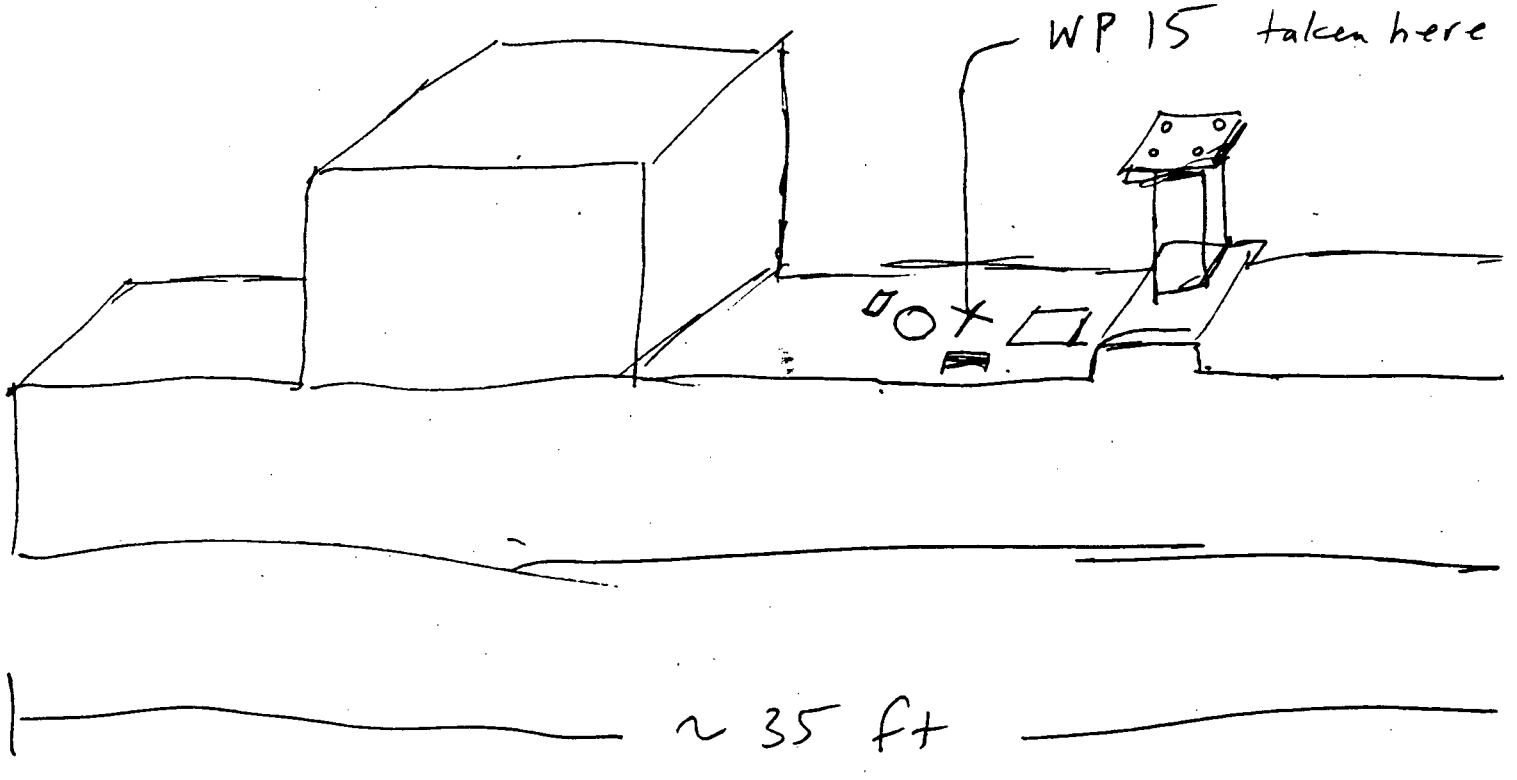
DEPTH OF SAMPLE

WEATHER

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8oz glass jar | gauze pad |
| | |
| | |

COMMENTS: Drawing not to scale

1st sample taken here.




PREPARED BY: _____

INTERNATIONAL TECHNOLOGY CORPORATION

| | | | | | |
|---|---|---|---|---|---|
| DATE | 3 | 18 | 88 | | |
| TIME | 14 | 15 | | | |
| PAGE ____ OF ____ | | | | | |
| PAGE | | | | | |
| PROJECT NO. 305281 | | | | | |

[redacted]

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D1949 WP16 Cylinder

SAMPLE LOCATION Compress #3 4th Stage ~~Buffer~~ Post Clean

SAMPLE TYPE WIPE

COMPOSITE ____ YES ✓ NO

COMPOSITE TYPE ____

DEPTH OF SAMPLE ____

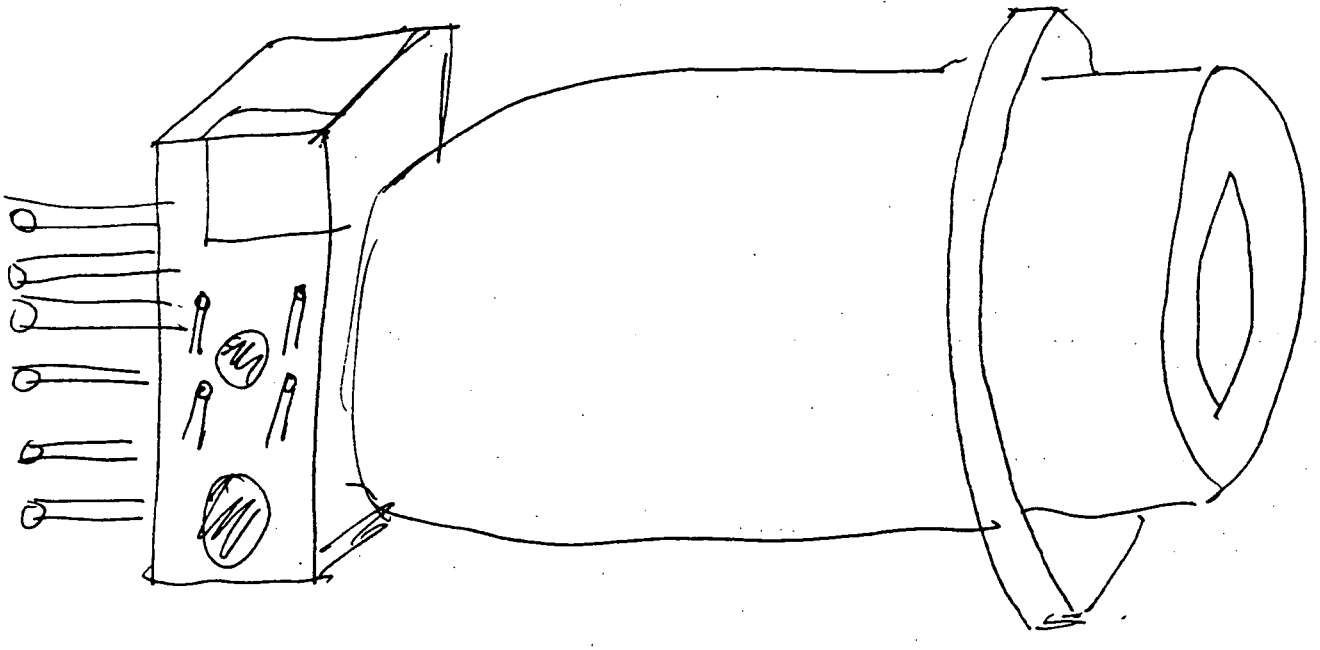
WEATHER ____

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8oz glass jar | gauze pad. |
| | |
| | |

COMMENTS:

2nd Sample taken on this piece.

1st time sampled ID was D 1843.



PREPARED BY: ____

INTERNATIONAL TECHNOLOGY CORPORATION

| | | | | | |
|---|---|---|---|---|---|
| DATE | 3 | 18 | 88 | | |
| TIME | 14 | 20 | | | |
| PAGE ____ OF ____ | | | | | |
| PAGE | | | | | |
| PROJECT NO. 305281 | | | | | |

[redacted]

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D 1950 WP 1~~7~~

SAMPLE LOCATION ~~Compress #3~~ Field Blank

SAMPLE TYPE WIPE

COMPOSITE ____ YES ✓ NO

COMPOSITE TYPE ____

DEPTH OF SAMPLE ____

WEATHER ____

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8oz glass jar | 1 gauze Pad |
| | |
| | |

COMMENTS:

Field Blank - 1 gauze pad was moistened ~~sprayed~~ w/ 10% HNO3 from Spray bottle.

WP 16

PREPARED BY: ____

UNION CARBIDE

RECEIVED

JAN 27 1988

UNION CARBIDE CORPORATION 39 OLD RIDGEBURY ROAD, DANBURY, CT 06817-0001

PURCHASING DEPARTMENT

UNION CARBIDE CORP.
SOMERSET REGION OFFICE
SOMERSET, N.J.

JAN 27 1988

N.A. DIFRANCO

January 25, 1988

I.T. Corporation
165 Fieldcrest Avenue
P.O. Box 7809
Edison, N.J. 08818-7809

Attn: Linda Webb

Dear Linda,

Two copies of the signed release agreement covering the subject work are enclosed for execution by I.T. Corp. Please ensure that the copy which is stamped "UNION CARBIDE File Copy" is returned to me. We cannot pay your invoices until that copy is received and entered into our accounting system. Please note also that the address to which I.T.'s invoices are to be directed is provided in the release agreement.

Thank you for your courteous assistance in implementing this pro- ject. If you have any questons of a commercial nature, do not hesitate to contact me.

Very truly yours,

UNION CARBIDE CORP.

Don Mueller

D.H. Mueller
Purchasing Agent

cc Scott Hicke - Moorestown
John Crane - Newark Linde Plant
Randy O'Neal - Moorestown
Nick DiFranco - Somerset - 828

A. DELIVERY LOCATION:

UNION CARBIDE'S Linde Division Facility located on Union Carbide Property on South Wood Avenue in Linden, New Jersey (07036).

Facility EPA ID No. is NJD 011 392 735

B. MATERIALS

The Materials consist of soil adjacent to a concrete OIL-STORAGE pad, which soil is contaminated with compressor oil and traces of mercury, as further described on Envirosafe Services of Ohio (hereinafter called "Disposal Subcontractor") form entitled "Application for Acceptance of Waste Product" which is attached to and hereby made a part of this EXHIBIT "A", plus approximately 85 empty 55-gallon steel drums contaminated with waste oil and minor amounts of debris (rags, etc.). Said empty drums and debris shall be characterized in detail on Disposal Subcontrator's forms as part of the Work hereof, which forms, when completed, shall become a part of this EXHIBIT "A".

C. WORK

Contractor shall:

1. Characterize the drum portion of the Materials on Disposal Subcontractor's "Application for Acceptance of Waste Product" forms for review and signature by Engineer (herinafter named).

2. Crust empty drums and deposit into approximately sized sealed-gate roll-off container.

3. Excavate the soil portion of the Materials which is bounded by a perimeter which is one foot in excess of the area of visible oil contamination, to a depth of 3" below the level of visible contamination, or 1" below the surface level of red clay soil, whichever depth is reached first, or such other depth as may be directed by Engineer. Contractor shall advise Engineer as to its professional opinion of the minimum amount of excavation necessary to remove said contaminated soil.

4. Deposit the soil portion of the Materials in "roll-off" container(s) provided by Contractor.

5. Securely cover all such containers utilized to prevent escape of the soil portion of the Materials into the environment, and maintain the integrity of such covering until such containers arrive at the disposal location, which is specified in Section "D" of this EXHIBIT "A".

6. Backfill areas of excavation using clean 1.5" crushed quarry stone fill material.

7. Conduct analyses necessary to characterize the Materials to the extent necessary to secure acceptance of the Materials at the Disposal Location. It is recognized that the number of samples analysed and the degree of analysis required for each sample will depend on the requirements stipulated by the Disposal Facility. However, Contractor shall put forth best efforts to minimize the amount of analysis required, and shall perform such analyses only after advising Engineer of the estimated cost of all such analyses and securing Engineer's approval for such portion of the Work.

8. Arrange for and secure acceptance of the Materials at the Disposal Location.

9. Transport Materials to the Disposal Location. Containers and transportation are to be provided by American Industrial Marine Services of Plainfield, New Jersey (EPS ID No. NJD 981 873 664), a subcontractor of Contractor.

10. Dispose of the Materials at the Disposal Location via land buriel.

Except as otherwise provided in this release agreement, Contractor shall provide and furnish, in connection with its performance of the Work, all personnel and services and all materials, equipment and other things which are required for its performance of the Work. The Work shall be performed and completed to the satisfaction of Engineer.

D. DISPOSAL LOCATION

The Materials are to land-buried at the following secure landfill facility, which is operated by Envirosafe Sevices, Inc., a subcontractor of Contractor (sometimes referred to herein as "Disposal Subcontractor"):

Fondessy Enterprises, Inc.
876 Otter Creek Road
Oregon, Ohio

EPA ID No. OHD 045 243 706

E. QUANTITY

Quantity of the soil portion of the Materials is estimated to be 30 to 40 cubic yards. The exact amount will be determined in the course of the performance of the work.

F. ORDERING PROCEDURES AND SCHEDULES

Contractor shall prepare and promptly submit to Engineer a detailed schedule of the various portions of the work, in form satisfactory to engineer, and shall keep such schedule current with the progress of the Work.

UNION CARBIDE hereby designates Scott Hickes as Engineer. Engineer is hereby given authority to give approvals and to take action to the extent necessary for the orderly and expeditious prosecution of the Work, but Engineer shall not have authority to amend, modify, or terminate the Contract.

Contractor hereby designates Adrian Gill as its duly authorized representative with respect to this Release Agreement. Contractor shall not change its representative without the written agreement of UNION CARBIDE.

UNION CARBIDE CORP.

By_____
D.H. Mueller

Title: Purchasing Agent

Agreed to and accepted this _____ day of _____, 1988

I.T. CORPORATION
(Contractor)

By_____

Title_____

A. QUANTITY MEASUREMENT

Contractor shall estimate the number of cubic yards of materials excavated at the Delivery Location, based on percentage of known volume of the containers occupied by such materials following deposition at the Delivery Location. Such estimate shall be reviewed by Engineer and the agreed-upon volume shall be recorded on the Shipping Manifest(s) which accompany the materials to the Disposal Location.

The volume of excavated materials shall be converted to tons based on a density of 2200 lbs. per cubic yard as indicated on the Disposal Subcontractor's waste product form, unless another density is demonstrated by Contractor to Engineer.

The quantity of fill material shall be measured in tons, and confirmed by weight tickets or suppliers receipts, to the satisfaction of Engineer.

B. CONTRACT PRICE

UNION CARBIDE shall pay to Contractor for the performance of the Work the sum of the amounts established as follows:

1. The fixed amount of $7,350.00 for excavation of the Materials, crushing and staging of drums, and backfill and repair of excavated volume. In the event that the quantity of Materials excavated exceeds 30 tons, the price for excavation shall be increased by $85.00 for each ton in excess of 30.

2. An amount for the crushed stone fill material determined at the rate of $17.50 per ton.

3. An amount for analyses of the Materials, determined at a rate ranging from $600.00 to $900.00 per sample (the estimated cost of which has been approved in advance by Engineer).

4. An amount for spotting of the roll-off containers and transportation of the Materials to the Disposal Location, determined at the rate of $2,058.00 per load consisting of one filled roll-off rate of $8.00 per day. In the event containers are required to remain at the Delivery Location for more than one month, Contractor shall endeavor to secure a lower monthly rate from its transportation subcontractor.

5. An amount for disposal of the Materials determined at the rate of $136.00 per ton of materials delivered to and deposited at the Disposal Location. Portions of the Materials which weigh less than one ton per cubic yard may be charged at the rate of $136.00 per cubic yard.

6 In the event that Contractor is requested by engineer to delay backfilling of the excavated area, and such delay requires Contractor to idle its on-site labor and equipment, an amount determined at the rate of $100.00 for each hour of such delay.

All applicable Federal, State and local taxes are included in the contract price so determined.

C. INVOICING INSTRUCTIONS.

Invoices for work performed hereunder shall reference both the Contract and Release Agreement, and shall be submitted with copies of applicable Shipping Manifests and documentation of ALL QUANTITIES FOR WHICH CONTRACTOR IS REQUESTING REIMBURSEMENT ON A UNIT PRICE BASIS to:

UNION CARBIDE CORPORATION
Invoice Auditing Dept./HWDS Auditor
P.O. Box 8690
South Charleston, WV 25303

UNION CARBIDE CORP.

By D.H. Mueller

1211g

Title: Purchasing Agent

Agreed to and accepted this _____ day of _____, 1988

I.T. CORPORATION
(Contractor)

By_____

Title_____

D. Mueller

# ENVIROSAFE SERVICES OF OHIO, INC.
876 OTTER CREEK RD. P.O. BOX 167571
OREGON, OHIO 43616-7571

## Application for Acceptance of Waste Product

TELEPHONE (24 HOURS) 419-726-1521
TOLL FREE (INSIDE OHIO) 800-472-0414
TOLL FREE (OUTSIDE OHIO) 800-537-0426
U.S. EPA I.D. Number OHD045243706

RECEIVED
JAN 21 1988
D. H. MUELLER

Envirosafe Services Only
Application # ____
PCN ____ ____
CUST# 0 ____
☐ DIRECT ☐ ACES
☐ BILLING BROKER ☐ ESPI
Sales Zone Code ____
TAX ☐ YES ☐ NO
Acceptance Code ____
Laboratory Test Code ____
Update Analysis Code ____

Form 87-1

### SECTION A - GENERATOR DATA

1. Generator UNION CARBIDE CORP - LINDE DIV.
Address SOUTH WOOD AVENUE
City/State LINDEN, NJ ZIP 07036
Tech. Contact JOHN CRANE TEL (201) 589-7435
2. County UNION
3. U.S. EPA IDENTIFICATION NUMBER NJD011392735
4. Billing/Broker IT CORP.
Address 165 FIELDCREST AVE.
City/State EDISON, NJ ZIP 08818
Billing Contact LEAH WEBB TEL (201) 225-2000

### SECTION B - WASTE CHARACTERIZATION

1. Common Name for This Waste: SOIL CONTAMINATED W/ OIL + MERCURY
2. Process Generating This Waste: OIL LEAKED ONTO SOIL OVER A PERIOD OF YEARS. MERCURY RESULTED FROM $H_2$ GAS FILLING.
3. Annual Quantity: 40 1 ☒ Tons 2 ☐ Yards 3.1 ____ 3 ☐ Drums
4. Shipment Duration:
1 ☐ Permanent (1 Year or Longer)
2 ☒ Temporary (LessThan 1 Year)
5. Shipment Mode:
1 ☒ Bulk 2 ☐ Palletized Boxes 3 ☐ Woven Cloth Bags 4 ☐ Metal Drums
5 ☐ Other: ____

### SECTION C - PHYSICAL PROPERTIES

1. Describe Physical State at 70° F:
1 ☒ Dry Solid 2 ☐ Damp Solid 3 ☐ Semi-Solid / Gel 4 ☐ Flowable Liquid 6 ☐ Labpack
2. Describe Load Bearing Strength at 70° F: 2.1 Penetrometer PSI: 2.2 % Solids @105°C:
1 ☒ Solid / Rigid 2 ☐ Sludge 3 ☐ Weak / None — 90
3. Describe Physical Appearance of Waste (Include Color): BROWN SOIL
4. Apparent Density of Waste: 2200 Lb./ Cu. Yard
5. Flash Point (TAG or Setaflash Closed Cup): 5.1 Actual Flash Pt: 5.2 Combustible:
1 ☐ 25-70° F 2 ☐ 70-100° F 3 ☐ 100-140°F 4 ☒ >140° F ____ °F 1 ☐ Yes 2 ☒ No
6. pH (10 % Slurry in Distilled Water for Solids): 6.1 Actual pH (S.U.):
1 ☐ < 2.0 2 ☐ 2.0-5.0 3 ☒ 5.0-10.0 4 ☐ 10.0-12.5 5 ☐ > 12.5 ____
7. Describe Odor of Waste:
1 ☒ None 2 ☐ Slight 3 ☐ Strong
8. Describe Temperature of Waste at Time of Disposal:
1 ☒ Ambient -100° F 2 ☐ 100-140° F 3 ☐ >140° F

ENVIROSAFE SERVICES OF OHIO, INC.



Application # | | | | |

PCN | | | | | | |

## SECTION D - WASTE COMPOSITION

1. List all components within the waste stream by percentage. Account for 100 percent of waste in the TYPICAL % column.

| | TYPICAL % | RANGE % |
|---|---|---|
| SOIL | 99 | - |
| PETROLEUM HYDROCARBONS | 1 | - |
| MERCURY | 12 mg/kg | - |
| | | - |
| | | - |
| | | - |
| | | - |
| | | - |
| | | - |
| | | - |

## SECTION E - ANALYTICAL REPORT

| PARAMETER | mg/Kg (Total) | mg/L (Extract) | PARAMETER | mg/Kg (Total) | mg/L (Extract) | PARAMETER | mg/Kg (Total) | mg/L (Extract) |
|---|---|---|---|---|---|---|---|---|
| Aluminum | | | Total Cyanide | NONE | | Acetone | NONE | |
| Antimony | | | Free Cyanide | | | Butanol | | |
| Arsenic | | 0.003 | Total Sulfide | | | Carbon Disulfide | | |
| Barium | | <1.0 | Soluble Sulfide | | | Carbon Tetrachloride | | |
| Beryllium | | | Phenolics | | | Chlorobenzene | | |
| Cadmium | | <0.01 | Chloride | | | Cresols-Cresylic Acid | | |
| Chromium (hex) | | | Fluoride | | | Cyclohexanone | | |
| Chromium (tot) | | | Phosphate | | | 1,2-Dichlorobenzene | | |
| Cobalt | | | Sulfate | | | Ethyl Acetate | | |
| Copper | | | Nitrate-N | | | Ethyl Benzene | | |
| Iron | | | Nitrite-N | | | Ethyl Ether | | |
| Lead | | | Ammonia-N | | | Isobutanol | | |
| Mercury | 12 | <0.0050 | Kjeldahl-N | | | Methanol | | |
| Nickel | | - | Oil & Grease | 10,000 | | Methylene Chloride | | |
| Selenium | | <0.001 | TOC (Carbon) | 10,000 | | Methyl Ethyl Ketone | | |
| Silver | | <0.02 | TOX (Halogen) | — | | Methyl Isobutyl Ketone | | |
| Thallium | | | PCB's | NONE | | Nitrobenzene | | |
| Zinc | | | | | | Pyridine | | |
| | | | | | | Tetrachloroethylene | | |
| | | | | | | Toluene | | |
| | | | | | | 1,1,1-Trichloroethane | | |
| Endrin | NONE | | | | | Trichlorotrifluoroethane | | |
| Lindane | | | | | | Trichloroethylene | | |
| Methoxychlor | | | | | | Trichlorofluoromethane | | |
| Toxaphene | | | | | | Xylene(s) | | |
| 2,4-D | | | | | | | | |
| 2,4,5-TP/Silvex | | | | | | | | |
| | | | | | | | | |

Application # ____

PCN ____

## SECTION F - WASTE CLASSIFICATION

1. RCRA Waste Description from 40 CFR 261: [X] RCRA NON-HAZARDOUS

2. RCRA EPA Waste Code(s) from 40 CFR 261:

3. Does Waste Contain the Following:

| | | |
|---|---|---|
| EXPLOSIVE | [ ] YES | [X] NO |
| SHOCK SENSITVE | [ ] YES | [X] NO |
| PYROPHORIC | [ ] YES | [X] NO |
| PATHOGENIC | [ ] YES | [X] NO |
| INFECTIOUS | [ ] YES | [X] NO |
| RADIOACTIVE | [ ] YES | [X] NO |

If YES, Explain in Section H

## SECTION G - U.S. DOT SHIPPING DESCRIPTION

1. U.S. DOT Proper Shipping Name (PSN): NON-HAZARDOUS SOIL CONTAMINATED WITH OIL

2. DOT Hazard Class: N/A

3. Code:

4. UN/NA Number:

5. Additional DOT Descriptions:

## SECTION H - ADDITIONAL COMMENTS

1. Additional Comments, Descriptions, or Waste Stream Information:

VENDORS OF $H_2$ GAS PRODUCED IT AS A BYPRODUCT OF MANUFACTURING CHLORINE GAS: $HCl \xrightarrow[\text{MERCURY BATTERY CELLS}]{\text{RUN THROUGH}} Cl_2\uparrow + H_2\uparrow$

THE MERCURY FROM THESE BATTERY CELLS ATTACHED TO THE HYDROGEN GAS. THE MERCURY WAS IN GASEOUS FORM; HOWEVER, IN THE QUANTITIES PRESENT IT EVOLVED INTO VAPOR THEN LIQUID MERCURY. UNION CARBIDE RECEIVED

PROCESS DIAGRAM OR PHOTOGRAPH

THE HYDROGEN GAS + MERCURY THROUGH A PIPELINE FROM VENDORS.

## SECTION J - CERTIFICATION

Application # ____

PCN ____

### 1. GENERATOR CERTIFICATION STATEMENT:

I HEREBY CERTIFY THAT AS AN AUTHORIZED REPRESENTATIVE OF THE GENERATOR NAMED HEREIN, ALL INFORMATION SUBMITTED IN THIS AND ALL ATTACHED DOCUMENTS IS TRUE AND ACCURATE. TO THE BEST OF MY KNOWLEDGE, ALL KNOWN AND SUSPECTED HAZARDOUS COMPONENTS HAVE BEEN INCLUDED IN THE DOCUMENTATION.

SIGNATURE — DATE 01/18/88 — TITLE OPER. MGR.

## SECTION K - DISPOSAL SITE USE ONLY

01. X Normal Operating Arrival Hours: Bulk 6:45 AM - 3:30 PM. Drums, Bags, Boxes and Special Handling 7:00 AM - 2:00 PM
02. X Product Code Number Must Appear on Each Manifest or Shipping Paper Required by EPA or DOT
03. ___ Bulk Disposal Charges Will be Billed by the Cubic Yard if Waste Density is Less Than 2000 Pounds per Cubic Yard
04. ___ Acceptance Ends _____; Provide Waste Minimization Data to ESOI for OEPA by _____ To Continue
05. ___ Generator Must Provide Updated Analysis _____, 19____ and Annually Thereafter
06. ___ pH of a 10% Slurry of Waste in Distilled Water Must be at Least _____ but Less Than _____ by ESOI Methods
07. ___ Flash Point of Incoming Material Must be _____ °F or Greater by ESOI Methods
08. ___ Bulk: No Unauthorized Materials or Free Liquids
09. ___ Bulk Scheduling Requirements
10. ___ Bulk PCN's Prohibition on Mix Without Authorization
11. ___ General Bulk Waste Mixing Instructions
12. ___ Bulk Must Contain Sufficient Moisture to Supress Dust
13. ___ Woven Cloth Bags; Acceptance Requirements
14. ___ Palletized Boxes; Acceptance Requirements
15. ___ Material Solid, Non-flowable & Penetrometer Standard
16. ___ Miscellaneous Debris 3 Feet Dimensional Limit
17. ___ ESOI has Stds. for Odor, Temperature & Liquid Stability
18. ___ Odoriferous Waste May Not be Acceptable
19. ___ Cyanide or Sulfide Permit Limit Requirements
20. ___ PCB Concentration Limit Requirements
21. ___ Oxidizer Concentration Limits & Isolation Requirements
22. ___ Generator Must Schedule Containers, Obtain Acc. No.
23. ___ PCN Stenciled on Each Drum or Container (Top, Side)
24. ___ Drums No Free Liquid, Void Space, Metal, < 800 Pounds
25. ___ Containerized Material Must be Solid, Non-flowable
26. ___ Exemption Requirements for Land Ban Waste
27. ___ Certify Waste Does Not Contain F001-F005 Solvents
28. ___ Participation in Monthly Analytical Survey
29. ___ Heat Generation in Contact With Water Requirements
30. ___ Caustic Concentration Limit Requirements
31. ___ Gas Generation in Contact With Water Requirements
32. ___ Standard Conditions for Custom Asbestos
33. ___ Standard Conditions for Generic Asbestos
34. ___ Standard Conditions for Custom Labpacks
35. ___ Standard Conditions for Generic Labpacks

SIGNATURE — DATE — TITLE

## SECTION L - REGULATORY AGENCY USE ONLY

### 1. ACCEPTANCE STATUS:

1 ☐ ACCEPTED  2 ☐ CONDITIONAL ACCEPTANCE  4 ☐ ACCEPTANCE DENIED

### 2. CONDITIONS FOR ACCEPTANCE OR REASONS FOR DENIAL:

SIGNATURE — TITLE — DATE — AGENCY

### 3. ACCEPTANCE AMENDED:

SIGNATURE — TITLE — DATE — AGENCY

# ANALYSIS DATA SHEET

IT

| JOB # | LOT # | SAMPLE DATE | SAMPLE # | BOTTLE #'s |
|---|---|---|---|---|
| 305281 | 5 | 6267 | 031898 | D1845 - |

DATE RECEIVED 3/18/88

LOT NUMBER 6267

PROJECT NAME: Union Carbide - Linden

NO. OF BOTTLES: 1

DESCRIPTION: Compress. #3 Small Inner Cooler Post Clean WPM PAGE 1 OF 5

**RESULTS (as ppm unless specified)** ☐ WET WT. ☐ DRY WT.

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| 24-HOUR ANALYSIS | Acidity (as $CaCO_3$) | | | | |
| | Alkalinity (as $CaCO_3$) | | | | |
| | Ammonia-N | | | | |
| | $BOD_5$ | | | | |
| | Chlorine Demand (at 15 min) | | | | |
| | Chlorine Residual | | | | |
| | Coliform-Fecal (# col./100ml) | | | | |
| | Coliform-Total (# col./100ml) | | | | |
| | Color (Pt. Co. units) | | | | |
| | Cyanide (Total) | | | | |
| | Dissolved Oxygen | | | | |
| | Hexavalent Chromium | | | | |
| | Nitrate-N | | | | |
| | Nitrite-N | | | | |
| | Nitrogen-Kjeldahl | | | | |
| | Nitrogen-Organic | | | | |
| | Oil & Grease Gr.☐ IR☐ | | | | |
| | Petro. Hydrocarbon Gr.☐ IR☐ | | | | |
| | Phosphate-P (Ortho) | | | | |
| | pH (units) | | | | |
| | Phenols (Total) | | | | |
| | Settleable Solids | | | | |
| | Specific Conductance (umhos) | | | | |
| | Sulfite | | | | |
| | Surfactants | | | | |
| | TOC | | | | |
| | TOX | | | | |
| WET CHEMISTRY | Boron | | | | |
| | Chloride | | | | |
| | COD | | | | |
| | Fluoride | | | | |
| | Hardness (as $CaCO_3$) | | | | |
| | Phosphate-P (Total) | | | | |
| | Silica | | | | |
| | Sulfate | | | | |
| | Sulfide | | | | |
| | Total Ash | | | | |
| | Total Dissolved Solids | | | | |
| | Total Solids | | | | |
| | Total Suspended Solids | | | | |
| | Total Volatile Solids | | | | |
| | Turbidity (NTU) | | | | |
| | | | | | |
| MISC. | Flash Point (°F) | | | | |
| | Heating Value (BTU) | | | | |
| | Organic Chloride (%) | | | | |
| | Organic Sulfur (%) | | | | |
| | Specific Gravity (g/ml) | | | | |
| | Viscosity (cp units) | | | | |

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INI |
|---|---|---|---|---|---|
| METALS | Aluminum (Al) | | | | |
| | Antimony (Sb) | | | | |
| | Arsenic (As) | | | | |
| | Barium (Ba) | | | | |
| | Beryllium (Be) | | | | |
| | Cadmium (Cd) | | | | |
| | Calcium (Ca) | | | | |
| | Chromium (Cr) | | | | |
| | Cobalt (Co) | | | | |
| | Copper (Cu) | | | | |
| | Iron (Fe) | | | | |
| | Lead (Pb) | | | | |
| | Magnesium (Mg) | | | | |
| | Manganese (Mn) | | | | |
| | Mercury (Hg) | ✓ | 0.18mg/wipe | 3/19 | D |
| | Molybdenum (Mo | | | | |
| | Nickel (Ni) | | | | |
| | Potassium (K) | | | | |
| | Selenium (Se) | | | | |
| | Silver (Ag) | | | | |
| | Sodium (Na) | | | | |
| | Thallium (Tl) | | | | |
| | Tin (Sn) | | | | |
| | Titanium (Ti) | | | | |
| | Vanadium (V) | | | | |
| | Zinc (Zn) | | | | |
| | | | | | |
| EP. TOXICITY | Arsenic | | | | |
| | Barium | | | | |
| | Cadmium | | | | |
| | Chromium | | | | |
| | Lead | | | | |
| | Mercury | | | | |
| | Selenium | | | | |
| | Silver | | | | |
| | Endrin | | | | |
| | Lindane | | | | |
| | Methoxychlor | | | | |
| | Toxaphene | | | | |
| | 2,4 - D | | | | |
| | 2,4,5 - TP | | | | |
| OTHER | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

PROJECT MANAGER: _____

| JOB # | LOT # | SAMPLE DATE | SAMPLE # | BOTTLE #'s |
|---|---|---|---|---|
| 5 | 6267 | 031898 | D1847 | - |

305281

DATE RECEIVED 3/18/88

LOT NUMBER 6267

PROJECT NAME: Union Carbide - Linden

NO. OF BOTTLES: 1

DESCRIPTION: Compress#3 Upper Heat Exchanger - Post Clean WP 14

PAGE 2 OF 6

## RESULTS (as ppm unless specified)

☐ WET WT. ☐ DRY WT.

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| 24-HOUR ANALYSIS | Acidity (as $CaCO_3$) | | | | |
| | Alkalinity (as $CaCO_3$) | | | | |
| | Ammonia-N | | | | |
| | $BOD_5$ | | | | |
| | Chlorine Demand (at 15 min) | | | | |
| | Chlorine Residual | | | | |
| | Coliform-Fecal (# col./100ml) | | | | |
| | Coliform-Total (# col./100ml) | | | | |
| | Color (Pt Co units) | | | | |
| | Cyanide (Total) | | | | |
| | Dissolved Oxygen | | | | |
| | Hexavalent Chromium | | | | |
| | Nitrate-N | | | | |
| | Nitrite-N | | | | |
| | Nitrogen-Kjeldahl | | | | |
| | Nitrogen-Organic | | | | |
| | Oil & Grease Gr ☐ IR ☐ | | | | |
| | Petro. Hydrocarbon Gr ☐ IR ☐ | | | | |
| | Phosphate-P (Ortho) | | | | |
| | pH (units) | | | | |
| | Phenols (Total) | | | | |
| | Settleable Solids | | | | |
| | Specific Conductance (umhos) | | | | |
| | Sulfite | | | | |
| | Surfactants | | | | |
| | TOC | | | | |
| | TOX | | | | |
| WET CHEMISTRY | Boron | | | | |
| | Chloride | | | | |
| | COD | | | | |
| | Fluoride | | | | |
| | Hardness (as $CaCO_3$) | | | | |
| | Phosphate-P (Total) | | | | |
| | Silica | | | | |
| | Sulfate | | | | |
| | Sulfide | | | | |
| | Total Ash | | | | |
| | Total Dissolved Solids | | | | |
| | Total Solids | | | | |
| | Total Suspended Solids | | | | |
| | Total Volatile Solids | | | | |
| | Turbidity (NTU) | | | | |
| | | | | | |
| MISC. | Flash Point (°F) | | | | |
| | Heating Value (BTU) | | | | |
| | Organic Chloride (%) | | | | |
| | Organic Sulfur (%) | | | | |
| | Specific Gravity (g/ml) | | | | |
| | Viscosity (cp units) | | | | |

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INI |
|---|---|---|---|---|---|
| METALS | Aluminum (Al) | | | | |
| | Antimony (Sb) | | | | |
| | Arsenic (As) | | | | |
| | Barium (Ba) | | | | |
| | Beryllium (Be) | | | | |
| | Cadmium (Cd) | | | | |
| | Calcium (Ca) | | | | |
| | Chromium (Cr) | | | | |
| | Cobalt (Co) | | | | |
| | Copper (Cu) | | | | |
| | Iron (Fe) | | | | |
| | Lead (Pb) | | | | |
| | Magnesium (Mg) | | | | |
| | Manganese (Mn) | | | | |
| | Mercury (Hg) | ✓ | 5.8 mg/wipe | 3/19 | DM |
| | Molybdenum (Mo) | | | | |
| | Nickel (Ni) | | | | |
| | Potassium (K) | | | | |
| | Selenium (Se) | | | | |
| | Silver (Ag) | | | | |
| | Sodium (Na) | | | | |
| | Thallium (Tl) | | | | |
| | Tin (Sn) | | | | |
| | Titanium (Ti) | | | | |
| | Vanadium (V) | | | | |
| | Zinc (Zn) | | | | |
| | | | | | |
| EP. TOXICITY | Arsenic | | | | |
| | Barium | | | | |
| | Cadmium | | | | |
| | Chromium | | | | |
| | Lead | | | | |
| | Mercury | | | | |
| | Selenium | | | | |
| | Silver | | | | |
| | Endrin | | | | |
| | Lindane | | | | |
| | Methoxychlor | | | | |
| | Toxaphene | | | | |
| | 2,4-D | | | | |
| | 2,4,5-TP | | | | |
| OTHER | | | | | |

PROJECT MANAGER

5 | 6 2 6 7 | 0 3 1 8 9 8 | D 1 8 4 6 | -

JOB # 305281 LOT # SAMPLE DATE SAMPLE # BOTTLE #

DATE RECEIVED 3/18/88

LOT NUMBER 6267

PROJECT NAME Union Carbide - Linden

NO. OF BOTTLES 1

DESCRIPTION Compress. #3 Lower Heat Exchanger - Post Clean WP13

PAGE 3 OF 5

## RESULTS (as ppm unless specified)

☐ WET WT. ☐ DRY WT.

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| 24-HOUR ANALYSIS | Acidity (as $CaCO_3$) | | | | |
| | Alkalinity (as $CaCO_3$) | | | | |
| | Ammonia-N | | | | |
| | $BOD_5$ | | | | |
| | Chlorine Demand (at 15 min) | | | | |
| | Chlorine Residual | | | | |
| | Coliform-Fecal # col. 100ml) | | | | |
| | Coliform-Total # col. 100ml) | | | | |
| | Color (Pt Co units) | | | | |
| | Cyanide (Total) | | | | |
| | Dissolved Oxygen | | | | |
| | Hexavalent Chromium | | | | |
| | Nitrate-N | | | | |
| | Nitrite-N | | | | |
| | Nitrogen-Kjeldahl | | | | |
| | Nitrogen-Organic | | | | |
| | Oil & Grease Gr ☐ IR ☐ | | | | |
| | Petro Hydrocarbon Gr ☐ IR ☐ | | | | |
| | Phosphate-P (Ortho) | | | | |
| | pH (units) | | | | |
| | Phenols (Total) | | | | |
| | Settleable Solids | | | | |
| | Specific Conductance (umhos) | | | | |
| | Sulfite | | | | |
| | Surfactants | | | | |
| | TOC | | | | |
| | TOX | | | | |
| WET CHEMISTRY | Boron | | | | |
| | Chloride | | | | |
| | COD | | | | |
| | Fluoride | | | | |
| | Hardness (as $CaCO_3$) | | | | |
| | Phosphate-P (Total) | | | | |
| | Silica | | | | |
| | Sulfate | | | | |
| | Sulfide | | | | |
| | Total Ash | | | | |
| | Total Dissolved Solids | | | | |
| | Total Solids | | | | |
| | Total Suspended Solids | | | | |
| | Total Volatile Solids | | | | |
| | Turbidity (NTU) | | | | |
| | | | | | |
| MISC. | Flash Point (°F) | | | | |
| | Heating Value (BTU) | | | | |
| | Organic Chloride (%) | | | | |
| | Organic Sulfur (%) | | | | |
| | Specific Gravity (g/ml) | | | | |
| | Viscosity (cp units) | | | | |

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INI |
|---|---|---|---|---|---|
| METALS | Aluminum (Al) | | | | |
| | Antimony (Sb) | | | | |
| | Arsenic (As) | | | | |
| | Barium (Ba) | | | | |
| | Beryllium (Be) | | | | |
| | Cadmium (Cd) | | | | |
| | Calcium (Ca) | | | | |
| | Chromium (Cr) | | | | |
| | Cobalt (Co) | | | | |
| | Copper (Cu) | | | | |
| | Iron (Fe) | | | | |
| | Lead (Pb) | | | | |
| | Magnesium (Mg) | | | | |
| | Manganese (Mn) | | | | |
| | Mercury (Hg) | ✓ | 0.11 mg/wipe | 3/19 | C |
| | Molybdenum (Mo) | | | | |
| | Nickel (Ni) | | | | |
| | Potassium (K) | | | | |
| | Selenium (Se) | | | | |
| | Silver (Ag) | | | | |
| | Sodium (Na) | | | | |
| | Thallium (Tl) | | | | |
| | Tin (Sn) | | | | |
| | Titanium (Ti) | | | | |
| | Vanadium (V) | | | | |
| | Zinc (Zn) | | | | |
| | | | | | |
| EP. TOXICITY | Arsenic | | | | |
| | Barium | | | | |
| | Cadmium | | | | |
| | Chromium | | | | |
| | Lead | | | | |
| | Mercury | | | | |
| | Selenium | | | | |
| | Silver | | | | |
| | Endrin | | | | |
| | Lindane | | | | |
| | Methoxychlor | | | | |
| | Toxaphene | | | | |
| | 2.4 - D | | | | |
| | 2.4.5 - TP | | | | |
| OTHER | | | | | |
| | | | | | |
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| | | | | | |
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PROJECT MANAGER

ANALYSIS DATA SHEET

| JOB # | LOT # | SAMPLE DATE | SAMPLE # | BOTTLE # |
|---|---|---|---|---|
| 5 | 6267 | 031898 | D1848 | - |

305281

DATE RECEIVED 3/18/88

LOT NUMBER 6267

PROJECT NAME Union Carbide - Linden

NO. OF BOTTLES: 1

DESCRIPTION Compress. #3 Platform, Post Clean WP 15 PAGE 4 OF 5

**RESULTS (as ppm unless specified)** ☐ WET WT. ☐ DRY WT.

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| 24-HOUR ANALYSIS | Acidity (as $CaCO_3$) | | | | |
| | Alkalinity (as $CaCO_3$) | | | | |
| | Ammonia-N | | | | |
| | $BOD_5$ | | | | |
| | Chlorine Demand (at 15 min) | | | | |
| | Chlorine Residual | | | | |
| | Coliform-Fecal (# col. 100ml) | | | | |
| | Coliform-Total (# col. 100ml) | | | | |
| | Color (Pt Co units) | | | | |
| | Cyanide (Total) | | | | |
| | Dissolved Oxygen | | | | |
| | Hexavalent Chromium | | | | |
| | Nitrate-N | | | | |
| | Nitrite-N | | | | |
| | Nitrogen-Kjeldahl | | | | |
| | Nitrogen-Organic | | | | |
| | Oil & Grease Gr ☐ IR ☐ | | | | |
| | Petro. Hydrocarbon Gr ☐ IR ☐ | | | | |
| | Phosphate-P (Ortho) | | | | |
| | pH (units) | | | | |
| | Phenols (Total) | | | | |
| | Settleable Solids | | | | |
| | Specific Conductance (umhos) | | | | |
| | Sulfite | | | | |
| | Surfactants | | | | |
| | TOC | | | | |
| | TOX | | | | |
| WET CHEMISTRY | Boron | | | | |
| | Chloride | | | | |
| | COD | | | | |
| | Fluoride | | | | |
| | Hardness (as $CaCO_3$) | | | | |
| | Phosphate-P (Total) | | | | |
| | Silica | | | | |
| | Sulfate | | | | |
| | Sulfide | | | | |
| | Total Ash | | | | |
| | Total Dissolved Solids | | | | |
| | Total Solids | | | | |
| | Total Suspended Solids | | | | |
| | Total Volatile Solids | | | | |
| | Turbidity (NTU) | | | | |
| | | | | | |
| MISC. | Flash Point (°F) | | | | |
| | Heating Value (BTU) | | | | |
| | Organic Chloride (%) | | | | |
| | Organic Sulfur (%) | | | | |
| | Specific Gravity (g/ml) | | | | |
| | Viscosity (cp units) | | | | |

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| METALS | Aluminum (Al) | | | | |
| | Antimony (Sb) | | | | |
| | Arsenic (As) | | | | |
| | Barium (Ba) | | | | |
| | Beryllium (Be) | | | | |
| | Cadmium (Cd) | | | | |
| | Calcium (Ca) | | | | |
| | Chromium (Cr) | | | | |
| | Cobalt (Co) | | | | |
| | Copper (Cu) | | | | |
| | Iron (Fe) | | | | |
| | Lead (Pb) | | | | |
| | Magnesium (Mg) | | | | |
| | Manganese (Mn) | | | | |
| | Mercury (Hg) | ✓ | 0.16 mg/wipe | 3/19 | DA |
| | Molybdenum (Mo) | | | | |
| | Nickel (Ni) | | | | |
| | Potassium (K) | | | | |
| | Selenium (Se) | | | | |
| | Silver (Ag) | | | | |
| | Sodium (Na) | | | | |
| | Thallium (Tl) | | | | |
| | Tin (Sn) | | | | |
| | Titanium (Ti) | | | | |
| | Vanadium (V) | | | | |
| | Zinc (Zn) | | | | |
| | | | | | |
| EP. TOXICITY | Arsenic | | | | |
| | Barium | | | | |
| | Cadmium | | | | |
| | Chromium | | | | |
| | Lead | | | | |
| | Mercury | | | | |
| | Selenium | | | | |
| | Silver | | | | |
| | Endrin | | | | |
| | Lindane | | | | |
| | Methoxychlor | | | | |
| | Toxaphene | | | | |
| | 2,4-D | | | | |
| | 2,4,5-TP | | | | |
| OTHER | | | | | |
| | | | | | |
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PROJECT MANAGER:

# ANALYSIS DATA SHEET

IT

JOB # 305281 | LOT # 6267 | SAMPLE DATE 03188 | SAMPLE # D849 | BOTTLE #'s -

DATE RECEIVED 3/19/88

LOT NUMBER 6267

PROJECT NAME: Union Carbide - Linden

NO. OF BOTTLES: 1

DESCRIPTION: Compress. #3, 4th Stage Cylinder, Post Clean WP 16

PAGE 5 OF 6

**RESULTS (as ppm unless specified)** ☐ WET WT. ☐ DRY WT.

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| 24-HOUR ANALYSIS | Acidity (as $CaCO_3$) | | | | |
| | Alkalinity (as $CaCO_3$) | | | | |
| | Ammonia-N | | | | |
| | $BOD_5$ | | | | |
| | Chlorine Demand (at 15 min) | | | | |
| | Chlorine Residual | | | | |
| | Coliform-Fecal # col./100ml) | | | | |
| | Coliform-Total # col./100ml) | | | | |
| | Color (Pt.Co units) | | | | |
| | Cyanide (Total | | | | |
| | Dissolved Oxygen | | | | |
| | Hexavalent Chromium | | | | |
| | Nitrate-N | | | | |
| | Nitrite-N | | | | |
| | Nitrogen-Kjeldahl | | | | |
| | Nitrogen-Organic | | | | |
| | Oil & Grease Gr ☐ IR ☐ | | | | |
| | Petro. Hydrocarbon Gr ☐ IR ☐ | | | | |
| | Phosphate-P (Ortho) | | | | |
| | pH (units) | | | | |
| | Phenols (Total | | | | |
| | Settleable Solids | | | | |
| | Specific Conductance (umhos) | | | | |
| | Sulfite | | | | |
| | Surfactants | | | | |
| | TOC | | | | |
| | TOX | | | | |
| WET CHEMISTRY | Boron | | | | |
| | Chloride | | | | |
| | COD | | | | |
| | Fluoride | | | | |
| | Hardness (as $CaCO_3$) | | | | |
| | Phosphate-P (Total) | | | | |
| | Silica | | | | |
| | Sulfate | | | | |
| | Sulfide | | | | |
| | Total Ash | | | | |
| | Total Dissolved Solids | | | | |
| | Total Solids | | | | |
| | Total Suspended Solids | | | | |
| | Total Volatile Solids | | | | |
| | Turbidity (NTU) | | | | |
| | | | | | |
| MISC. | Flash Point (°F) | | | | |
| | Heating Value (BTU) | | | | |
| | Organic Chloride (%) | | | | |
| | Organic Sulfur (%) | | | | |
| | Specific Gravity (g/ml) | | | | |
| | Viscosity (cp units) | | | | |

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INIT |
|---|---|---|---|---|---|
| METALS | Aluminum (Al) | | | | |
| | Antimony (Sb) | | | | |
| | Arsenic (As) | | | | |
| | Barium (Ba) | | | | |
| | Beryllium (Be) | | | | |
| | Cadmium (Cd) | | | | |
| | Calcium (Ca) | | | | |
| | Chromium (Cr) | | | | |
| | Cobalt (Co) | | | | |
| | Copper (Cu) | | | | |
| | Iron (Fe) | | | | |
| | Lead (Pb) | | | | |
| | Magnesium (Mg) | | | | |
| | Manganese (Mn) | | | | |
| | Mercury (Hg) | ✓ | 1.4 mg/wipe | 3/19 | DS |
| | Molybdenum (Mo) | | | | |
| | Nickel (Ni) | | | | |
| | Potassium (K) | | | | |
| | Selenium (Se) | | | | |
| | Silver (Ag) | | | | |
| | Sodium (Na) | | | | |
| | Thallium (Tl) | | | | |
| | Tin (Sn) | | | | |
| | Titanium (Ti) | | | | |
| | Vanadium (V) | | | | |
| | Zinc (Zn) | | | | |
| | | | | | |
| EP. TOXICITY | Arsenic | | | | |
| | Barium | | | | |
| | Cadmium | | | | |
| | Chromium | | | | |
| | Lead | | | | |
| | Mercury | | | | |
| | Selenium | | | | |
| | Silver | | | | |
| | Endrin | | | | |
| | Lindane | | | | |
| | Methoxychlor | | | | |
| | Toxaphene | | | | |
| | 2,4 - D | | | | |
| | 2,4,5 - TP | | | | |
| OTHER | | | | | |
| | | | | | |
| | | | | | |
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PROJECT MANAGER: _____

# ANALYSIS DATA SHEET

| JOB # | LOT # | SAMPLE DATE | SAMPLE # | BOTTLE # |
|---|---|---|---|---|
| 305281 | 6267 | 031898 | D1850 | - |

DATE RECEIVED 3/18/88

LOT NUMBER 6267

PROJECT NAME: Union Carbide - Linden

NO. OF BOTTLES: 1

DESCRIPTION: Field Blank WP 17

PAGE 6 OF 6

## RESULTS (as ppm unless specified)

☐ WET WT. ☐ DRY WT.

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| 24-HOUR ANALYSIS | Acidity (as $CaCO_3$) | | | | |
| | Alkalinity (as $CaCO_3$) | | | | |
| | Ammonia-N | | | | |
| | $BOD_5$ | | | | |
| | Chlorine Demand (at 15 min) | | | | |
| | Chlorine Residual | | | | |
| | Coliform-Fecal (# col/100ml) | | | | |
| | Coliform-Total (# col/100ml) | | | | |
| | Color (Pt Co units) | | | | |
| | Cyanide (Total) | | | | |
| | Dissolved Oxygen | | | | |
| | Hexavalent Chromium | | | | |
| | Nitrate-N | | | | |
| | Nitrite-N | | | | |
| | Nitrogen-Kjeldahl | | | | |
| | Nitrogen-Organic | | | | |
| | Oil & Grease Gr ☐ IR ☐ | | | | |
| | Petro. Hydrocarbon Gr ☐ IR ☐ | | | | |
| | Phosphate-P (Ortho) | | | | |
| | pH (units) | | | | |
| | Phenols (Total) | | | | |
| | Settleable Solids | | | | |
| | Specific Conductance (umhos) | | | | |
| | Sulfite | | | | |
| | Surfactants | | | | |
| | TOC | | | | |
| | TOX | | | | |
| WET CHEMISTRY | Boron | | | | |
| | Chloride | | | | |
| | COD | | | | |
| | Fluoride | | | | |
| | Hardness (as $CaCO_3$) | | | | |
| | Phosphate-P (Total) | | | | |
| | Silica | | | | |
| | Sulfate | | | | |
| | Sulfide | | | | |
| | Total Ash | | | | |
| | Total Dissolved Solids | | | | |
| | Total Solids | | | | |
| | Total Suspended Solids | | | | |
| | Total Volatile Solids | | | | |
| | Turbidity (NTU) | | | | |
| | | | | | |
| MISC. | Flash Point (°F) | | | | |
| | Heating Value (BTU) | | | | |
| | Organic Chloride (%) | | | | |
| | Organic Sulfur (%) | | | | |
| | Specific Gravity (g/ml) | | | | |
| | Viscosity (cp units) | | | | |

| | TEST PARAMETER | ✓ | RESULT | ANALYSIS DATE | INITIAL |
|---|---|---|---|---|---|
| METALS | Aluminum (Al) | | | | |
| | Antimony (Sb) | | | | |
| | Arsenic (As) | | | | |
| | Barium (Ba) | | | | |
| | Beryllium (Be) | | | | |
| | Cadmium (Cd) | | | | |
| | Calcium (Ca) | | | | |
| | Chromium (Cr) | | | | |
| | Cobalt (Co) | | | | |
| | Copper (Cu) | | | | |
| | Iron (Fe) | | | | |
| | Lead (Pb) | | | | |
| | Magnesium (Mg) | | | | |
| | Manganese (Mn) | | | | |
| | Mercury (Hg) | ✓ | 0.0002 mg/wipe | 3/19 | |
| | Molybdenum (Mo) | | | | |
| | Nickel (Ni) | | | | |
| | Potassium (K) | | | | |
| | Selenium (Se) | | | | |
| | Silver (Ag) | | | | |
| | Sodium (Na) | | | | |
| | Thallium (Tl) | | | | |
| | Tin (Sn) | | | | |
| | Titanium (Ti) | | | | |
| | Vanadium (V) | | | | |
| | Zinc (Zn) | | | | |
| | | | | | |
| EP. TOXICITY | Arsenic | | | | |
| | Barium | | | | |
| | Cadmium | | | | |
| | Chromium | | | | |
| | Lead | | | | |
| | Mercury | | | | |
| | Selenium | | | | |
| | Silver | | | | |
| | Endrin | | | | |
| | Lindane | | | | |
| | Methoxychlor | | | | |
| | Toxaphene | | | | |
| | 2.4 - D | | | | |
| | 2.4.5 - TP | | | | |
| OTHER | | | | | |
| | | | | | |
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PROJECT MANAGER: _____

INTERNATIONAL TECHNOLOGY CORPORATION

# CHAIN-OF-CUSTODY RECORD

R/A Control No. 63373

C/C Control No. A 76322

PROJECT NAME/NUMBER Union Carbide - Linden 305281

LAB DESTINATION I.T. Edison

SAMPLE TEAM MEMBERS J.H. Hill

CARRIER/WAYBILL NO.

| Sample Number | Sample Location and Description | Date and Time Collected | Sample Type | Container Type | Condition on Receipt (Name and Date) | Disposal Record No. |
|---|---|---|---|---|---|---|
| D1845 | Comp.#3 Small Inner Cooler, Post Clean WP12 | 3/18/88 13:15 | WIPE | 8 oz glass jar | RUSH | |
| D1847 | Comp#3 Upper Heat Xchanger, Post Clean WP14 | 3/18/88 13:43 | WIPE | 8 oz glass jar | | |
| D1846 | Comp#3 Lower Heat Xchanger WP13 Post Clean | 3/18/88 13:30 | WIPE | 8 oz glass jar | | |
| D1848 | Comp#3 Platforms WP15 Post Clean | 3/18/88 14:05 | WIPE | 8 oz glass jar | | |
| D1849 | Comp#3, 4th Stage Cylinder WP16 Post Clean | 3/18/88 14:15 | WIPE | 8 oz glass jar | | |
| D1850 | Field Blank WP17 | 3/18/88 14:20 | WIPE | 8 oz glass jar | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Special Instructions: Rush 24 hr.

Possible Sample Hazards: Hg

SIGNATURES: (Name, Company, Date and Time)

1. Relinquished By: Jacques H. Hill IT 3/18/88 @ 1537

   Received By: Sam Halifax IT 3-18-88 1537

2. Relinquished By:

   Received By:

3. Relinquished By:

   Received by:

4. Relinquished By:

   Received By:

WHITE - To accompany samples
YELLOW - Field copy

INTERNATIONAL TECHNOLOGY CORPORATION

# REQUEST FOR ANALYSIS

R/A Control No. 63373
C/C Control No. ~~76236~~ 76322

PROJECT NAME: Union Carbide - Linden
PROJECT NUMBER: 305291
PROJECT MANAGER: Tom Hernon
BILL TO: PC 3811 Edison

PURCHASE ORDER NO.

DATE SAMPLES SHIPPED: 3/18/88
LAB DESTINATION: I.T. Edison
LABORATORY CONTACT
SEND LAB REPORT TO

DATE REPORT REQUIRED
PROJECT CONTACT
PROJECT CONTACT PHONE NO.

| Sample No. | Sample Type | Sample Volume | Preservative | Requested Testing Program | Special Instructions |
|---|---|---|---|---|---|
| D1845 | WIPE | 1 gauze pad | NONE | Hg | RUSH |
| D1847 | WIPE | " | " | Hg | RUSH |
| D1846 | WIPE | " | " | Hg | RUSH |
| D1848 | WIPE | " | " | Hg | RUSH |
| D1849 | WIPE | " | " | Hg | RUSH |
| D1850 | WIPE | " | " | Hg | RUSH |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

TURNAROUND TIME REQUIRED: (Rush must be approved by the Project Manager) 24 hr turnaround

Normal _____ Rush X (Subject to rush surcharge)

POSSIBLE HAZARD IDENTIFICATION: (Please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances)

Nonhazard _____ Flammable _____ Skin Irritant _____ Highly Toxic _____ Other Hg (Please Specify)

SAMPLE DISPOSAL: (Please indicate disposition of sample following analysis. Lab will charge for packing, shipping, and disposal.)

Return to Client _____ Disposal by Lab _____

FOR LAB USE ONLY

Received By _____ Date/Time _____

WHITE - Original, to accompany samples
YELLOW - Field copy

INTERNATIONAL TECHNOLOGY CORPORATION

WP 18

| | | | | | | |
|---|---|---|---|---|---|---|
| DATE | 3 | 22 | 88 | | | |
| TIME | 14 | 50 | 16 | 48 | | |
| PAGE 1 OF | | | | | | |
| PAGE | | | | | | |
| PROJECT NO. 305281 | | | | | | |

[redacted] [redacted]

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D 1852 + D 1863 WP 18 + WP 29

SAMPLE LOCATION Comp. #1 Intake valve cover, Chamber #1, Preclean + Post Clean

SAMPLE TYPE WIPE

COMPOSITE ____ YES ____ NO

COMPOSITE TYPE ____

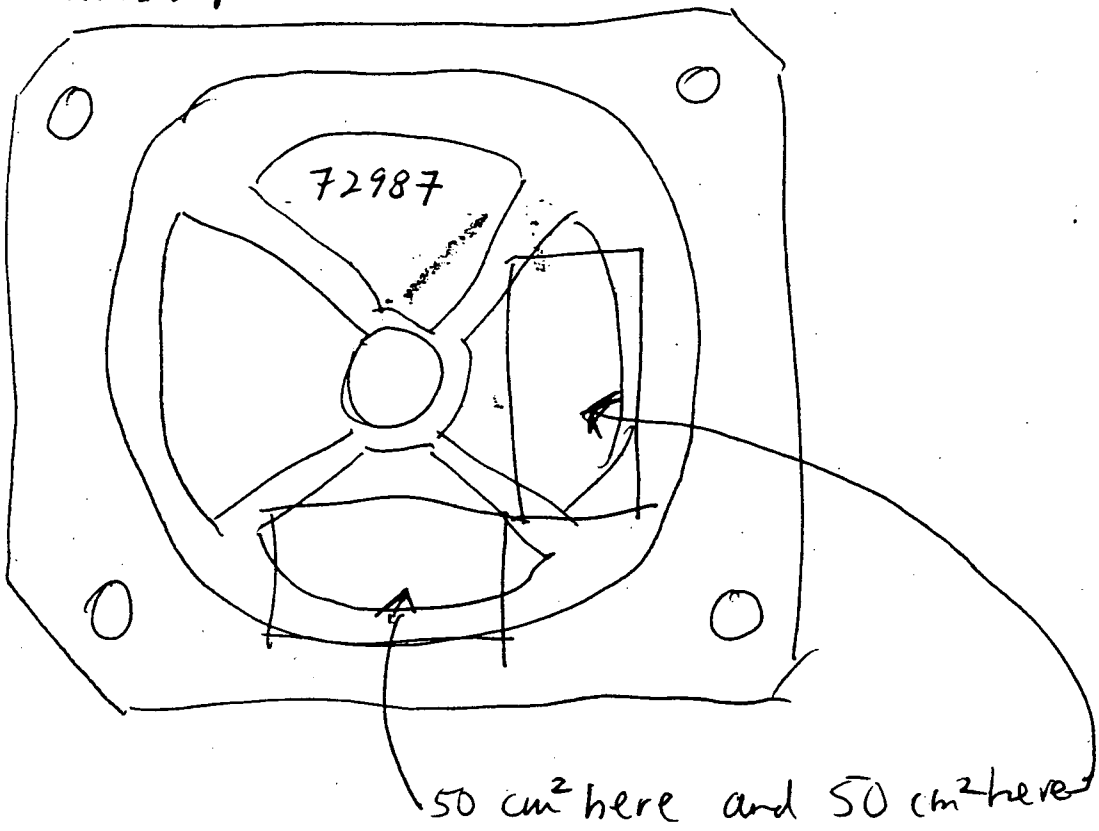
DEPTH OF SAMPLE ____

WEATHER ____

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8oz glass jar | 1 gauze pad |
| 8oz glass jar | 1 gauze pad |
| | |

COMMENTS:

WP 18 - Preclean
WP 29 - Post Clean




PREPARED BY: ____

INTERNATIONAL TECHNOLOGY CORPORATION

| | | | | | |
|---|---|---|---|---|---|
| DATE | 03 | 22 | 88 | | |
| TIME | 15 | 05 | | | |
| PAGE 2 OF ____ | | | | | |
| PAGE | | | | | |
| PROJECT NO. 305281 | | | | | |

[redacted]

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide – Linden

SAMPLE NO. D1853 WP19

SAMPLE LOCATION ~~Comp #3~~ Field Blank

SAMPLE TYPE WIPE

COMPOSITE ____ YES ____ NO

COMPOSITE TYPE ____

DEPTH OF SAMPLE ____

WEATHER ____

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8oz glass jars | 1 gauze pad |
| | |
| | |

COMMENTS:

A gauze pad was moistened w/ $HNO_3$ from the sprayer, then placed in a jar

PREPARED BY: ____

INTERNATIONAL TECHNOLOGY CORPORATION

| | | | | | |
|---|---|---|---|---|---|
| DATE | 3 | 22 | 88 | | |
| TIME | 15 | 15 | | | |
| PAGE 3 OF ____ | | | | | |
| PAGE | | | | | |
| PROJECT NO. 305281 | | | | | |

[redacted]

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D1854 WP 20

SAMPLE LOCATION Comp. # 3, 3rd Stage Piston, Post-Clean

SAMPLE TYPE WIPE

COMPOSITE ____ YES ____ NO

COMPOSITE TYPE ____

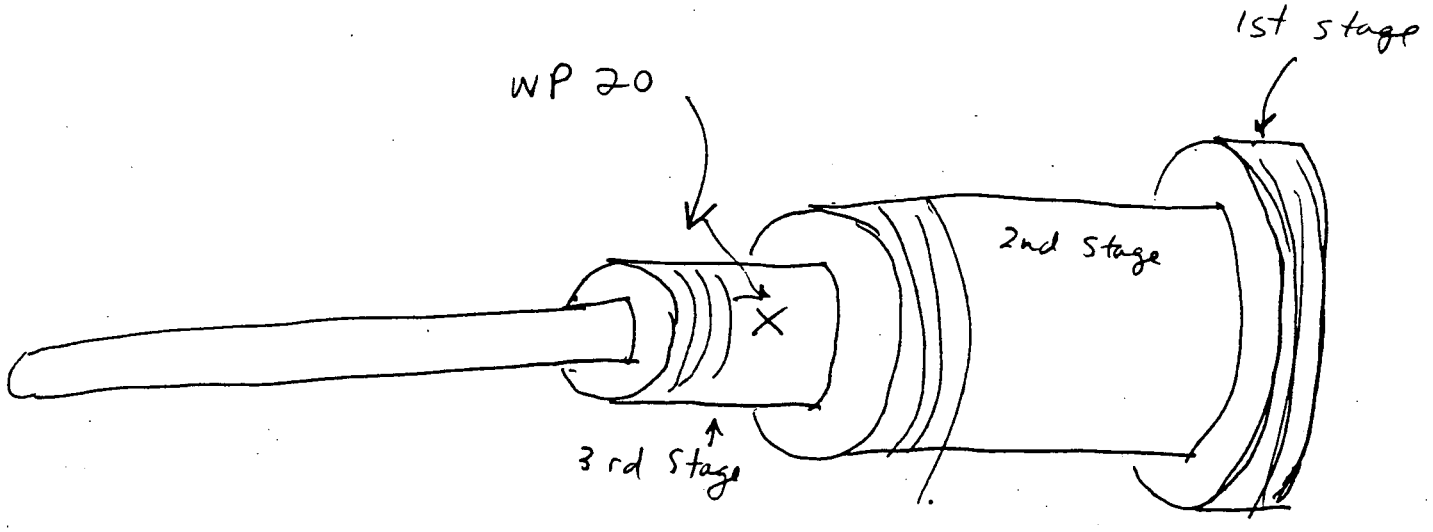
DEPTH OF SAMPLE ____

WEATHER ____

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8oz glass jar | gauze pad |
| | |
| | |

COMMENTS:

2nd Time this piece was sampled




PREPARED BY: ____

INTERNATIONAL TECHNOLOGY CORPORATION

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| DATE | 3 | 22 | 88 | | |
| TIME | 15 | 25 | | | |
| PAGE 4 OF | | | | | |
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| PROJECT NO. 305281 | | | | | |

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## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D1955

SAMPLE LOCATION Comp. #3 1st Stage Cylinder, Post Clean WP 21

SAMPLE TYPE WIPE

COMPOSITE ____ YES ____ NO

COMPOSITE TYPE ____

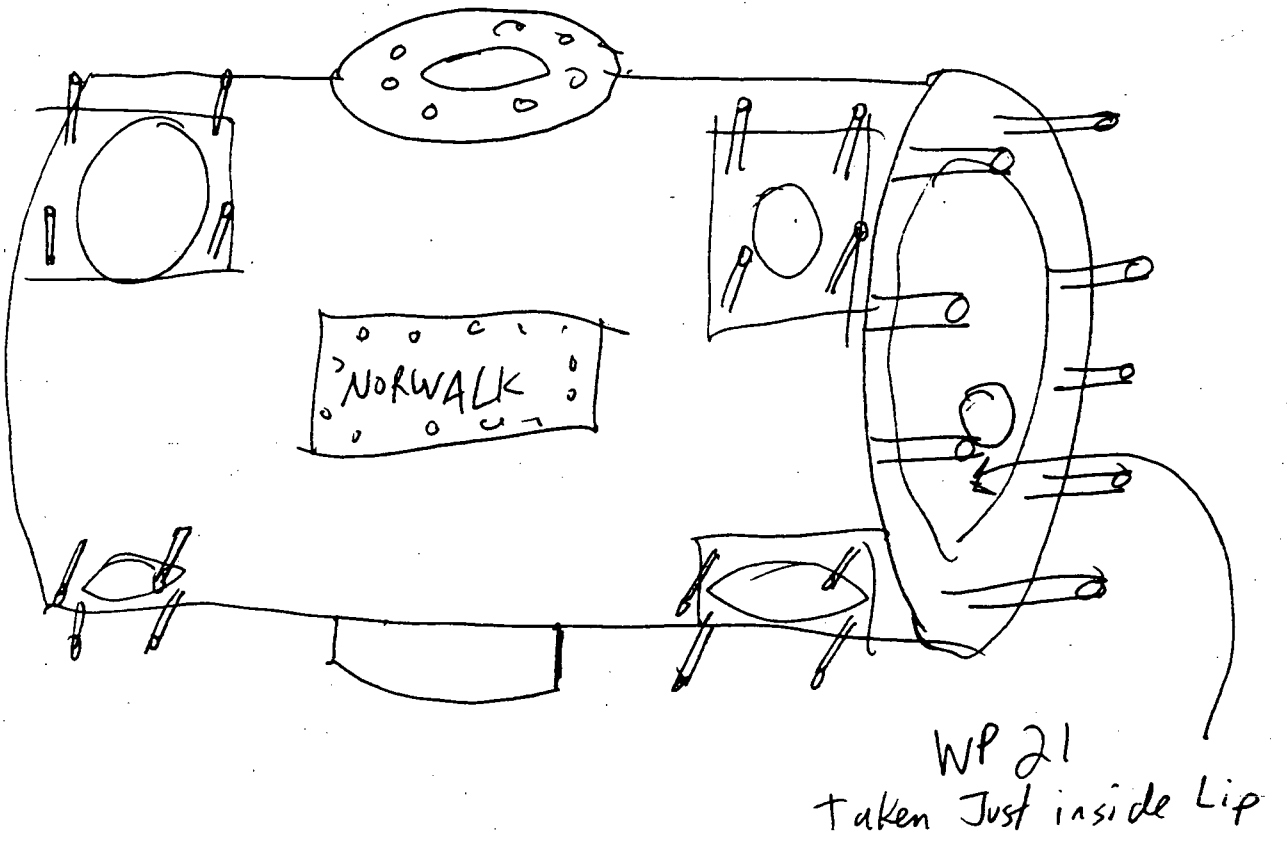
DEPTH OF SAMPLE ____

WEATHER ____

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8oz glass jar | gauze Pad |
| | |
| | |

COMMENTS:

2nd Time this piece was sampled.

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| PROJECT NO. 305281 | | | | | |

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D 1856 WP 22

SAMPLE LOCATION Compress. #3, 2nd Stage Cylinder, Post Clean

SAMPLE TYPE WIPE

COMPOSITE ____ YES ____ NO

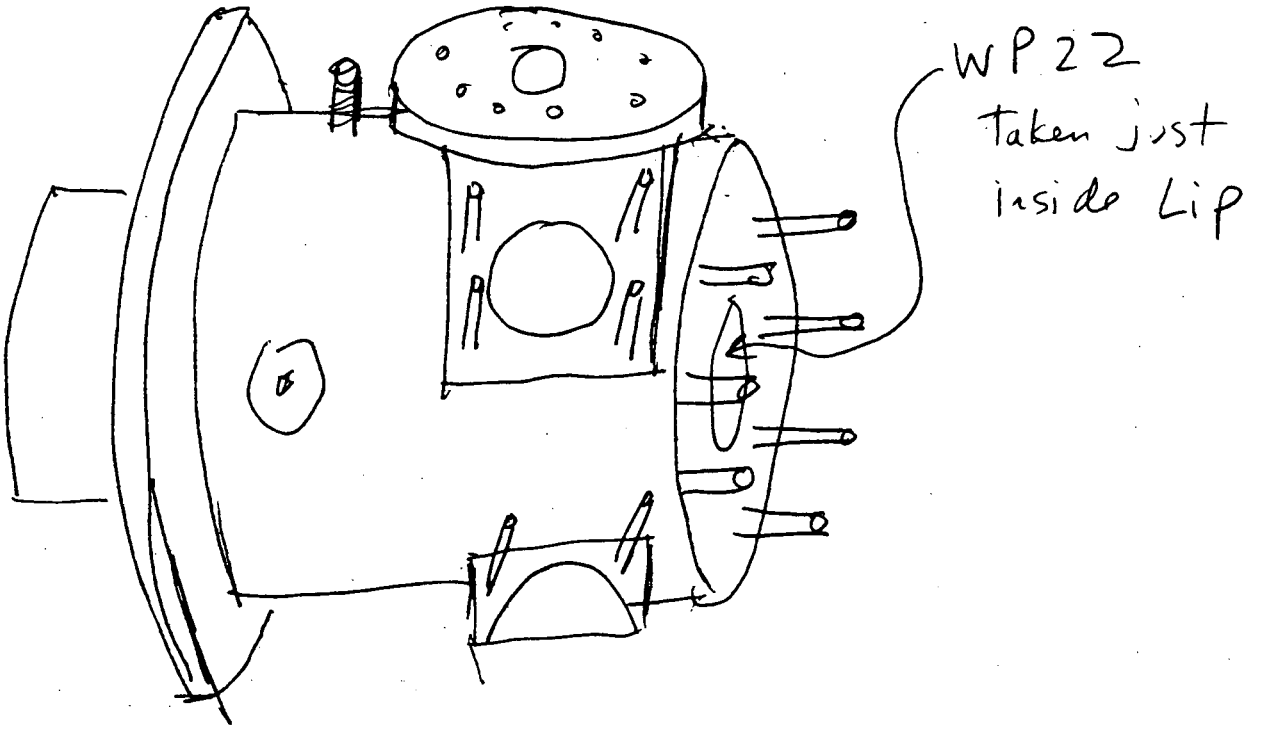
COMPOSITE TYPE ____

DEPTH OF SAMPLE ____

WEATHER ____

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8 oz glassjar | Gauze Pad |
| | |
| | |

COMMENTS: 2nd Time this piece was sampled




PREPARED BY: ____

INTERNATIONAL TECHNOLOGY CORPORATION

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| PROJECT NO. 305281 | | | | | |

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## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide -Linden

SAMPLE NO. D 1857 WP 23

SAMPLE LOCATION Comp.#3, 4th Stge Cylinder, Post Clean

SAMPLE TYPE WIPE

COMPOSITE ____ YES ✓ NO

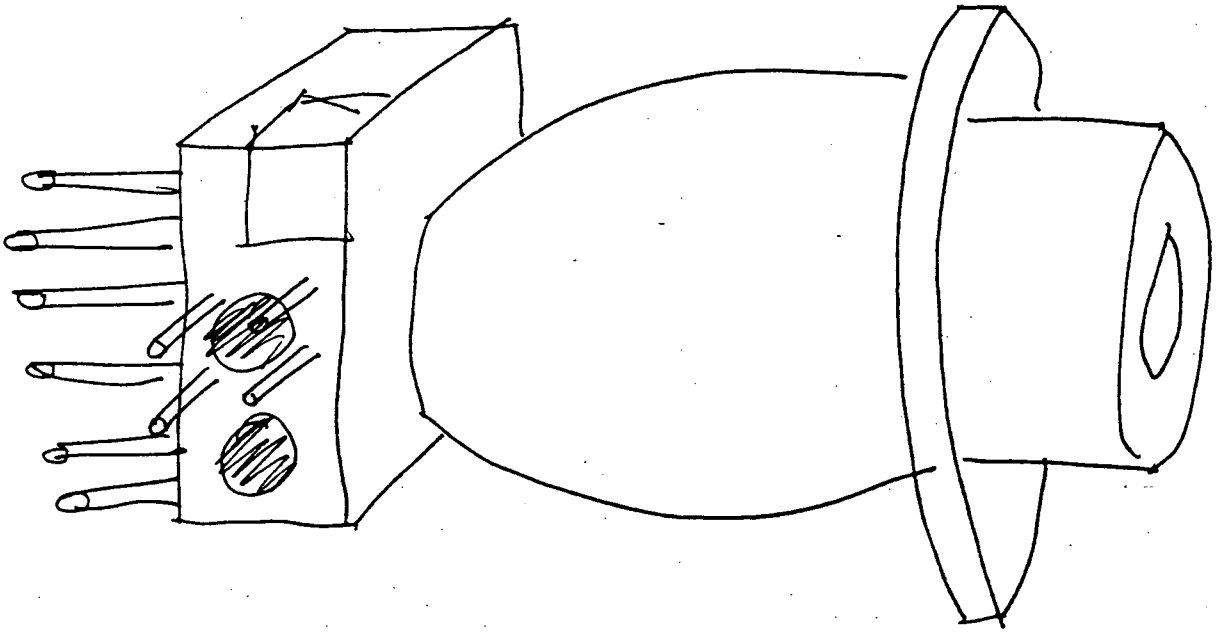
COMPOSITE TYPE ____

DEPTH OF SAMPLE ____

WEATHER ____

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8oz glass jar | 1 gauze pad |
| | |
| | |

COMMENTS: 3rd Sample taken on this piece



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| PROJECT NO. 305291 | | | | | |

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D 1058 ~~[illegible]~~

SAMPLE LOCATION Sample of water inside the Small Inner cooler, Post Clean

SAMPLE TYPE Water

COMPOSITE ____ YES ____ NO

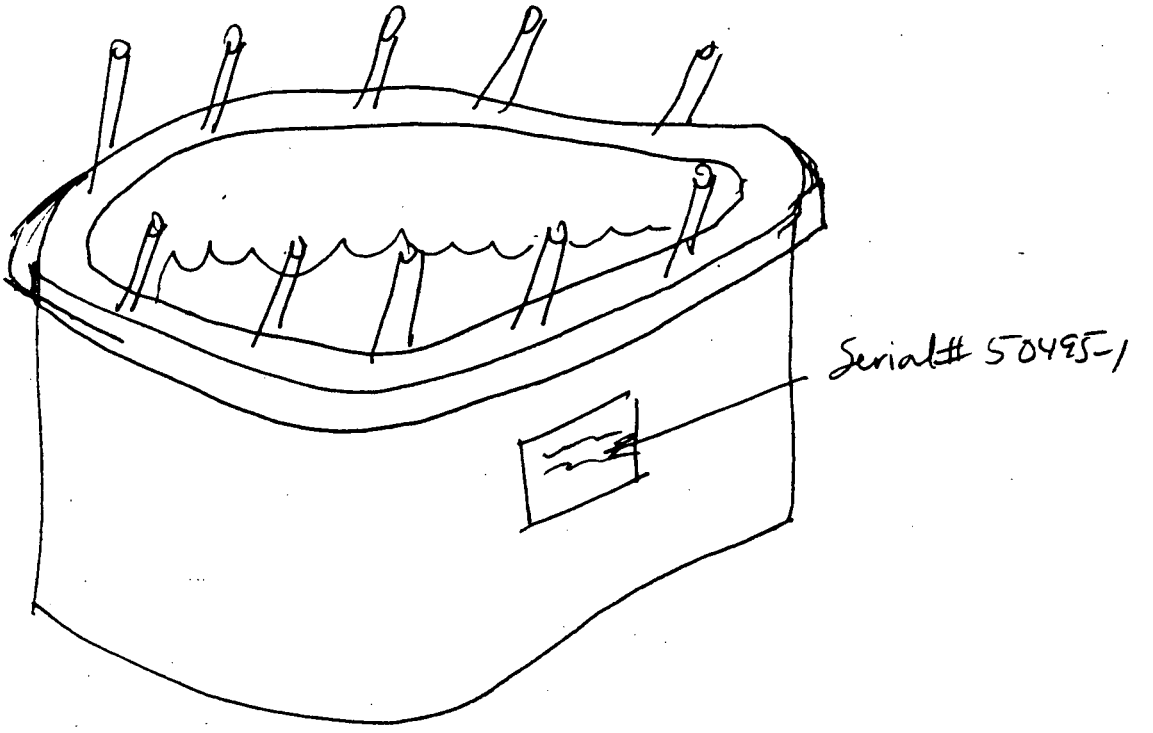
COMPOSITE TYPE ____

DEPTH OF SAMPLE ____

WEATHER ____

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 28oz glass jars | 2 × 8oz |
| | |
| | |

COMMENTS:

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| PROJECT NO. 305281 | | | | | |

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## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide Linden

SAMPLE NO. D-1859 WP 24

SAMPLE LOCATION Comp. #3 small inner cooler Post clean

SAMPLE TYPE WIPE

COMPOSITE ____ YES ✓ NO

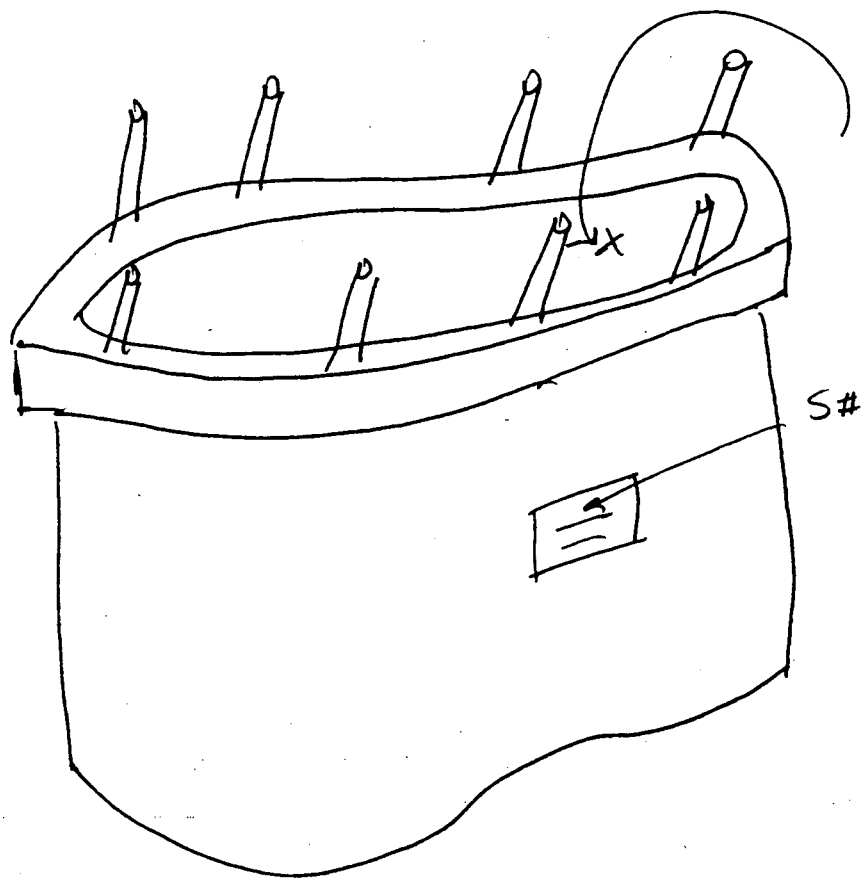
COMPOSITE TYPE

DEPTH OF SAMPLE

WEATHER

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8oz glass jar | 1 gauze pad |
| | |
| | |

COMMENTS:




WP 24 taken on inside wall

S# 50495-1

PREPARED BY: _____

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## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide Linden

SAMPLE NO. D 1859 WP 25

SAMPLE LOCATION Comp# 3 Lower Heat Exchanger, Post Clean

SAMPLE TYPE WIPE

COMPOSITE ____ YES ✓ NO

COMPOSITE TYPE ____

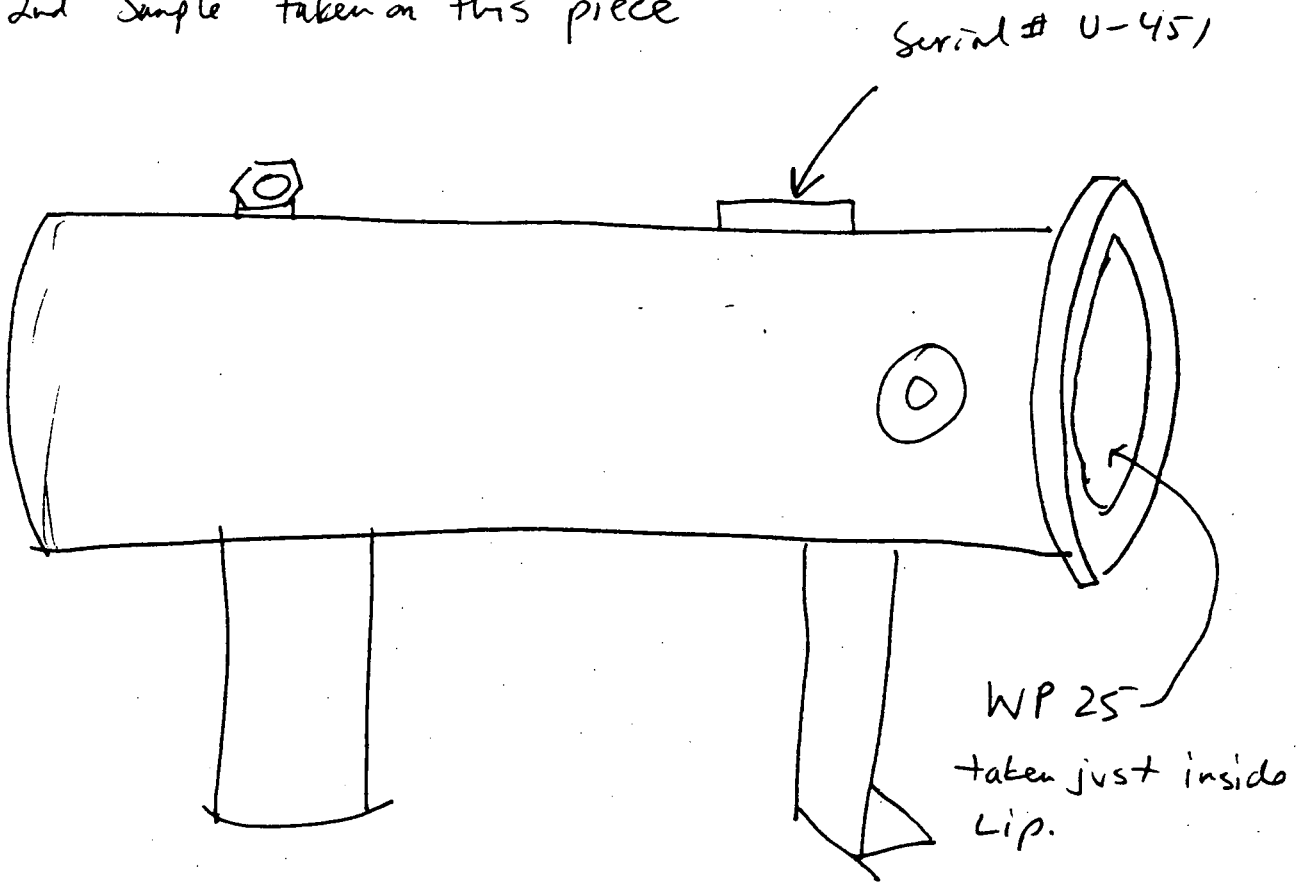
DEPTH OF SAMPLE ____

WEATHER ____

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8oz glass jar | 1 gauze pad |
| | |
| | |

COMMENTS:

2nd Sample taken on this piece

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| PROJECT NO. 305281 | | | | | |

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## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide – Linden

SAMPLE NO. D1861

SAMPLE LOCATION Comp #3 upper heat exchanger, Post Clean WP27

SAMPLE TYPE WIPE

COMPOSITE ____ YES ✓ NO

COMPOSITE TYPE

DEPTH OF SAMPLE

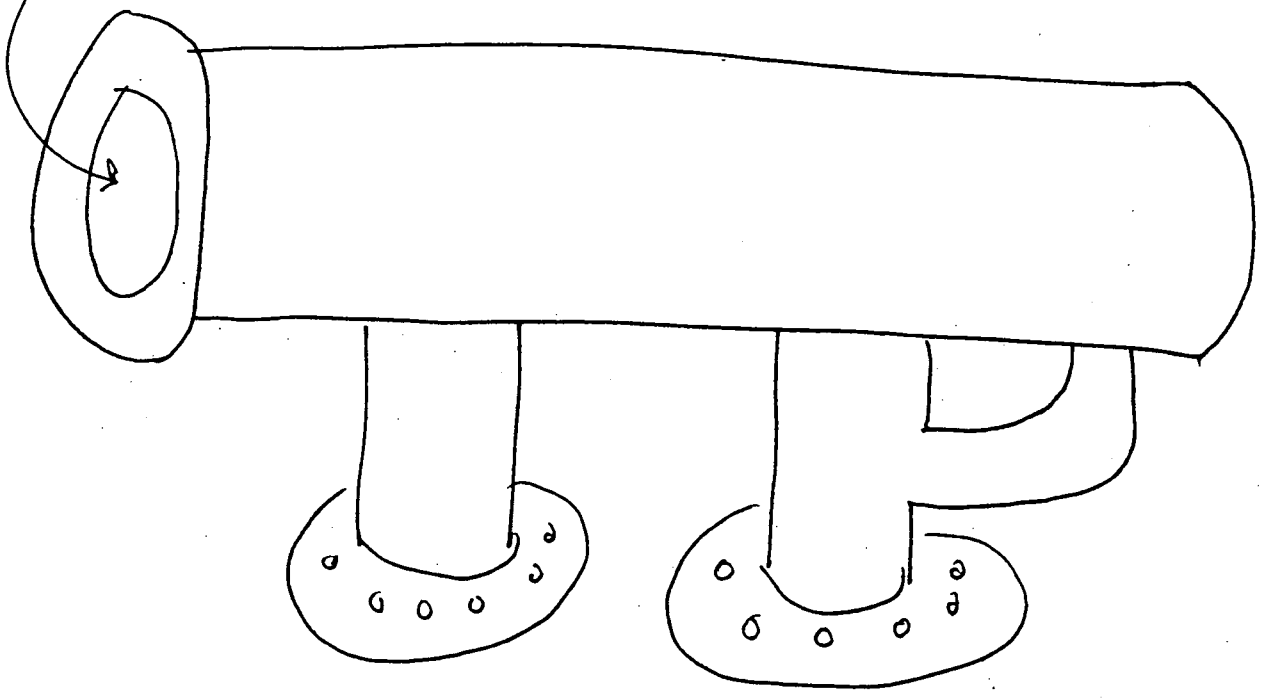
WEATHER

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8oz glass jar | 1 gauze pad |
| | |
| | |

COMMENTS:

2nd Sample taken from this piece.

WP26 Taken Just Inside Lip.



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INTERNATIONAL TECHNOLOGY CORPORATION

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| PROJECT NO. 305281 | | | | | |

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## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D1862 WP 28

SAMPLE LOCATION Comp # 3 platform, Post Clean

SAMPLE TYPE WIPE

COMPOSITE ____ YES ✓ NO

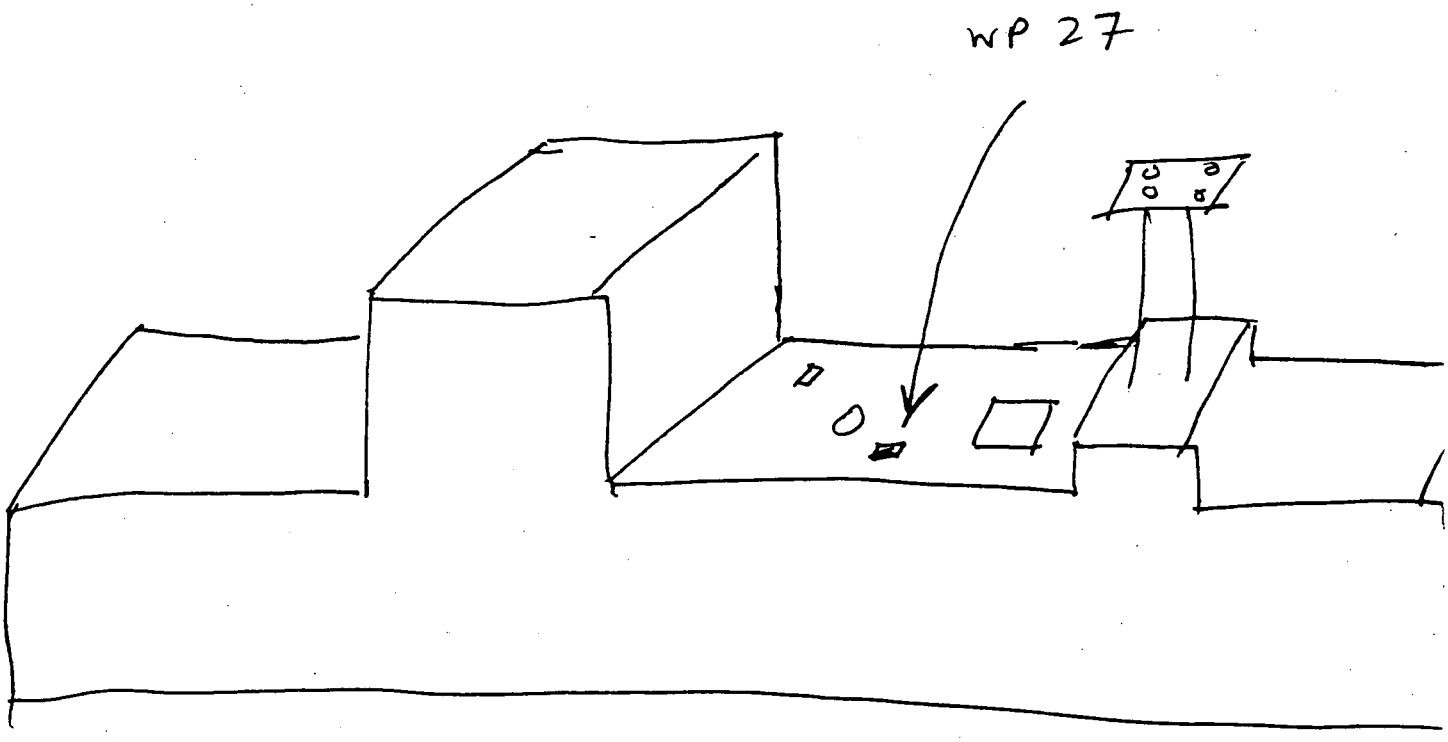
COMPOSITE TYPE ____

DEPTH OF SAMPLE ____

WEATHER ____

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 8oz glass jar | 1 gauze pad |
| | |
| | |

COMMENTS:

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INTERNATIONAL TECHNOLOGY CORPORATION

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| PROJECT NO. 305281 | | | | | |

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# SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide - Linden

SAMPLE NO. D 1864

SAMPLE LOCATION 1,000 gallon water storage tank

SAMPLE TYPE water

COMPOSITE ____ YES ✓ NO

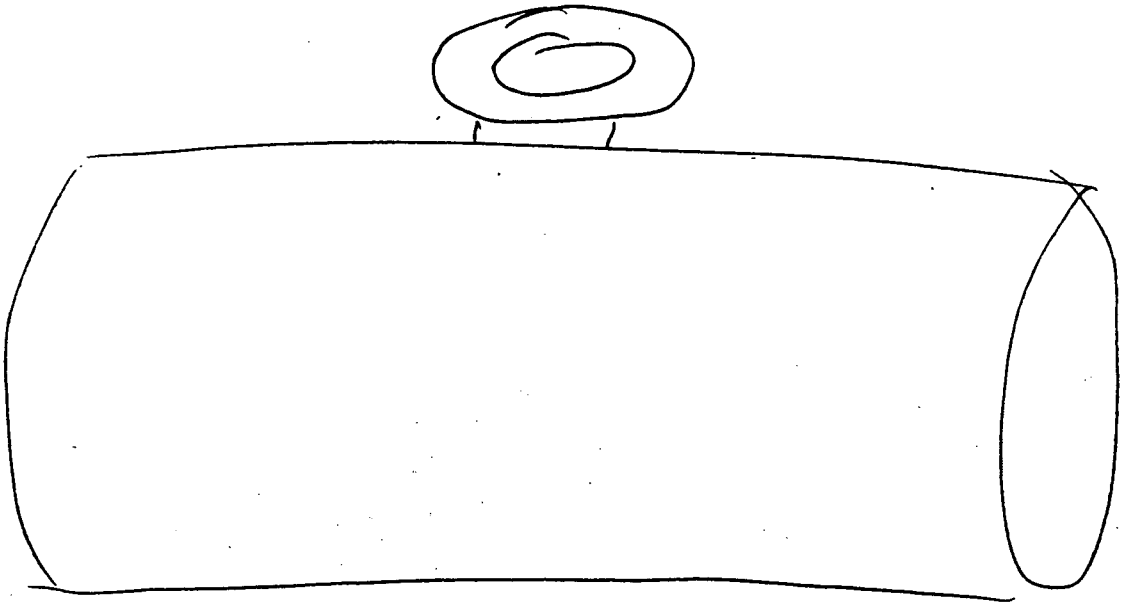
COMPOSITE TYPE water

DEPTH OF SAMPLE

WEATHER

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 1-1gt glass jar | 1 gt. |
| | |
| | |

COMMENTS:



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INTERNATIONAL TECHNOLOGY CORPORATION

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| | | | | | |
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| DATE | 3 | 22 | 88 | | |
| TIME | 17 | 00 | | | |
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| PROJECT NO. 305281 | | | | | |

## SAMPLE COLLECTION LOG

PROJECT NAME Union Carbide Linden

SAMPLE NO. D 1865

SAMPLE LOCATION Field Blank (DI water)

SAMPLE TYPE water

COMPOSITE ___ YES ✓ NO

COMPOSITE TYPE ___

DEPTH OF SAMPLE ___

WEATHER ___

| CONTAINERS USED | AMOUNT COLLECTED |
|---|---|
| 1-1 qt glass jar | 1 qt. |
| | |
| | |

COMMENTS:

The sample jar was filled w/ DI $H_2O$ from the Hudson Sprayer on site. Then 5 squirts of 10% $HNO_3$ from the $HNO_3$ sprayer were added.

PREPARED BY: ___

INTERNATIONAL TECHNOLOGY CORPORATION

41868

# REQUEST FOR ANALYSIS

R/A Control No.

C/C Control No. 028674

PROJECT NAME: Union Carbide - Linden

PROJECT NUMBER: 305291

PROJECT MANAGER: Tom McCrann

BILL TO: PC 3811 Edison

PURCHASE ORDER NO.

DATE SAMPLES SHIPPED: 3/22/88

LAB DESTINATION: I.T. Edison

LABORATORY CONTACT

SEND LAB REPORT TO

DATE REPORT REQUIRED

PROJECT CONTACT

PROJECT CONTACT PHONE NO.

| Sample No. | Sample Type | Sample Volume | Preservative | Requested Testing Program | Special Instructions |
|---|---|---|---|---|---|
| D1862 | Wipe | 1 gauze pad | | Hg | Rush |
| D1863 | Wipe | 1 gauze pad | | Hg | Rush |
| D1864 | Water | 1 qt | $HNO_3$ | Hg | Rush |
| D1865 | Water | 1 qt | $HNO_3$ | Hg | Rush |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

COPY

TURNAROUND TIME REQUIRED: (Rush must be approved by the Project Manager.) 24hr turnaround

Normal _____ Rush ✓ (Subject to rush surcharge)

POSSIBLE HAZARD IDENTIFICATION: (Please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances)

Nonhazard _____ Flammable _____ Skin Irritant _____ Highly Toxic _____ Other Hg (Please Specify)

SAMPLE DISPOSAL: (Please indicate disposition of sample following analysis. Lab will charge for packing, shipping, and disposal.)

Return to Client _____ Disposal by Lab _____

FOR LAB USE ONLY

Received By _____ Date/Time _____

WHITE - Original, to accompany samples
YELLOW - Field copy

INTERNATIONAL TECHNOLOGY CORPORATION

# REQUEST FOR ANALYSIS

R/A Control No. 63375
C/C Control No. A76106

PROJECT NAME: Union Carbide - Linden
PROJECT NUMBER: 305 281
PROJECT MANAGER: Tom Hernon
BILL TO: PC 3811 Edison

DATE SAMPLES SHIPPED: 3/22/88
LAB DESTINATION: I.T. Edison
LABORATORY CONTACT:
SEND LAB REPORT TO:

PURCHASE ORDER NO.:

DATE REPORT REQUIRED:
PROJECT CONTACT:
PROJECT CONTACT PHONE NO.:

| Sample No. | Sample Type | Sample Volume | Preservative | Requested Testing Program | Special Instructions |
|---|---|---|---|---|---|
| D1852 | WIPE | 1 gauze pad | | Hg | Rush |
| D1853 | WIPE | 1 gauze pad | | Hg | Rush |
| D1854 | WIPE | 1 gauze pad | | Hg | Rush |
| 55 ~~D1855~~ | WIPE | 1 gauze pad | | Hg | Rush |
| D1856 | WIPE | 1 gauze pad | | Hg | Rush |
| D1857 | WIPE | 1 gauze pad | | Hg | Rush |
| D1858 | Water | 2 x 8 oz | $HNO_3$ | Hg | Rush |
| D1859 | WIPE | 1 gauze pad | | Hg | Rush |
| D1860 | WIPE | 1 gauze pad | | Hg | Rush |
| D1861 | WIPE | 1 gauze pad | | Hg | Rush |

TURNAROUND TIME REQUIRED: (Rush must be approved by the Project Manager.)

Normal _____ Rush ✓ (Subject to rush surcharge) 24 hr turnaround

POSSIBLE HAZARD IDENTIFICATION: (Please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances)

Nonhazard _____ Flammable _____ Skin Irritant _____ Highly Toxic _____ Other Hg (Please Specify)

SAMPLE DISPOSAL: (Please indicate disposition of sample following analysis. Lab will charge for packing, shipping, and disposal.)

Return to Client _____ Disposal by Lab _____

FOR LAB USE ONLY

Received By _____ Date/Time _____

WHITE - Original, to accompany samples
YELLOW - Field copy

INTERNATIONAL TECHNOLOGY CORPORATION

# CHAIN-OF-CUSTODY RECORD

R/A Control No. 63375

C/C Control No. A 76406

PROJECT NAME/NUMBER Union Carbide - Linden - 305281

LAB DESTINATION I.T. Edison

SAMPLE TEAM MEMBERS Jacques Hill

CARRIER/WAYBILL NO.

| Sample Number | Sample Location and Description | Date and Time Collected | Sample Type | Container Type | Condition on Receipt (Name and Date) | Disposal Record No. |
|---|---|---|---|---|---|---|
| D1852 | Comp#1, Intake Valve Cover Pre Clean WP18 | 3/22/98 14:50 | WIPE | 8oz glass jar | | |
| D1853 | Field Blank WP19 | 3/22/98 1505 | WIPE | 8oz glass jar | | |
| D1854 | Comp#3, 3rd Stage Piston, Post Clean WP20 | 3/22/98 1515 | WIPE | 8oz glass jar | | |
| D1855 | Comp#3, 1st Stage Cylinder Post Clean WP21 | 3/22/98 1525 | WIPE | 8oz glass jar | | |
| D1856 | Comp#3, 2nd Stage Cylinder, Post Clean WP22 | 3/22/98 1535 | WIPE | 8oz glass jar | | |
| D1857 | Comp#3, 4th Stge Cylinder, Post Clean WP23 | 3/22/98 1550 | WIPE | 8oz glass jar | | |
| D1858 | Comp#3, Water in Small inner cooler Post Clean | 3/22/98 1600 | Water | 1qt glass jar | | |
| D1859 | Comp#3, Small inner cooler Post Clean WP24 | 3/22/98 1614 | WIPE | 8oz glass jar | | |
| D1860 | Comp#3, Lower heat exchange Post Clean WP26 | 3/22/98 1630 | WIPE | 8oz glass jar | | |
| D1861 | Comp#3, Upper Heat exchange Post Clean WP27 | 3/22/98 1635 | WIPE | 8oz glass jar | | |

Special Instructions: RUSH 24 Hr. Turnaround

Possible Sample Hazards: Mercury

SIGNATURES: (Name, Company, Date and Time)

1. Relinquished By: Jacques H. Hill III 3/22 1835

Received By: [illegible] 3/22/98 18:35

2. Relinquished By:

Received By:

3. Relinquished By:

Received by:

4. Relinquished By:

Received By:

WHITE - To accompany samples
YELLOW - Field copy

INTERNATIONAL TECHNOLOGY CORPORATION

# CHAIN-OF-CUSTODY RECORD

R/A Control No. 41868

C/C Control No. 028674

PROJECT NAME/NUMBER Union Carbide - Linden 305281

LAB DESTINATION I.T. Edison

SAMPLE TEAM MEMBERS Jack Hill

CARRIER/WAYBILL NO.

| Sample Number | Sample Location and Description | Date and Time Collected | Sample Type | Container Type | Condition on Receipt (Name and Date) | Disposal Record No. |
|---|---|---|---|---|---|---|
| D1862 | wipe Comp#3 platform WP28 Post + Clean | 3/22/88 1645 | wipe | 8oz glass | | |
| D1863 | WP29 Comp#1 intake valve cover Chamber#1 Post Clean | 3/22/88 1648 | wipe | 8oz glass | | |
| D1864 | 1000 gal water storage tank | 3/22/88 1705 | water | 1gal glass | | |
| D1865 | Field Blank | 3/22/88 1700 | water | 1gal glass | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

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Special Instructions:

Possible Sample Hazards:

SIGNATURES: (Name, Company, Date and Time)

1. Relinquished By: Jacques H. Hill III 3/22 18:35

Received By: Michael J. Fish 3/22/88 18:35

2. Relinquished By:

Received By:

3. Relinquished By:

Received by:

4. Relinquished By:

Received By:

WHITE - To accompany samples
YELLOW - Field copy

# ATTACHMENT 3

# Remedial Action Report
# Linde Gases of the Mid-Atlantic, Inc. Facility
# Linden, New Jersey
# ISRA Case No. 90367

**Prepared for:**

**Praxair, Inc.**
**Tonawanda, New York**

**Prepared By:**

**IT Corporation**
**165 Fieldcrest Avenue**
**Edison, New Jersey 08837**
**(908) 225-2000**

**June 1994**

**IT Project No. 529326**

EDIS/6-94/ENG/K361-rpt

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| C | Soil Disposal Waste Manifests |
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# 1.0 Introduction

The cessation of operations at the former Linde Gases of the Mid-Atlantic, Inc. (Linde) facility, located in Linden, New Jersey, required compliance with the Environmental Cleanup Responsibility Act (ECRA). The Linde operations were terminated in May 1990. ECRA is administered by the New Jersey Department of Environmental Protection and Energy (NJDEPE). The NJDEPE assigned case No. 90367 to this ECRA case.

Since May 1990, Praxair has implemented an ECRA soil and groundwater investigation at this facility property. Specifically, soil sampling and analysis was completed in June 1990 and June 1991. Additionally, "at peril" remedial excavations and soil sampling and analysis were completed in April 1992. Groundwater sampling and analysis was performed in June 1991, July 1991 and April 1992. The results of the soil and groundwater sampling and analysis, prior to July 1991 were provided in two separate *Remedial Investigation Reports* in March 1991 and July 1991. The results of the July 1991 and April 1992 groundwater sampling and analysis and the April 1992 "at peril" remedial excavations were provided in the May 1992 *Remedial Investigation Report*.

At the time of the ECRA filing, Linde was a division of Union Carbide Industrial Gases, Inc. On June 5, 1992 Union Carbide Industrial Gases, Inc., changed its name to Praxair, Inc. Linde, therefore, became a division of Praxair, Inc. On June 30, 1992 Union Carbide Corporation spun-off Praxair, Inc. to its shareholders who are also the ultimate shareholders of Praxair, Inc. (Praxair).

On November 24, 1992, Praxair met with the NJDEPE to discuss future considerations for this case. From this meeting it was mutually concluded that capping of the unpaved areas of the site would provide a cost-effective and environmentally sound remedial option for this case. In February 1993, Praxair submitted the ECRA Cleanup Plan for this case, based upon the conclusions reached with the NJDEPE during the November 1992 NJDEPE meeting. The draft NJDEPE Cleanup Plan approval letter was received from the NJDEPE in September 1993 and responded to with comments in October 1993. Following NJDEPE Cleanup Plan/Remedial Action Workplan approval in April 1994, the remedial capping and related activities were implemented in April 1994.

This remedial action report, prepared for Praxair as per N.J.A.C. 7:26E-6.6, outlines how the capping remedial option was implemented.

# 2.0 Background

## 2.1 Environmental Setting and Site Information

The following section presents a profile of the environmental characteristics of the site and general area.

### 2.1.1 General

The Linde facility was utilized as a hydrogen transfill and repackaging plant. The property is situated in a heavily industrialized area on South Wood Avenue, north of Tremley Point Road in Linden, Union County, New Jersey. Linde leased the property from LCP Chemicals and Plastics, Inc. (LCP).

The property consists of approximately 2.1 acres. An estimated forty percent of the property is occupied by buildings and other impervious structures and the remainder is covered with traprock and gravel. The location of the site is shown on Figure 1, attached at the end of this document.

### 2.1.2 Site History

Prior to 1957 the property was owned by GAF Corporation but was vacant land. In 1957 the property was leased by Union Carbide Corporation-Linde Division (UCC-Linde). Subsequent to 1957, LCP became property owner and continued this property lease by UCC-Linde. UCC-Linde operated the Linden facility as a hydrogen transfill and repackaging plant. In 1988, operation of the facility was transferred to Linde Gases of the Mid Atlantic Inc., a wholly owned subsidiary of Union Carbide Industrial Gases Inc., and continued to operate as a hydrogen transfill and repackaging plant until the cessation of operations in May 1990.

### 2.1.3 Geology and Soils

The areas in the vicinity of the site are underlain by Brunswick sandstone and/or shale. Soils are stratified silty clays usually very soft and highly compressible. The top 2 to 5 feet of marsh area consists of an organic layer or decomposed roots from tidal marsh plant growth.

When the property was developed, approximately seven to eight feet of fill material was deposited over the natural marsh and silty clay deposits. It is well documented that various heterogenous materials, including cinder ash/slag, were used as backfill to increase site grade to its existing elevation.

### 2.1.4 Topography/Drainage

The regional topography is characteristically flat at or near ocean tide level. Drainage is poor due to the high silt and clay content, the flat land surface, and the fluctuations of tide water.

### 2.1.5 Hydrogeology

Groundwater is relatively shallow, two or four feet below grade, and may be tidally influenced. Shallow groundwater flow direction is generally south to southwest towards the nearby Rahway River which is within 1,500 feet due south of the Praxair site.

## 2.2 Sampling and Remedial Activities to Date

### 2.2.1 Former 4,000 Gallon No. Two Fuel Oil Underground Storage Tanks

Two steel 4,000 gallon No. Two fuel oil underground storage tanks (UST) were removed by excavation from the facility property in July 1988. Figure 2, attached at the end of this document, shows the former location of these tanks. After removal, the tanks were cleaned and, from a visual inspection of both tanks, there was no evidence of leaking, holes or cracks. The tanks were dismantled and removed off-site for disposal.

The excavation pit was 36 feet long, 17 feet wide and approximately 6 to 7 feet deep. Fifteen confirmatory post-excavation soil samples were collected and analyzed for total petroleum hydrocarbons (TPHC). Five of the post-excavation samples were also analyzed for priority pollutant base/neutral organics plus fifteen (B/N+15). Results of the TPHC soil sample analyses ranged from not detected to 600 parts per million (ppm). There were no priority pollutant base/neutral organics detected in the soil samples. As a result, the excavation was properly backfilled and the excavated soil was removed for off-site disposal. The post-excavation soil sample analytical results are summarized on Table 1.

To date analytical results of groundwater samples from nearby monitoring wells have indicated that these USTs have not impacted the environment. Tables 2, 3, 4 and 5 summarize the analytical results of the groundwater sampling completed to date for this and all remaining site areas of environmental concern.

### 2.2.2 Building Interior and Equipment Decontamination

Hydrogen gas, generated by LCP the adjacent facility and property to the north, was delivered to Linde by aboveground - overhead pipeline. The hydrogen gas from LCP was contaminated with mercury due to the LCP process but was purified by Linde prior to containerization. Over time, however, the process of hydrogen gas purification contaminated the main building interior

with mercury. This hydrogen gas transfer and mercury removal process was terminated in 1980, after which cryogenic liquid hydrogen was delivered by trailer to Linde. The delivered hydrogen was stored on-site in an aboveground 18,000 gallon storage tank.

In March 1988, the main building interior and a gas compressor unit were fully decontaminated to remove residual mercury (Hg) from all surfaces.

All surfaces and pertinent equipment were vacuumed utilizing a HEPA vacuum and degreased by scrubbing with a non-hazardous solvent. The degreasing scrub was followed by pressure wash with a water and mercury absorbent solution. Finally all surfaces and pertinent equipment were thoroughly rinsed with water. Decontamination was verified by confirmatory wipe samples analyzed for mercury. The wipe sample analytical results indicated mercury removal was completed properly.

### *2.2.3 ISRA Investigation*

IT Corporation (IT) implemented a Sampling and Analysis Plan (SAP) at the Linde, Linden, New Jersey facility in June, 1990 under ECRA case number 90367. The SAP consisted of a soil sampling and analysis program to initiate the evaluation of the potential areas of environmental concern at the Linde facility. This program was implemented "at peril" prior to SAP approval from the NJDEPE. Conditional NJDEPE SAP approval was received on December 6, 1990. The results of the implemented preapproved SAP were submitted to the NJDEPE in the March, 1991 *Remedial Investigation Report.*

On May 13, 1991, the NJDEPE comments to the *Remedial Investigation Report* were received by Linde. Generally, the NJDEPE comment letter outlined and required additional soil sampling and analysis, at various areas of environmental concern. Also, the NJDEPE comment letter required the implementation of a facility groundwater sampling program.

In July 1991, Linde submitted a second *Remedial Investigation Report* for the additional soil sampling and analysis and results of the groundwater sampling program. On January 24, 1992, Linde received comments to the July 1991 report from the NJDEPE approving proposed actions by Linde and outlining additional requirements.

In May 1992, Linde submitted a third and most recent *Remedial Investigation Report* for additional soil and groundwater sampling and analyses results. In October 1992, Linde received a draft letter from the NJDEPE commenting on the May 1992 *Remedial Investigation Report.*

In February 1993, Linden submitted a *Cleanup Plan,* which recommended a cap of all unpaved surface areas of the site with an impermeable three inch layer of asphalt pavement. In April 1994, Linde received from the NJDEPE, a draft approval letter commenting on the February 1993 *Cleanup Plan.* This draft letter approved proposed actions, by Linde, for the Linden site. The NJDEPE also recommended that all applicable permits be obtained before the proposed action commenced. Only one permit was necessary, *a Soil Erosion and Sediment Control Plan.* The plan was submitted to the Somerset-Union Soil Conservation District in October 1993 and approved on December 6, 1993. Appendix A presents the approval and compliance letters for the *Soil Erosion and Sediment Control Plan,* from the Somerset-Union Soil Conservation District.

The ISRA soil sampling and analysis results to date are summarized on Figure 2. The groundwater sampling and analysis results are summarized on Tables 2, 3, 4 and 5. Each ISRA case area of concern and the related sampling activities are discussed below.

### *Area A - Abandoned Cylinder Caustic Bath Sump*

A sump was previously used for caustic bath liquid generated from exterior paint stripping of gas cylinders. Figure 2 shows the location of the caustic bath sump behind the charging plant.

This area was evaluated by a surficial soil sampling program on the perimeter of the sump. Two samples, A-1 and A-2, were collected at 1.0 to 1.5 feet below grade and analyzed for priority pollutant volatile organics plus fifteen (VO+15), priority pollutant heavy metals (Metals) and total petroleum hydrocarbons (TPHC). Samples A-1 and A-2 were collected on June 12, 1990. Due to the elevated levels of Metals detected in samples A-1 and A-2, nine additional soil samples, at sample locations A-2 through A-6, were collected at 1.0 to 1.5 and 4.0 to 4.5 foot intervals. These samples were collected on June 3 and 4, 1991 and analyzed for Metals only.

Results of the June 1990 and June 1991 soil sampling suggested that the caustic solution, had overflowed into the soil surrounding the sump. As a result, the caustic solution, likely containing dissolved Metals in solution, had apparently contaminated the soil surrounding this sump.

Due to the extent of Metals in the caustic sump area, an "at peril" remedial excavation was undertaken in this area in April 1992. Confirmatory post-excavation soil samples were collected on April 16, 1992 and analyzed for Metals. Analytical results of the post-excavation soil sampling indicated Metals contamination remained in the soil in this area. However, the remedial excavation clearly revealed that this area had been filled with cinder ash/slag material from grade elevation to at least 4.5 feet below grade. Investigation into NJDEPE public files revealed that a Metals contaminated historic fill condition, documented to the turn of the century, existed at

Linde's leasehold property and extended to hundreds of acres of surrounding property. Therefore, the resultant conclusion was that the source of the Metals contamination was the cinder ash/slag fill material and not facility operations. Figure 2 presents all sampling locations and analytical results for this area to date. The capping remedial action was completed for this area of concern.

### *Area B - Non Contact Cooling Water Sump*

A non-contact cooling water sump was utilized to accept non-contact cooling water overflow from the adjacent cooling tower. The non-contact cooling water was circulated between the cooling tower and the compressors. Figure 2 shows the location of the cooling water sump behind the charging plant.

This area was evaluated by a surficial soil sampling program on the perimeter of the sump. Two samples, B-1 and B-2 were collected at 1.0 to 1.5 feet below grade and analyzed for Metals and TPHC. Samples B-1 and B-2 were collected on June 12, 1990. Due to the elevated levels of Metals detected in samples B-1 and B-2, eight additional soil samples, at sample locations B-3 through B-7 were collected at 1.0 to 1.5 and 4.0 to 4.5 foot intervals. These samples were collected on June 4, 1991 and analyzed for Metals only.

Results of the June 1990 and June 1991 soil sampling suggested that the non-contact cooling water, apparently containing Metals in solution, had overflowed and contaminated the soil surrounding this sump.

Due to the extent of Metals in the cooling water sump area, an "at peril" remedial excavation was undertaken in this area in April 1992. Confirmatory post-excavation soil samples were collected on April 16, 1992 and analyzed for Metals. Analytical results of the post-excavation soil sampling indicated Metals contamination remained in the soil in this area. However, the remedial excavation clearly revealed that this area had been filled with cinder ash/slag material from grade elevation to at least 4.5 feet below grade. Investigation into NJDEPE public files revealed that a Metals contaminated historic fill condition, documented to the turn of the century, existed at Linde's leasehold property and extended to hundreds of acres of surrounding property. Therefore, the resultant conclusion was that the source of the Metals contamination was the cinder ash/slag fill material and not facility operations. Figure 2 presents all sampling locations and analytical results for this area to date. The capping remedial action was completed for this area of concern.

### *Area C - Former 1,000 Gallon No. Two Fuel Oil Underground Storage Tank*

A steel 1,000 gallon No. Two fuel oil UST is located near the former garage. Figure 2 shows the location of the tank. The tank was properly decommissioned in place by Linde in 1974 and

filled with sand. This tank and its potential impacts have been addressed as part of the site groundwater investigation. The capping remedial action was completed for this area of concern.

***Area D/G - Truck/Cylinder Cooling Water Rinse Station and Runoff Collection Drum***

Tube trailers, comprised of long tube-like gas cylinders, were sprayed with cooling water as they were filled with gas. This cooling rinse took place on a concrete pad surface west of the charging plant. The cooling water runoff collected in a catchbasin in the concrete pad and discharged to a nearby drum which was partially below ground level. Figure 2 shows the location of these areas.

This area was evaluated by a surficial soil sampling program. One sample, D-1 was collected adjacent to the runoff collection drum at the 1.0 to 1.5 foot interval and two samples, G-1 and G-2, were collected adjacent to the concrete surface in this area. These samples were collected on June 12, 1990 and analyzed for TPHC and Hg. Additional analytical parameters and soil sampling were required in this area by the NJDEPE, therefore four additional soil samples were collected. The additional soil samples, G-1A, G-2A, G-3 and D-1A, were collected at the 1.0 to 1.5 foot interval on June 3 and 4, 1991. These samples were analyzed for Metals and B/N+15.

Results of the D-1 and D-1A soil sampling indicated that the area surrounding the runoff collection drum was apparently contaminated by Metals. Analytical results of the G-1, G-1A, G-2, G-2A and G-3 soil samples indicated that sample location G-3 was apparently contaminated by base/neutral organics. The remaining Area G soil sampling location analytical results indicated there was no apparent contamination remaining.

Due to the extent of Metals in the runoff collection drum and base/neutral organics in the G-3 sampling location, each area was remediated by "at peril" excavation in April 1992. Confirmatory post-excavation soil samples were collected and analyzed for Metals in the runoff collection drum area, designated as Area D/G. Confirmatory post-excavation soil samples were collected and analyzed for B/N+15 in the remedial excavation at previous soil sample location G-3, designated Area G-3. The confirmatory post-excavation soil samples for both areas were collected on April 17, 1992. The Area D/G post-excavation soil sample analytical results indicated Metals contamination remained in the soil in this area. However, the excavation revealed this area contained the Metals contaminated historic fill material. The resultant conclusion was that the source of Metals contamination was the fill material. The Area G-3 post-excavation soil sample analytical results indicated base/neutral contaminated soil had been removed. Figure 2 presents all sampling locations and analytical results for these areas to date. The capping remedial action was completed for this area of concern.

### *Area E - Former 4,000 Gallon No. Two Fuel Oil Underground Storage Tanks*

Two 4,000 gallon No. two fuel oil USTs were located south of the charging plant. Figure 2 shows the former location of these tanks. Both USTs were excavated, cleaned, dismantled and disposed of in July 1988. This area is discussed in more detail in Section 2.2.1 of this report and in greater detail in the Report on Excavation of Underground Fuel Oil Storage Tanks by IT in August 1988. This IT report was included in the May 1990 Site Evaluation Submission for this ISRA case, No. 90367. The capping remedial action was completed for this area of concern.

### *Area F - Septic Tank and Leach Field*

A septic tank and leach field are located east of the charging plant. Figure 2 shows the location of the septic tank and leach field. The septic tank was used for sanitary wastes only. One sludge sample, F-sludge, and one liquid sample, F-liquid, were collected in June 1990 from the septic tank and analyzed for Hg and B/N+15. Results of the sludge and liquid sample analyses indicated 80 and 0.0003 parts per million (ppm) of Hg were detected in the sludge sample and liquid samples, respectively. Results of the sludge and liquid B/N+15 analyses indicated 20 ppm and 0.058 ppm total base/neutral organic compounds were detected in the sludge and liquid samples, respectively.

Additionally, two soil samples, F-1 and F-2, were collected within the septic tank leach field at the 3.5 to 4.0 foot interval below grade. Each sample was collected in June 1990 and analyzed for B/N+15 and Hg. Results of the B/N +15 analyses of samples F-1 and F-2 indicated there were no base/neutral organics detected in the septic tank leach field. The Hg analyses results indicated there was no Hg detected in soil sample F-1 and 2.6 to 4.3 ppm of Hg were detected in soil sample F-2.

Soil sample locations F-1 and F-2 were resampled in August 1991 for analysis of the remaining priority pollutant Metals and TPHC. These samples were designated as F-1A and F-2A. The analytical results of the resampling indicated Metals were present in the soil in the area of the septic tank leach field. The Metals were attributed to the contaminated historic fill material observed throughout the property. Figure 2 presents all sampling locations and analytical results for this area, to date. The capping remedial action was completed for this area of concern.

### *Area H - Former Hydrogen Bladder Storage Tank Location*

A circular elevated concrete pad, located east of the charging plant, was used as a base for a hydrogen bladder storage tank until the tank was removed. The hydrogen gas, entering the bladder tank via overhead piping from the adjacent LCP facility was known to contain Hg. Figure 2 shows the location of the circular tank pad.

Six soil samples, H-1 through H-6, were collected at the perimeter of the circular pad and two additional samples, H-7 and H-8, were collected beneath the overhead piping. All samples were collected at the 1 to 1.5 foot interval below grade and analyzed for Hg.

Results of Hg analysis of samples H-1 through H-8 ranged from 0.28 to 5.2 ppm indicating there was no significant impact from the tank. Figure 2 presents all sampling locations and analytical results for this area. The capping remedial action was completed for this area of concern.

### *Area I - Elevated Storage Pad*

An elevated storage pad, located east of the charging plant, was previously used to store cylinders. Figure 2 shows the location of the storage pad. The pad is 4 to 6 feet above grade and is no longer in use. Four soil samples, I-1 through I-4, were collected adjacent to the pad. One sample was collected from each side of the pad at the 1 to 1.5 foot interval below grade and analyzed for TPHC and Hg.

Results of the TPHC analysis for all samples ranged from not detected to 96 ppm. Results of the Hg analysis show samples I-1 through I-4 ranging from 0.45 ppm to 2 ppm. These results indicate there was no significant impact from the cylinders stored on the pad. Figure 2 presents all sampling locations and analytical results for this area. The capping remedial action was completed for this area of concern.

### *Area J - Background*

To identify the background condition of the facility, soil samples were collected in an area assumed to be unaffected by facility operations. Two soil samples at location J-1 were collected at the 1 to 1.5 foot and 3.5 to 4 foot intervals below grade in the southwest corner of the property (See Figure 2). These samples were analyzed for TPHC, VO+15, B/N+15 and Metals.

Results of TPHC analysis of sample J-1 at the 1 to 1.5 foot interval and the 3.5 to 4 foot interval were not detected and 68 ppm, respectively. Results of B/N+15 analysis of sample J-1 at the 1 to 1.5 foot interval were not detected for all target compounds. Results of B/N+15 analysis of sample J-1 at the 3.5 to 4 foot interval show 0.46 ppm of bis (2-ethylhexyl) phthalate, 0.48 ppm of chrysene and 0.81 ppm of pyrene. All other priority pollutant base/neutral organic compounds were not detected. Results of VO+15 analysis for sample J-1 at the 1 to 1.5 foot interval and the 3.5 to 4 foot interval were 0.007 ppm and 0.016 ppm methylene chloride, respectively. All other priority pollutant volatile organics, at both sampling depths, were not detected.

Results of Metals analysis for sample J-1 at 1 to 1.5 feet below grade ranged from not detected to 340 ppm of zinc. Results of Metals analysis for sample J-1 at 3.5 to 4 feet below grade ranged from not detected to 2800 ppm of lead.

Additional soil sampling in background areas of the facility was completed. Three soil samples, K-4 through K-6 were collected surrounding previous sample location J-1. Three additional soil samples, K-1 through K-3, were collected in another background location of the property in an area assumed to be independent of facility operations. All six samples were collected at the 3.5 to 4.0 foot interval on June 3 and 4, 1991 and analyzed for Metals. Results of the Metals analyses of these samples indicated Metals were inherent in the fill material, although concentrations of Metals were not consistent throughout all locations. With the exception of background locations K-1 through K-3, remedial actions were completed for this area of concern as this area was included in the asphalt cap.

### *Groundwater*

A shallow groundwater investigation has been completed at this site utilizing eight groundwater monitoring wells. Initially, six wells were installed in June 1991 and two additional wells were installed in April 1992.

Groundwater samples were collected on June 27, 1991 and were analyzed for VO+15, B/N+15, TPHC and Metals. A second round of groundwater samples was collected on July 31, 1991 and analyzed for VO+15, B/N+15, TPHC and Metals. These first two sampling rounds utilized the initial six wells. A third round of groundwater samples was collected on April 30, 1992 utilizing all eight wells.

In the third groundwater sampling round, the original six wells MW-1 through MW-6, were analyzed for Metals only, with the exception of MW-2, analyzed for VO+15 also. The two additional wells, MW-7 and MW-8 were sampled on December 2, 1992 and analyzed for VO+15 only.

Groundwater level measurements from all groundwater sampling events indicate groundwater flow direction is south to southwest, toward the Rahway River.

Results of the shallow groundwater investigation at the facility property indicated facility operations have not impacted shallow groundwater. Any elevated levels of contaminants in the shallow groundwater of this area are documented in NJDEPE files as the result of off-site sources. No remediation was conducted for this area of concern.

# 3.0 Findings/Remedial Actions

From an evaluation of sampling analytical results and visual observations from site sampling and excavation activities, it is apparent that Metals are the only contaminants posing any significant potential threat to human health and the environment at this site. Furthermore, it is apparent that Metals contamination at this site is inherent in the cinder slag material utilized as backfill for elevating site grade and general site development. This backfilling is well documented in NJDEPE files and predates Linde's tenancy at this site. This Remedial Action - asphalt capping was implemented at this site to achieve protection of human health and the environment from heavy metals (Metals) contamination in site fill material. Capping the surface area of the site with an impermeable asphalt pavement layer was the most cost-effective and technically viable Remediation Action. In conjunction with the asphalt capping, the NJDEPE requires a Department Approved Use Restriction for the site. At this time, final execution of a Declaration of Environmental Restrictions (DER) with property owner LCP is pending. An executed DER will be forwarded to the NJDEPE immediately upon receipt from LCP.

## 3.1 Findings/Excavation Backfilling, Grading and Surface Pavement Cap

Backfilling for the remedial excavations implemented in Areas A, B and D was completed in December 1993. The backfill material was certified clean soil from a virgin soil pit. Appendix B contains a copy of the certification of the backfill virgin soil. Appendix C contains copies of the excavated soil waste disposal manifests for soil removed from these areas for proper off-site disposal.

To preclude ingestion of the Metals in the fill material, from either direct contact or by inhalation of dusts, an impermeable three inch layer of asphalt pavement was placed on all unpaved surface areas of the site. This procedure commenced on April 25, 1994, with grading of all surface areas of the site. Contaminant - free fill was deposited to facilitate proper grading of the site. This fill material consists of NJDEPE approved recycled concrete and/or brick which meets NJDEPE Division of Solid Waste requirements. The concrete or brick received and processed as a raw material to produce the fill is certified clean before receipt by the processing facility. See Appendix D for raw material specification requirements of the clean fill grading material. Grading was necessary to produce proper drainage of surface water away from the site. A total of 511 tons of the recycled clean fill material were spread and graded at the site. The fill was placed in no more than six inch layers and compacted by a vibratory roller. After final grading and compaction, a three inch layer of asphalt pavement was placed over all unpaved surfaces. This procedure was completed on May 23, 1994. During the grading and paving, a representative

of the Somerset-Union Soil Conservation District visited the site weekly to assure the specifications of the approved *Soil Erosion and Sediment Control Plan* was implemented. Figure 3 shows those areas of the facility property where the remedial asphalt cap was applied.

### 3.2 Well Abandonment

The eight shallow groundwater monitoring wells onsite were sealed, according to N.J.A.C. 7:9-9, by a New Jersey licensed well sealer on October 13, 1993. The well abandonment reports were submitted to the Bureau of Water Supply, Planning and Management. Appendix E contains copies of the well abandonment reports.

### 3.3 Project Costs

The total cost for implementing the Cleanup/Remedial Action, including labor, equipment and materials was $69,400.

TABLE 1

SUMMARY OF ANALYTICAL RESULTS
OF POSTEXCAVATION SOIL SAMPLING AT
UNION CARBIDE CORPORATION
LINDEN, NEW JERSEY
JULY 7, 1988

| Sample Location | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 | B9 | FB | TB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Depth | 0-6" | 0-6" | 0-6" | 0-6" | 0-6" | 0-6" | 0-6" | 0-6" | 0-6" | 0-6" | 0-6" | 0-6" | 0-6" | 0-6" | 0-6" | + | |
| Sample Date | 7/7/88 | 7/7/88 | 7/7/88 | 7/7/88 | 7/7/88 | 7/7/88 | 7/7/88 | 7/7/88 | 7/7/88 | 7/7/88 | 7/7/88 | 7/7/88 | 7/7/88 | 7/7/88 | 7/7/88 | 7/7/88 | 7/7/ |
| **Parameter (ppm)** | | | | | | | | | | | | | | | | | |
| Total Petroleum Hydrocarbons | 600 | 320 | 350 | 90 | 160 | <24 | 41 | 240 | 180 | 340 | 120 | 70 | 200 | 170 | 120 | [illegible] | N |
| Base/Neutral Compounds +15 | ND | NA | NA | ND | NA | NA | ND | NA | NA | NA | ND | NA | NA | NA | ND | ND | N/ |
| Tentatively Identified Compounds (TIC) | 57.5 | NA | NA | ND | NA | NA | ND | NA | NA | NA | ND | NA | NA | NA | ND | [illegible] | N |
| Volatile Organic Compounds +15 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | | / |

ND = Non-detectable
NA = Not Analyzed

ENG/KD119-rpt

TABLE – 2

GROUNDWATER SAMPLING OF JUNE 1991
ANALYTICAL RESULTS SUMMARY

LINDE GASES OF THE MID–ATLANTIC, INC.
LINDEN, NEW JERSEY

| SAMPLE POINT | MW–1 | MW–2 | MW–3 | MW–4 | MW–5 | MW–6 | FIELD BLANK | TRAVEL BLANK |
|---|---|---|---|---|---|---|---|---|
| SAMPLE DATE | 6/27/91 | 6/27/91 | 6/27/91 | 6/27/91 | 6/27/91 | 6/27/91 | 6/27/91 | 6/27/91 |
| PRIORITY POLLUTANT METALS (ppm) | | | | | | | | |
| Antimony | ND | ND | 0.024 | 0.10 | ND | ND | ND | NA |
| Arsenic | 0.42 | 0.42 | 0.59 | 0.54 | 0.069 | 0.016 | ND | NA |
| Berylium | ND | ND | ND | ND | ND | ND | ND | NA |
| Cadmium | ND | ND | ND | 0.008 | ND | ND | ND | NA |
| Chromium | 0.018 | 0.017 | 0.016 | 0.15 | 0.013 | ND | ND | NA |
| Copper | ND | ND | 0.42 | 5.9 | ND | ND | ND | NA |
| Lead | 0.027 | 0.022 | 0.25 | 4.8 | 0.040 | 0.046 | ND | NA |
| Mercury | 0.010 | 0.001 | 0.004 | 0.032 | 0.003 | 0.0005 | ND | NA |
| Nickel | ND | ND | 0.047 | 0.17 | ND | ND | ND | NA |
| Selenium | ND | ND | ND | 0.006 | ND | ND | ND | NA |
| Silver | ND | ND | ND | ND | ND | ND | ND | NA |
| Thallium | ND | ND | ND | ND | ND | ND | ND | NA |
| Zinc | 0.021 | ND | 0.95 | 6.7 | 0.031 | 0.024 | ND | NA |
| PIORITY POLLUTANT VOLATILE ORGANICS (ppb) | | | | | | | | |
| Acrolein | ND | ND | ND | ND | ND | ND | ND | ND |
| Acrylonitrile | ND | ND | ND | ND | ND | ND | ND | ND |
| Benzene | ND | 32 | ND | ND | ND | ND | ND | ND |
| Bromoform | ND | ND | ND | ND | ND | ND | ND | ND |
| Bromomethane | ND | ND | ND | ND | ND | ND | ND | ND |
| Carbon tetrachloride | ND | ND | ND | ND | ND | ND | ND | ND |
| Chlorobenzene | ND | 18 | ND | ND | ND | ND | ND | ND |
| Chlorodibromomethane | ND | ND | ND | ND | ND | ND | ND | ND |
| Chloroethane | ND | ND | ND | ND | ND | ND | ND | ND |
| 2–chloroethylvinyl ether | ND | ND | ND | ND | ND | ND | ND | ND |
| Chloroform | ND | ND | ND | ND | ND | ND | ND | ND |
| Chloromethane | ND | ND | ND | ND | ND | ND | ND | ND |
| Dichlorobromomethane | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,1–Dichloroethane | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2–Dichloroethane | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,1–Dichloroethene | ND | ND | ND | ND | ND | ND | ND | ND |
| trans–1,2–Dichloroethene | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2–Dichloropropane | ND | ND | ND | ND | ND | ND | ND | ND |
| cis–1,3–Dichloropropene | ND | ND | ND | ND | ND | ND | ND | ND |
| trans–1,3–Dichloropropene | ND | ND | ND | ND | ND | ND | ND | ND |
| Ethyl benzene | ND | ND | ND | ND | ND | ND | ND | ND |
| Methylene Chloride | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,1,2,2–Tetrachloroethane | ND | ND | ND | ND | ND | ND | ND | ND |
| Tetrachloroethene | ND | ND | ND | ND | ND | ND | ND | ND |
| Toluene | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,1,1–Trichloroethane | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,1,2–Trichloroethane | ND | ND | ND | ND | ND | ND | ND | ND |
| Trichloroethene | ND | ND | ND | ND | ND | ND | ND | ND |
| Trichlorofluoromethane | ND | ND | ND | ND | ND | ND | ND | ND |
| Vinyl chloride | ND | ND | ND | ND | ND | ND | ND | ND |
| Total Xylenes | ND | ND | ND | ND | ND | ND | ND | ND |
| TOTAL PRIORITY POLLUTANT VOLATILE ORGANICS (ppb) | ND | 50 | ND | ND | ND | ND | ND | ND |
| TOTAL NON–PRIORITY POLLUTANT VOLATILE ORGANICS (ppb) | 103 | 79 | ND | ND | 120 | 6 | 24 | ND |

TABLE - 2

GROUNDWATER SAMPLING OF JUNE 1991
ANALYTICAL RESULTS SUMMARY

LINDE GASES OF THE MID-ATLANTIC, INC.
LINDEN, NEW JERSEY

| SAMPLE POINT | MW-1 | MW-2 | MW-3 | MW-4 | MW-5 | MW-6 | FIELD BLANK | TRAVEL BLANK |
|---|---|---|---|---|---|---|---|---|
| SAMPLE DATE | 6/27/91 | 6/27/91 | 6/27/91 | 6/27/91 | 6/27/91 | 6/27/91 | 6/27/91 | 6/27/91 |
| PIORITY POLLUTANT BASE NEUTRAL ORGANICS (ppb) | | | | | | | | |
| Acenaphthene | ND | ND | ND | ND | ND | ND | ND | NA |
| Acenaphthylene | ND | ND | ND | ND | ND | ND | ND | NA |
| Anthracene | ND | ND | ND | ND | ND | ND | ND | NA |
| Benzidine | ND | ND | ND | ND | ND | ND | ND | NA |
| Benzo(a)anthracene | ND | ND | ND | ND | ND | ND | ND | NA |
| Benzo(b)fluoranthene | ND | ND | ND | ND | ND | ND | ND | NA |
| Benzo(k)fluoranthene | ND | ND | ND | ND | ND | ND | ND | NA |
| Benzo(a)pyrene | ND | ND | ND | ND | ND | ND | ND | NA |
| Benzo(g,h,i)perylene | ND | ND | ND | ND | ND | ND | ND | NA |
| Bis(2-Chloroethyl)ether | ND | ND | ND | ND | ND | ND | ND | NA |
| Bis(2-Chloroethoxy)methane | ND | ND | ND | ND | ND | ND | ND | NA |
| Bis(2-Ethylhexyl)phthalate | ND | ND | ND | 13 | ND | ND | ND | NA |
| Bis(2-Chloroisopropyl)ether | ND | ND | ND | ND | ND | ND | ND | NA |
| 4-Bromophenyl Phenyl Ether | ND | ND | ND | ND | ND | ND | ND | NA |
| Butyl Benzyl Phthalate | ND | ND | ND | ND | ND | ND | ND | NA |
| 2-Chloronaphthalene | ND | ND | ND | ND | ND | ND | ND | NA |
| 4-Chlorophenyl Phenyl Ether | ND | ND | ND | ND | ND | ND | ND | NA |
| Chrysene | ND | ND | ND | ND | ND | ND | ND | NA |
| Dibenzo(a,h)anthracene | ND | ND | ND | ND | ND | ND | ND | NA |
| Di-n-butylphthalate | ND | ND | ND | ND | ND | ND | ND | NA |
| 1,2-Dichlorobenzene | ND | ND | ND | ND | ND | ND | ND | NA |
| 1,3-Dichlorobenzene | ND | ND | ND | ND | ND | ND | ND | NA |
| 1,4-Dichlorobenzene | ND | ND | ND | ND | ND | ND | ND | NA |
| 3,3'-Dichlorobenzidine | ND | ND | ND | ND | ND | ND | ND | NA |
| Diethylphthalate | ND | ND | ND | ND | ND | ND | ND | NA |
| Dimethylphthalate | ND | ND | ND | ND | ND | ND | ND | NA |
| 2,4-Dinitrotoluene | ND | ND | ND | ND | ND | ND | ND | NA |
| 2,6-Dinitrotoluene | ND | ND | ND | ND | ND | ND | ND | NA |
| Di-n-Octylphthalate | ND | ND | ND | ND | ND | ND | ND | NA |
| 1,2-Diphenylhydrazine | ND | ND | ND | ND | ND | ND | ND | NA |
| Fluoranthene | ND | ND | ND | ND | ND | ND | ND | NA |
| Fluorene | ND | ND | ND | ND | ND | ND | ND | NA |
| Hexachlorobenzene | ND | ND | ND | ND | ND | ND | ND | NA |
| Hexachlorobutadiene | ND | ND | ND | ND | ND | ND | ND | NA |
| Hexachloroethane | ND | ND | ND | ND | ND | ND | ND | NA |
| Hexachlorocyclopentadiene | ND | ND | ND | ND | ND | ND | ND | NA |
| Indeno(1,2,3-cd)pyrene | ND | ND | ND | ND | ND | ND | ND | NA |
| Isophorone | ND | ND | ND | ND | ND | ND | ND | NA |
| Naphthalene | ND | ND | ND | ND | ND | ND | ND | NA |
| Nitrobenzene | ND | ND | ND | ND | ND | ND | ND | NA |
| N-Nitroso-dimethylamine | ND | ND | ND | ND | ND | ND | ND | NA |
| N-Nitrosodipropylamine | ND | ND | ND | ND | ND | ND | ND | NA |
| N-Nitrosodiphenylamine | ND | ND | ND | ND | ND | ND | ND | NA |
| Phenanthrene | ND | ND | ND | ND | ND | ND | ND | NA |
| Pyrene | ND | ND | ND | ND | ND | ND | ND | NA |
| 1,2,4-Trichlorobenzene | ND | ND | ND | ND | ND | ND | ND | NA |
| TOTAL PRIORITY POLLUTANT BASE NEUTRAL ORGANICS (ppb) | ND | ND | ND | 13 | ND | ND | ND | NA |
| TOTAL NON-PRIORITY POLLUTANT BASE NEUTRAL ORGANICS (ppb) | 292 | 490 | 36 | 24 | 8 | 91 | 29 | NA |
| TOTAL PETROLEUM HYDROCARBONS (ppm) | ND | ND | ND | ND | ND | ND | ND | NA |

1. "NA" signifies not analyzed.
2. "ND" signifies not detected.
3. Analytical methodology as follows:
   - VO+15 – EPA Method 624
   - B/N+15 – EPA Method 625
   - TPH – Std. Methods 503B,C,&E

TABLE – 3

GROUNDWATER SAMPLING OF JULY 1991
ANALYTICAL RESULTS SUMMARY

LINDE GASES OF THE MID–ATLANTIC, INC.
LINDEN, NEW JERSEY

| SAMPLE POINT | MW–1 | MW–2 | MW–3 | MW–4 | MW–5 | MW–6 | SUMP SAMPLE | FIELD BLANK | TR BL |
|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DATE | 7/31/91 | 7/31/91 | 7/31/91 | 7/31/91 | 7/31/91 | 7/31/91 | 7/31/91 | 7/31/91 | 7/31 |
| PRIORITY POLLUTANT METALS (ppm) | | | | | | | | | |
| Antimony | ND | ND | ND | ND | ND | ND | ND | ND | NA |
| Arsenic | 0.14 | 0.11 | 0.027 | 0.052 | 0.05 | 0.15 | ND | ND | NA |
| Berylium | ND | ND | ND | ND | ND | ND | ND | ND | NA |
| Cadmium | ND | ND | ND | ND | 0.005 | ND | ND | ND | NA |
| Chromium | ND | ND | ND | ND | ND | ND | ND | ND | NA |
| Copper | ND | ND | 1.3 | 0.22 | 0.037 | ND | ND | ND | NA |
| Lead | ND | ND | ND | ND | ND | ND | ND | ND | NA |
| Mercury | ND | 0.0002 | ND | 0.0009 | 0.0005 | ND | 0.002 | ND | NA |
| Nickel | ND | ND | 0.24 | 0.076 | ND | ND | ND | ND | NA |
| Selenium | ND | ND | ND | 0.006 | ND | ND | ND | ND | NA |
| Silver | ND | ND | ND | ND | ND | ND | ND | ND | NA |
| Thallium | ND | ND | ND | ND | ND | ND | ND | ND | NA |
| Zinc | ND | ND | 4.6 | 1.2 | 0.022 | 0.029 | 0.19 | ND | NA |
| PIORITY POLLUTANT VOLATILE ORGANICS (ppb) | | | | | | | | | |
| Acrolein | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| Acrylonitrile | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| Benzene | ND | 29 | ND | ND | ND | ND | NA | ND | ND |
| Bromoform | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| Bromomethane | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| Carbon tetrachloride | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| Chlorobenzene | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| Chlorodibromomethane | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| Chloroethane | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| 2–chloroethylvinyl ether | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| Chloroform | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| Chloromethane | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| Dichlorobromomethane | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| 1,1–Dichloroethane | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| 1,2–Dichloroethane | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| 1,1–Dichloroethene | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| trans–1,2–Dichloroethene | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| 1,2–Dichloropropane | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| cis–1,3–Dichloropropene | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| trans–1,3–Dichloropropene | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| Ethyl benzene | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| Methylene Chloride | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| 1,1,2,2–Tetrachloroethane | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| Tetrachloroethene | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| Toluene | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| 1,1,1–Trichloroethane | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| 1,1,2–Trichloroethane | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| Trichloroethene | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| Trichlorofluoromethane | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| Vinyl chloride | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| Total Xylenes | ND | ND | ND | ND | ND | ND | NA | ND | ND |
| TOTAL PRIORITY POLLUTANT VOLATILE ORGANICS (ppb) | ND | 29 | ND | ND | ND | ND | NA | ND | ND |
| TOTAL NON–PRIORITY POLLUTANT VOLATILE ORGANICS (ppb) | 31 | 61 | ND | 34 | 8 | 24 | NA | ND | ND |

TABLE – 3

GROUNDWATER SAMPLING OF JULY 1991
ANALYTICAL RESULTS SUMMARY

LINDE GASES OF THE MID–ATLANTIC, INC.
LINDEN, NEW JERSEY

| SAMPLE POINT | MW–1 | MW–2 | MW–3 | MW–4 | MW–5 | MW–6 | SUMP SAMPLE | FIELD BLANK | TRAVEL BLANK |
|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DATE | 7/31/91 | 7/31/91 | 7/31/91 | 7/31/91 | 7/31/91 | 7/31/91 | 7/31/91 | 7/31/91 | 7/31/91 |
| PIORITY POLLUTANT BASE NEUTRAL ORGANICS (ppb) | | | | | | | | | |
| Acenaphthene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Acenaphthylene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Anthracene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Benzidine | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Benzo(a)anthracene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Benzo(b)fluoranthene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Benzo(k)fluoranthene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Benzo(a)pyrene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Benzo(g,h,i)perylene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Bis(2–Chloroethyl)ether | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Bis(2–Chloroethoxy)methane | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Bis(2–Ethylhexyl)phthalate | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Bis(2–Chloroisopropyl)ether | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| 4–Bromophenyl Phenyl Ether | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Butyl Benzyl Phthalate | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| 2–Chloronaphthalene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| 4–Chlorophenyl Phenyl Ether | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Chrysene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Dibenzo(a,h)anthracene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Di–n–butylphthalate | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| 1,2–Dichlorobenzene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| 1,3–Dichlorobenzene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| 1,4–Dichlorobenzene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| 3,3'–Dichlorobenzidine | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Diethylphthalate | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Dimethylphthalate | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| 2,4–Dinitrotoluene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| 2,6–Dinitrotoluene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Di–n–Octylphthalate | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| 1,2–Diphenylhydrazine | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Fluoranthene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Fluorene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Hexachlorobenzene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Hexachlorobutadiene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Hexachloroethane | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Hexachlorocyclopentadiene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Indeno(1,2,3–cd)pyrene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Isophorone | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Naphthalene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Nitrobenzene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| N–Nitroso–dimethylamine | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| N–Nitrosodipropylamine | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| N–Nitrosodiphenylamine | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Phenanthrene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| Pyrene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| 1,2,4–Trichlorobenzene | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| TOTAL PRIORITY POLLUTANT BASE NEUTRAL ORGANICS (ppb) | ND | ND | ND | ND | ND | ND | NA | ND | NA |
| TOTAL NON–PRIORITY POLLUTANT BASE NEUTRAL ORGANICS (ppb) | 146 | 213 | ND | 16 | 529 | 24 | NA | ND | NA |
| TOTAL PETROLEUM HYDROCARBONS (ppm | ND | ND | ND | ND | ND | ND | 1.2 | ND | NA |

1. "NA" signifies not analyzed.
2. "ND" signifies not detected.
3. Analytical methodology as follows:
   - VO+15 – EPA Method 624
   - B/N+15 – EPA Method 625
   - TPH – Std. Methods 503B,C,&E

TABLE 4

GROUNDWATER SAMPLING OF APRIL 1992
ANALYTICAL RESULTS SUMMARY

LINDE GASES OF THE MID-ATLANTIC, INC.
LINDEN, NEW JERSEY

| SAMPLE POINT | MW-1 | MW-2 | MW-3 | MW-4 | MW-5 | MW-6 | MW-7 | MW-8 | TRAVEL BLANK | B |
|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DATE | 4/30/92 | 4/30/92 | 4/30/92 | 4/30/92 | 4/30/92 | 4/30/92 | 4/30/92 | 4/30/92 | 4/30/92 | 4/ |
| PRIORITY POLLUTANT METALS (ppm) | | | | | | | | | | |
| Antimony | ND | ND | ND | ND | ND | ND | ND | ND | NA | ND |
| Arsenic | 0.13 | 0.07 | 0.11 | 0.130 | 0.068 | 0.05 | 0.04 | 0.026 | NA | ND |
| Berylium | ND | ND | ND | ND | ND | ND | ND | ND | NA | ND |
| Cadmium | ND | ND | ND | ND | ND | ND | ND | ND | NA | ND |
| Chromium | ND | ND | ND | ND | ND | ND | ND | ND | NA | ND |
| Copper | ND | ND | ND | ND | ND | ND | ND | ND | NA | ND |
| Lead | ND | ND | ND | ND | ND | ND | ND | ND | NA | ND |
| Mercury | ND | ND | ND | ND | ND | ND | ND | ND | NA | ND |
| Nickel | ND | ND | ND | ND | ND | ND | ND | ND | NA | ND |
| Selenium | ND | ND | ND | ND | ND | ND | ND | ND | NA | ND |
| Silver | ND | ND | ND | ND | ND | ND | ND | ND | NA | ND |
| Thallium | ND | ND | ND | ND | ND | ND | ND | ND | NA | ND |
| Zinc | ND | ND | ND | 1.5 | ND | ND | ND | ND | NA | ND |
| PIORITY POLLUTANT VOLATILE ORGANICS (ppb) | | | | | | | | | | |
| Acrolein | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| Acrylonitrile | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| Benzene | NA | 28 | NA | NA | NA | NA | 43 | ND | ND | ND |
| Bromoform | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| Bromomethane | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| Carbon tetrachloride | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| Chlorobenzene | NA | 17 | NA | NA | NA | NA | 17 | 6 | ND | ND |
| Chlorodibromomethane | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| Chloroethane | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| 2-chloroethylvinyl ether | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| Chloroform | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| Chloromethane | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| Dichlorobromomethane | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| 1,1-Dichloroethane | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| 1,2-Dichloroethane | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| 1,1-Dichloroethene | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| trans-1,2-Dichloroethene | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| 1,2-Dichloropropane | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| cis-1,3-Dichloropropene | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| trans-1,3-Dichloropropene | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| Ethyl benzene | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| Methylene Chloride | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| 1,1,2,2-Tetrachloroethane | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| Tetrachloroethene | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| Toluene | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| 1,1,1-Trichloroethane | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| 1,1,2-Trichloroethane | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| Trichloroethene | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| Trichlorofluoromethane | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| Vinyl chloride | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| Total Xylenes | NA | ND | NA | NA | NA | NA | ND | ND | ND | ND |
| TOTAL PRIORITY POLLUTANT VOLATILE ORGANICS (ppb) | NA | 45 | NA | NA | NA | NA | 60 | 6 | ND | ND |
| TOTAL NON-PRIORITY POLLUTANT VOLATILE ORGANICS (ppb) | NA | 49 | NA | NA | NA | NA | 64 | 31 | ND | ND |

TABLE 4

GROUNDWATER SAMPLING OF APRIL 1992
ANALYTICAL RESULTS SUMMARY

LINDE GASES OF THE MID–ATLANTIC, INC.
LINDEN, NEW JERSEY

| SAMPLE POINT | MW–1 | MW–2 | MW–3 | MW–4 | MW–5 | MW–6 | MW–7 | MW–8 | TRAVEL BLANK | FIEL BLAN |
|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DATE | 4/30/92 | 4/30/92 | 4/30/92 | 4/30/92 | 4/30/92 | 4/30/92 | 4/30/92 | 4/30/92 | 4/30/92 | 4/30/9 |
| PIORITY POLLUTANT BASE NEUTRAL ORGANICS (ppb) | | | | | | | | | | |
| Acenaphthene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Acenaphthylene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Anthracene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Benzidine | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Benzo(a)anthracene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Benzo(b)fluoranthene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Benzo(k)fluoranthene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Benzo(a)pyrene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Benzo(g,h,i)perylene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Bis(2–Chloroethyl)ether | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Bis(2–Chloroethoxy)methane | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Bis(2–Ethylhexyl)phthalate | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Bis(2–Chloroisopropyl)ether | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| 4–Bromophenyl Phenyl Ether | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Butyl Benzyl Phthalate | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| 2–Chloronaphthalene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| 4–Chlorophenyl Phenyl Ether | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Chrysene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Dibenzo(a,h)anthracene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Di–n–butylphthalate | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| 1,2–Dichlorobenzene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| 1,3–Dichlorobenzene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| 1,4–Dichlorobenzene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| 3,3'–Dichlorobenzidine | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Diethylphthalate | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Dimethylphthalate | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| 2,4–Dinitrotoluene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| 2,6–Dinitrotoluene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Di–n–Octylphthalate | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| 1,2–Diphenylhydrazine | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Fluoranthene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Fluorene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Hexachlorobenzene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Hexachlorobutadiene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Hexachloroethane | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Hexachlorocyclopentadiene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Indeno(1,2,3–cd)pyrene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Isophorone | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Naphthalene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Nitrobenzene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| N–Nitroso–dimethylamine | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| N–Nitrosodipropylamine | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| N–Nitrosodiphenylamine | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Phenanthrene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| Pyrene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| 1,2,4–Trichlorobenzene | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| TOTAL PRIORITY POLLUTANT BASE NEUTRAL ORGANICS (ppb) | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |
| TOTAL NON–PRIORITY POLLUTANT BASE NEUTRAL ORGANICS (ppb) | NA | NA | NA | NA | NA | NA | 334 | 190 | NA | 55 |
| TOTAL PETROLEUM HYDROCARBONS (ppm) | NA | NA | NA | NA | NA | NA | ND | ND | NA | ND |

1. "NA" signifies not analyzed.
2. "ND" signifies not detected.
3. Analytical methodology as follows:
   VO+15 – EPA Method 624
   B/N+15 – EPA Method 625
   TPH – Std. Methods 503 B,C,&E

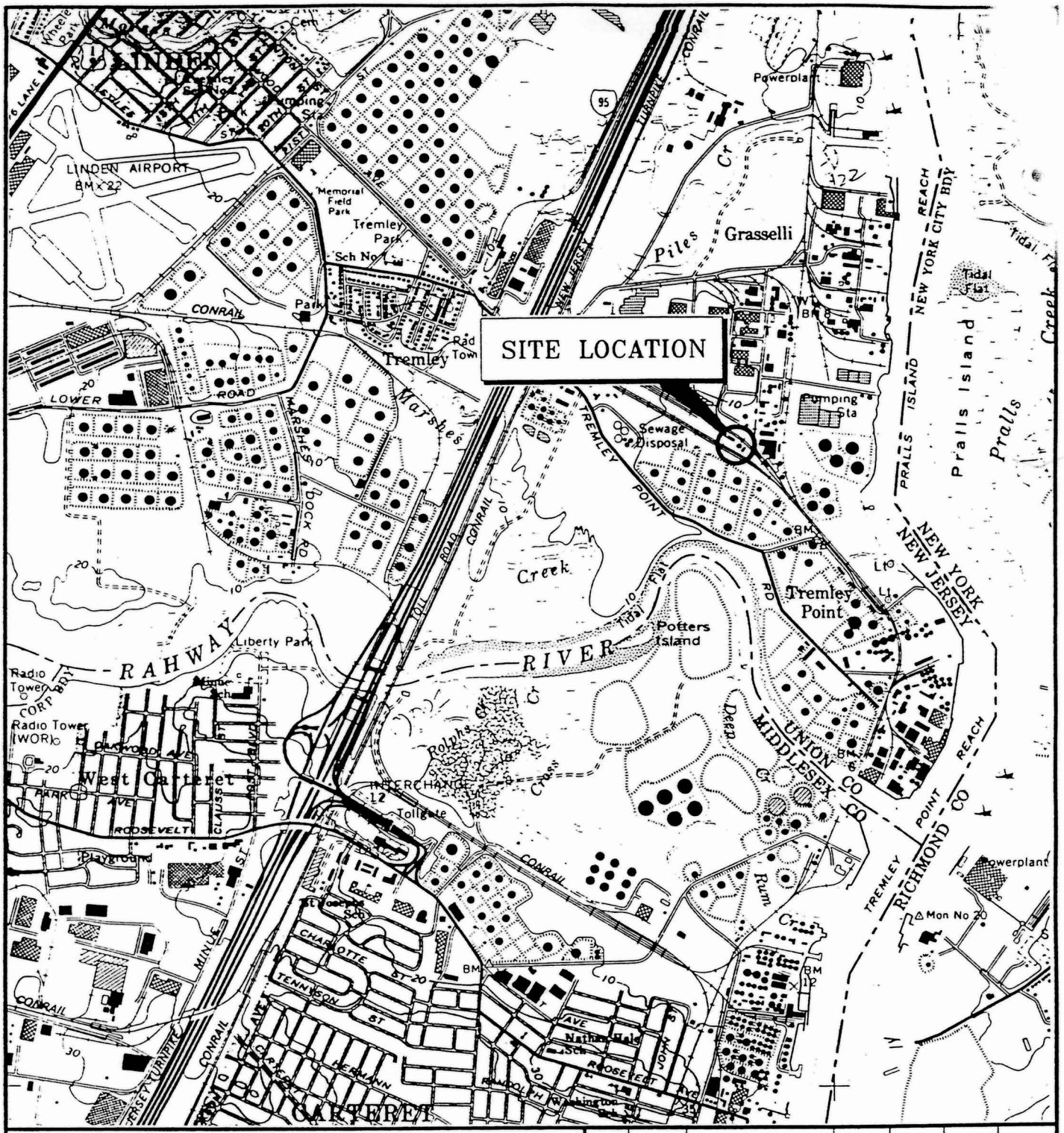
TABLE 5

GROUNDWATER SAMPLING OF DECEMBER 1992
ANALYTICAL RESULTS SUMMARY

LINDE GASES OF THE MID-ATLANTIC, INC.
LINDEN, NEW JERSEY

| SAMPLE POINT | MW-7 | MW-8 | TRAVEL BLANK | FIELD BLANK |
|---|---|---|---|---|
| SAMPLE DATE | 12/2/92 | 12/2/92 | 12/2/92 | 12/2/92 |
| PIORITY POLLUTANT VOLATILE ORGANICS (ppb) | | | | |
| Acrolein | ND | ND | ND | ND |
| Acrylonitrile | ND | ND | ND | ND |
| Benzene | ND | ND | ND | ND |
| Bromoform | ND | ND | ND | ND |
| Bromomethane | ND | ND | ND | ND |
| Carbon tetrachloride | ND | ND | ND | ND |
| Chlorobenzene | 20 | 9 | ND | ND |
| Chlorodibromomethane | ND | ND | ND | ND |
| Chloroethane | ND | ND | ND | ND |
| 2-chloroethylvinyl ether | ND | ND | ND | ND |
| Chloroform | ND | ND | ND | ND |
| Chloromethane | ND | ND | ND | ND |
| Dichlorobromomethane | ND | ND | ND | ND |
| 1,1-Dichloroethane | ND | ND | ND | ND |
| 1,2-Dichloroethane | ND | ND | ND | ND |
| 1,1-Dichloroethene | ND | ND | ND | ND |
| trans-1,2-Dichloroethene | ND | ND | ND | ND |
| 1,2-Dichloropropane | ND | ND | ND | ND |
| cis-1,3-Dichloropropene | ND | ND | ND | ND |
| trans-1,3-Dichloropropene | ND | ND | ND | ND |
| Ethyl benzene | ND | ND | ND | ND |
| Methylene Chloride | ND | ND | ND | ND |
| 1,1,2,2-Tetrachloroethane | ND | ND | ND | ND |
| Tetrachloroethene | ND | ND | ND | ND |
| Toluene | ND | ND | ND | ND |
| 1,1,1-Trichloroethane | ND | ND | ND | ND |
| 1,1,2-Trichloroethane | ND | ND | ND | ND |
| Trichloroethene | ND | ND | ND | ND |
| Trichlorofluoromethane | ND | ND | ND | ND |
| Vinyl chloride | ND | ND | ND | ND |
| TOTAL PRIORITY POLLUTANT VOLATILE ORGANICS (ppb) | 20 | 9 | ND | ND |
| TOTAL NON-PRIORITY POLLUTANT VOLATILE ORGANICS (ppb) | 87 | 50 | ND | ND |

1. "ND" signifies not detected.
2. Analytical methodology:
   VO+15 – EPA Method 624




SOURCE: USGS 7.5 MINUTE SERIES TOPOGRAPHIC MAP, ARTHUR KILL, N.Y.– N.J. QUADRANGLE 1966 PHOTOREVISED 1981

NOTE: CONTOUR INTERVAL – 20 FEET
SITE LONGITUDE – 74° 12' 48"
SITE LATITUDE – 40° 36' 30"

1000 0 1000 2000
SCALE OF FEET

| REV. NO. | DATE | DESCRIPTION OF REVISION | REV. BY | CHKD | CHKD BY | APPVD BY |
|---|---|---|---|---|---|---|
| | | | | | | |

PROJECT MANAGER: P. DIMAKOS DRAWN BY: E.W. DATE: 6/7/94

INTERNATIONAL TECHNOLOGY CORPORATION

FIGURE 1
USGS SITE LOCATION MAP
LINDE FACILITY
Prepared For:
PRAXAIR, INC.
TONAWANDA, NEW YORK
JUNE 1994

| PROJECT NO. | FILE NO. | CHK'D: | DRAWING NUMBER | REV. NO. |
|---|---|---|---|---|
| 529326 | A1 | ENG. P.D. APPVD. P.D. | 529326-A1 | |

529326A1 06/21/94 3:01pm T. M.

**FIGURE 2, “Facility Layout with Areas of Concern, Soil Sampling Locations and Analytical Results”, and FIGURE 3, “As Built of Facility Layout”, included in hard copies**

# *Appendix A*

## *Soil Erosion and Sediment Control Plan Approval and Compliance Letters*

New Jersey Natural Resources Conservation Program

SOMERSET - UNION SOIL CONSERVATION DISTRI

Somerset County 4-H Center, 308 Milltown Road

Bridgewater, New Jersey 08807

Telephone (908) 526-2701

December 2, 1993

IT CORPORATION
EDISON, NEW JERSEY
DEC - 6 1993
RECEIVED BY: P. Dimakos
No. 529326

Paul Dimakos
IT Corporation
165 Fieldcrest Avenue
Edison, N.J. 08837

Re: Praxair Linde
(plan dated 10/93)
Block 587 - Lot 3
City of Linden
Index 3u-30-4720

Dear Mr. Dimakos:

The Somerset-Union Soil Conservation District has reviewed the above erosion control plan and certifies that the plan is in accordance with the N. J. Soil Erosion and Sediment Control Act, Chapter 251, P.L. 1975.

This approval is limited to the soil erosion and sedimentation controls specified in this plan. It is not authorization to engage in the proposed land use unless such use has been previously approved by the municipality or other controlling agency.

The District requires written notification prior to the start of land disturbance. Please be advised that failure to do so is considered a violation of State Law.

If there are any questions, please feel free to call our office.

Yours very truly,

SOMERSET-UNION S.C.D.

William E. Roach, Jr.

William E. Roach, Jr.
District Supervisor

WER:EHT:mjc

enclosure

pc: City Planning Board w/plan
J. Ziemian, City Engineer
T. caverly, City Const. Official
M. DiFranco, Praxair

New Jersey Natural Resources Conservation Program

SOMERSET - UNION SOIL CONSERVATION DISTRICT

Somerset County 4-H Center, 308 Milltown Road

Bridgewater, New Jersey 08807

Telephone (908) 526-2701

RECEIVED

MAY 31 1994

# FINAL REPORT OF COMPLIANCE

The requirements for permanent soil erosion and sediment control measures have been met at the following site in accordance with the N. J. Soil Erosion and Sediment Control Act, Chapter 251, P.L. 1975:

Project Name PRAXAIR LINDE Index 3U-30-4720

Block 587 Lot 3 Address SOUTH WOOD AVE

Block _____ Lot _____ Address _____

Block _____ Lot _____ Address _____

Block _____ Lot _____ Address _____

Block _____ Lot _____ Address _____

Block _____ Lot _____ Address _____

Block _____ Lot _____ Address _____

Block _____ Lot _____ Address _____

Block _____ Lot _____ Address _____

Block _____ Lot _____ Address _____

Block _____ Lot _____ Address _____

Municipality LINDEN

William A. Larkowski
District Official

5-26-94
Date

THIS APPROVAL IS SUBJECT TO MUNICIPAL ENGINEER'S GRADING PLAN AND DRAINAGE APPROVAL.

Distribution:
original - building inspector, T. Caverly
yellow - file
pink - owner or builder , Praxair Linde Division

SUSCD-29 (Rev.1/88)

# *Appendix B*

## *Certification of Backfill Virgin Soil*

# RUSTIC MATERIALS CO. INC.

5138 WEST HURLEY POND ROAD
FARMINGDALE, N.J. 07727
(908) 938-4224
FAX (908) 919-0867

July 14, 1993

Prax Air
Linden Facility
Keasbey, NJ 08832

RE: Customer: Westmont Construction
105 Haddenfield Ave.
Lavallette, NJ 08735

Dear Sir:

This certifies that the bank run sand material which we provide is of virgin origin from historically non-industrial property located at our site in Wall Township, Monmouth County, New Jersey on Route 34, Lot 66, Block 917. It is clean compactable sand used in backfilling. This material has not been exposed to or affected by sources of contamination either directly or indirectly which might cause it to be environmentally unsuitable for use as fill.

Very truly yours,

Richard Schulz,
President

RS:mch

# *Appendix C*

## *Soil Disposal Waste Manifests*

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS SUBSTANCES REGULATION

# HAZARDOUS WASTE MANIFEST

P.O. Box 12820, Albany, New York 12212

Please print or type. Do not Staple.

Form Approved OMB No 2050-0039 Expires

## UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. NJD011392735 Manifest Document No. 00004
2. Page 1 of 1 — Information in the shad is not required by Feder

3. Generator's Name and Mailing Address
PRAXAIR INC.
FOOT OF SOUTH WOOD AVE.
LINDEN, NJ 07036

4. Generator's Phone (201-862-2422

A. State Manifest Document No. NY B 513863 1

B. Generator's ID

5. Transporter 1 (Company Name) NORWITH TRUCKS INC.

6. US EPA ID Number PAD146714878

C. State Transporter's ID TN 99723

D. Transporter's Phone (215) 261-22

7. Transporter 2 (Company Name)

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
CWM CHEMICAL SERVICES, INC.
1550 BALMER RD.
MODEL CITY, NY 14107

10. US EPA ID Number NYD049836679

G. State Facility's ID

H. Facility's Phone (716) 754-0231

| 11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number) | 12. Containers No. | Type | 13. Total Quantity | 14. Unit Wt/Vol | I. Waste No. |
|---|---|---|---|---|---|
| a. RQ, HAZARDOUS WASTE, SOLID, N.O.S., 9, NA3077, III, (D007, D008), (LEAD, CHROME) | 001 | DT | 22 | T | EPA D007 / STATE |
| b. | | | | | EPA / STATE |
| c. | | | | | EPA / STATE |
| d. | | | | | EPA / STATE |

J. Additional Descriptions for Materials listed Above
A. SOIL 100%; LEAD 9.1 PPM; CHROMIUM 9.3 PPM; S; T

K. Handling Codes for Wastes Listed Above

a b c d

15. Special Handling Instructions and Additional Information
CWM EMERGENCY [illegible] RESPONSE INFORMATION (800) 765-8713 SR # 38731-4
PROFILE RD8020 ERC # 31
81413118

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.
If I am a large quantity generator, I certify that I have program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR if I am a small generator, I have made a good faith effort to minimize my waste and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name — Signature — Mo. Day Year 0[illegible]

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day Year

18. Transporter 2 (Acknowledgement or Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day Year

19. Discrepancy Indication Space
ITEM K - [illegible]
ITEM B - SAME
72620P

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name [illegible] ER — Signature Eileen Carter — Mo. Day Year 0[illegible]

GENERATOR — TRANSPORTER — FACILITY

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Dept. of Environmental Conservation (518) 457-7362.

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

COPY 5 – Generator-mailed by TSD facility

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS SUBSTANCES REGULATION

# HAZARDOUS WASTE MANIFEST

P.O. Box 12820, Albany, New York 12212

Please print or type. Do not Staple.

Form Approved OMB No. 2050-0039 Expire

## UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. NJD013927353 Manifest Document No.

2. Page 1 of 1 Information in the sha is not required by Fede

3. Generator's Name and Mailing Address
PRAXAIR INC.
FOOT OF SOUTH WOOD AVE.
LINDEN, NJ 07036

4. Generator's Phone (201) 862-2422

A. State Manifest Document No. NY B 513898 2

B. Generator's ID

5. Transporter 1 (Company Name) HORNITH TRUCKS INC.

6. US EPA ID Number PAD146718788

C. State Transporter's ID TV4657

D. Transporter's Phone (215) 261-222

7. Transporter 2 (Company Name)

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
CWM CHEMICAL SERVICES INC.
1550 BALMER RD.
MODEL CITY, NY 14107

10. US EPA ID Number KYD049836679

G. State Facility's ID

H. Facility's Phone (716) 754-8231

GENERATOR

| 11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number) | 12. Containers No. | Type | 13. Total Quantity | 14. Unit Wt/Vol | I. Waste No. |
|---|---|---|---|---|---|
| a. RQ, HAZARDOUS WASTE, SOLID, N.O.S., 9, NA3077, III, (D007, D008), (LEAD, CHROME) | 001 | DT | | P | EPA D007 / STATE |
| b. | | | | | EPA / STATE |
| c. | | | | | EPA / STATE |
| d. | | | | | EPA / STATE |

J. Additional Descriptions for Materials listed Above
A. SOIL 15CY, LEAD 5.2 PPM; CHROMIUM 9.3 PPM; S; T
a c b d

K. Handling Codes for Wastes Listed Above
a c b d

15. Special Handling Instructions and Additional Information
CWM EMERGENCY RESPONSE INFORMATION (800) 765-8713 SR # 81413121
PROFILE #08920 ERG #31

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.

If I am a large quantity generator, I certify that I have program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR if I am a small generator, I have made a good faith effort to minimize my waste and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name | Signature | Mo. Day Year

TRANSPORTER

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name | Signature | Mo. Day Year

18. Transporter 2 (Acknowledgement or Receipt of Materials)
Printed/Typed Name | Signature | Mo. Day Year

FACILITY

19. Discrepancy Indication Space ITEM A - 15 actual pkgs 4,120P ITEM C - (PA) ITEM A - SAME

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name EILEEN CARTER | Signature | Mo. 03 Day 18 Year 94

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Dept. of Environmental Conservation (518) 457-7362.

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

COPY 5 – Generator-mailed by TSD facility

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS SUBSTANCES REGULATION

# HAZARDOUS WASTE MANIFEST

P.O. Box 12820, Albany, New York 12212

Please print or type. Do not Staple.

Form Approved OMB No 2050-0039 Expires

## UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No.: NJD011392735 — Manifest Document No.: 00005
2. Page 1 of 1 — Information in the shade is not required by Federal

3. Generator's Name and Mailing Address:
RKE PRAXAIR INC.
FOOT OF SOUTH WOOD AVE.
LINDEN, NJ 07036

4. Generator's Phone (201) 862-2422

A. State Manifest Document No.: NYB 513897 3

B. Generator's ID

5. Transporter 1 (Company Name): NORWITH TRUCKS INC.

6. US EPA ID Number: PAD146714878

C. State Transporter's ID: 15 7710

D. Transporter's Phone (215) 261-222[illegible]

7. Transporter 2 (Company Name)

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone ( )

9. Designated Facility Name and Site Address:
CWM CHEMICAL SERVICES, INC.
1550 BALMER RD.
MODEL CITY, NY 14107

10. US EPA ID Number: NYD049836679

G. State Facility's ID

H. Facility's Phone: (716) 754-8231

| 11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number) | 12. Containers No. | Type | 13. Total Quantity | 14. Unit Wt/Vol | I. Waste No. |
|---|---|---|---|---|---|
| a. RQ, HAZARDOUS WASTE, SOLID, N.O.S., 9, NA3077, III, (D007, D008), (LEAD, CHROME) | 001 | DT | Est 00022 | T | EPA D007 / STATE |
| b. | | | | | EPA / STATE |
| c. | | | | | EPA / STATE |
| d. | | | | | EPA / STATE |

J. Additional Descriptions for Materials listed Above
a. A. SOIL 100%; LEAD 9.2 PPM; CHROMIUM 9.3 PPM; S; T
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. ☐ c. ☐
b. ☐ d. ☐

15. Special Handling Instructions and Additional Information
CWM EMERGENCY RESPONSE INFORMATION (800) 765-8713 SR # 82731-7
PROFILE BB8020 ERG #31
21413107

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.
If I am a large quantity generator, I certify that I have program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR if I am a small generator, I have made a good faith effort to minimize my waste and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Dave Nilsson — Signature: D. Nilsson — Mo. Day Year: 03 17 94

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name: Bill Cassium — Signature: Bill Cassium — Mo. Day Year: 03 17 94

18. Transporter 2 (Acknowledgement of Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day Year

19. Discrepancy Indication Space
actual recd 47440 P

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: EILEEN CARTER — Signature: Eileen Carter — Mo. Day Year: 03 18 94

GENERATOR / TRANSPORTER / FACILITY

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Dept. of Environmental Conservation (518) 457-7362.

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

COPY 5—Generator-mailed by TSD facility

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS SUBSTANCES REGULATION

# HAZARDOUS WASTE MANIFEST

P.O. Box 12820, Albany, New York 12212

Please print or type. Do not Staple.

Form Approved OMB No. 2050-0039 Expires

## UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. HJD011392735 Manifest Document No. 00006
2. Page 1 of 1 — Information in the shade is not required by Feder

3. Generator's Name and Mailing Address
PRAXAIR INC.
FOOT OF SOUTH WOOD AVE
LINDEN, NJ 07036

4. Generator's Phone ( ) PH(201) 862-2422

A. State Manifest Document No. NYB 513896 4

B. Generator's ID

5. Transporter 1 (Company Name) BORMITH TRUCKS INC.
6. US EPA ID Number PAD146714878

C. State Transporter's ID T 3167

D. Transporter's Phone ( 215 261-22[illegible]

7. Transporter 2 (Company Name)
8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
CWM CHEMICAL SERVICES, INC.
1550 BALMER RD.
MODEL CITY, NY 14107

10. US EPA ID Number NYD049834679

G. State Facility's ID

H. Facility's Phone (716) 754-8231

| 11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number) | 12. Containers No. | Type | 13. Total Quantity | 14. Unit Wt/Vol | I. Waste No. |
|---|---|---|---|---|---|
| a. RQ, HAZARDOUS WASTE, SOLID, N.O.S., 9, NA3077, III, (D007, D008), (LEAD, CHROME) | 001 | DT | Ft 18 | 7 | EPA D007 / STATE |
| b. | | | | | EPA / STATE |
| c. | | | | | EPA / STATE |
| d. | | | | | EPA / STATE |

J. Additional Descriptions for Materials listed Above
a. A. SOIL 100%; LEAD 9.2 PPM; CHROMIUM 9.3 PPM; S; T
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
CWM EMERGENCY RESPONSE INFORMATION (800) 765-8713 SR # 8[illegible]
PROFILE BD8020 ERG #31

81413106

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.

If I am a large quantity generator, I certify that I have program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR if I am a small generator, I have made a good faith effort to minimize my waste and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: [illegible] Signature: [illegible] Mo. Day Year: [illegible]

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name: Amon[illegible] J [illegible] Signature: [illegible] Mo. Day Year: [illegible]

18. Transporter 2 (Acknowledgement or Receipt of Materials)
Printed/Typed Name: Signature: Mo. Day Year:

19. Discrepancy Indication Space
actual record 42880P
ITEM K - [illegible]
ITEM L - SAME

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: EILEEN CARTER Signature: Eileen Carter Mo. Day Year: 02 [illegible]

GENERATOR / TRANSPORTER / FACILITY

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Dept. of Environmental Conservation (518) 457-7362.

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

COPY 5 – Generator-mailed by TSD facility

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS SUBSTANCES REGULATION

# HAZARDOUS WASTE MANIFEST

P.O. Box 12820, Albany, New York 12212

Please print or type. Do not Staple.

Form Approved OMB No 2050-0039 Expires 9

**UNIFORM HAZARDOUS WASTE MANIFEST**

1. Generator's US EPA No. NJD013927735 — Manifest Document No.

2. Page 1 of 1 — Information in the shaded is not required by Federal

3. Generator's Name and Mailing Address
PRAXAIR INC.
FOOT OF SOUTH WOOD AVE
LINDEN, NJ 07036

4. Generator's Phone (redacted) PH (201) 862-2422

A. State Manifest Document No. NY B 613895 5

B. Generator's ID

5. Transporter 1 (Company Name) HORWITH TRUCKS INC.

6. US EPA ID Number PAD146714878

C. State Transporter's ID TL-8796L

D. Transporter's Phone (215) 261-2220

7. Transporter 2 (Company Name)

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
CWM CHEMICAL SERVICES, INC.
1550 BALMER RD.
MODEL CITY, NY 14107

10. US EPA ID Number NYD048366799

G. State Facility's ID

H. Facility's Phone (716) 754-8231

GENERATOR

| 11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number) | 12. Containers No. | Type | 13. Total Quantity | 14. Unit Wt/Vol | I. Waste No. |
|---|---|---|---|---|---|
| a. RQ. HAZARDOUS WASTE, SOLID, N.O.S., 9, NA3077, III, (D007, D008), (LEAD, CHROME) | 001 | DT | 27 CST. | T | EPA D007 / STATE |
| b. | | | | | EPA / STATE |
| c. | | | | | EPA / STATE |
| d. | | | | | EPA / STATE |

J. Additional Descriptions for Materials listed Above
A. SOIL 100%; LEAD 9.2 PPM; CHROMIUM 9.3 PPM; E
a c b d

K. Handling Codes for Wastes Listed Above
a c b d

15. Special Handling Instructions and Additional Information
CWM EMERGENCY RESPONSE INFORMATION (800) 765-8713 SR # 88731-3
PROFILE DD6020 REC #31
81413101

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.

If I am a large quantity generator, I certify that I have program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR if I am a small generator, I have made a good faith effort to minimize my waste and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: Dave N. Nelson — Signature: [signature] — Mo. Day Year 07 14

TRANSPORTER

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name: Raymond S Beak — Signature: Raymond S Beak — Mo. Day Year 07 14 94

18. Transporter 2 (Acknowledgement or Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day Year

FACILITY

19. Discrepancy Indication Space
GEN. OMITTED DOCUMENT NO. ITEM E-SAME, ITEM A-A&L
actual rec'd 46140P ITEM K-L (PA)

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: EILEEN CARTER — Signature: Eileen Carter — Mo. Day Year 08 18 94

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

COPY 5 – Generator-mailed by TSD facility

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Dept. of Environmental Conservation (518) 457-7362.

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS SUBSTANCES REGULATION

# HAZARDOUS WASTE MANIFEST

P.O. Box 12820, Albany, New York 12212

Please print or type. Do not Staple.

Form Approved OMB No 2050-0039. Expires

## UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No.: NJD011392735 — Manifest Document No.: 00001
2. Page 1 of 1 — Information in the shade is not required by Federa

3. Generator's Name and Mailing Address: PRAXAIR INC. FOOT OF SOUTH WOOD AVE. LINDEN, NJ 07036
4. Generator's Phone (201) 862-2422

A. State Manifest Document No.: NY B 513867 6
B. Generator's ID

5. Transporter 1 (Company Name): NORWITH TRUCKS INC.
6. US EPA ID Number: PAD146714878
C. State Transporter's ID: T130468 K
D. Transporter's Phone (215) 261-22

7. Transporter 2 (Company Name)
8. US EPA ID Number
E. State Transporter's ID
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address: CWM CHEMICAL SERVICES, INC. 1550 BALMER RD. MODEL CITY, NY 14107
10. US EPA ID Number: NYD049836679
G. State Facility's ID
H. Facility's Phone (716) 754-8231

| 11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number) | 12. Containers No. | Type | 13. Total Quantity | 14. Unit Wt/Vol | I. Waste No. |
|---|---|---|---|---|---|
| a. RQ, HAZARDOUS WASTE, SOLID, N.O.S., 9, NA3077, III, (D007,D008), (LEAD, CHROME) | 001 | DT | Est. 45400 | GB. Pa | EPA D007 / STATE |
| b. | | | | | EPA / STATE |
| c. | | | | | EPA / STATE |
| d. | | | | | EPA / STATE |

J. Additional Descriptions for Materials listed Above
a. A. SOIL 100%; LEAD 9.2 PPM; CHROMIUM 9.3 PPM; S; T
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information

CWM EMERGENCY RESPONSE INFORMATION (800) 765-8713 SR #7 88731-1
PROFILE ED8020 ERG #31
81413104

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.

If I am a large quantity generator, I certify that I have program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR if I am a small generator, I have made a good faith effort to minimize my waste and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: — Signature: — Mo. Day Year: 3 17 94

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name: Gordon Bird — Signature: Gordon Bird — Mo. Day Year: 03 17 94

18. Transporter 2 (Acknowledgement or Receipt of Materials)
Printed/Typed Name: — Signature: — Mo. Day Year:

19. Discrepancy Indication Space: [illegible] 48180P — ITEM E-SAME ITEM K-LET

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: EILEEN CARTER — Signature: Eileen Carter — Mo. Day Year: 03 18 94

GENERATOR — TRANSPORTER — FACILITY

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Dept. of Environmental Conservation (518) 457-7362.

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

COPY 5—Generator-mailed by TSD facility

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS SUBSTANCES REGULATION

# HAZARDOUS WASTE MANIFEST

P.O. Box 12820, Albany, New York 12212

Please print or type. Do not Staple.

Form Approved OMB No 2050-0039 Expires

## UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No.: NJD011392735 — Manifest Document No.:
2. Page 1 of 1 — Information in the shade is not required by Federal

3. Generator's Name and Mailing Address: PRAXAIR INC. ROUT OF SOUTH WOOD AVE LINDEN, NJ 07036
4. Generator's Phone (201) 862-2422

A. State Manifest Document No.: NY B 513866 7
B. Generator's ID:

5. Transporter 1 (Company Name): NORWITH TRUCKS INC.
6. US EPA ID Number: FAD146714878

C. State Transporter's ID:
D. Transporter's Phone (215) 261-222

7. Transporter 2 (Company Name):
8. US EPA ID Number:

E. State Transporter's ID:
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address: CWM CHEMICAL SERVICES, INC/ 1550 BALMER RD. MODEL CITY, NY 14107
10. US EPA ID Number: NYD049836679

G. State Facility's ID:
H. Facility's Phone (716) 754-8231

| 11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number) | 12. Containers No. | Type | 13. Total Quantity | 14. Unit Wt/Vol | I. Waste No. |
|---|---|---|---|---|---|
| a. EQ. HAZARDOUS WASTE, NR SOLID, N.O.S., 9, NA3077, III, (D007, D008), (lead, chrome) | [illegible] | [illegible] | [illegible] | Y | EPA D007 / STATE |
| b. | | | | | EPA / STATE |
| c. | | | | | EPA / STATE |
| d. | | | | | EPA / STATE |

J. Additional Descriptions for Materials listed Above
a. A. BOIL 100 I; LEAD 9.2 PPM; CH ROMIUM 9.3 PPM; S; T
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
CWM EMERGENCY RESPONSE INFORMATION (800) 765-8713 SR # [illegible]
PROFILE RD8020 REG #31
81413103

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.

If I am a large quantity generator, I certify that I have program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR if I am a small generator, I have made a good faith effort to minimize my waste and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: [illegible] — Signature: [illegible] — Mo. Day Year: 03 17 94

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name: [illegible] — Signature: [illegible] — Mo. Day Year: [illegible]

18. Transporter 2 (Acknowledgement or Receipt of Materials)
Printed/Typed Name: — Signature: — Mo. Day Year:

19. Discrepancy Indication Space: actual period 50440 P — LIEME SAME ITEM 14

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: EILEEN CARTER — Signature: Eileen Carter — Mo. Day Year: 03 18 94

GENERATOR / TRANSPORTER / FACILITY

In case of emergency or spill immediately call the National Response Center (800) 424-8802 and the N.Y. Dept. of Environmental Conservation (518) 457-7362.

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

COPY 5—Generator-mailed by TSD facility

# *Appendix D*

## *Raw Material Specification Requirements of Clean Fill Grading Material*

**Grasselli Point Industries, Inc.**
CONCRETE RECYCLING

MAILING ADDRESS:
P.O. Box 4126
Linden, N.J. 07036

LOCATION:
Dupont Industrial Complex
Grasselli Road
Linden, N.J. 07036

908-86
FAX 908-86

# Material Specification Requirements

## Operational Hours: Monday thru Friday 7:am to 5:pm

Grasselli Point Industries, Inc. is a New Jersey DEPE Approved Recycling Center. As part of our approval we are required by the NJDEPE to provide users of this facility a specification sheet for incoming materials:

1) Only source separated concrete, asphalt, brick, block or similar masonry material may be accepted at this facility.

2) Size and weight restrictions apply only to the legal weight restrictions of local motor vehicle weight laws.

3) We will not allow any excess dirt, wood, or other contaminants to be present in any load that is presented to our facility for disposal. Any attempt to do so will result in the load being rejected or reloaded onto the transporter or origin at additional cost. No more than 1% of contaminants by volume will be allowed.

4) All incoming material is required to be inspected at our tipping site by our "Dump Master".

5) We reserve the right to reject any material presented at our facility.

CERTIFICATION REQUIREMENT:
All persons bringing recyclable material to the recycling center shall certify, at the time of delivery the amount of material per load, the municipality of orgin of that material received, as per Recyclable Material Receipt Form.

It is the written policy of the management and employees of Grasselli Point Industries Inc. to cooperate and support the waste flow laws of the State of New Jersey and to cooperate in their enforcement.

N.J.D.E.P. RECYCLING CENTER NUMBER GPI 2009

CONCRETE RECYCLING & STATE APPROVED AGGREGATES

7:26A 3-2 (a) 16il

# *Appendix E*

# *Well Abandonment Reports*

DWR-020
10/92

New Jersey Department of Environmental Protection and Energy
Water Supply Element — Bureau of Water Allocation

# WELL ABANDONMENT REPORT

MAIL TO:

Bureau of Water Allocation
CN 426
Trenton, NJ 08625-0426

WELL PERMIT # 26-2528
of well sealed

DATE WELL SEALED 10-13-93

PROPERTY OWNER Union Carbide

ADDRESS Grasselli Road — Linden, NJ Union Co.

WELL LOCATION Same as above
Street & No., Township, County

MW-1 Lot 3 Block 587
Well No., Lot & Block No., Longitude & Latitude (N.J. Grid # may be substituted for longitude & latitude)

TYPE OF WELL ABANDONED: Monitor

REASON FOR ABANDONMENT: No longer in use

WAS A NEW WELL DRILLED? ☐ YES ☒ NO PERMIT # OF NEW WELL: _____

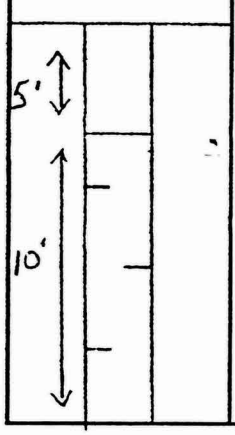
TOTAL DEPTH OF WELL 15'
DIAMETER 4"
CASING LENGTH 5'
SCREEN LENGTH 10'
NUMBER OF CASINGS 2

MATERIAL USED TO SEAL WELL:

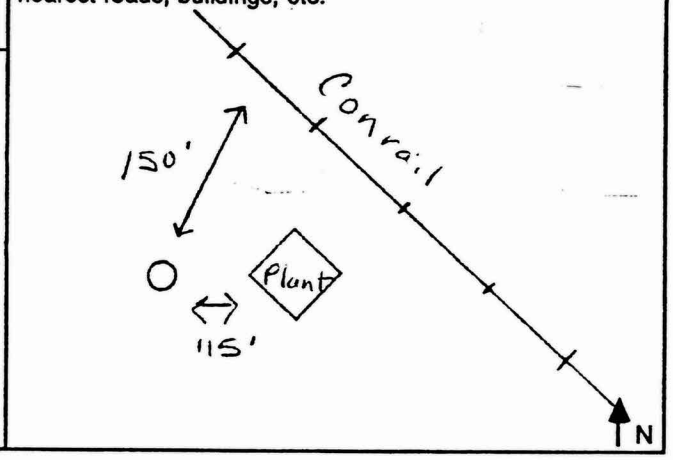
14 Gallons of Water
188 Lbs. of Cement
10 Lbs. of Bentonite
0 Lbs. of Sand/Gravel
(none if well is contaminated)

FORMATION: ____ Consolidated
✓ Unconsolidated

Cross-section of sealed well




Draw a sketch showing distance and relations of well site to nearest roads, buildings, etc.




To permit adequate grouting, the casing should remain in place, but ungrouted liner pipes or any other obstructions must be removed. Pressure grouting is the only accepted method.

WAS CASING LEFT IN PLACE? ☒ YES ☐ NO CASING MATERIAL: PVC

WERE OTHER OBSTRUCTIONS REMOVED? ☒ YES ☐ NO WHAT WERE THE OBSTRUCTIONS: None

I certify that this well was sealed in accordance with N.J.A.C. 7:9-9.1 et seq.

John Vogt
Name of Person Doing Sealing Work (Print or Type)

489 Union Bridgewater NJ
Address

11-5-93
Mailing Date

John Vogt
Signature of Person Doing Sealing Work

J-1544
License #

*COPIES: White - Water Allocation Yellow - Owner Pink - Health Dept. Goldenrod - Driller*

DWR-020
10/92

New Jersey Department of Environmental Protection and Energy
Water Supply Element — Bureau of Water Allocation

# WELL ABANDONMENT REPORT

**MAIL TO:**

Bureau of Water Allocation
CN 426
Trenton, NJ 08625-0426

WELL PERMIT # 26-2528
of well sealed

DATE WELL SEALED 10-13-93

PROPERTY OWNER Union Carbide

ADDRESS Grasselli Road Linden NJ Union Co

WELL LOCATION Same as above
Street & No., Township, County

MW2 Lot 3 Block 587
Well No., Lot & Block No., Longitude & Latitude (N.J. Grid # may be substituted for longitude & latitude)

TYPE OF WELL ABANDONED: Monitor

REASON FOR ABANDONMENT: No longer in use

WAS A NEW WELL DRILLED? ☐ YES ☐ NO PERMIT # OF NEW WELL:

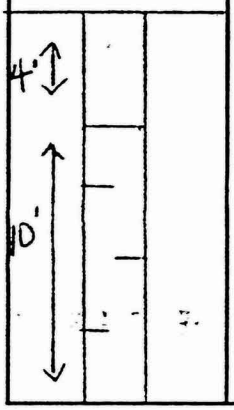
TOTAL DEPTH OF WELL 14'
DIAMETER 4"
CASING LENGTH 4'
SCREEN LENGTH 10'
NUMBER OF CASINGS 2

MATERIAL USED TO SEAL WELL:

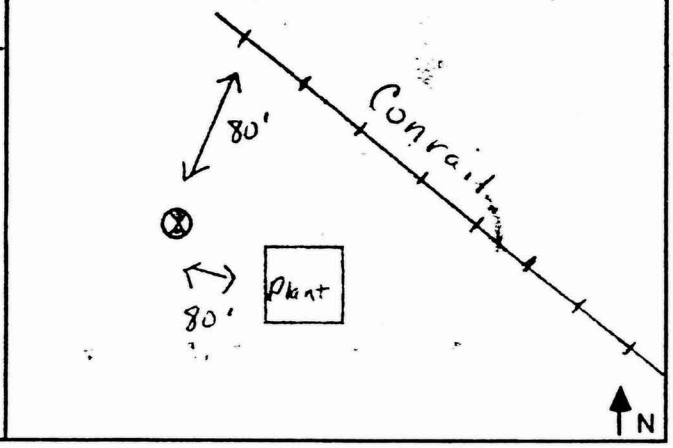
14 Gallons of Water
188 Lbs. of Cement
10 Lbs. of Bentonite
0 Lbs. of Sand/Gravel
(none if well is contaminated)

FORMATION: ___ Consolidated
✓ Unconsolidated

Cross-section of sealed well




Draw a sketch showing distance and relations of well site to nearest roads, buildings, etc.




To permit adequate grouting, the casing should remain in place, but ungrouted liner pipes or any other obstructions must be removed. Pressure grouting is the only accepted method.

WAS CASING LEFT IN PLACE? ☑ YES ☐ NO CASING MATERIAL: PVC

WERE OTHER OBSTRUCTIONS REMOVED? ☑ YES ☐ NO WHAT WERE THE OBSTRUCTIONS: None

I certify that this well was sealed in accordance with N.J.A.C. 7:9-9.1 et seq.

John Vogt
Name of Person Doing Sealing Work (Print or Type)

489 Union Bridgewater NJ
Address

11-5-93
Mailing Date

John Vogt
Signature of Person Doing Sealing Work

J-1544
License #

*COPIES: White - Water Allocation Yellow - Owner Pink - Health Dept. Goldenrod - Driller*

DWR-020
10/92

New Jersey Department of Environmental Protection and Energy
Water Supply Element — Bureau of Water Allocation

# WELL ABANDONMENT REPORT

**MAIL TO:**

Bureau of Water Allocation
CN 426
Trenton, NJ 08625-0426

WELL PERMIT # 26-2526
of well sealed

DATE WELL SEALED 10-13-93

PROPERTY OWNER Union Carbide

ADDRESS Grasselli Road, Linden, NJ, Union Co

WELL LOCATION Same as above
Street & No., Township, County

MW3 Lot 3 Block 587
Well No., Lot & Block No., Longitude & Latitude (N.J. Grid # may be substituted for longitude & latitude)

TYPE OF WELL ABANDONED: Monitor

REASON FOR ABANDONMENT: No longer in use

WAS A NEW WELL DRILLED? ☐ YES ☒ NO PERMIT # OF NEW WELL: _____

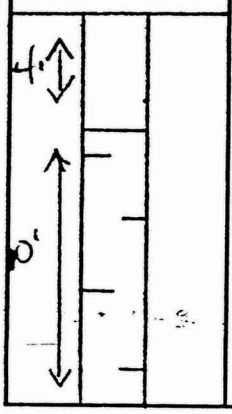
TOTAL DEPTH OF WELL 14'
DIAMETER 4"
CASING LENGTH 4'
SCREEN LENGTH 10'
NUMBER OF CASINGS 2

MATERIAL USED TO SEAL WELL:

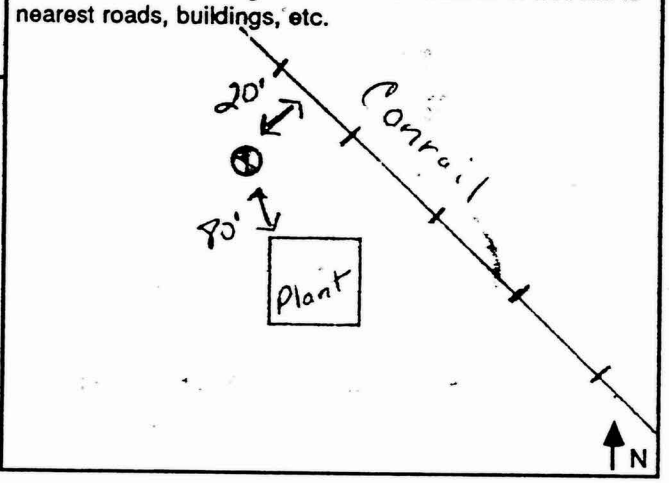
14 Gallons of Water
188 Lbs. of Cement
10 Lbs. of Bentonite
0 Lbs. of Sand/Gravel
(none if well is contaminated)

FORMATION: ___ Consolidated
4 Unconsolidated

Cross-section of sealed well




Draw a sketch showing distance and relations of well site to nearest roads, buildings, etc.




To permit adequate grouting, the casing should remain in place, but ungrouted liner pipes or any other obstructions must be removed. Pressure grouting is the only accepted method.

WAS CASING LEFT IN PLACE? ☒ YES ☐ NO CASING MATERIAL: PVC

WERE OTHER OBSTRUCTIONS REMOVED? ☒ YES ☐ NO WHAT WERE THE OBSTRUCTIONS: None

I certify that this well was sealed in accordance with N.J.A.C. 7:9-9.1 et seq.

John Vogt — Name of Person Doing Sealing Work (Print or Type)
489 Union Bridgewater NJ — Address
11-5-93 — Mailing Date
John Vogt — Signature of Person Doing Sealing Work
J-1544 — License #

*COPIES: White - Water Allocation Yellow - Owner Pink - Health Dept. Goldenrod - Driller*

DWR-020
10/92

New Jersey Department of Environmental Protection and Energy
Water Supply Element — Bureau of Water Allocation

# WELL ABANDONMENT REPORT

**MAIL TO:**

Bureau of Water Allocation
CN 426
Trenton, NJ 08625-0426

WELL PERMIT # 26-25280
of well sealed

DATE WELL SEALED 10-13-93

PROPERTY OWNER Union Carbide

ADDRESS Grasselli Road Linden NJ Union Co

WELL LOCATION Same as above
Street & No., Township, County

MW 4 lot. 3 Block 587
Well No., Lot & Block No., Longitude & Latitude (N.J. Grid # may be substituted for longitude & latitude)

TYPE OF WELL ABANDONED: Monitor

REASON FOR ABANDONMENT: No longer in use

WAS A NEW WELL DRILLED? ☐ YES ☒ NO PERMIT # OF NEW WELL: _____

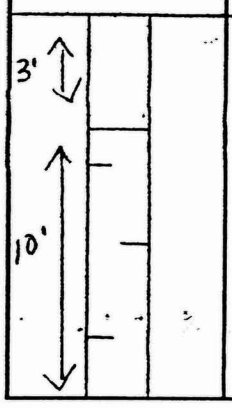
TOTAL DEPTH OF WELL 13'
DIAMETER 4"
CASING LENGTH 3'
SCREEN LENGTH 10'
NUMBER OF CASINGS 2

MATERIAL USED TO SEAL WELL:

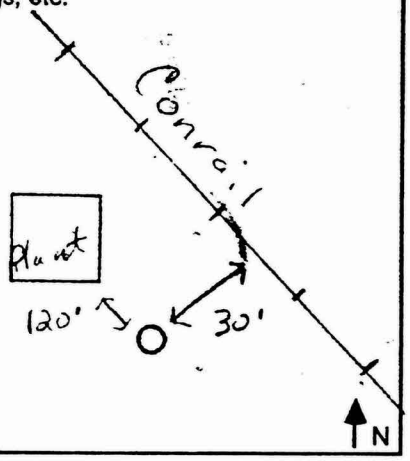
7 Gallons of Water
94.6 Lbs. of Cement
5 Lbs. of Bentonite
3 Lbs. of Sand/Gravel
(none if well is contaminated)

FORMATION: ___ Consolidated
4 Unconsolidated

Cross-section of sealed well




Draw a sketch showing distance and relations of well site to nearest roads, buildings, etc.




To permit adequate grouting, the casing should remain in place, but ungrouted liner pipes or any other obstructions must be removed. Pressure grouting is the only accepted method.

WAS CASING LEFT IN PLACE? ☒ YES ☐ NO CASING MATERIAL: PVC

WERE OTHER OBSTRUCTIONS REMOVED? ☒ YES ☐ NO WHAT WERE THE OBSTRUCTIONS: None

I certify that this well was sealed in accordance with N.J.A.C. 7:9-9.1 et seq.

John Vogt — Name of Person Doing Sealing Work (Print or Type)
489 Union Bridgewater NJ — Address
11-9-93 — Mailing Date

John Vogt — Signature of Person Doing Sealing Work
J-1544 — License #

*COPIES: White - Water Allocation Yellow - Owner Pink - Health Dept. Goldenrod - Driller*

DWR-020
10/92

New Jersey Department of Environmental Protection and Energy
Water Supply Element — Bureau of Water Allocation

# WELL ABANDONMENT REPORT

**MAIL TO:**

Bureau of Water Allocation
CN 426
Trenton, NJ 08625-0426

WELL PERMIT # 26-252
of well sealed

DATE WELL SEALED 10-13-93

PROPERTY OWNER Union Carbide

ADDRESS Grusselli Rd. Linden NJ. Union Co.

WELL LOCATION Same as above
Street & No., Township, County

MW-5 Lot 3 Block 587
Well No., Lot & Block No., Longitude & Latitude (N.J. Grid # may be substituted for longitude & latitude)

TYPE OF WELL ABANDONED: Monitor

REASON FOR ABANDONMENT: No longer in use

WAS A NEW WELL DRILLED? ☐ YES ☐ NO PERMIT # OF NEW WELL: _____

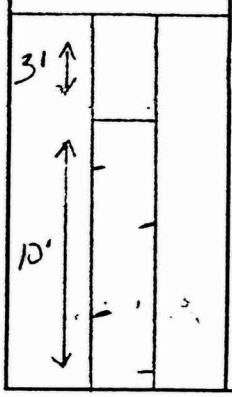
TOTAL DEPTH OF WELL 13'
DIAMETER 4"
CASING LENGTH 3'
SCREEN LENGTH 10'
NUMBER OF CASINGS 2

MATERIAL USED TO SEAL WELL:

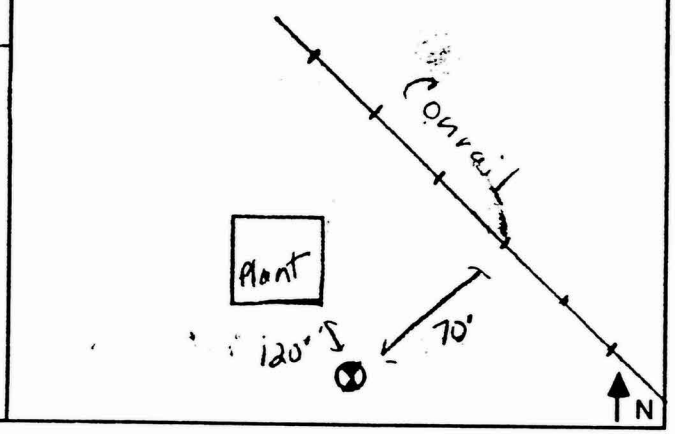
7 Gallons of Water
946 Lbs. of Cement
5 Lbs. of Bentonite
0 Lbs. of Sand/Gravel
(none if well is contaminated)

FORMATION: ____ Consolidated
X Unconsolidated

Cross-section of sealed well




Draw a sketch showing distance and relations of well site to nearest roads, buildings, etc.




To permit adequate grouting, the casing should remain in place, but ungrouted liner pipes or any other obstructions must be removed. Pressure grouting is the only accepted method.

WAS CASING LEFT IN PLACE? ☒ YES ☐ NO CASING MATERIAL: PVC

WERE OTHER OBSTRUCTIONS REMOVED? ☒ YES ☐ NO WHAT WERE THE OBSTRUCTIONS: None

I certify that this well was sealed in accordance with N.J.A.C. 7:9-9.1 et seq.

John Vogt — Name of Person Doing Sealing Work (Print or Type)
489 Union Bridgewater NJ — Address
11.9.93 — Mailing Date
John Vogt — Signature of Person Doing Sealing Work
J-1544 — License #

*COPIES: White - Water Allocation Yellow - Owner Pink - Health Dept. Goldenrod - Driller*

DWR-020
10/92

New Jersey Department of Environmental Protection and Energy
Water Supply Element — Bureau of Water Allocation

# WELL ABANDONMENT REPORT

**MAIL TO:**

Bureau of Water Allocation
CN 426
Trenton, NJ 08625-0426

WELL PERMIT # 26-25286
of well sealed

DATE WELL SEALED 10-13-93

PROPERTY OWNER Union Carbide

ADDRESS Grasell Rd. Linden NJ Union Co

WELL LOCATION Same as above
Street & No., Township, County

MW #6 Lot 3 Block 587
Well No., Lot & Block No., Longitude & Latitude (N.J. Grid # may be substituted for longitude & latitude)

TYPE OF WELL ABANDONED: Montor

REASON FOR ABANDONMENT: No Longer in use

WAS A NEW WELL DRILLED? ☐ YES ☒ NO PERMIT # OF NEW WELL:

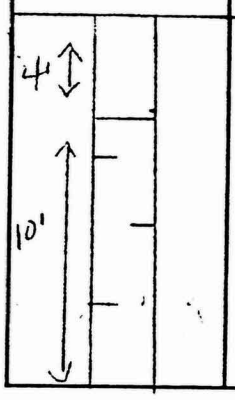
TOTAL DEPTH OF WELL 14'
DIAMETER 4"
CASING LENGTH 4'
SCREEN LENGTH 10'
NUMBER OF CASINGS 2

MATERIAL USED TO SEAL WELL:

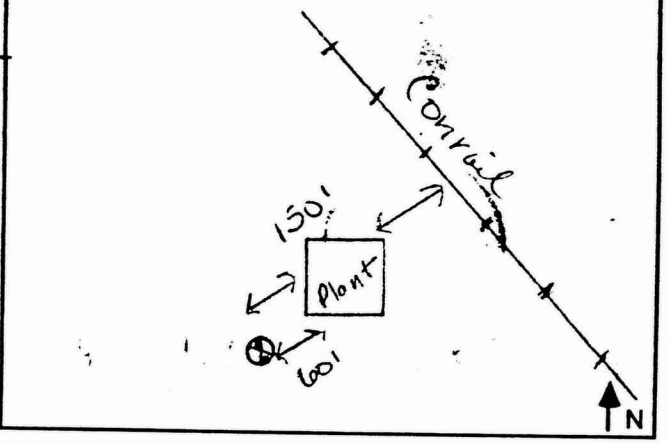
14 Gallons of Water
188 Lbs. of Cement
10 Lbs. of Bentonite
0 Lbs. of Sand/Gravel
(none if well is contaminated)

FORMATION: ___ Consolidated
4 Unconsolidated

Cross-section of sealed well




Draw a sketch showing distance and relations of well site to nearest roads, buildings, etc.




To permit adequate grouting, the casing should remain in place, but ungrouted liner pipes or any other obstructions must be removed. Pressure grouting is the only accepted method.

WAS CASING LEFT IN PLACE? ☒ YES ☐ NO CASING MATERIAL: PVC

WERE OTHER OBSTRUCTIONS REMOVED? ☒ YES ☐ NO WHAT WERE THE OBSTRUCTIONS: None

I certify that this well was sealed in accordance with N.J.A.C. 7:9-9.1 et seq.

John Vogt — Name of Person Doing Sealing Work (Print or Type)
489 Union Ave Bridgewater NJ — Address
11-9-93 — Mailing Date

John Vogt — Signature of Person Doing Sealing Work
J-1544 — License #

*COPIES: White - Water Allocation Yellow - Owner Pink - Health Dept. Goldenrod - Driller*

DWR-020
10/92

New Jersey Department of Environmental Protection and Energy
Water Supply Element — Bureau of Water Allocation

# WELL ABANDONMENT REPORT

MAIL TO:

Bureau of Water Allocation
CN 426
Trenton, NJ 08625-0426

WELL PERMIT # 26-2113-
of well sealed

DATE WELL SEALED 10-13-93

PROPERTY OWNER Union Carbide

ADDRESS Grosselli Rd Linden NJ Union Co

WELL LOCATION Same as above
Street & No., Township, County

MW #7 Lot-3 Block-587
Well No., Lot & Block No., Longitude & Latitude (N.J. Grid # may be substituted for longitude & latitude)

TYPE OF WELL ABANDONED: Monitor

REASON FOR ABANDONMENT: No longer in use

WAS A NEW WELL DRILLED? ☐ YES ☒ NO PERMIT # OF NEW WELL: _____

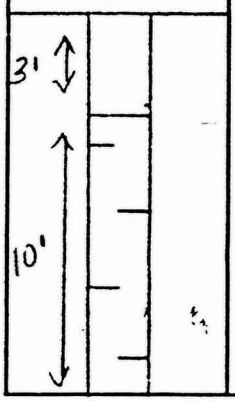
TOTAL DEPTH OF WELL 13'
DIAMETER 4"
CASING LENGTH 3'
SCREEN LENGTH 10'
NUMBER OF CASINGS 2

MATERIAL USED TO SEAL WELL:

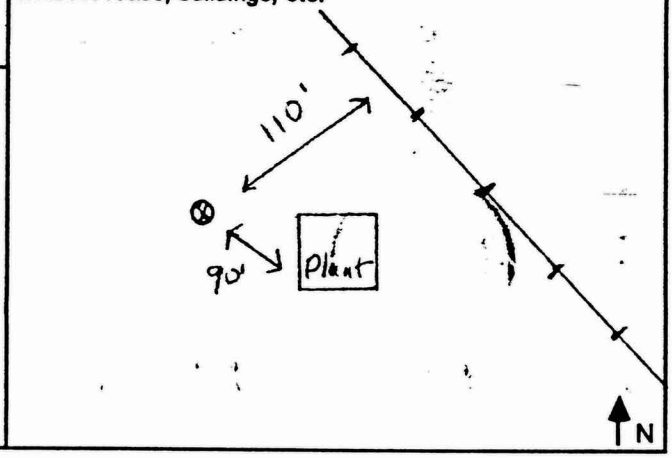
7 Gallons of Water
94.6 Lbs. of Cement
5 Lbs. of Bentonite
0 Lbs. of Sand/Gravel
(none if well is contaminated)

FORMATION: ____ Consolidated
✓ Unconsolidated

Cross-section of sealed well




Draw a sketch showing distance and relations of well site to nearest roads, buildings, etc.




To permit adequate grouting, the casing should remain in place, but ungrouted liner pipes or any other obstructions must be removed. Pressure grouting is the only accepted method.

WAS CASING LEFT IN PLACE? ☒ YES ☐ NO CASING MATERIAL: PVC

WERE OTHER OBSTRUCTIONS REMOVED? ☒ YES ☐ NO WHAT WERE THE OBSTRUCTIONS: None

I certify that this well was sealed in accordance with N.J.A.C. 7:9-9.1 et seq.

John Vogt
Name of Person Doing Sealing Work (Print or Type)

489 Union Bridgewater NJ
Address

11-9-93
Mailing Date

John Vogt
Signature of Person Doing Sealing Work

J-1544
License #

*COPIES: White - Water Allocation Yellow - Owner Pink - Health Dept. Goldenrod - Driller*

DWR-020
10/92

New Jersey Department of Environmental Protection and Energy
Water Supply Element — Bureau of Water Allocation

# WELL ABANDONMENT REPORT

**MAIL TO:**

Bureau of Water Allocation
CN 426
Trenton, NJ 08625-0426

WELL PERMIT # 26-29134 of well sealed

DATE WELL SEALED 10-13-93

PROPERTY OWNER Union Carbide

ADDRESS Grasell. Rd, Linden NJ, Union Co

WELL LOCATION Same as above
Street & No., Township, County

MW#8 Lot 3 Block 587
Well No., Lot & Block No., Longitude & Latitude (N.J. Grid # may be substituted for longitude & latitude)

TYPE OF WELL ABANDONED: Monitor

REASON FOR ABANDONMENT: No longer in use

WAS A NEW WELL DRILLED? ☐ YES ☒ NO PERMIT # OF NEW WELL: _____

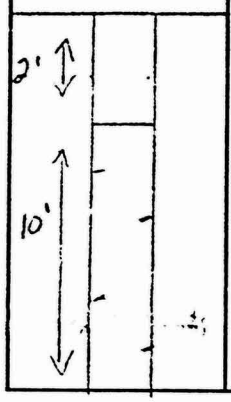
TOTAL DEPTH OF WELL 12'
DIAMETER 4"
CASING LENGTH 2'
SCREEN LENGTH 12'
NUMBER OF CASINGS 2

MATERIAL USED TO SEAL WELL:

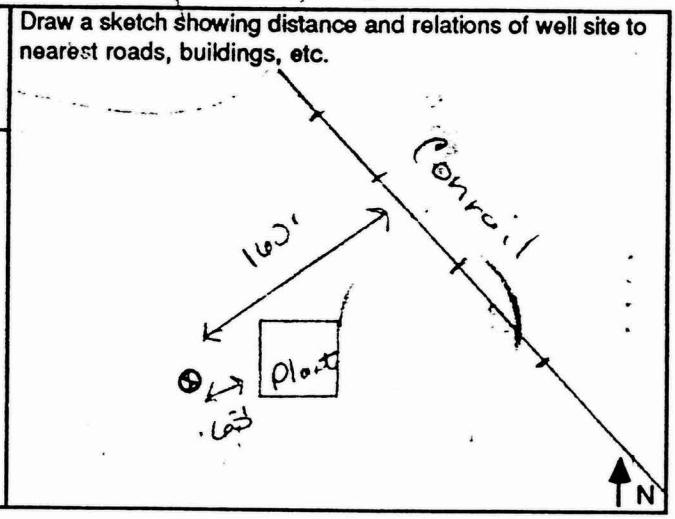
7 Gallons of Water
94 4 Lbs. of Cement
5 Lbs. of Bentonite
0 Lbs. of Sand/Gravel
(none if well is contaminated)

FORMATION: ____ Consolidated
✓ Unconsolidated

Cross-section of sealed well




Draw a sketch showing distance and relations of well site to nearest roads, buildings, etc.




To permit adequate grouting, the casing should remain in place, but ungrouted liner pipes or any other obstructions must be removed. Pressure grouting is the only accepted method.

WAS CASING LEFT IN PLACE? ☒ YES ☐ NO CASING MATERIAL: PVC

WERE OTHER OBSTRUCTIONS REMOVED? ☒ YES ☐ NO WHAT WERE THE OBSTRUCTIONS: None

I certify that this well was sealed in accordance with N.J.A.C. 7:9-9.1 et seq.

John Vogt — Name of Person Doing Sealing Work (Print or Type)

489 Union Bridgewater NJ — Address

11-9-93 — Mailing Date

John Vogt — Signature of Person Doing Sealing Work

J-1544 — License #

*COPIES: White - Water Allocation Yellow - Owner Pink - Health Dept. Goldenrod - Driller*

# ATTACHMENT 4

State of New Jersey

Christine Todd Whitman
*Governor*

Department of Environmental Protection

Robert C. Shinn, Jr.
*Commissioner*

JUN 20 1995

N. A. DiFranco
Praxair Inc.
Industrial Ave., Box 237
Keasbey, NJ 08832

RE: Industrial Establishment: Linde Gases of the Mid-Atlantic Inc.
Location: S. Wood Ave., Linden City, Union County
Block: 00587 Lot: 00003 (Leasehold only)
ISRA Case # 90367
Transaction: Sale of Business, Cessation of Operations
Negative Declaration Affidavit by operator dated March 27, 1995

Dear Mr. DiFranco:

Pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (NJDEP) by the Industrial Site Recovery Act (ISRA), formerly known as the Environmental Cleanup Responsibility Act (ECRA), (N.J.S.A. 13:1K-6 et seq.) and duly delegated to the Assistant Director of the Industrial Site Evaluation Element pursuant to N.J.S.A. 13:1B-4, the referenced Negative Declaration Affidavit is hereby approved. This approval is based upon information provided in your Initial Notice as well as NJDEP review of the site.

Please be advised that areas exist which contain contaminant concentrations above current NJDEP residential direct contact soil cleanup criteria. Therefore, site use is being restricted. Appropriate institutional controls and engineering controls are currently in place, including, but not limited to, a Declaration of Environmental Restrictions, which has been recorded pursuant to N.J.S.A. 58:10B-13.

This No Further Action letter is for the leasehold portion of the property only. This does not apply to the elevated metals contamination found during background sampling which may be due to historical fill materials.

This notice will serve to release the Remediation Funding Source to Praxair Inc. for the Administrative Consent Order signed on May 25, 1993 and any other funds held pending compliance with ISRA.

This approval shall be limited to the above referenced transaction only and shall not restrict or prohibit the NJDEP or any other agency from taking regulatory

RECEIVED

JUN 23 1995

action under any other statute, rule or regulation. By issuing this No Further Action letter, NJDEP continues to reserve all rights to pursue any penalties allowable under the law for violations of the ISRA statute or ECRA regulations associated with this transaction.

Sincerely,

Wayne C. Howitz, Assistant Director
Industrial Site Evaluation Element

c: Henry F. Gavan, Linden Board of Health
301 North Wood Ave.
Linden, NJ 07036
Brian Sogorka, BEERA (was Debbie Bessen)
Beverly Phillips, BGWPA
BAC, Registration number 0054146
Tina Layre, BAC
Suzanne E. Blanchard, Cohen, Shapiro, Polisher, Shiekman and Cohen
Princeton Pike Corporate Center
1009 Lenox Drive - Building Four
Lawrenceville, NJ 08648
Randall W. Hansen, LCP Chemicals New Jersey
P. O. Box 484
Linden, NJ 07036

# ATTACHMENT 5

014893

RECEIVED & RECORDED

95 MAR 31 AM 11:57

JOANNE RAJOPPI
REGISTER

# DECLARATION OF ENVIRONMENTAL RESTRICTIONS

APR 4 1995
CITY CLERK'S OFFICE

Prepared by:

Suzanne E. Blanchard, Esquire

This Declaration of Environmental Restrictions, made as of the 23RD day of SEPTEMBER 1994, by LCP Chemicals New Jersey, A Division of Hanlin Group, Inc. (formerly LCP Chemicals & Plastics, Inc.) of Raritan Plaza II, Raritan Center, Edison, New Jersey 08818, together with its successors and assigns (collectively "Owner").

W I T N E S S E T H:

WHEREAS, Owner is the owner in fee simple of certain real property (the "Property") designated as Lot 3, Block 587 on the tax map of the City of Linden, Union County, more particularly described on Exhibit Aattached hereto and made a part hereof; and

WHEREAS, the New Jersey Department of Environmental Protection and Energy ("Department") has issued a remedial approval in ECRA/ISRA Case Number 90367, Linde Gases of the Mid-Atlantic, concerning the Property in which the Department has approved the use of nonresidential soil standards, institutional controls, and engineering controls in accordance with P. L. 1993 c. 139 (S-1070); and

WHEREAS, this Declaration itself is not intended to create any interest in real estate in favor of the Department, nor to create a lien or encumbrance against the Property, but merely is intended to reflect the regulatory and statutory obligations imposed as a condition of using nonresidential standards: and

WHEREAS, the area described on Exhibit B attached hereto and made a part hereof (the "Identified Area") contains contaminants;

WHEREAS, the type, concentration and specific location of the contaminants are described on one or more diagrams, maps and/or tables on Exhibit B attached hereto and made a part hereof; and

WHEREAS, to prevent the potential for unacceptable risk of exposure to the contamination of humans or the environment, the Identified Area is and will remain paved, and the location of the paving is shown in Exhibit B; and

WHEREAS, in accordance with the remedial approval, and in consideration of the terms and conditions of the remedial approval, and other good and valuable consideration Owner has agreed to subject the Property to certain statutory and regulatory requirements which impose

restrictions upon the use of the Property, and to restrict certain activities at the Property, as set forth below; and

WHEREAS, Owner intends to notify all interested parties that such regulatory and statutory restrictions shall be binding upon and enforceable against Owner and Owner's successors and assigns while such own and/or operate at the Property.

NOW, THEREFORE, Owner agrees to be subject to the regulatory and statutory requirements applicable to those who seek to remediate property to nonresidential direct contact soil cleanup criteria and hereby notifies all interested parties, owners, and operators that the applicable regulations and statutes require of Owner and operators while owning or operating the Property as follows:

1. RESTRICTED USES.

(a) Owner, and all operators of the Identified Area (as described on Exhibit B), shall allow only nonresidential use of such Identified Area.

2. WRITTEN APPROVAL FOR PROJECTS INVOLVING ALTERATIONS, IMPROVEMENTS, AND DISTURBANCES AT THE IDENTIFIED AREAS. Owner and operators shall not make, nor allow to be made, any alteration, improvement, or disturbance in, to, or about the Identified Area which creates an unacceptable risk of exposure to contamination to humans or the environment, or results in a disturbance of any engineering control designed to contain or reduce exposure to the contaminants, without first obtaining the express written consent of the Department, which consent shall be given or withheld at the reasonable discretion of Department. Nothing herein shall constitute a waiver of the Owner's obligation to comply with all applicable laws and regulations.

3. EMERGENCY PROJECTS. In the event of an emergency which presents a significant risk to human health, safety, or the environment, the application of Paragraph 2 above may be unilaterally suspended by the Owner, provided the Owner:

(a) Immediately notifies the Department of the emergency;

(b) Limits both the actual disturbance and the time needed for the disturbance to the minimum reasonably necessary to adequately respond to the emergency;

(c) Implements all measures necessary to limit actual or potential, present or future risk of exposure to the residual contamination to humans or the environment; and

(d) Implements restoration of the disturbed areas to the preemergency conditions to the extent reasonably possible, and provides a report to the Department of such emergency efforts.

4. EXEMPTED PROJECTS. Express written consent of the Department is not required for any alteration, improvement, or disturbance that:

(a) provides for restoration of any disturbance of an engineering control to pre-disturbance conditions within sixty days of completion of the project causing such disturbance, and

(b) does not create contaminant levels above those specified in Exhibit B, provided that all applicable worker health and safety laws and regulations are followed during the alteration, improvement, or disturbance.

5. NOTICE TO LESSEES AND OTHER HOLDERS OF PROPERTY INTERESTS.

(a) Owner shall cause all leases, grants, and other written transfers of interest by the Owner in the Property to contain a provision expressly requiring all holders thereof to take the Property subject to the use restriction and not to violate any of the conditions of this Declaration of Environmental Restrictions.

(b) Nothing contained in this paragraph 5 shall be construed as limiting any obligation of Owner to provide any notice required by any law, regulation, or order of any governmental authority.

6. ENFORCEMENT OF VIOLATIONS. The restrictions provided herein are for the benefit of the Department and shall be enforceable against any person who knowingly violates this Declaration, solely by the Department. A violation of this Declaration of Environmental Restrictions shall not have an adverse impact on the status of the ownership of and title to the Property. To enforce violations of this Declaration of Environmental Restrictions, the Department may initiate an action in Superior Court or as otherwise allowed by law against any person who is in any way responsible for a violation hereof and seek all available remedies, including without limitation, penalties and injunctive relief. Such enforcement proceedings shall not be initiated against past Owners or operators who have not violated this Declaration.

7. SEVERABILITY. If any court or other tribunal determines that any provision of this Declaration is invalid or unenforceable, such provision shall be deemed to have been modified automatically to conform to the requirements for validity and enforceability as determined by such court or tribunal. In the event that the provision invalidated is of such a nature that it cannot be so modified, the provision shall be deemed deleted from this instrument as though it had never been included herein. In either case, the remaining provisions of this Declaration shall remain in full force and effect.

8. SUCCESSORS AND ASSIGNS. This Declaration shall be binding upon Owner and upon Owner's successors and assigns, and the Department, its agents, contractors, and employees, and to any other person performing remediation under the direction of the Department.

9. TERMINATION AND MODIFICATION.

(a) This Declaration shall terminate only upon filing of an instrument, executed by the Department, in the office of the Register of Deeds and Mortgages of Union County, New Jersey, expressly terminating this Declaration.

(b) Owner may request in writing at any time that the Department modify or terminate this Declaration of Environmental Restrictions or execute termination proceedings based on, for example, the Owner's proposal that the property does not pose an unacceptable risk to human health or the environment. Within 90 calendar days after receiving the request the Department shall either:

i. execute the termination or modification of this Declaration; or

ii. issue a draft notice of intent to deny.

The Department shall set forth in a draft notice of intent to deny the request its basis for its decision. The Owner can respond to the draft denial by providing new or additional information or data. The Department shall review any such new or additional information and issue a final decision to execute the agreement or deny the request within 60 calendar days of the Department's receipt of the Owner's response.

IN WITNESS WHEREOF, Owner has executed this Declaration as of the date first written above.

ATTEST:

LCP CHEMICALS NJ,
A DIVISION OF HANLIN
GROUP, INC.

By: Acting CEO

RANDALL HANSEN, ACTING CHIEF
EXECUTIVE OFFICER

By:



F:\FS3\35061001\DOCS\SEBDEED.LND
10/7/93 12:01PM

STATE OF NEW JERSEY

SS.:

COUNTY OF UNION

I certify that on 23, 1994, RANDALL HANSEN personally came before me, and this person acknowledged under oath, to my satisfaction, that:

(a) this person is the ACTING CHIEF EXECUTIVE OFFICER of Hanlin Group, Inc., the corporation named in this document;

(b) this person is the attesting witness to the signing of this document by the proper corporate officer who is the president of the corporation;

(c) this document was signed and delivered by the corporation as its voluntary act and was duly authorized;

(d) this person knows the proper seal of the corporation which was affixed to this document; and

(e) this person signed this proof to attest to the truth of these facts.

Signed and sworn before me on this 23rd

day of September, 1994.

Lynne Wagner

Notary Public

LYNNE C. WAGNER
A Notary Public of New Jersey
My Commission Expires October 19, 1998

Exhibit A

Description of Property to be Conveyed
to Linden Chlorine Products, Inc.
by GAF Corporation
City of Linden, Union County, New Jersey

BEGINNING at the terminus of the Second Course of the Second Tract in a deed from Central Railroad Company of New Jersey to General Aniline & Film Corporation dated January 19, 1967, and recorded on January 20, 1967 in Deed Book 2794 on Page 745 in the Union County Register's Office; Thence

(1) North 58°-57'-30" East, seventeen feet (17.00) to a point; Thence

(2) North 31°-02'-30" West, three hundred ten feet and fifty eight one-hundredths of a foot (310.58) to a point;

Thence (3) North 28°-58'-40" West, eighty seven feet and seven one-hundredths of a foot (87.07) to a point of curve;

Thence (4) Curving to the right along a curve having a Radius of three hundred forty feet and ninety one one-hundredths of a foot (340.91) an arc distance of one hundred fifty three feet and twenty five one-hundredths of a foot (153.25) to a point of tangency;

Thence (5) North 3°-13'-20" West, sixty nine feet and thirty two one-hundredths of a foot (69.32) to a point;

Thence (6) Curving to the right along a curve having a Radius of one thousand four hundred seven feet and sixty nine one-hundredths of a foot (1,407.69) an arc distance of one hundred ninety five feet and seventy one one-hundredths of a foot (195.71) to a point;

Thence (7) North 75°-50'-28" East, two hundred nineteen feet and seventy four one-hundredths of a foot (219.74) to a point;

Thence (8) South 64°-52'-17" East, nine hundred eighty three feet and twelve one-hundredths of a foot (983.12) to a point in the Pierhead and Bulkhead line of the Arthur Kill;

Thence (9) North 2°-42'-17" West, along the said Pierhead and Bulkhead line of the Arthur Kill, eighty six feet and forty one-hundredths of a foot (86.40) to a point;

Thence (10) North 18°-11'-43" East, continuing along the said Pierhead and Bulkhead line of the Arthur Kill, forty three feet and ninety two one-hundredths of a foot (43.92) to a point;

Thence (11) North 64°-52'-17" West, six hundred five feet and twenty seven one-hundredths of a foot (605.27) to a point of curve;

Thence (12) Curving to the right along a curve having a Radius of two hundred fifty feet (250.00) an arc distance of one hundred ninety five feet and forty two one-hundredths of a foot (195.42) to a point of tangency;

Thence (13) North 20°-05' West, five hundred seventy five feet and one one-hundredth of a foot (575.01) to a point;

Thence (14) North 74°-55' West, two hundred six feet and nineteen one-hundredths of a foot (206.19) to a point;

Thence (15) North 15°-05' East, one hundred sixty four feet and forty one-hundredths of a foot (164.40) to a point;

Thence (16) North 74°-52' West, three hundred seventy two feet and ten one-hundredths of a foot (372.10) to a point;

Thence (17) North 15°-17' East, forty four feet and fifty nine one-hundredths of a foot (44.59) to a point;

Thence (18) North 74°-55' West, twenty seven feet and eighty four one-hundredths of a foot (27.84) to a point;

Thence (19) South 64°-23'-30" West, one hundred thirty three feet and twenty eight one-hundredths of a foot (133.28) to a point;

Thence (20) South 15°-46' West, one hundred three feet (103.00) to a point;

Thence (21) North 87°-03'-11" West, forty one feet and eighty nine one-hundredths of a foot (41.89) to a point;

Thence (22) North 75°-25' West, seventy five feet and fifty four one-hundredths of a foot (75.54) to a point;

Thence (23) North 54°-56' West, one hundred seventeen feet and forty seven one-hundredths of a foot (117.47) to a point;

Thence (24) North 79°-38'-10" West, two hundred thirty three feet and eighty three one-hundredths of a foot (233.83) to a point;

Thence (25) North 82°-00'-12" West, ninety four feet and sixty seven one-hundredths of a foot (94.67) to a point;

Thence (26) South 37°-56' West, three hundred feet (300.00) to a point in the Sixth Course of the First Tract in the recorded deed mentioned hereinbefore;

Thence (27) South 52°-18' East, along part of said Sixth Course in the recorded deed mentioned hereinbefore, seven hundred eighty two feet and forty two one-hundredths of a foot (782.42) to a point;

Thence (28) South 46°-03'-10" East, along the Seventh Course in the recorded deed mentioned hereinbefore, five hundred twenty two feet and seventy seven one-hundredths of a foot (522.77) to a point;

Thence (29) South 31°-07'-30" East, three hundred twenty feet and sixty five one-hundredths of a foot (320.65) to a point;

Thence (30) South 58°-52'-30" West, two feet and ninety six one-hundredths of a foot (2.96) to point;

Thence (31) South 31°-02'-30" East, five hundred thirty feet (530.00) to the point and place of BEGINNING.

Easements and Other Agreements

Reservation by Central Railroad of New Jersey of the right of ingress and egress in common with GAF Corporation and others, over a 24 foot wide driveway, in Deed Book 2356, Page 634, in Union County. Union Carbide and Carbon Corporation (Linde Division) has been granted a right to use said driveway.

Grant of easement to Elizabethtown Water Company, in Deed Book 2739, Page 990, and in Deed Book 2917, Page 226, in Union County, New Jersey.

Grant of easement to Elizabethtown Consolidated Gas Company in Deed Book 2608, Page 138, and in Deed Book 2611, Page 213, in Union County, New Jersey.

Grant of right of way and easement to City of Linden, in Deed Book 533, Page 233, Deed Book 533, Page 589, Deed Book 588, Page 499, and relocated in Deed Book 2681, Page 225, Deed Book 2924, Page 209, and Deed Book 2946, Page 162, in Union County, New Jersey.

Sidetrack agreements and the operating agreement between The Central Railroad Company of New Jersey and General Aniline & Film Corporation, in Deed Book 2795, Page 925. The parties understand that sidetrack agreements and operating agreement or agreements are being prepared by The Railroad Company to cover railroad tracks on respective lands of parties.

Grant to Linden Roselle Sewerage Authority in Deed Book 1898, Page 168, in Union County, New Jersey.

Grants of rights of way to Elizabethtown Water Company for 12 inch water line along and east of former Sound Shore Railroad Company. (Not recorded.)

Grant to Union Carbide and Chemical Company of a right of way for a nitrogen pipeline, dated November 3, 1967, recorded January 2, 1968, in Deed Book 2821, Page 929.

Railroad License Agreement and Road Agreement in Deed Book 1847, Page 79, in Union County, New Jersey.

Rights granted to the Linden Roselle Sewerage Authority for a 24 inch force main and 30 inch storm sewer.

Agreements, dated January 17, 1956, April 6, 1970 and January 27, 1971, with Public Service Company of New Jersey relating to certain encroachments and for rights to install electric lines and to install road lighting on poles along the road and in the area of the substation.

Lease agreement with Union Carbide & Carbon Corporation dated March 22, 1957 as amended and grant of easement rights to Union Carbide & Carbon Corporation for hydrogen, steam, brackish water, fresh water pipelines and sewer lines. (Not recorded.)

The rights, easements and rights of way granted pursuant to the Agreement of June 16, 1972 between the parties and to be executed at the Closing.

Easement Agreement with Central Railroad of New Jersey in Deed Book 2771, Page 858, in Union County.

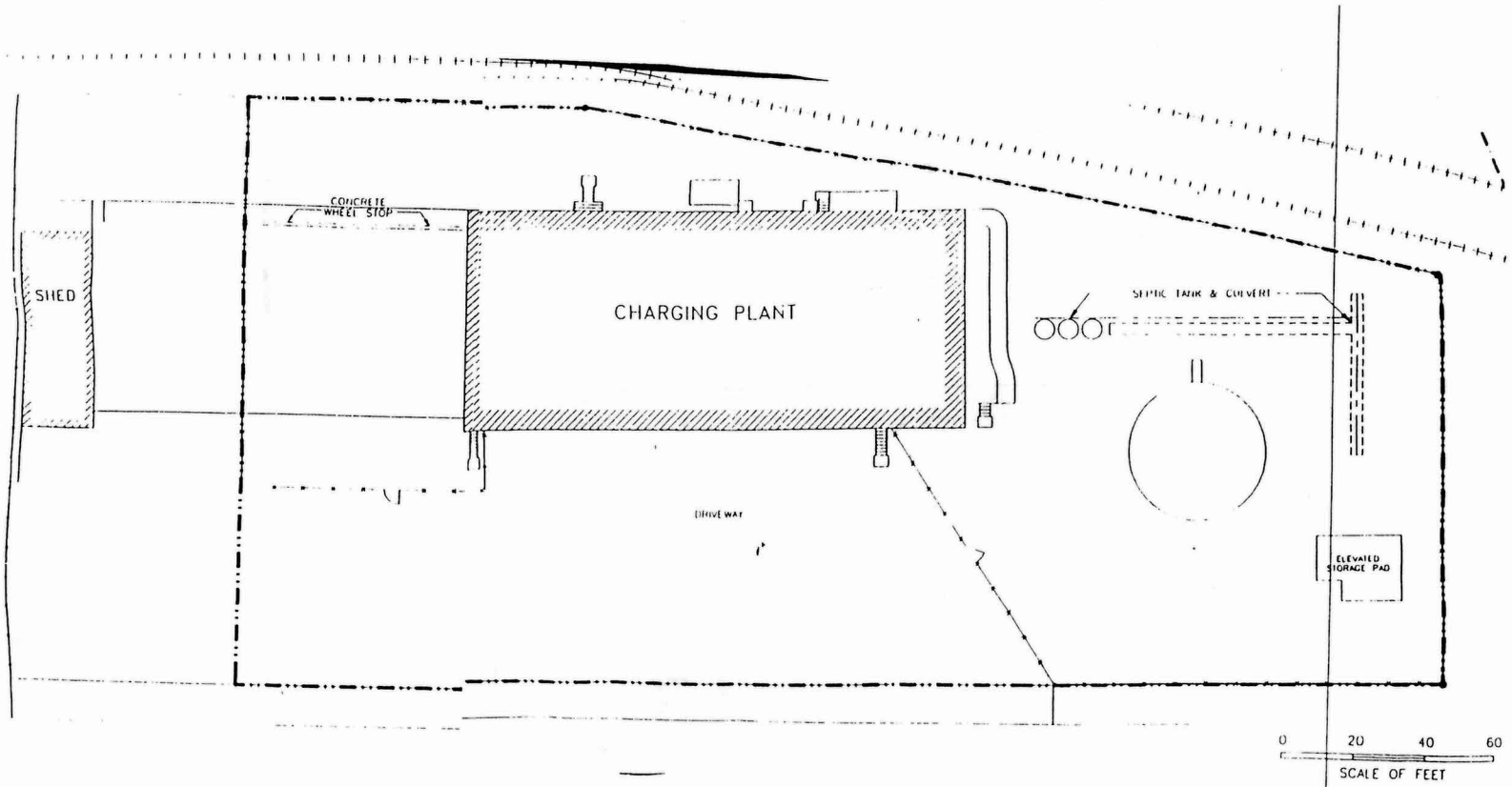
Easement Agreement with Sinclair Refining Company in Deed Book 2802, Page 542, in Union County.

Assignment Agreement in Deed Book 2802, Page 839, in Union County.

Pipeline Easement in Deed Book 2821, Page 929, in Union County.

Grant to Elizabethtown Gas Company in Deed Book 2909, Page 697, in Union County.

Exhibit B




LEGEND

CURRENT LOT LINE

FENCE LINE

BLOCK LINE

RAILROAD

NEW ASPHALT

| REV | DATE | DESCRIPTION OF REVISION | REV BY | ENG | CHKD BY | APPVD BY |
|---|---|---|---|---|---|---|
| 0 | 6/21/94 | DEVELOPED DRAWING | EKW/DWB | PD | | PD |

PROJECT MANAGER: P. DIMAKOS | DRAWN BY: M.S. MAIBACH, SR

INTERNATIONAL TECHNOLOGY CORPORATION

FIGURE 3
AS BUILT OF FACILITY LAYOUT
LINDE FACILITY
LINDEN, NEW JERSEY
Prepared For
PRAXAIR, INC

TONAWANDA, NEW YORK
PROJECT No 529326
JUNE 1994

| LAYER(S) | DATE INITIATED | DRAWING NUMBER |
|---|---|---|
| FIGURE 1 | 9/8/90 | 529326-D1 |

| REV. | DATE | DESCRIPTION OF REVISION | REV. BY | ENG | CHKD BY | APPVD BY |
|---|---|---|---|---|---|---|
| 0 | 6/21/94 | DEVELOPED DRAWING | E.K.W. | P.D. | | P.D. |

PROJECT MANAGER: P. DIMAKOS | DRAWN BY: M.S. MAIBACH, SR.

INTERNATIONAL TECHNOLOGY CORPORATION

FIGURE 2

FACILITY LAYOUT WITH AREAS OF CONCERN, SOIL SAMPLING LOCATIONS AND ANALYTICAL RESULTS

Prepared For:

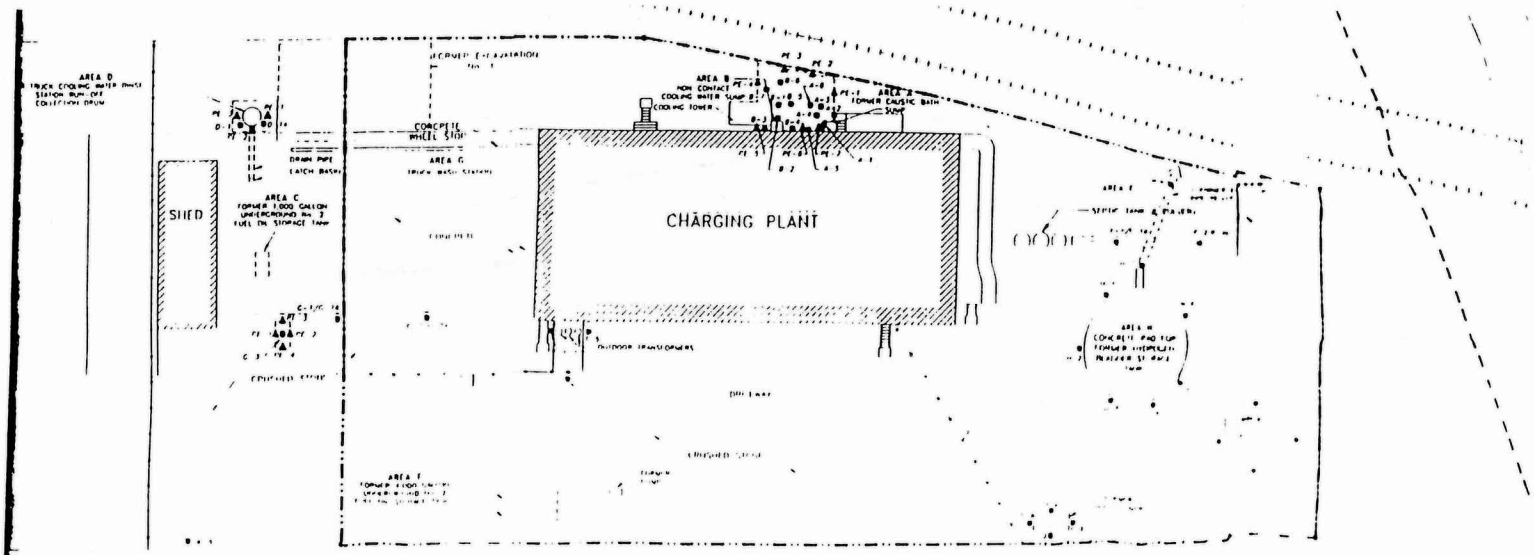
PRAXAIR, INC.
TONAWANDA, NEW YORK
PROJECT No. 529326
JUNE 1994

| LAYER(S) | DATE INITIATED | DRAWING NUMBER |
|---|---|---|
| 0 | 9/8/90 | 529326-E1 |

LEGEND

- LOT LINE
- FENCE LINE
- BLOCK LINE
- RAILROAD
- POST EXCAVATION SOIL SAMPLE LOCATION
- SOIL SAMPLE LOCATION
- PERIMETER EXCAVATION

0 20 40 60
SCALE OF FEET



## SAMPLING DATE JUNE 12, 1990

| SAMPLE POINT | A-1 | A-2 | B-1 | B-2 | D-1 | F SLUDGE | F LIQUID |
|---|---|---|---|---|---|---|---|
| SAMPLE DEPTH | 1-1.5 | 1-1.5 | 1-1.5 | 1-1.5 | 1-1.5 | | |
| METALS (ppm) | | | | | | | |
| Antimony | 31 | 83 | 130 | 22 | NA | NA | NA |
| Arsenic | 65 | 130 | 200 | 100 | NA | NA | NA |
| Beryllium | 40 | 25 | 14 | 17 | NA | NA | NA |
| Cadmium | 10 | 15 | 10 | 17 | NA | NA | NA |
| Chromium | 71 | 81 | 87 | 100 | NA | NA | NA |
| Copper | 11,000 | 140 | 3,800 | 3,700 | NA | NA | NA |
| Lead | 14,000 | 7,900 | 7,300 | 7,000 | NA | 80 | 0.0001 |
| Mercury | 0.79-2.5 | 2.3 | 0.40 | 7.6 | 34 | NA | NA |
| Nickel | 14,000 | 390 | 550 | 340 | NA | NA | NA |
| Selenium | 1.8 | 2.1 | 1.5 | 2.7 | NA | NA | NA |
| Silver | 5.7 | 4.1 | 3.0 | 3.5 | NA | ND | NA |
| Thallium | ND | ND | ND | ND | NA | ND | NA |
| Zinc | 1,000 | 72,000 | 58,000 | 28,000 | NA | | |
| TOTAL PRIORITY POLLUTANT VOLATILE ORGANICS (ppm) | ND | 0.007 | NA | NA | NA | NA | NA |
| TOTAL PRIORITY POLLUTANT BASE/NEUTRAL ORGANICS (ppm) | NA | NA | NA | NA | NA | 20 | 0.034 |
| TOTAL PETROLEUM HYDROCARBONS (ppm) | 70 | 87 | 300 | 120 | 430 | NA | NA |

1 "NA" signifies not analyzed
2 "ND" signifies not detected

## SAMPLING DATE AUGUST 7, 1991

| SAMPLE POINT | F-1A | F-2A |
|---|---|---|
| SAMPLE DEPTH | 3.5-4.0' | 3.5-4.0' |
| METALS (ppm) | | |
| Antimony | 100 | 210 |
| Arsenic | 270 | 390 |
| Beryllium | 42 | 9.7 |
| Cadmium | ND | 2.4-4.4 |
| Chromium | 120 | 74 |
| Copper | 11,000 | 3,800-7,400 |
| Lead | 12,000 | 4,900-6,700 |
| Nickel | 670 | 300-430 |
| Selenium | 4.3 | 4.8 |
| Silver | 3.8 | 2.9 |
| Thallium | ND | ND |
| Zinc | 100,000 | 28,000-48,000 |
| TOTAL PETROLEUM HYDROCARBONS (ppm) | ND | NA |

## SAMPLING DATE APRIL 17, 1992

| | AREA D/G | | | | | AREA G-3 | | |
|---|---|---|---|---|---|---|---|---|
| SAMPLE POINT | PE-1 | PE-2 | PE-3 | PE-1 | PE | PE-3 | PE-4 | FIELD BLANK |
| SAMPLE DEPTH | 2.5-3.0' | 2.3-3.0' | 2.5-3.0' | 1.5-2.0' | 1.5 | 1.5-2.0' | 1.5-2.0 | |
| PRIORITY POLLUTANT METALS (ppm) | | | | | | | | |
| Antimony | 220 | 18 | 81 | NA | N | NA | NA | ND |
| Arsenic | 110 | 13 | 73 | NA | N | NA | NA | ND |
| Beryllium | ND | ND | 1.1 | NA | N | NA | NA | ND |
| Cadmium | 1.4 | ND | 0.85 | NA | N | NA | NA | ND |
| Chromium | 31 | ND | 18 | NA | N | NA | NA | ND |
| Copper | 1,100 | 380 | 680 | NA | N | NA | NA | 44 |
| Lead | 1,300 | 120 | 540 | NA | N | NA | NA | ND |
| Mercury | 1.7 | 0.41 | 1.1 | NA | N | NA | NA | ND |
| Nickel | 110 | 25 | 80 | NA | N | NA | NA | ND |
| Selenium | ND | ND | ND | NA | N | NA | NA | ND |
| Silver | 2.5 | ND | 1.3 | NA | N | NA | NA | ND |
| Thallium | ND | ND | ND | NA | N | NA | NA | ND |
| Zinc | 8,200 | 1,500 | 4,400 | NA | N | NA | NA | 58 |
| BASE/NEUTRAL ORGANICS (ppm) | | | | | | | | |
| Bis(2-Ethylhexyl)phthalate | NA | NA | NA | 1.2 | N | 2.6 | ND | ND |
| Naphthalene | NA | NA | NA | ND | N | ND | 1.8 | ND |
| Phenanthrene | NA | NA | NA | ND | N | 0.89 | ND | ND |
| TOTAL PRIORITY POLLUTANT BASE/NEUTRAL ORGANICS (ppm) | NA | NA | NA | 1.2 | N | 3.5 | 1.8 | ND |
| | | | | | | 34.8 | 60.9 | 0.33 |

## SAMPLING DATE JUNE 4, 1991

| SAMPLE POINT | B-3 | B-4 | B-5 | B-5 | B-6 | B-6 | B-7 | B-7 |
|---|---|---|---|---|---|---|---|---|
| SAMPLE DEPTH | 1.0-1.5' | 1.0-1.5' | 1.0-1.5' | 4.0-4.5' | 1.0-1.5' | 4.0-4.5' | 1.0-1.5' | 4.0-4.5' |
| PARAMETERS METALS (ppm) | | | | | | | | |
| Antimony | 29 | 36 | 51 | 15 | 50 | 48 | 17 | 74 |
| Arsenic | 98 | 160 | 170 | 340 | 44 | 530 | 180 | 170 |
| Beryllium | 39 | 18 | 8.7 | 5.7 | 5.9 | 4.9 | 20 | 4.9 |
| Cadmium | 15 | 14 | 16 | 31 | 5.4 | 36 | 14 | ND |
| Chromium | 75 | 68 | 78 | 82 | 55 | 170 | 87 | ND |
| Copper | 8,900 | 5,600 | 3,700 | 4,100 | 1,900 | 4,700 | 5,100 | ND |
| Lead | 10,000 | 7,300 | 4,900 | 5,200 | 2,500 | 6,200 | 7,200 | ND |
| Mercury | 1.8 | 2.1 | 1.5 | 0.72 | 0.91 | 0.45 | 22 | ND |
| Nickel | 1,000 | 670 | 400 | 420 | 260 | 550 | 550 | ND |
| Selenium | 8.1 | 3.8 | 2.2 | 2.8 | 1.2 | 7.0 | 5.8 | 5.1 |
| Silver | 4.1 | 3.4 | 2.1 | 3.0 | 1.3 | 5.8 | 2.3 | 4.2 |
| Thallium | ND | ND | ND | ND | ND | ND | ND | ND |
| Zinc | 95,000 | 57,000 | 31,000 | 25,000 | 22,000 | 28,000 | 53,000 | 29,000 |

0 20 40 60
SCALE OF FEET

| REV # | DATE | DESCRIPTION OF REVISION | REV BY | ENG | CHKD BY | APPVD BY |
|---|---|---|---|---|---|---|
| 0 | 6/21/94 | DEVELOPED DRAWING | EKW | PD | | PD |

PROJECT MANAGER P. DINAKOS | DRAWN BY M.S. MAIBACH, SR

IT INTERNATIONAL TECHNOLOGY CORPORATION

FIGURE 2

FACILITY LAYOUT WITH AREAS OF CONCERN, SOIL SAMPLING LOCATIONS AND ANALYTICAL RESULTS

Prepared For

PRAXAIR, INC
TONAWANDA, NEW YORK
PROJECT No. 529326
JUNE 1994

| LAYER(S) | DATE INITIATED | DRAWING NUMBER |
|---|---|---|
| 0 | 9/8/90 | 529326-E1 |

## SAMPLING DATE APRIL 16.1992

| SAMPLE POINT | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | FIELD BLANK |
|---|---|---|---|---|---|---|---|---|
| SAMPLE DEPTH | 4.0-4.5 | 4.0-4.5 | 4.0-4.5 | 4.0-4.5 | 4.0-4.5 | 4.0-4.5 | 4.0-4.5 | |
| PARAMETERS | | | | | | | | |
| METALS (ppm) | | | | | | | | |
| Antimony | | | | | | | | |
| Arsenic | 180 | 150 | 180 | 130 | 110 | 90 | 170 | |
| Barium | 870 | 830 | 1,800 | 860 | 640 | 720 | 1,200 | ND |
| Cadmium | 6.5 | 11 | 7.5 | 6.6 | 6.7 | 2.2 | 3 | ND |
| Chromium | 15 | 10 | 18 | [illegible] | 6.2 | 3.5 | 5.5 | ND |
| Copper | 280 | 320 | 290 | 180 | 210 | 56 | 48 | ND |
| Lead | 13,000 | 16,000 | 13,000 | 7,700 | 9,300 | 2,000 | 82,800 | 0.21 |
| Mercury | 19,000 | 23,000 | 19,000 | 11,000 | 13,000 | 3,300 | 84,200 | ND |
| Nickel | 0.11 | 0.16 | 1.3 | ND | 0.81 | 0.34 | 0.61 | ND |
| Selenium | 1,700 | 1,800 | 1,300 | 790 | 920 | 230 | 300 | ND |
| Silver | 3.4 | 17 | 7.9 | 11 | 11 | 9.3 | 8.4 | ND |
| Thallium | 18 | 21 | 18 | 11 | 13 | 3.9 | 4.1 | ND |
| Zinc | ND | ND | ND | ND | ND | ND | ND | ND |
| | 79,000 | 100,000 | [illegible] | [illegible] | 57,000 | 14,000 | 15,000 | ND |

## SAMPLING DATE JUNE 3 & 4, 1991

| SAMPLE POINT | A-2 | A-3 | A-3 | A-4 | A-4 | A-5 | A-5 | A-6 | A-6 | FIELD BLANK | FIELD BLANK |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DEPTH | 4.0-4.5 | 1.0-1.5 | 4.0-4.5 | 1.0-1.5 | 4.0-4.5 | 1.0-1.5 | 4.0-4.5 | 1.0-1.5 | 4.0-4.5 | | |
| PARAMETERS | | | | | | | | | | | |
| METALS (ppm) | | | | | | | | | | | |
| Antimony | 76 | 39 | 120 | 48 | 140 | 21 | 26 | 120 | 67 | ND | ND |
| Arsenic | 570 | 200 | 630 | 320 | 620 | 89 | 400 | 390 | 270 | ND | ND |
| Barium | 5.7 | 23 | 3.8 | 17 | 4.2 | 5.1 | 3.4 | 15 | [illegible] | ND | ND |
| Cadmium | 0.82 | [illegible] | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Chromium | 180 | 150 | 830 | 160 | 79 | 180 | 66 | 80 | ND | ND | ND |
| Copper | 7,900 | 8,800 | 4,100 | 10,000 | 6,700 | 12,000 | 2,900 | 5,900 | 5,800 | ND | ND |
| Lead | 11,000 | 11,000 | 5,800 | 12,000 | 5,300 | 14,000 | 4,000 | 7,100 | 7,600 | ND | ND |
| Mercury | [illegible] | 1.5 | 0.97 | 1.4 | [illegible] | [illegible] | 15 | 0.82 | [illegible] | ND | ND |
| Nickel | 680 | 860 | 370 | 930 | 340 | 1,200 | 240 | 540 | 600 | ND | ND |
| Selenium | 4.5 | 3.6 | 4.3 | 4.7 | 4.5 | 3.8 | 4 | 3.9 | 3.3 | ND | ND |
| Silver | 6.6 | 8.4 | ND | 9.2 | 1.7 | [illegible] | ND | ND | ND | ND | ND |
| Thallium | ND | ND | ND | [illegible] | ND | ND | ND | ND | ND | ND | ND |
| Zinc | 57,000 | 91,000 | 28,000 | [illegible] | 28,000 | 150,000 | 20,000 | 61,000 | 61,000 | 0.31 | ND |

## SAMPLING DATE JUNE 3 & 4, 1991

| SAMPLE POINT | G-1a | G-3 | G-2a | G-1a | W-1 | W-2 | W-3 | W-4 | W-5 | W-6 | FIELD BLANK | FIELD BLANK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE DEPTH | 1.0-1.5 | 1.0-1.5 | 1.0-1.5 | 1.0-1.5 | 3.5-4.0 | 3.5-4.0 | 3.5-4.0 | 3.5-4.0 | 3.5-4.0 | 3.5-4.0 | | |
| PARAMETERS | | | | | | | | | | | | |
| METALS (ppm) | | | | | | | | | | | | |
| Antimony | | | | | | | | | | | | |
| Arsenic | 8.4 | ND | ND | ND | 150 | 2.5 | 2.5 | ND | ND | ND | ND | ND |
| Barium | 44 | 11 | 2.4 | 2.6 | 600 | [illegible] | [illegible] | [illegible] | 8 | 3.6 | ND | ND |
| Cadmium | 4.1 | ND | 1.4 | 1.5 | 5.6 | [illegible] | 0.92 | [illegible] | 0.93 | 2.3 | ND | ND |
| Chromium | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Copper | 56 | 4.3 | 21 | 29 | 170 | 38 | 27 | 20 | 16 | 22 | ND | ND |
| Lead | 1100 | 9.4 | 13 | 21 | 7800 | 41 | 8.4 | 43 | 72 | 25 | ND | ND |
| Mercury | 1300 | 5.4 | 14 | 12 | 13,000 | 26 | 12 | 85 | 89 | 15 | ND | ND |
| Nickel | 26 | 0.18 | ND | ND | 0.22 | 0.25 | ND | 0.31 | 0.12 | ND | ND | ND |
| Selenium | 140 | ND | 33 | 41 | 820 | 56 | 31 | 34 | 28 | 39 | ND | ND |
| Silver | 0.77 | ND | ND | ND | 4.6 | ND | ND | ND | 0.95 | ND | ND | ND |
| Thallium | ND | ND | ND | ND | 1.4 | ND | ND | ND | ND | ND | ND | ND |
| Zinc | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| | 12,000 | 58 | 110 | 74 | 34,000 | 840 | 200 | 180 | 72 | 93 | 0.33 | ND |
| BASE/NEUTRAL ORGANICS (ppm) | | | | | | | | | | | | |
| Bis(2-Ethylhexyl)Phthalate | ND | ND | 1 | ND | NA | NA | NA | NA | NA | NA | NA | NA |
| Fluorene | ND | 5.4 | ND | ND | NA | NA | NA | NA | NA | NA | NA | NA |
| Naphthalene | ND | 7.7 | ND | ND | NA | NA | NA | NA | NA | NA | NA | NA |
| Phenanthrene | ND | 11 | ND | ND | NA | NA | NA | NA | NA | NA | NA | NA |
| TOTAL PRIORITY POLLUTANT BASE/NEUTRALS (ppm) | ND | 24.1 | 1 | ND | NA | NA | NA | NA | NA | NA | NA | NA |

## SAMPLING DATE APRIL 16.1992

| SAMPLE POINT | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | FIELD BLANK |
|---|---|---|---|---|---|---|---|---|
| SAMPLE DEPTH | 0-6" | 0-6" | 0-6" | 0-6" | 0-6" | 0-6" | 0-6" | |
| PESTICIDES/ POLYCHLORINATED BIPHENYLS | | | | | | | | |
| PESTICIDES (ppm) | ND | ND | ND | ND | ND | ND | ND | ND |
| AROCHLOR 1016 | ND | ND | ND | ND | ND | ND | ND | ND |
| AROCHLOR 1221 | ND | ND | ND | ND | ND | ND | ND | ND |
| AROCHLOR 1232 | ND | ND | ND | ND | ND | ND | ND | ND |
| AROCHLOR 1242 | ND | ND | ND | ND | ND | ND | ND | ND |
| AROCHLOR 1248 | ND | ND | 0.11 | ND | 0.19 | 0.15 | 0.4 | ND |
| AROCHLOR 1254 | ND | ND | ND | ND | 0.15 | 0.14 | 0.4 | ND |
| AROCHLOR 1260 | 1.5 | ND | 0.11 | ND | | | | |
| TOTAL PCBs (ppm) | | | | | | | | |

# ATTACHMENT 6

INTERNATIONAL TECHNOLOGY CORPORATION

September 28, 1994

Mr. Nick A. DiFranco
Manager - Environmental Affairs
Praxair, Inc.
Industrial Avenue
P.O. Box 237
Keasbey, New Jersey 08832

Project No. 529326

Linde Gases of the Mid-Atlantic, Inc.
Linden, New Jersey Site
ISRA Case No. 90367

Dear Nick:

At your request, I have prepared a preliminary cost estimate for remediation of the referenced site to the NJDEP residential cleanup criteria. Due to the extent of Metals contamination inherent in the historic fill/soil continuous throughout this site, cleanup to the residential criteria would require a monumental effort and associated cost. It is estimated that project duration would be four weeks for entire soil removal throughout the recently paved area of the site. The estimated cost is as follows:

| | |
|---|---|
| 17,938 est. tons of soil removed and disposed of off-site | $1,255,625 |
| 17938 estimated tons of certified clean soil back-fill | $179,380 |
| Equipment | $20,000 |
| Labor | $20,000 |
| Materials | $5,000 |
| **Total** | **$1,480,005** |

Regional Office
165 Fieldcrest Avenue • Edison, New Jersey 08837-3638 • 908-225-2000 • FAX: 908-225-1691

IT Corporation is a wholly owned subsidiary of International Technology Corporation

If I can be of further assistance, please call. Thank you.

Very truly yours,
*IT CORPORATION*

Paul Dimakos
Project Manager
Regulatory Compliance Division

529326/remedup/pd

# ATTACHMENT 7

State of New Jersey
Department of Environmental Protection and Energy

Robert C. Shinn, Jr.
*Commissioner*

February 8, 1994

MEMORANDUM

TO: Site Remediation Program Staff

FROM: Lance Miller, Assistant Commissioner
Site Remediation Program

SUBJECT: Revised Soil Cleanup Criteria

Soil Cleanup Criteria (SCC) were initially distributed to Site Remediation Program Staff in January 1993. The SCC were revised in March 1993 and contained in the April 1993 issue of the Site Remediation News. Since that time, there have been toxicity factor changes as well as the identification of computational and typographical errors for several SCC compounds. These changes and corrections have been made resulting in a revised SCC list which is attached.

Thirty eight (38) criteria encompassing 31 compounds are affected. The majority of changes are to the impact to groundwater SCC. Sixteen (16) SCC have increased, 19 SCC have decreased and criteria for 2,4-/2,6-dinitrotoluene (mixture) have been added. Please refer to the footnotes contained in the SCC list for more detail.

It is important to note that SCC for eight (8) compounds have decreased by at least an order of magnitude. These compounds are:

| | |
|---|---|
| acrylonitrile | (impact to groundwater criterion) |
| benzo(b)fluoranthene | (impact to groundwater criterion) |
| 1,2-dichloroethene | (impact to groundwater criterion) |
| heptachlor | (impact to groundwater criterion) |
| hexachlorobutadiene | (residential and non-residential direct contact criteria) |
| methoxychlor | (impact to groundwater criterion) |
| methylene chloride | (impact to groundwater criterion) |
| toxaphene | (impact to groundwater criterion) |

The purpose and function of the SCC remains the same - to provide guidance in establishing site-specific cleanup levels. Other factors such as environmental impacts, site-specific conditions and background levels may be considered which could result in a site-specific cleanup level which differs from the SCC.

If you have any questions regarding the above or other cleanup standards issues, please bring them to the attention of your Bureau or Element managers. Thank you for your cooperation.

attachment

# Soil Cleanup Criteria (mg/kg)
(Last Revised - 2/3/94)

This listing represents the combination of Tables 3-1 and 7-1 from the Department of Environmental Protection and Energy's February 3, 1992 proposed rule entitled Cleanup Standards for Contaminated Sites, N.J.A.C. 7:26D, with noted corrections based upon errors identified by the Department during or subsequent to the comment period as well as new toxicological information obtained since the rule proposal. Please refer to the respective footnotes for more detail. Notwithstanding, where the following criteria are based on human health impacts, the Department shall still consider environmental impacts when establishing site specific cleanup criteria. This along with other site specific factors including background conditions may result in site specific cleanup criteria which differ from the criteria listed below. Therefore, this list shall not be assumed to represent approval by the Department of any remedial action or to represent the Department's opinion that a site requires remediation.

Note: Material bracketed [thus] is deleted and material underlined thus is added

| Contaminant | CASRN | Residential Direct Contact Soil Cleanup Criteria(a)(b) | Non Residential Direct Contact Soil Cleanup Criteria(a)(b) | Impact to Ground water Soil Cleanup Criteria(b) |
|---|---|---|---|---|
| Acenaphthene | 83-32-9 | 3400 | 10000(c) | 100 |
| Acetone | 67-64-1 | 1000(d) | 1000(d) | [50] 100(i) |
| Acrylonitrile | 107-13-1 | 1 | 5 | [100] 1(i) |
| Aldrin | 309-00-2 | 0.040 | 0.17 | 50 |
| Anthracene | 120-12-7 | 10000(c) | 10000(c) | [500] 100(i) |
| Antimony | 7440-36-0 | 14 | 340 | (h) |
| Arsenic | 7440-38-2 | [2(f)] 20(e) | [2(f)] 20(e) | (h) |
| Barium | 7440-39-3 | 700 | 47000(n) | (h) |
| Benzene | 71-43-2 | 3 | 13 | 1 |
| 3,4-Benzofluoranthene (Benzo(b)fluoranthene) | 205-99-2 | 0.9 | 4 | [500] 50(i) |
| Benzo(a)anthracene | 56-55-3 | 0.9 | 4 | 500 |
| Benzo(a)pyrene (BaP) | 50-32-8 | 0.66(f) | 0.66(f) | 100 |
| Benzo(k)fluoranthene | 207-08-9 | 0.9 | 4 | 500 |
| Benzyl Alcohol | 100-51-6 | 10000(c) | 10000(c) | 50 |
| Beryllium | 7440-41-7 | 1(f) | 1(f) | (h) |
| Bis(2-chloroethyl) ether | 111-44-4 | 0.66(f) | 3 | [1] 10(j) |
| Bis(2-chloroisopropyl) ether | 39638-32-9 | 2300 | 10000(c) | 10 |
| Bis(2-ethylhexyl) phthalate | 117-81-7 | 49 | 210 | 100 |
| Bromodichloromethane (Dichlorobromomethane) | 75-27-4 | [5] 11(g) | [22] 46(g) | 1 |
| Bromoform | 75-25-2 | 86 | 370 | 1 |
| Bromomethane | 74-83-9 | 79 | 1000(d) | 1 |
| 2-Butanone (MEK) | 78-93-3 | 1000(d) | 1000(d) | 50 |
| Butylbenzyl phthalate | 85-68-7 | 1100 | 10000(c) | 100 |
| Cadmium | 7440-43-9 | 1 | 100 | (h) |

# Soil Cleanup Criteria (mg/kg)
(Last Revised - 2/3/94)

| | | | | |
|---|---|---|---|---|
| Carbon tetrachloride | 56-23-5 | 2(k) | 4(k) | 1 |
| 4-Chloroaniline | 106-47-8 | 230 | 4200 | (r) |
| Chlorobenzene | 108-90-7 | 37 | 680 | 1 |
| Chloroform | 67-66-3 | 19(k) | 28(k) | 1 |
| 4-Chloro-3-methyl phenol (p-Chloro-m-cresol) | 59-50-7 | 10000(c) | 10000(c) | 100 |
| Chloromethane | 74-87-3 | 520 | 1000(d) | 10 |
| 2-Chlorophenol | 95-57-8 | 280 | 5200 | [50] 10(j) |
| Chrysene | 218-01-9 | 9 | 40 | 500 |
| Copper | 7440-50-8 | 600(m) | 600(m) | (h) |
| Cyanide | 57-12-5 | 1100 | 21000(o) | (h) |
| 4,4'-DDD (p,p'-TDE) | 72-54-8 | 3 | 12 | [100] 50(i) |
| 4,4'-DDE | 72-55-9 | 2 | 9 | [100] 50(i) |
| 4,4'-DDT | 50-29-3 | 2 | 9 | [100] 500(i) |
| Dibenz(a,h)anthracene | 53-70-3 | 0.66(f) | 0.66(f) | [500] 100(j) |
| Dibromochloromethane (Chlorodibromomethane) | 124-48-1 | 110 | 1000(d) | 1 |
| Di-n-butyl phthalate | 84-74-2 | 5700 | 10000(c) | 100 |
| Di-n-octyl phthalate | 117-84-0 | 1100 | 10000(c) | 100 |
| 1,2-Dichlorobenzene | 95-50-1 | 5100 | 10000(c) | 50 |
| 1,3-Dichlorobenzene | 541-73-1 | 5100 | 10000(c) | 100 |
| 1,4-Dichlorobenzene | 106-46-7 | 570 | 10000(c) | 100 |
| 3,3'-Dichlorobenzidine | 91-94-1 | 2 | 6 | 100 |
| 1,1-Dichloroethane | 75-34-3 | 570 | 1000(d) | [1] 10(i) |
| 1,2-Dichloroethane | 107-06-2 | 6 | 24 | 1 |
| 1,1-Dichloroethene | 75-35-4 | 8 | 150 | 10 |
| 1,2-Dichloroethene (trans) | 156-60-5 | 1000(d) | 1000(d) | 50 |
| 1,2-Dichloroethene (cis) | 156-59-2 | 79 | 1000(d) | [50] 1(i) |
| 2,4-Dichlorophenol | 120-83-2 | 170 | 3100 | 10 |
| 1,2-Dichloropropane | 78-87-5 | 10 | 43 | (r) |
| 1,3-Dichloropropene (cis and trans) | 542-75-6 | 4 | 5(k) | 1 |
| Dieldrin | 60-57-1 | 0.042 | 0.18 | 50 |
| Diethyl phthalate | 84-66-2 | 10000(c) | 10000(c) | 50 |
| 2,4-Dimethyl phenol | 105-67-9 | 1100 | 10000(c) | 10 |
| Dimethyl phthalate | 131-11-3 | 10000(c) | 10000(c) | 50 |
| 2,4-Dinitrophenol | 51-28-5 | 110 | 2100 | 10 |
| Dinitrotoluene (2,4-/2,6- mixture) | 25321-14-6 | 1(l) | 8(l) | 10(l) |
| Endosulfan | 115-29-7 | [3] 340(g) | [52] 6200(g) | 50 |
| Endrin | 72-20-8 | 17 | 310 | 50 |
| Ethylbenzene | 100-41-4 | 1000(d) | 1000(d) | 100 |
| Fluoranthene | 206-44-0 | 2300 | 10000(c) | [500] 100(i) |
| Fluorene | 86-73-7 | 2300 | 10000(c) | 100 |
| Heptachlor | 76-44-8 | 0.15 | 0.65 | [500] 50(j) |
| Hexachlorobenzene | 118-74-1 | 0.66(f) | 2 | [50] 100(i) |
| Hexachlorobutadiene | 87-68-3 | [11] 1(g) | [210] 21(g) | [50] 100(g) |

# Soil Cleanup Criteria (mg/kg)
(Last Revised - 2/3/94)

| | | | | | |
|---|---|---|---|---|---|
| Hexachlorocyclopentadiene | 77-47-4 | 400 | 7300 | 100 | |
| Hexachloroethane | 67-72-1 | 6 | 100 | 100 | |
| Indeno(1,2,3-cd)pyrene | 193-39-5 | 0.9 | 4 | 500 | |
| Isophorone | 78-59-1 | 1100 | 10000(c) | [10] | 50(j) |
| Lead | 7439-92-1 | 100(p) | 600(q) | (h) | |
| Lindane | 58-89-9 | 0.52 | 2.2 | [1] | 50(j) |
| 2-Methylphenol | 95-48-7 | 2800 | 10000(c) | (r) | |
| 4-Methylphenol | 106-44-5 | 2800 | 10000(c) | (r) | |
| Methoxychlor | 72-43-5 | 280 | 5200 | [500] | 50(i) |
| Mercury | 7439-97-6 | 14 | 270 | (h) | |
| 4-Methyl-2-pentanone(MIBK) | 108-10-1 | 1000(d) | 1000(d) | 50 | |
| Methylene chloride | 75-09-2 | 49 | 210 | [10] | 1(j) |
| Naphthalene | 91-20-3 | 230 | 4200 | 100 | |
| Nickel | 7440-02-0 | 250 | 2400(k)(n) | (h) | |
| Nitrobenzene | 98-95-3 | 28 | 520 | [50] | 10(i) |
| N-Nitrosodiphenylamine | 86-30-6 | 140 | 600 | 100 | |
| N-Nitrosodi-n-propylamine | 621-64-7 | 0.66(f) | 0.66(f) | [1] | 10(j) |
| PCBs (Polychlorinated biphenyls) | 1336-36-3 | 0.49 | 2 | [100] | 50(i) |
| Pentachlorophenol | 87-86-5 | 6 | 24 | 100 | |
| Phenol | 103-95-2 | 10000(c) | 10000(c) | 50 | |
| Pyrene | 129-00-0 | 1700 | 10000(c) | [500] | 100(j) |
| Selenium | 7782-49-2 | 63 | 3100(n) | (h) | |
| Silver | 7440-22-4 | 110 | 4100(n) | (h) | |
| Styrene | 100-42-5 | 23 | 97 | 100 | |
| 1,1,1,2-Tetrachloroethane | 630-20-6 | 170 | 310 | 1 | |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | 34 | 70(k) | 1 | |
| Tetrachloroethylene | 127-18-4 | 4(k) | 6(k) | 1 | |
| Thallium | 7440-28-0 | 2(f) | 2(f) | (h) | |
| Toluene | 108-88-3 | 1000(d) | 1000(d) | 500 | |
| Toxaphene | 8001-35-2 | 0.10(k) | 0.2(k) | [100] | 50(i) |
| 1,2,4-Trichlorobenzene | 120-82-1 | 68 | 1200 | 100 | |
| 1,1,1-Trichloroethane | 71-53-6 | 210 | 1000(d) | 50 | |
| 1,1,2-Trichloroethane | 79-00-5 | 22 | 420 | 1 | |
| Trichloroethene (TCE) | 79-01-6 | 23 | 54(k) | 1 | |
| 2,4,5-Trichlorophenol | 95-95-4 | 5600 | 10000(c) | 50 | |
| 2,4,6-Trichlorophenol | 88-06-2 | 62 | 270 | [50] | 10(i) |
| Vanadium | 7440-62-2 | 370 | 7100(n) | (h) | |
| Vinyl chloride | 75-01-4 | 2 | 7 | [1] | 10(i) |
| Xylenes (Total) | 1330-29-7 | 410 | 1000(d) | 10 | |
| Zinc | 7440-66-6 | 1500(m) | 1500(m) | (h) | |

# Soil Cleanup Criteria (mg/kg)
(Last Revised - 2/3/94)

**Footnotes**

(a) criteria are health based using an incidental ingestion exposure pathway except where noted below
(b) criteria are subject to change based on site specific factors (e.g., aquifer classification, soil type, natural background, environmental impacts, etc.)
(c) health based criterion exceeds the 10000 mg/kg maximum for total organic contaminants
(d) health based criterion exceeds the 1000 mg/kg maximum for total volatile organic contaminants
(e) cleanup standard proposal was based on natural background
(f) health based criterion is lower than analytical limits; cleanup criterion based on practical quantitation level
(g) criterion has been recalculated based on new toxicological data
(h) the impact to ground water values for inorganics will be developed based upon site specific chemical and physical parameters
(i) original criterion was incorrectly calculated and has been recalculated
(j) typographical error
(k) criterion based on inhalation exposure pathway which yielded a more stringent criterion than the incidental ingestion exposure pathway
(l) new criterion derived using methodology in the basis and background document
(m) criterion based on ecological (phytotoxicity) effects
(n) level of the human health based criterion is such that evaluation for potential environmental impacts on a site by site basis is recommended
(o) level of the criterion is such that evaluation for potential acute exposure hazard is recommended
(p) criterion based on the goal that children should be exposed to the minimal amount of lead that is practicable and is reflective of natural background as altered by diffuse anthropogenic pollution. Criterion corresponds to both a median value for urban land which has not been impacted by any local point source of lead and a 90th percentile value for similar suburban land
(q) criteria was derived from a model developed by the Society for Environmental Geochemistry and Health (SEGH) and was designed to be protective for adults in the workplace
(r) Insufficient information available to calculate impact to ground water criteria

ATTACHMENT 8

PRAXAIR, INC. Linde Division
Industrial Avenue, Keasbey, NJ 08832 Telephone: (908) 738-4000

September 30, 1992

Mr. Joseph Goliszewski
New Jersey Department of Environmental Protection and Energy
Division of Responsible Party Site Remediation
Bureau of Environmental Evaluation and Cleanup Responsibility Assessment
401 E. State Street - 5th Floor
Trenton, New Jersey 08625-0028

RE: Linde Gases of the Mid-Atlantic, Inc. Linden Facility;
ECRA Case
Number 90367

Dear Mr. Goliszewski:

As you know, Linde Gases of the Mid-Atlantic, Inc. (Linde Gases), a subsidiary of Praxair, Inc. (Praxair), was formerly a tenant at the above-referenced facility, which is located in Linden, New Jersey.[1] The facility is not and was never owned by Praxair. Rather, during the entire tenancy of Linde Gases the facility was owned by LCP Chemicals, a Division of Hanlin Group, Inc. (LCP). Praxair has not been a tenant at the facility for more than two years. ECRA Case Number 90367 stems from the termination of the Linde Gases lease in 1990.

The remedial investigations conducted to date at the Linden facility have determined that much of the surficial soils on the former leasehold are composed of a black cinder material that contains elevated levels of certain heavy metals. Further investigations of the activities and disposal practices of both the prior tenants and owners of the property have produced clear evidence that the source of the cinder fill and the heavy metals at the Linde Gases facility is solely the result of the activities of these property owners and prior tenants. None of the elevated levels of heavy metals is related in any way to the Linde Gases tenancy. Moreover, the heavy metals appear to be a function of the fill material which is ubiquitous throughout the area. In addition, there is conclusive evidence concerning the origin of the arsenic present in the surficial aquifer underlying the site. The following discussion presents documentation uncovered to date from a limited review of NJDEPE files regarding responsibility for both areas of concern. Praxair's investigation is ongoing; consequently, this letter may be supplemented as appropriate when new information is obtained.

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[1] See Exhibit 1 - Site Location Map.

**Cinder Fill Material and Metals Contamination**

There is a large body of evidence regarding the origin of the black cinder fill material in this area, which has been the site of numerous industrial operations since 1885.[2] A review of NJDEPE's files points to GAF, the former owner and current neighbor of the property at issue, as the source of the fill and metal contamination. Production at the neighboring GAF Chemicals facility, which has included the manufacture of surfactants, dyestuffs, pigments, industrial chemicals and metal specialty products, started in 1919.[3]

The documentation in NJDEPE's files demonstrates quite clearly that the entire area is filled. Exhibit 2 is a 1982 memorandum from Walter Olenick of the NJDEPE to Scott Santora stating that sections of the GAF facility were "constructed on pilings over an area filled with cinders from their coal burning facilities." This statement is corroborated by the RCRA Facility Assessment for GAF.[4] Exhibit 3, an undated handwritten geological cross-section prepared by Jill Monroe of NJDEPE, provides further evidence that a large amount of fill overlies the area.

In Exhibit 5, a more detailed description of the soil profile is given, noting that the "site has been reclaimed from tidal marshes by the placement of 5 to 10 feet of fill."[5] The report states that "Hazardous Waste Management practices over the past 100 years at GAF has lead [sic] to widespread contamination", noting the use of an open ditch system for disposal of hazardous materials, and concluding that "fill material may have been contaminated prior to emplacement."[6] Soil samples collected by NJDEPE at the GAF Facility in 1988 contained metals.[7] Moreover, Exhibit 5 documents that GAF production buildings located just to the east of the former Linde Gases leasehold were used for processes involving metals. Building 200 housed carbonyl iron powder production, while buildings 303 through 306 housed ethylene oxide production utilizing silver as a catalyst.[8]

A 1982 Geraghty & Miller report for LCP also confirms the ubiquitous presence of "miscellaneous fill deposits" ranging in depth from 4.5 feet to 13.5 feet covering the study area (which is located on the same lot & block as the former Linde Gases Facility) "continuously"

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[2] Exhibit 5 at p. 1.

[3] Id.

[4] Exhibit 4 at p. 2.

[5] Exhibit 5 at p. 3.

[6] Exhibit 5 at p. 5.

[7] Id.

[8] Exhibit 5 at p. 43.

and contain "slag, crushed stone, and brick."[9] The report opines that this fill was in place before LCP occupied the site, and states that soil boring records from Hazen and Stewart (1969) demonstrate that fill coverage is "extensive."[10] The report found that the metals contamination in the surficial soils decreased with depth, and that the ground water was essentially free from mercury, the metal targeted in the report.[11] Jill Monroe, NJDEPE Geologist and author of the soil profile sketch found in Exhibit 3, reported in a memorandum to Brian Crisafulli that the surficial layer at the LCP site consists of 10 to 15 feet heterogenous fill which includes "brick and slag."[12]

Obviously, fill is ubiquitous in the entire area surrounding the leasehold. Just as obviously, the fill was in place long before Linde Gases became a tenant. Finally, the documentation in NJDEPE files and the detailed information available concerning the operations of Linde Gases discloses that the elevated metal readings found in the leasehold are due to the fill placed there long before Linde Gases leased the premises, and has nothing whatsoever to do with the operations of Linde Gases.

**Arsenic Contamination in the Surficial Aquifer**

The discharge by GAF of arsenic acid solutions to the low lying areas of the GAF facility is well documented. A 1982 NJDEPE Memorandum contains a detailed narrative description of the GAF practice of discharging arsenical liquid wastes to low lying, marshy areas.[13] The EPA Preliminary Assessment for RCRA Corrective Action Program further substantiates this direct discharge of arsenic acid to an area referred to as the "Drum Landfill."[14] Page 2 of Exhibit 4, which is an excerpt from the RCRA Facility Assessment conducted by NUS at GAF, also discusses GAF's generation of arsenic wastes.

Exhibit 8 concludes that arsenic found in groundwater at the LCP site is "due to an outside source of contamination."[15] This conclusion is based on the "relatively invariant contaminant concentrations" and

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[9] Exhibit 7 at p. 8. LCP purchased the chlorine production facility from GAF in 1971 and operated it until 1985. GAF had operated this facility from 1955 to 1971.

[10] Id. at 9.

[11] Exhibit 7 at p.11. Mercury was targeted because metallic mercury was used in the LCP chlorine production process.

[12] Exhibit 9 at p. 3.

[13] Exhibit 2.

[14] Exhibit 6 at pp. 2, 4, 5.

[15] Exhibit 8 at p. 5.

LCP's claim that it did not use arsenic in its production processes.[16] In Exhibit 9, an NJDEPE Memorandum, Jill Monroe reports that groundwater sampling results from 1982 to 1987 evidenced arsenic contamination. A 1989 Geraghty & Miller report confirms this conclusion that the arsenic contamination represents "background conditions in the Arthur Kill rather than contamination resulting from the LCP Facility."[17]

Conclusion

NJDEPE is required, pursuant to NJSA 13:1K-10(a), to take into consideration "the location of the site and surrounding ambient conditions" in establishing minimum criteria for soil, groundwater and surface water quality. The facility formerly leased by Linde Gases is located in a Tidal Marsh area where groundwater is saline and tidally influenced.[18] The area is zoned heavy industrial and has been used for a wide variety of industrial operations for more than one hundred years. Historical waste management facilities in this area contributed to widespread contamination.[19] As the foregoing discussion demonstrates, there is ample evidence that both the metals contaminated fill and arsenic contaminated groundwater predated Linde Gases' tenancy. Any number of historical production processes could have created these conditions. Conversely, nothing in the Linde Gases operation involved the heavy metals found in the surficial soils at various locations in and around the site. The operation was merely a hydrogen gas repackaging operation.[20] Elevated levels of zinc, arsenic, copper, and lead were found throughout the fill material. NJDEPE has, however, in the past questioned whether the metals contamination in a function of the fill material. Praxair's further investigation reveals that metals contamination is likely to be found throughout the heterogeneous fill, not just in the cinder - type fill, given the historical waste management practices at this and neighboring properties. These metals, while ubiquitous at the site, do not appear to be leaching from the surficial fill. Further, as noted above, the arsenic in the groundwater appear to stem from contamination from neighboring facilities and are influenced by the tidal action occurring in the surficial aquifer.

Linde Gases, merely a former tenant at the Linden facility, was not the source of the contamination found in either the surficial fill or in the groundwater. Rather, this contamination is area-wide and pre-dates by many years the Linde Gases tenancy. Under these circumstances, we believe that a no further action proposal is an appropriate and

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[16] Id.

[17] Exhibit 10 at p. 7.

[18] Exhibit 5 at p. 3

[19] Exhibit 5 at p. 5.

[20] Exhibit 11.

reasonable measure regarding the facility. This is especially true because Linde Gases is not and had never been the owner of the facility in question. It is difficult to understand why a tenant should be responsible for the remediation of background contamination for which it has no responsibility whatsoever. We would request prompt confirmation that our no further action proposal is acceptable to the Department under these circumstances.

Very Truly Yours,

N. A. DiFranco
Manager, Environmental Affairs

Attachments

cc: Richard G. Tisch, Esquire
William L. Warren, Esquire

## EXHIBITS

| | |
|---|---|
| Exhibit 1 - | Site Location Map |
| Exhibit 2 - | Memorandum from Walter Olenick to Scott Santora, NJDEP, RE GAF - Linden, dated 1/13/82 |
| Exhibit 3 - | Hand drawn Soil Profile by Jill Monroe, undated |
| Exhibit 4 - | RCRA Facility Assessment (RFA), undated |
| Exhibit 5 - | GAF Chemicals Corporation EDPA ID# NJD002185973, Undated |
| Exhibit 6 - | Preliminary Assessment for RCRA Corrective Action Program - GAF Linden, Undated |
| Exhibit 7 - | Waste Lagoon Ground-Water Monitoring - LCP Chemicals, Geraghty & Miller, February 1982 |
| Exhibit 8 - | LCP Chemicals EDP ID# NJD079303020 Undated |
| Exhibit 9 - | Memorandum from Jill Monroe through Tracy Wagner to Brian Crisafulli RE CME for LCP Chemicals, Undated |
| Exhibit 10 - | Results of the July/August 1988 Ground-Water Sampling Program - LCP Chemicals, Geraghty & Miller, January 1989 |
| Exhibit 11- | Attachment #1 (Past Operations), to Linde Gases of The Mid Atlantic's Site Evaluation Submission dated June 6, 1990. |

**MEMO**

DEPARTMENT OF E. NMENTAL PROTECTION

TO Scott Santora

FROM Walter Olenick

DATE 1/13/82

SUBJECT GAF - Linden

As we discussed, I am submitting data regarding toxic contamination at the subject company site with a brief discussion outlining the contaminants which were discharged.

1. The Special Sewer area highlighted in red was used for the discharge of arsenic acid residues from Building #46. The line went overhead approximately 300' over a trestle over the railroad tracks and was discharged in the low lying marsh area. This overflowed to the other red highlighted area to the west. The westerly area was inundated by the tidal flow flowing Piles Creek and toxic materials flowed back and forth with the tides (a sort of reflux action).

   Arsenic acid residues result from the amination (using ammonia) of sulfonated anthraquinones in the presence of arsenic acid under pressure in an autoclave. On completion of the amination, pressure is reduced by blowing off unreacted ammonia (which is condensed and recycled to subsequent batches), followed by dilution with water and filtration of the product. Spent arsenic acid in the filtrate were discharged via the Special Sewer line to the Special Sewer Area.

   If process details of this reaction procedure are required, this can be made available from U.S. Government Printing Office documentation obtained in post World War II process studies conducted by several teams at the I.G. Farben plants in Germany. GAF formerly was owned by I.G. Farben.

   In addition to arsenic wastes, iron sludges were also directed to the Special Sewer Area via the Special Sewer line.

2. Among products manufactured in Building #49, were the alpha sulfonated anthraquinones. See report of December 21, 1970 for details regarding this operation.

   Discharge of acidic solutions was by means of sewer lines which discharged beneath the building. The building was constructed on pilings over an area filled with cinders from their coal burning facilities. Included in this waste discharge, was the diluted sulfuric acid residues from the alpha sulfonated anthraquinones, which contained mercuric sulfate and traces of entrained metallic mercury. The acidic solutions drained through the cinder fill and was discharged via drainage ditch to Tract #9. It is estimated conservatively that over 2.5 million pounds of mercury and mercury compounds were discharged to ultimately become incorporated in sludges in the Arthur Kill. Building #49 has since been demolished.

3. During an inspection period in 1970, drums of highly chlorinated hydrocarbon compounds from still residues were buried in the green highlighted area of the plot plan. The residues were from the manufacture of pre-emergence herbicides.

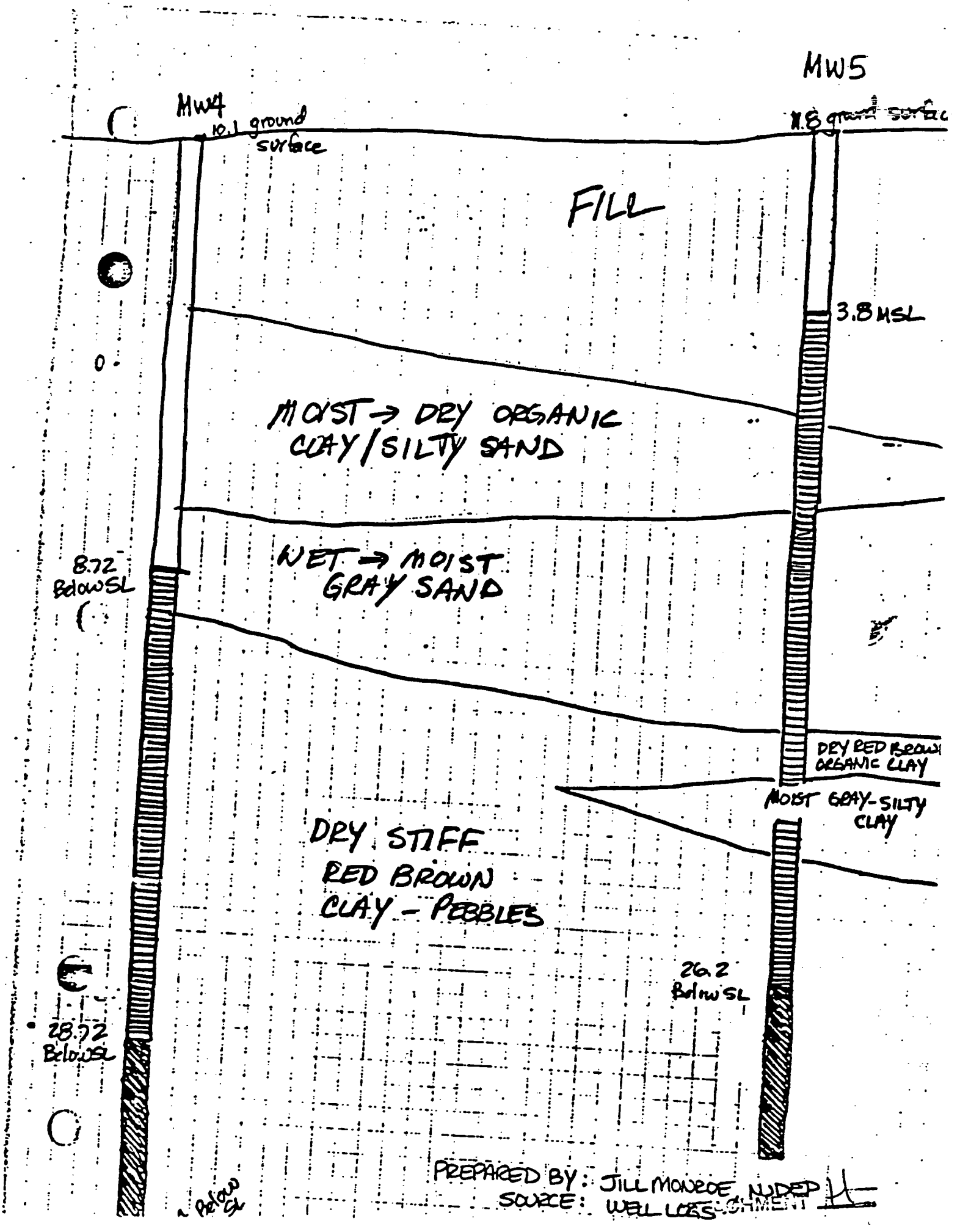
4. I am enclosing a copy of documentation regarding mercury pollution dated December 21, 1970. Although it had been forwarded to the Water Resources group on January 11, 1971. (See memo of H. Wortreich and later to Marty Sanvito on December 12, 1976, and even more recently copies went to Water Resources in 1979 - no action appears to have been taken.

   Is it possible to obtain mining rights?

Walter Olenick

Walter Olenick
Supervisor

D4


MW4
10.1 ground surface
MW5
11.8 ground surface
FILL
3.8 MSL
MOIST → DRY ORGANIC CLAY/SILTY SAND
WET → MOIST GRAY SAND
8.72 Below SL
DRY RED BROWN ORGANIC CLAY
MOIST GRAY-SILTY CLAY
DRY STIFF RED BROWN CLAY - PEBBLES
26.2 Below SL
28.72 Below SL
PREPARED BY: JILL MONROE NJDEP
SOURCE: WELL LOGS

RFA

The GAF Corporation plant in Linden has been in operation under various owners and operations since the early 1900's. The facility began as a German owned Film and analine manufacturer and was taken over by the United States Justice Department in 1941 and was operated by the U.S. Government until 1966. The plant has been operated by what is now GAF from 1966 until the present.

The plant at its peak manufactured five- hundred finished products which were derived from using four-hundred raw materials in process and storage. The principal product catagories are surfactants, dye stuffs, industrial chemicals and metal specialty products.

The facility is bordered on the east by the Arthur Kill, on the west by the Central Railroad and the New Jersey Turnpike. Piles Creek and Dupont Co. are adjacent at the northern border. Sinclair Refinning and the Linden-Roselle Sewage Authority are the southern border.

The plant is located in the tidal wetlands associated with the Arthur Kill and the nearby Rahway River. The natural and man made surface waters of the site all flow to the plants waste water treatment system (built in 1978) via an open, unlined drainage ditch system.

The facility is constructed on fill of variable thickness. Boring logs indicate this fill to be underlain by tidal marsh, glacial till deposits consisting of layers and lenses of silt, sand and clay. Bedrock occurs about twenty feet below the surface. Water bearing zones would be found in the fill and in the more permeable sections of the till material. The Brunswick Formation is used as an aquifer for industrial cooling by facilities in the area.

GAF has withdrawn their RCRA Part B application. They no longer intend to store hazardous waste for longer than a 90 day period. The plants permitted hazardous waste container (SOL) storage facility (Building #53) is in the closure process at this time and has been cleared of all contaminanted materials. A new, short term storage site (Building 207) is being made ready to receive containerized hazardous waste. The drains in the building have been plugged and door ways have been diked to contain spills. GAF is waiting approval from NJDEP to begin using this new storage space.

A system of unlined earthern drainage channels up to 6 ft. wide in places, through out the facility is used to collect any surface water run-off, wasteswater from the chemical process areas, spilled material and the facility raw sewage and send it to the facilities Water Treatment Plant.

Building #49 (demolished) was part of this open ditch system. Among the products manufactured in building #46 were the Alpha Sulfonated Anthraquiones. This building was constructed on pilings over an area filled with cinders from the GAF coal burning facility. Included in the waste discharge from building #49 was diluted Sulfuric Acid residues from the Alpha Sulfonated Anthraquiones which contained mercuric sulfate and traces of entrained metallic mercury. The acidic solution drained through the cinder fill and discharged via open ditches to tract #9 which is now the site of the Industrial Waste Management Facility (IWMF). It is estimated that 2.5 million pounds of mercury and mercury compounds were discharged to ultimatedtly become incorporated in sludges in the Arthur Kill. The Sulfonated Anthraquiones also produced arsenic acid residues as a result of amination of the Sulfonated Anthraquiones in the presence of arsenic acid under pressure. Spent arsenic acid was discharged from Building #49 and deposited in tract #9 via the open drainage ditch.

When work was suspended in Building #49, Building #46 housed the Alpha Sulfonated Anthraquione manufacturing process. The arsenic acid residue was discharged from this building via a special overhead sewer line. This line ran 300 ft. over a trestle over the railroad tracks and discharged in the low marsh area (site of drum landfill) west of Building #120 adjacent Piles Creek. This area was indunated by the tidal affected Piles Creek and toxic materials flowed back and forth with the tides. In addition to arsenic wastes, iron sludges were also directed to the special sewer area west of Building #46 via the special overhead sewer line.

GAF operated two landfills on site. The larger one "Old Landfill" is located in the southwest portion of the property and is 10-12 acres in size. This landfill was operated from 1964 to 1971 by GAF. It is also possible this area was used by both the U.S. Government and the German manufacture (I.G Faben) for chemical waste disposal. GAF admitts to disposing of chemical wastes and drummed materials, along with building rubble and industrial trash at the Old Landfill. During an inspection in 1970 drums of highly chlorinated hychrocarbon compounds from still residues were detected buried in the Old Landfill. These residues were from the manufacture of pre-emergent herbicides.

In 1975 four concrete standpipes (14" dia) were installed on the Old Landfill to recover oil floating on the water. The only layer is periodically pumped out drummed and disposed of off site. Analysis results from 1982 show the only layer to be high in phenols, mercury and chlorinated hychrocarbons. Depth to water in the standpipes indicates that they penatrate only the landfill material. No perforations are visable on the walls of the pipes. Perforated pipe is considered proper installation with this type well.

A second landfill was on site from 1970 to 1973. This drum landfill is located north of the Old Landfill in the low marsh area west of Building #120. The same area as the arsenic acid disposal over flow.

This area was also proposed as a demolition fill site by GAF and Linden. This area was once a tributory of Piles Creek which borders the site on the north. The creek has been dammed off at Dupont Rd. The area now contains a large volume of standing water, also buried drums and leachate seeps were observed on various inspections.

Seven monitoring wells are in place ground both landfills. Sample analysis results from 1983 show high levels of volatile organics, phenolics and metals contamination. These wells are 2"-diameter PVC. Four wells GAF 1, 4, 5 and 6 are screened in the surficial fill with top of their well screens above the groundwater table. The remaining three wells GAF 2, 3 and 7 are screened in the underlying aquitarad and could be serving as a conduit for flow from the surficial fill. Eleven wells have been proposed by DEP, but not installed at this time.

Since 1977 GAF has operated an Industrial Waste Management Facility (IWMF) on site.

The IWMF is located in the southeastern portion of the facility in the area of Tract #9, the arsenic and mercury disposed site.

The IWMF is made up of the following units:

1. Oil Water Skimmer- to remove waste oil floating on top of wastewater stream before the wastewater enters the IWMF.

2. Lagoon Storage Tank- 6,000 gallon Fiberglass Tank used to store skimmed waste oil. The tank is located on a concrete pad and is surrounded by a concrete dike. On inspection the diked area was found to contain 1 inch of dark oily liquid. The tank styrofoam cover has a large crack. GAF contends the lagoon oil stored in this tank is non hazardous 70% nonylphenol and 19% fatty acids. BHWPC informed GAF that classification of lagoon oil would require additional testing. In any case it is manifested to the Delaware Container Co. of Pennsylvania and burned.

3. Aeration lagoons - 3 large 200' x 300' synthetic membrane lined.

4. Clarifiers- 3 waste water clarifiers-

   In Jan. 1979 a concrete wall in the equalization basin of the IWMF collapsed. The basin was primarily used to dampen acid wastes before being neutralized.

   In March 1979 the Interstate Sanitary Commission cited GAF for exessive levels of phenols, arsenic acid and high concentrations of chlorinated hydrocarbons in the wastewater discharge.

   A non-compliance report was drafted in June '79 changing that the NPDES discharge limit for phenols and arsenic acid had been exceeded.

   Sept. 1979 the GAF IWMF was cited for violation of the NPDES permit due to discharge of heavy foam to the Arthur Kill.

   June 1986 GAF and NJDEP entered into an ACO requiring GAF to meet the

Tetrahydrofuran (THF) is manufactured at this plant. As a result of the manufacture of this product, a residue accumulates in the process reactor when the material is synthesized and also after distillation a residue accumulates in the distillation unit. When a sufficent quantity of residue is accumulated it is removed directly from these units and sent off site to a licensed/permitted T/S/D Facility. The THF area has a concrete base and a 3 ft. concrete dike surround the area. On inspection the diked area was found to contain 1-2 inches of dark oily liquid.

GAF was included in the 1983 Phase I dioxin study by NJDEP the results of this sampling proved to be inconclusive, due to background interferance in May 1985 the facility was included in the EPA National Dioxin Study. Soil and sediment samples were taken, with no detectable dioxin levels in the soils. Sediment results were not available.

Enforcement Actions and Incidents:

June 1973- The state issues a Notice of Intent to deny renewed of the GAF registration to landfill on site.

June 1981- GAF failed to use or complete the required forms of New Jersey to dispose of waste oil by private disposal service.

April 1969- A private investigator was called on site due to plant workers being over come by noxious fumes.

March 1979- An explosion occured in Building #46 and a fire broke out. Suspected cause, a reaction of sulfuric and nitric acids. One half the building is completely demolished.

Nov. 1982- Storage tank containing oleum (approx. 500 gals.) ruptured. The spilled material was diluted with water and allowed to flow to the drainage ditches.

Nov. 1982- A final order by EPA Reg II issued for improper handling and disposal of PCB's at GAF.

RECOMMENDATIONS

GAF through their consultant Aware Inc. has presented NJDEP/DWR with a Supplemental Information and Compliance Plan concerning the renewal of NJPDES permit no. 0000019.

Drainage Ditches- Ground water Quality Management evaluate the impact of ditches on area ground water quality. Sampling of ditch sludges parameters to include dioxin. Upgrade or remove ditches from service.

1. GAF has historically been involved in the manufacture of dioxin precursors and dioxin forming compounds. NJDEP Phase I study proved inconclusive and the EPA results are incomplete. Further dioxin sampling is needed at GAF. Both landfills, special sewer areas, Tract #9, Buildings #46, #36 and area where Building #49 once stood should be sampled.

2. Further investigate the mercury disposal area. Initiate soil sampling in the area. Parameters to include Priority Pollutants and Dioxin.

3. GAF should resample lagoon oil for it to be classified as non-hazardous.

   Expedite approval of Building 207 as the hazardous waste container storage site.

   Up grade monitoring well system at the site.

On Oct. 1986 inspection at GAF by Bureau of Site Assessment observed empty drums, stained ground construction materials and construction debris in the arsenic acid disposal site east of the "Old Landfill". This area should be inspected by Solid Waste as a possible land fill site.

GAF CHEMICALS CORPORATION
FOOT OF SOUTH WOOD AVENUE
LINDEN, UNION COUNTY, NEW JERSEY
EPA ID # NJD002185973

GENERAL INFORMATION AND SITE HISTORY

The GAF Chemicals Corporation (GAF) operates a 125-acre chemical manufacturing facility located on South Wood Avenue, Block 587, Lots 1 and 2.1 in the City of Linden, Union County, New Jersey. The site lies in an industrial area on the western bank of the Arthur Kill. The site is bordered to the northwest by DuPont's Grasselli Plant, to the southwest by BP Oil and to the south by LCP Chemicals and Plastics, Inc. and Northville Industries. Undeveloped wetlands associated with Piles Creek lie to the north. The New Jersey Turnpike borders on the west. Tremley and Linden residential areas begin 0.3 mile west of GAF. Carteret residential areas are 1.4 miles south. Residents of New York's Staten Island lie 1.2 miles southeast.

Grasselli Chemicals Company began operations in this general area of Linden in 1885, although the portion of the former Grasselli property, which is now owned by GAF, was not utilized for chemical manufacturing until approximately 1919. It became Grasselli Dyestuff Company and was subsequently incorporated in 1929 as American I.G. Chemical Corporation, which was owned by I.G. Farbenindustrie A.G., a German company. The U.S. company's name was changed in 1939 to General Aniline and Film Corporation. In 1942, 98% of the company stock was seized by the United States Justice Department as a war asset and the facility was operated by the U.S. Government as Alien Property Custodian until 1965, when the U.S. Government sold the stock to the public in a public offering. On April 24, 1968, General Aniline and Film Corporation changed its name to GAF Corporation. In 1986, GAF Chemicals Corporation was incorporated, and all of the assets of the former Chemicals Division of GAF Corporation were transferred to GAF Chemicals Corporation.

SITE OPERATIONS OF CONCERN

The product categories that have been manufactured at the site include surfactants, dyestuffs, pigments, industrial chemicals, and metal speciality products. The following general categories of compounds were the primary products manufactured by the various operators of the facility during the time frames specified:

| PRODUCTION COMMENCED | MATERIALS PRODUCED | PRODUCTION CEASED |
|---|---|---|
| 1919 | Dyestuffs | 1974 |
| 1935 | Igepons (Surfactants) | Still in production |
| 1940 | Igepals (Surfactants) | Still in production |
| 1941 | Carbonyl Iron Powders (Iron Pentacarbonyl) | Late 1940s |
| 1945 | Reppe Chemistry Pilot Plant | 1957 |
| 1955 | Caustic Chlorine | 1971 |
| 1957 | Ethylene Oxide | 1971 |
| 1958 | Phosphate Ester Surfactants | Still in production |

| | | |
|---|---|---|
| 1962 | Agricultural Herbicides, Amino Type Compounds including Amiben | 1977 |
| 1963 | Low Foamers (Surfactants) | Still in production |
| 1964 | Polyclar (Polyvinyl pyrilidone, food grade beer clarifier) | 1968 |
| 1965 | Gantrez Half Esters | 1969 |
| 1966 | Ganex | Still in production |
| 1970 | Gafquat 755 | Still in production |
| 1975 | Propoxylations (Propylene Oxide Surfactants) | Still in production |
| 1976 | Tetrahydrofuran | Still in production |

Currently, only tetrahydrofuran, surfactants, Gafquat 755 and Ganex are manufactured by GAF at the site. GAF plans to phase out production of surfactants by March 1991. The production will be moved to their plants in Georgia and South Carolina.

Past chemical manufacturing operations at the site generated numerous solid and liquid wastes including, but not limited to:

a. Phenol
b. Arsenic wastes including arsenic acid
c. Mercury compounds (entrained metallic mercury in dilute sulfuric acid solution, mercuric sulfate)
d. Chlorinated hydrocarbon compounds from still residues
e. Amiben and other amino type agricultural herbicides

Present manufacturing operations at the site generate phenol wastes, spent caustic, tetrahydrofuran bottoms and wastewater from cleaning process equipment.

A 10 to 12 acre landfill, sometimes referred to as the "Old Landfill", is located in the southwest portion of the facility. This landfill was operated from the early 1930s until 1970 by the various owners responsible for the facility during that time period. In 1981, GAF submitted a Comprehensive Environmental Response, Compensation and Liability Act (hereinafter "CERCLA") Section 103(c) Notification of Hazardous Waste Site document, and on May 22, 1985, GAF submitted a RCRA and HSWA Solid Waste Management Unit Information document, which described the materials disposed in the Old Landfill. GAF and the various other owners deposited dry and liquid chemical wastes (organics, inorganics, solvents, heavy metals, acids), drummed materials, bulk liquids, phenolic oils, laboratory wastes, off-specification products, still residues, solid wastes and industrial trash in this landfill. GAF alleges that the "Old Landfill" was operated in accordance with applicable law at the time of its operation.

GAF's final NJPDES Discharge to Surface Water Permit (No. NJ0000019) became effective March 1, 1986. The draft Discharge to Groundwater, dating back to November 25, 1987, has not been issued final at the time of this writing.

GAF has had various spills and releases which will be discussed in the following sections.

GROUNDWATER ROUTE

Bedrock under the GAF facility is the Brunswick Formation, soft highly fractured hematite stained red shales with some interbedded sandstones. The top 8 to 18 feet of the Brunswick Formation is considered residual soil, or weathered bedrock and can be described as clayey silt. Above this lies a layer of glacial deposits ranging between 9 and 23 feet in thickness, attributed to ground moraine. Above the glacial material lie tidal marsh deposits. The bottom 1.5 to 6 feet consists of organic silt and clay. This material grades into 1.5 to 10 feet of dark brown fibrous peat deposits containing minor amounts of sand and black organic silt and clay. The site has been reclaimed from tidal marshes by the placement of 5 to 10 feet of fill. The fill consists of soil, industrial materials and demolition debris.

Generally, the fill material acts as a surficial water bearing zone above the less permeable tidal marsh deposits and glacial till. The Brunswick Formation also acts as a semi-confined aquifer under these clays and silts. The GAF facility is located within a tidally influenced groundwater discharge area, which flows towards the Arthur Kill and Piles Creek.

At present, GAF has 12 4 inch diameter monitoring wells installed in 1983, 4 standpipes installed in the center of the landfill in 1975, 32 well points and 13 surface gages. The wells monitor a variety of depths. GAF proposes to install additional shallow and deep 2 inch diameter wells in accordance with an Administrative Consent Order (ACO) signed June 16, 1989. See site map for locations.

Groundwater in the vicinity of GAF is not used for potable purposes due to brackish conditions and chemical contamination. The nearest potable well, lying approximately 3.3 miles to the northwest, is operated by the Elizabethtown Water Company. It draws from the Brunswick Formation at a depth of 348 feet. The City of Rahway has a potable well approximately 4 miles west of GAF, drawing from the Brunswick Formation at 269 feet. There are no potable water intakes considered threatened by GAF.

GAF obtains water for industrial use from the Arthur Kill and from Elizabethtown Water Company. The nearest industrial well is operated approximately 2.6 miles north of GAF. It draws from the Brunswick Formation at a depth of 570 feet.

Groundwater sampling was conducted at GAF on November 29, 1988 by the NJDEP, Division of Hazardous Waste Management (DHWM), Bureau of Planning and Assessment (BPA). Sampling results, which are discussed below, revealed acetone, naphthalene, 1,2-dichloropropane, 1,2-dichlorobenzene, 4-chloraniline, acenaphthene, phenanthrene and bis (2-ethylhexyl) phthalate. There are, however, no groundwater uses in the immediate vicinity. Groundwater discharges to the adjacent surface water bodies, Arthur Kill and Piles Creek.

A draft NJPDES - Discharge to Groundwater permit was issued to GAF on September 16, 1985 and again on November 25, 1987. At the time of this writing, a new draft is being prepared.

SURFACE WATER ROUTE

GAF is bordered to the north by Piles Creek and to the east by the Arthur Kill. The portion of GAF containing the Waste Water Treatment Plant lies near the bank of the Arthur Kill. To the north of the Waste Water Treatment Plant, DuPont's Graselli Works separates GAF from the Arthur Kill by approximately 1200 feet. Piles Creek flows to within 100 feet of GAF by the Drum Landfill area, but is otherwise isolated by hundreds of feet of undeveloped swampland.

GAF uses an unlined ditch system to collect and transmit wastewater for disposal from the various buildings and chemical process areas throughout the site. This network of unlined topographical depressions and channels receives chemical process water, cooling water and sanitary wastewaters. The ditch system also captures surface runoff and leachate seeping from the landfills. Prior to 1977, wastewater in the ditches discharged to nearby surface water bodies, including Piles Creek and the Arthur Kill. In 1977, GAF constructed the Waste Water Treatment Plant which has since received the wastewaters. The connection to Piles Creek was dammed off in 1966.

GAF's consultant, Eckenfelder Inc., states in their Remedial Investigation Work Plan of December 1989 that runoff from approximately 82 acres entered the ditch system. Runoff on the ramaining 43 acres, therefore, infiltrates to groundwater or flows untreated to surrounding surface water bodies.

A sample was collected from the drainage ditch during the November 29, 1988 sampling episode conducted by the NJDEP, DHWM, BPA. Bis (2-ethylhexyl) phthalate, arsenic and manganese were detected in the sample. Sampling results are discussed below.

The surface water downstream from GAF has no potable uses due to salinity and chemical contamination. The Arthur Kill is used as a channel for large freight ships and for recreational boating, fishing and crabbing.

The only wetland within 2 miles is Pralls Island, located 800 feet across the Arthur Kill in New York territory. The Peregrine Falcon, a federally endangered species, is known to hunt in the salt marshes near GAF. Untreated runoff from a portion of GAF's property has the potential to transport contaminants off site to surrounding surface water bodies.

GAF is permitted to discharge to the Arthur Kill from their Waste Water Treatment Plant according to a NJPDES - Discharge to Surface Water Permit No. NJ0000019. The permit went into effect on March 1, 1986 and is due to expire on January 31, 1991. Tests for Acute Toxicity in GAF's discharge revealed GAF's discharge consistently failed to meet the minimum acute toxicity permit limitation of LC50 > 20% (by volume). The resultant Administrative Consent Order, signed June 1, 1989, requires GAF to upgrade their Waste Water Treatment Plant in order to meet their effluent limitations by March 4, 1991. GAF is in the process of complying with the ACO requirements.

AIR ROUTE

GAF has 38 active air permits and 23 recently expired temporary permits.

In April 1969, a private investigator was called on site due to plant workers being overcome by noxious fumes. Releases and Enforcement violations are listed as follows:

| | |
|---|---|
| 8/78 | Order to Cease Violation (visible smoke emitted from Boiler #1) |
| 3/31/81 | Notice of Violation (visible air emissions) |
| 8/25/87 | Notice of Violation (boiler stack exceeded emission capacity) |
| 11/6/87 | (40 lbs. of Ethylene oxide released) |
| 7/20/88 | (35 lbs. of Ethylene oxide released) |
| 11/17/88 | (Scrubber failure caused release of 165 lbs HCL and 260 lbs S02) |
| 1/4/89 | (Tetrahydrofuran vapor release from 2000 lb. spill) |

There is a continued potential for release at GAF via volatilization from the open ditch system.

SOIL

The GAF facility is placed on up to 10 feet of fill material which overlies the native marsh deposits. Some of this fill material may have been contaminated prior to emplacement.

Hazardous Waste Management practices over the past 100 years at GAF has lead to widespread contamination. GAF continues to discharge industrial and sanitary wastes to open ditches and impoundments under the buildings.

Soils and sediments were sampled by the NJDEP, DHWM, BPA on December 1, 1988. Numerous volatile organics, semi-volatiles and metals were detected in the samples. Sampling results are discussed below.

Prior to 1978, GAF produced a bacteriostatic/fungistatic agent (Preventol-I) containing 2,4,5-trichlorophenol (2,4,5-TCP) which is classified as a Class I dioxin precursor by the USEPA. Two samples of Preventol - I were tested on June 17, 1983 for 2,3,7,8-tetrachlorodibenzo dioxin (2,3,7,8-TCDD) and were found to contain 0.62 and 0.65 ppb.

On June 23, 1983, ERM-Northeast collected six samples (from ditch sediments, production building floors and in a production tank) for 2,3,7,8-TCDD analysis. Analysis by ETC indicated no presence of 2,3,7,8-TCDD with detection limits ranging from 0.02 to 0.51 ppb. Two of the samples, however, had no surrogate recovery, indicating possible matrix interference. All sediment samples were composited.

On July 11, 1985 USEPA personnel collected 34 composite samples from the area where Preventol was manufactured. Nineteen of the samples were of surficial soils; eight were collected from ditch sediments; and the remaining seven were QA/QC samples including replicates and blanks. None of the nineteen soil samples showed the presence of 2,3,7,8-TCDD above the detection limits. Seven of the eight sediment samples showed positive detection of 2,3,7,8-TCDD at levels ranging from 0.0036 to 0.0263 ppb. The standard action level for 2,3,7,8-TCDD in soils and sediments is 1 ppb.

On December 1, 1988, the NJDEP/DHWM/BPA collected ten on-site soil/sediment samples for 2,3,7,8-TCDD analysis from the impoundments and ditches associated with production Buildings 36, 46, 52 and 204. The laboratory

reported all samples as non-detected for 2,3,7,8-TCDD with detection limits for maximum possible concentrations ranging from 0.022 to 0.25 ppb. A QA/QC review however, rejected the data because the Performance Evaluation sample, reported as containing 3.25 ppb 2,3,7,8-TCDD was actually a soil blank containing no 2,3,7,8-TCDD.

The Remedial Investigation, required by the Administrative Consent Order of June 16, 1989, will include limited sampling for 2,3,7,8-TCDD. Table 3 is a compilation of 2,3,7,8-TCDD analyses.

DIRECT CONTACT

In April 1969, a private investigator was called on site due to plant workers being overcome by noxious fumes. No other reported incidents of direct contact were found in the file review. There is still potential for direct contact by employees via the open ditch system. The ditch system continues to transmit untreated wastewater and landfill leachate through the site.

The nearest offsite population, in the Tremley section of Linden, is approximately 0.3 mile west of GAF. The site is surrounded by an 8 foot chain link fence and barbed wire and has a 24 hour security guard at the entrance gate.

FIRE AND EXPLOSION

GAF reports the following fires and explosions:

| DATE | LOCATION | NATURE OF EVENT |
|---|---|---|
| 1959-1960 | Building 36 | Fire |
| December 1965 | Building 204E | Explosion (Propargyl Bromide) |
| Circa 1974 | Building 3 | Fire |
| October 1974 | Building 46 | Explosion and Fire (Nitration Reactor) |
| March 1979 | Building 46 | Explosion (Nitration Reactor) |

There is a continuing potential for fires or explosions at GAF due to the materials handled, including ethylene oxide. Ignition sources are restricted on site.

ADDITIONAL CONSIDERATIONS

There is evidence of vegetative stress at GAF. Much of the land does not support plant growth. While there are no reports of damage to fauna, there is potential due to the presence of contamination in the soil and surface water on site. Before 1977, GAF discharged wastewaters directly to the Arthur Kill. Bioaccumulative compounds, including mercury, may have damaged fauna and contaminated the food chain. Off-site property may have been damaged via runoff carrying contaminants to adjacent surface water bodies.

ENFORCEMENT ACTIONS

NJDEP Enforcement Actions are summarized below:

| DATE ISSUED | NATURE OF VIOLATION | DISPOSITION | NATURE OF NOTICE |
|---|---|---|---|
| AUGUST 1978 | EMITTING VISIBLE SMOKE FROM BOILER #1 | COMPLIED-NO PENALTY | ORDER TO CEASE VIOLATION |
| MARCH 31, 1981 | VISIBLE AIR EMISSIONS | WARNING-NO PENALTY OR ACTION REQUIRED | NOTICE OF VIOLATION |
| MAY 29, 1984 | RCRA DEFICIENCIES BASED ON AUGUST 11, 1983 INSPECTION | DEFICIENCIES CORRECTED- $2,000 PENALTY PAID | ADMINISTRATIVE ORDER |
| OCTOBER 13, 1985 | RCRA WASTE STORAGE DEFICIENCIES | CORRECTIVE ACTION TAKEN $6,300 PENALTY PAID | NOTICE OF VIOLATION |
| JUNE 4, 1987 | OPERATING EQUIPMENT WITHOUT A PERMIT | PERMIT OBTAINED- $4,400 PENALTY PAID | NOTICE OF VIOLATION |
| AUGUST 25, 1987 | BOILER STACK EXCEEDED EMISSION CAPACITY | $100 PENALTY PAID | NOTICE OF VIOLATION |
| NOVEMBER 17, 1988 | $SO_2$ HCL RELEASE DUE TO EQUIPMENT FAILURE - FAILURE TO REPORT | $2,000 PENALTY PAID<br>$4,000 PENALTY PAID<br>$1,000 PENALTY PAID | NOTICE OF VIOLATION |
| JUNE 7, 1989 | WWTP BIOASSAY $LC_{50}$ LIMITATION | $308,000 PENALTY PAID | VOLUNTARY ADMINISTRATIVE CONSENT ORDER |
| JUNE 19, 1989 | SITE REMEDIATION | $7.5 MILLION IN LETTER OF CREDIT | VOLUNTARY ADMINISTRATIVE CONSENT ORDER |

SUMMARY OF SAMPLING DATA

1. Sampling date: January 25, 1983
   Sampled by: ERM - Northeast
   Plainview, New York
   Samples: Seven monitor wells (2 inch diameter)
   Laboratory: ETC (#12257)
   Edison, New Jersey
   Parameters: Volatile organics, base/neutral compounds, acid compounds, metals, cyanide and phenol.
   Sample description: Seven on site monitoring wells:

| | DEPTH (feet) | SCREEN INTERVAL (feet) |
|---|---|---|
| W-1 | 10 | 0-10 |
| * W-2 | 20 | 12-20 |
| * W-3 | 18 | 13-18 |
| W-4 | 10 | 0-10 |
| W-5 | 12 | 0-12 |
| W-6 | 9.5 | 0-9.5 |
| * W-7 | 28 | 23-28 |

*(W-2, 3 and 7 will be removed, properly sealed and replaced by shallower wells. The existing borings penetrate the peat and clay layers and may act as conduits for vertical migration of contaminants).

Contaminants detected: Elevated levels of benzene, halogenated benzene compounds, naphthalene, phenol, arsenic and cyanide were detected in monitoring wells W-4, 5, 6 and 7.

No contaminants were detected in W-2 and W-3. Contaminants detected are summarized below:

(ppb)

| | W-1 | W-4 | W-5 | W-6 | W-7 |
|---|---|---|---|---|---|
| Benzene | 38 | 584 | 127 | 319 | 87 |
| Chlorobenzene | ND | 15,200 | 958 | 538 | 319 |
| 1,2-Dichloroethane | ND | 52 | ND | ND | 41 |
| Ethyl benzene | 33 | 27 | 13 | BMDL | ND |
| Toluene | 69 | 96 | BMDL | BMDL | BMDL |
| Phenol | BMDL | 5,800 | BMDL | BMDL | BMDL |
| 1,2-Dichlorobenzene | ND | 907 | 343 | 111 | 108 |
| 1,3-Dichlorobenzene | ND | 490 | 148 | 28 | 14 |
| 1,4-Dichlorobenzene | ND | 497 | 233 | 34 | 23 |
| Naphthalene | 203 | 114 | 36 | 26 | BMDL |
| 1,2,4-Trichlorobenzene | ND | 83 | 132 | 17 | BMDL |
| Arsenic | ND | 8.6 | 360 | 110 | BMDL |

ND = Not detected
BMDL = Below method detection limit

QA/QC: No QA/QC information other than method detection limits were provided.

File location: NJDEP/DHWM/BPA
Trenton, New Jersey

2. Sampling date: November 29, 1988

Sampled by: NJDEP/DHWM/BPA
Trenton, New Jersey

Samples: One sample from the drainage ditch north of the Waste Water Treatment Plant, bordering DuPont's Grasselli Plant. Ten groundwater samples.

Laboratory: Roy F. Weston, Inc.
Lionville, Pennsylvania

Parameters: Target Compound List plus 30 peaks

Sample description: One sample from the drainage ditch north of the Waste Water Treatment Plant. Ten onsite monitoring wells described as follows:

| | DEPTH (feet) | SCREEN INTERVAL (feet) |
|---|---|---|
| GAF-7S | 9 | 2-9 |
| 7D | 44 | 34-44 |
| 9S | 12.5 | 2.5-12.5 |
| 9D | 63 | 53-63 |
| 10S | 9 | 2-9 |
| 10D | 61 | 51-61 |
| 13S | 10 | 3-10 |
| 13D | 51 | 41-51 |
| 14S | 9 | 2-9 |
| 14D | 44 | 34-44 |

Contaminants detected: In the drainage ditch sample, bis(2-ethyl hexyl) phthalate at 12 ppb, arsenic at 72.2 ppb and manganese at 1280 ppb were detected. Bis(2-ethyl hexyl) phthalate was detected in all the wells. Metals detected are summarized in Table 1. Organic contaminants detected are summarized below:

(ppb)

| | 7S | 7D | 9S | 9D | 10S | 10D | 13S | 13D | 14S | 14D |
|---|---|---|---|---|---|---|---|---|---|---|
| ACETONE | ND | 420 | ND | ND | ND | 2400 | ND | ND | ND | ND |
| 1,2-DICHLOROPROPANE | ND | ND | ND | ND | ND | ND | 31 | ND | ND | ND |
| 1,2-DICHLOROBENZENE | ND | ND | ND | 6 | ND | ND | ND | ND | ND | ND |
| NAPHTHALENE | ND | ND | 18 | ND | ND | ND | ND | ND | ND | ND |
| 4-CHLOROANILINE | 83 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| ACENAPHTHENE | ND | ND | 12 | ND | ND | ND | ND | ND | ND | ND |
| PHENATHRENE | ND | ND | 21 | ND | ND | ND | ND | ND | ND | ND |
| BIS(2-ETHYLHEXYL) PHTHALATE | 3 | 5 | 1 | 17 | 2 | 460 | 26 | 3200 | 500 | 7 |

ND = Not detected

QA/QC: A QA/QC review of the data by the NJDEP, Division of Hazardous Site Mitigation (DHSM), Bureau of Environmental Measurements and Quality Assurance (BEMQA) stated that:

- o base/neutral results for the drainage ditch sample were rejected.
- o base/neutral acid extractable results were rejected for MW-14S.
- o holding times for the pesticide/PCB extraction were exceeded.
- o selenium results for all samples were rejected due to blank contamination.
- o low levels of various metals were found in the field blank; however, levels in the samples were five times greater than in the field blank.
- o percent recoveries of antimony, chromium and silver were high, thus qualifying, "J", the values.
- o lead and selenium results are qualified, "J", due to low sample spike recovery.

File location: NJDEP/DHWM/BPA
Trenton, New Jersey

3. Sampling date: December 1, 1988
Sampled by: NJDEP, DHWM, BPA
Trenton, New Jersey
Samples: 25 soil/sediment samples
Laboratory: Envirodyne Engineering Inc.
St. Louis, Missouri
Parameters: Target Compound List plus 30 peaks, dioxin.
Sample description: Soil and sediment samples were collected throughout various portions of the site.
Contaminants detected: Numerous metals above NJDEP action levels have been detected on site. Sediment 3 had the greatest number and highest concentrations of volatile organics. Sediments 2 and 11 had the most semi-volatile compounds with Sediment 2 having the highest concentrations. No pesticides or PCBs were detected in the samples. Contaminants detected are summarized in Table 2. Dioxin results are summarized in Table 3.
QA/QC: A complete QA/QC review was conducted by the NJDEP, DHSM, BEMQA. Findings included:

- o Samples Sed-1, Sed-4, Sed-6, Sed-8, Sed-10, Sed-11, Sed-12, Sed-13, Sed-15 and Soil-6D were all rejected for volatile organics due to holding times being exceeded. All additional samples were qualified as "J" due to holding times between 10 and 15 days.

- Samples Soil-2, Soil-3, Soil-9D, Soil 10, Sed-10 and Sed-11 were rejected due to exceeded holding times of base/neutral acid extractables.
- Field blank results for base/neutral acid extractables were rejected due to the method blank being outside control limits.
- The laboratory incorrectly reported not detected for the pesticide/PCB analysis, however, Aroclor-1260 in Sed-11 and Aroclor-1254 in Sed-9 were detected at concentrations of 190,000 ppb and 130,000 ppb, respectively.

File location: NJDEP/DHWM/BPA
Trenton, New Jersey

TABLE 1

11/29/88

INORGANIC ANALYSIS SUMMARY GAF, Linden

LABORATORY: WESTON-LIONVILLE

CONCENTRATION (Units UG/L)

| ANALYTE | 7S | | 7D | | 9S | | 9D | | 10S | | 10D | | 13S | | 13D | | 14S | | 14D | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 160 | B | 7390 | | 69.8 | B | 715 | | 94.9 | B | 1840 | | 23500 | | 573 | | 13800 | | 514 | | Alu |
| Antimony | 34.6 | U | 89.0 | | 34.6 | U | 44.5 | B | 34.6 | U | 34.6 | U | 66.8 | | 34.6 | U | 100 | | 40.8 | B | Ant |
| Arsenic | 6.6 | B | 7.6 | B | 10.7 | | 1.2 | U | 20.0 | | 12.0 | U | 26.0 | | 12.0 | U | 150 | | 12.0 | U | Ars |
| Barium | 65.5 | B | 356 | | 232 | | 62.3 | B | 468 | | 113 | B | 354 | | 455 | | 2530 | | 53.0 | B | Bar |
| Beryllium | 0.10 | U | 2.6 | B | 0.10 | U | 2.6 | B | 0.10 | U | 3.5 | B | 6.1 | | 1.7 | B | 3.2 | B | 2.6 | B | Ber |
| Cadmium | 2.2 | U | 2.2 | U | 2.2 | U | 2.2 | U | 2.2 | U | 2.2 | U | 6.7 | | 2.2 | U | 3.8 | B | 2.2 | U | Cad |
| Calcium | 162000 | | 764000 | | 37900 | | 1800000 | | 36500 | | 1870000 | | 201000 | | 975000 | | 737000 | | 1440000 | | Cal |
| Chromium | 3.0 | U | 11.0 | | 6.4 | B | 3.0 | U | 3.0 | U | 3.0 | U | 104 | | 3.0 | U | 54.2 | | 3.0 | U | Chr |
| Cobalt | 4.6 | B | 5.6 | B | 3.3 | U | 3.3 | U | 3.3 | U | 3.3 | U | 1150 | | 3.3 | U | 190 | | 7.1 | B | Cob |
| Copper | 48.2 | | 41.0 | | 25.7 | | 51.3 | | 15.0 | B | 56.3 | | 123 | | 48.8 | | 188 | | 61.0 | | Cop |
| Iron | 851 | | 41300 | | 8130 | | 16100 | | 15100 | | 18400 | | 433000 | | 1220 | | 224000 | | 84300 | | Iro |
| Lead | 1.3 | B | 13.4 | | 3.9 | B | 3.9 | B | 2.0 | B | 7.4 | | 52.8 | | 1.3 | B | 1160 | | 2.0 | B | Lea |
| Magnesium | 31100 | | 337000 | | 19400 | | 600000 | | 35900 | | 516000 | | 118000 | | 167000 | | 486000 | | 518000 | | Mag |
| Manganese | 712 | | 2440 | | 112 | | 1070 | | 196 | | 2080 | | 141000 | | 375 | | 157000 | | 8060 | | Man |
| Mercury | 1.6 | | 0.44 | | 0.20 | U | 4.1 | | 0.20 | U | 0.20 | U | 0.22 | | 0.20 | U | 10.1 | | 0.20 | U | Mer |
| Nickel | 58.9 | | 23.0 | B | 16.3 | B | 8.9 | B | 6.3 | B | 9.6 | B | 527 | | 8.5 | B | 107 | | 28.5 | B | Nic |
| Potassium | 5800 | | 14000 | | 13400 | | 26200 | | 36800 | | 24600 | | 18100 | | 488000 | | 55900 | | 29800 | | Pot |
| Selenium | 1.9 | B | 0.90 | U | 2.7 | B | 1.8 | U | 1.1 | B | 1.0 | B | 2.3 | B | 1.9 | B | 2.7 | B | 9.0 | U | |
| Silver | 5.1 | U | 5.1 | U | 6.8 | B | 5.1 | U | 5.1 | U | 5.1 | U | 21.0 | | 5.1 | U | 16.3 | | 5.1 | U | |
| Sodium | 95800 | | 619000 | | 309000 | | 3000000 | | 476000 | | 2260000 | | 814000 | | 2310000 | | 3140000 | | 3390000 | | Sod |
| Thallium | 36.0 | B | 30.0 | B | 23.0 | U | 4.6 | B | 2.3 | U | 48.0 | B | 36.0 | B | 44.0 | B | 48.0 | B | 36.0 | B | Tha |
| Vanadium | 4.8 | B | 32.6 | B | 68.3 | | 7.5 | B | 4.8 | B | 4.8 | B | 254 | | 4.8 | B | 95.5 | | 18.0 | B | Van |
| Zinc | 120 | | 82.5 | | 46.4 | | 42.6 | | 16.1 | B | 42.3 | | 979 | | 35.4 | | 380 | | 93.8 | | Zin |
| Cyanide | 10.0 | U | 10.0 | U | 10.0 | U | 10.0 | U | 10.0 | U | 10.0 | U | 10.0 | U | 10.0 | U | 12.6 | | 10.0 | U | Cya |

The following extracted samples required dilution because they contained high levels of target compounds:

| Well# | Dilution Factor |
|---|---|
| 10D | 10 |
| 13D | 50 |
| 14S | 10 |

TABLE 2-11

SUMMARY OF ALL SITE BUILDINGS

GAF Chemicals Corporation, Linden Plant

| Building No. | Time Period | Activities |
|---|---|---|
| 1 | 1929 ± 1952 | Production |
| 3 | 1929 ± 1976 | Cooperage - Warehouse |
| 5 | 1921 ± 1978 | Carpenter Shop |
| 6 | 1920 ± | Mason Shop |
| 7 | 1920 ± | Rigger Shop |
| 8 | 1921 ± 1976 | Warehouse |
| 9 | 1920 ± 1976 | Paint Shop - Lead Shop |
| 13 | 1940* | Power House |
| 18 | 1929 ± 1976 | Firehouse - Safety Equipment |
| 20 | | Pipe Shop |
| 22 | | Production |
| 23 | | Production |
| 24 | | Production |
| 25 | | Production |
| 26 | | Production |
| 27 | | Production |
| 28 | | Production |
| 29 | 1929* | Garage |
| 31 | 1915 ± 1978 | Laboratory and Offices |
| 33 | | Laboratory Store Room |
| 34 | 1941 ± | Naphthaline Storage |
| 35 | 1921 ± 1984 | Offices, later Warehouse - Pipe Shop |
| 36 | 1921* | Production |
| 40 | | |
| 41A | 1942 ± | |
| 41B | 1965* | THF Still |
| 42 | 1942 ± | Soda Ash Storage |
| 43 | 1944 ± | Metal Storage |
| 44 | 1925 ± 1976 | Water Meters |
| 45 | * | Chill Brine House - Refrigeration Equipment |
| 46 | 1926 1986* | Production |
| 47 | 1927* | Engineering Department and Maintenance Shops |
| 48 | 1934* | Warehouse/Laboratory |
| 49 | 1934 ± 1976 | Production |
| 50 | 1927 ± 1982 | Production |
| 51 | 1929 ± 1982 | Laboratory and Offices |
| 52 | 1927* | Production |
| 53 | 1937* | Production (1937-1974) |
| | | Waste Storage (1974-1986) |
| 56 | | Oil House |



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TABLE 2-11 (continued)

SUMMARY OF ALL SITE BUILDINGS

GAF Chemicals Corporation, Linden Plant

| Building No. | Time Period | Activities |
|---|---|---|
| 63 | * | Oil Pumping Station |
| 66 | * | Coal Silos |
| 100 | 1939/40* | Administration Building |
| 101 | 1929* | Showers and Lockers |
| 110 | * | Cooling Water Pumps |
| 120 | 1956* | Warehouse |
| 200/201 | 1941 ± | Ammonia Storage and Filling Station |
| 200 | 1940* | Production |
| 201 | 1940 ± 1976 | Storage |
| 202 | 1947 ± 1976 | Acetylene Generation |
| 203 | 1941 ± 1976 | Offices and Laboratory |
| 204 | 1946* | Pilot Plant/Semi-Works Production |
| 205 | 1916 ± 1929 | Storage |
| 207 | 1970* | Pilot Plant/Engineering Offices Laboratory and later Silver Recovery |
| 300 | * | Ethylene Oxide Area/Administration |
| 301 | | Service Building |
| 302 | | Utilities |
| 303 | | Reaction Building |
| 304 | | Compressor Control |
| 305 | | Distillation Building |
| 306 | * | Refrigeration Building |
| 308 | | Substation |
| 309 | | Storage |
| 350 | * | Machinery Building |
| 400 | * | Electrical Control |
| 402 | * | Pump Station |
| 410 | * | Filter Press & Control |

Note:

*Building still in existence, either wholly or in part



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TABLE 2-12

BUILDINGS CONTAINING SIGNIFICANT HAZARDOUS MATERIALS

GAF Chemicals Corporation, Linden Plant

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BUILDING 3AB:

Activity: Drums and barrels used for intermediate and semi-finished dyestuffs and pigments were washed in this building for reuse. Residue from products manufactured in Buildings 46, 49, 50 and 52 were rinsed from these containers.

BUILDING 13:

Activity: Powerhouse. This unit has burned various production byproducts including nonene, nonane, di-noyl phenol bottoms, ethanol, and ortho nitro toluene as a supplement to the No. 6 fuel oil.

BUILDING 24:

Activity: Produced sulfur colors and nitrobenzene, dinitrobenzene, nitrotoluene and dinitrotoluene.

Raw Materials: Inorganic acids and bases, non-metallic elements and several hydrocarbons.

BUILDING 36:

Activity: Produced sulfur colors, bacteriacide/fungicide, beta oxy naphthoic acid and numerous surface active agents.

Raw Materials: Inorganic acids including sulfuric and nitric, and inorganic bases including caustic chloride. Various organics including ethylene oxide, nonene, phenol, alkyl phenol, di-isobutylene, sodium oxethane, disobutyl phenol, chlorobenzene, 2,4,5 trichlorophenol, amines, various alcohols, non-metallic elements, and several acid chlorides.

Byproducts: Organic solvents, caustic solutions, poly alkyl phenols, fatty acid residues, and nonyl phenol.

BUILDING 46:

Activity: Produced dye intermediates

Raw Materials: Inorganic acids and bases, various metallic catalysts, and numerous other organic salts purchased or produced in 49 Building, and numerous hydrocarbon solvents.

Byproducts: Sodium sulfide, dinitrobenzene isomers, iron oxide sludge, dichlorobenzoyl chloride still bottoms, arsenic acid, and ammonia.

TABLE 2-12 (continued)

BUILDINGS CONTAINING SIGNIFICANT HAZARDOUS MATERIALS

GAF Chemicals Corporation, Linden Plant

---

BUILDING 48, Dept. 600:

Activity: Produced color formers for the former Binghamton photo products plant.

Raw Materials: Inorganic acids including chlorosulfonic acid, inorganic bases, organic solvents, including methyl hexanone, xylene, THF, toluene, naphthalene, nitrobenzene, benzene, heptane, chloro-nitrobenzene, acetone, pyridine and ethylene dichloride, as well as mercury, diethylamine, and anhydrous ammonia.

Byproducts: Acetic acid, organic solvents and mercury compounds.

BUILDING 49:

Activity: Produced dye intermediates.

Raw Materials: Inorganic acids and bases, various metallic catalysts including mercury, numerous other salts purchased or manufactured in 46 Building, and various organics, including chlorobenzene, nitrobenzene, and anthraquinone.

Byproducts: Organic solvents, dilute sulfuric acid, benzoic acid, arsenic medicuric sulfate, metallic mercury, polychlorobenzoyl chlorides, polychlornitro benzenes, iron sludges, and lime cakes.

BUILDINGS 50, 52, AND 53:

Activity: Produced dyestuffs and pigments. Building 50 was used primarily for simple acid pasting; Building 52 was used for dyestuff and pigment production using intermediates from 46 and 49 Buildings and for pigment production using urea and phthalic anhydride. Building 53 was used for physical conditioning of products from Buildings 50 and 52.

Raw Materials: Dye intermediates produced in Buildings 46 and 49; inorganic acids including chlorosulfonic and sulfonic, inorganic bases, various chlorinated solvents including nitrobenzene, dichlorobenzene, trichlorobenzene, naphthalene, metallic and non-metallic elements, including sulfuryl chloride, cuprous chloride, and aluminum chloride.

Byproducts: Ammonia, organic solvents, sodium sulfites, m-amino benzene sulfonate, sodium acetate, ethylene glycol iron cake, and tars.



B'

TABLE 2-12 (continued)

BUILDINGS CONTAINING SIGNIFICANT HAZARDOUS MATERIALS

GAF Chemicals Corporation, Linden Plant

---

BUILDING 120:

Activities: Surfactant materials of all kinds, i.e., Igepals, non-ionic surfactants, Alipals, phosphate esters, and low foamers are drummed and stored in this building.

BUILDING 200:

Activity: Produced carbonyl iron powder.

Raw Materials: Sponge iron, hydrogen, carbon monoxide and coke

BUILDING 204:

Activity: Initially a pilot facility used to produce acetylenic products from formaldehyde and acetylene. Later use of the building was for semi-works production of color formers for the former Binghamton photo products plant.

Raw Materials: Inorganic acids and bases, organic solvents including alcohols, heptane and benzene, as well as purchased organic salts were used in this production. Pilot batches of surfactants were made using ethylene oxide, various alcohols, and other organic salts and hydrocarbons.

Byproducts: Organic solvents and acetic acid.

BUILDING 207:

Activity: Used for silver recovery from the film operation, originally a research facility for the Chemical Engineering group in 1970.

Raw Materials: Scrap film, caustic and organic salt

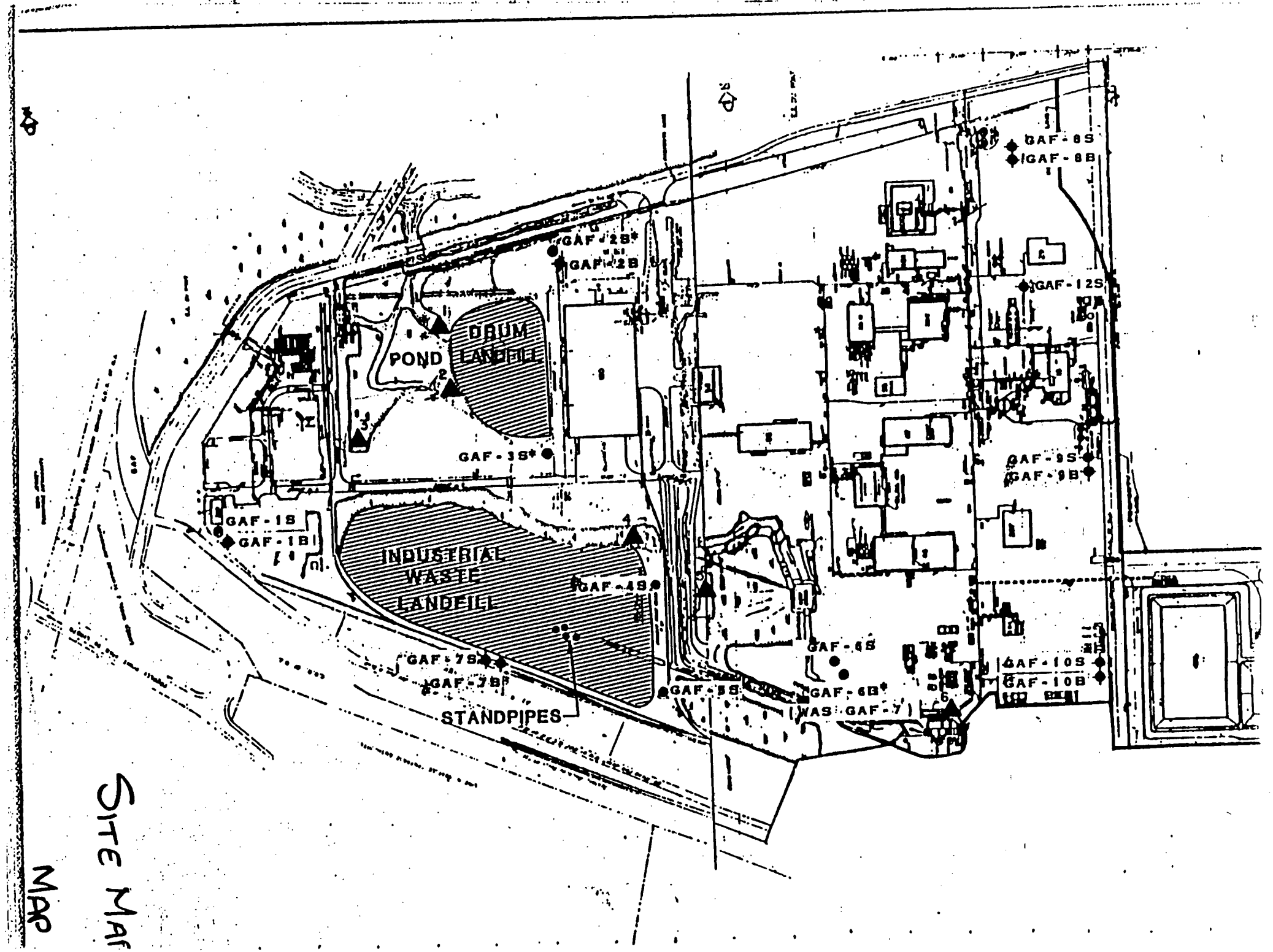
ETHYLENE OXIDE AREA (BUILDINGS 303, 304, 305, 306)

Activity: Produced ethylene oxide.

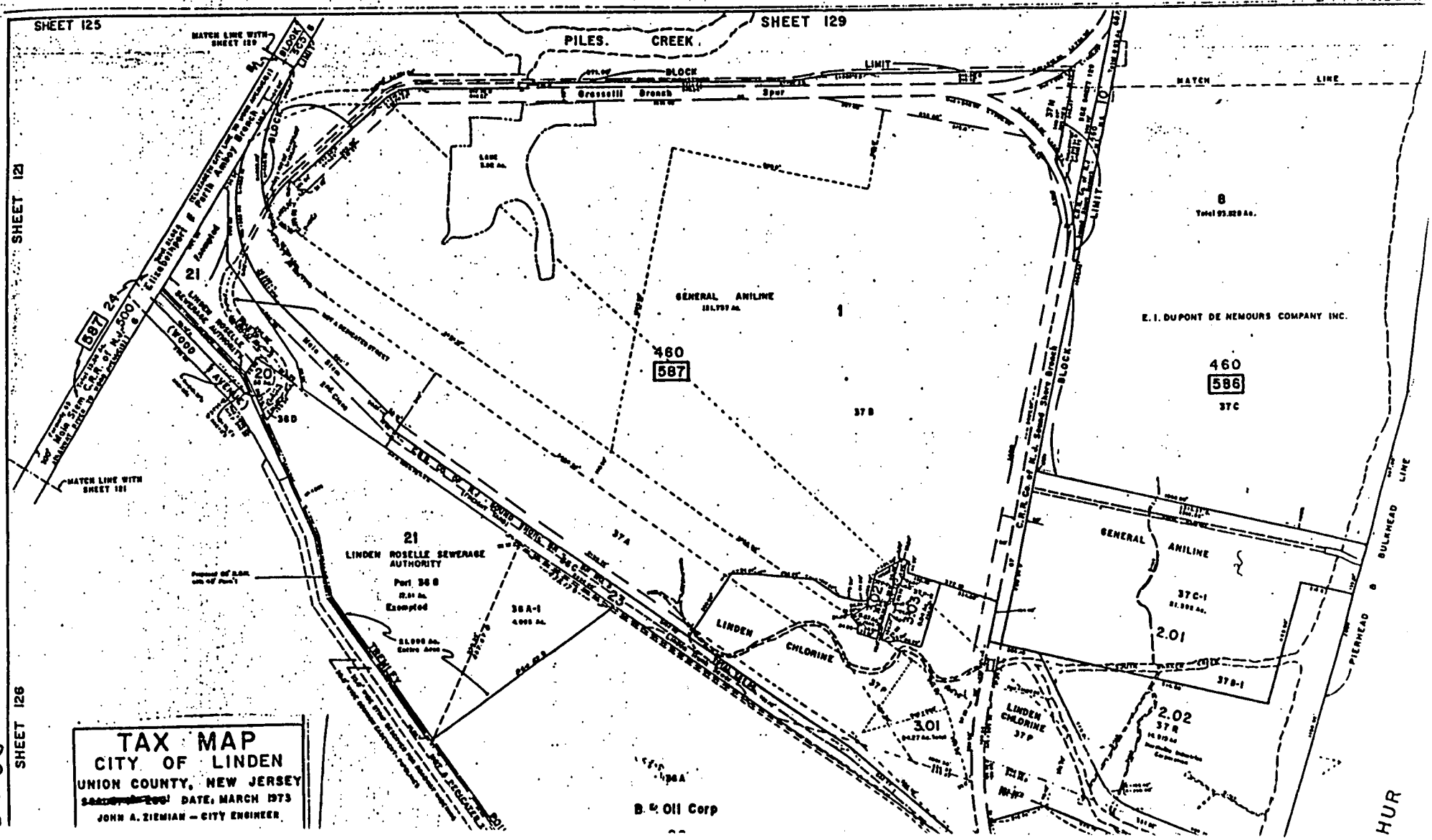
Raw Materials: Ethylene gas, platinum and silver catalyst.

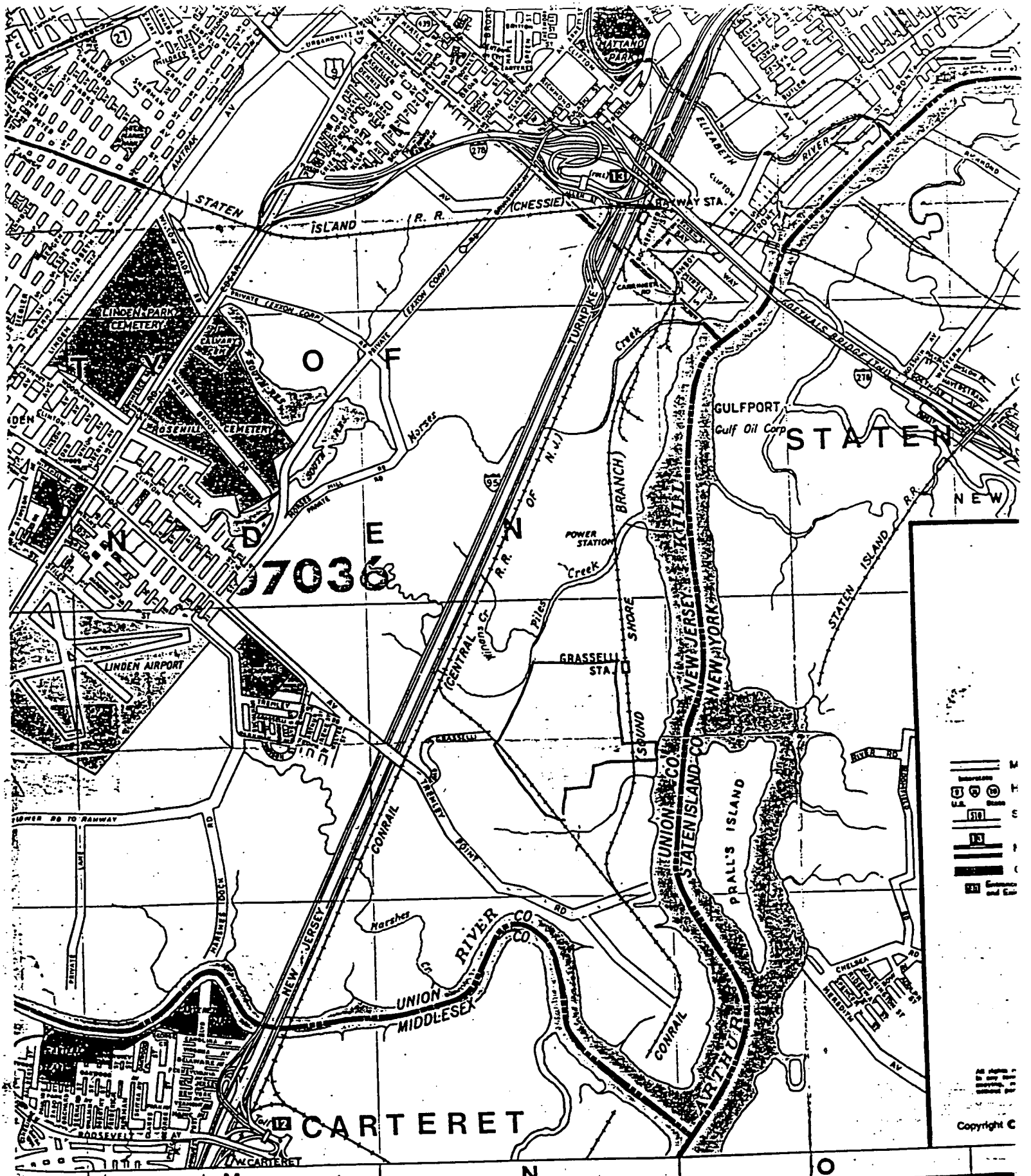
Byproducts: Glycols

---


DRUM LANDFILL
POND
INDUSTRIAL WASTE LANDFILL
STANDPIPES
GAF-1S
GAF-1B
GAF-2S*
GAF-2B
GAF-3S*
GAF-4S
GAF-5S
GAF-6S
GAF-6B*
(WAS GAF-7)
GAF-7S
GAF-7B
GAF-8S
GAF-8B
GAF-9S
GAF-9B
GAF-10S
GAF-10B
GAF-12S

Site Map


SHEET 125
SHEET 129
SHEET 121
SHEET 126
PILES. CREEK
MATCH LINE WITH SHEET 129
MATCH LINE WITH SHEET 121
MATCH LINE
BLOCK LIMIT
Grasselli Branch Spur
Elizabethport & Perth Amboy Branch
Main Stem C.R.R. of N.J.
LINDEN ROSELLE SEWERAGE AUTHORITY
(WOOD AVENUE)
GENERAL ANILINE
1
460
587
37 B
8
E. I. DUPONT DE NEMOURS COMPANY INC.
460
586
37 C
21
LINDEN ROSELLE SEWERAGE AUTHORITY
Part 36 B
Exempted
36 A-1
37 A
LINDEN CHLORINE
37 P
3.01
GENERAL ANILINE
37 C-1
2.01
37 B-1
2.02
37 R
LINDEN CHLORINE
37 P
PIERHEAD & BULKHEAD LINE
TRENTLEY
B. & Oil Corp
TAX MAP
CITY OF LINDEN
UNION COUNTY, NEW JERSEY
DATE: MARCH 1973
JOHN A. ZIEMIAN — CITY ENGINEER




UNION COUNTY ROAD MAI
MAP 4

TABLE 2-13

RAW MATERIALS USED IN MANUFACTURING PROCESSING —1988

GAF Chemicals Corporation, Linden Plant

Acetic AC GL Color Form
Acetic Anhydride PUR
Acrolein Tech
Acrylic Acid, Glacial
Additive GLY
Alfol 6
Alfol 810
Alfol 1012
Alfol 1218
Alfol 1620
Amberlyst 15
Amberlyst XN-1010
Am ETH Ethanolamine
Ammonia Anhy (CYL)
Ammonia Anhy (H)
Ammonia Anhy (1)
Amm Chloride Fine
Amm Sulphate
Antifoam B
Antifoam C-PG
Antifoam Y 30
Benzene
Benzoyl Perox 70
Benzyl Chloride
Boric Acid
Boron Trifluoride (CYL)
Boron Trifluoride Ether
Butanol
Butyl Cellosolve
T-Butyl Perox Pivalate
Carbonyl Iron Powder HFF
Castor oil
Caustic Pot FLK
Caustic Pot Pellets
Caustic Soda Beads
Caustic Soda FLK
Caustic Soda LIQ 25
Caustic Soda LIQ 100
CHL Acetate AC
Citric Acid
Coco Fatty AC C-108
Coco Fatty AC C-120
Coconut Amine Dist
Coconut Fat AC STR
Decyl ALC
Dibutyl 4 Cresol CP
Di-t-butyl Perox
Dicyanid
Diethanolamine
Dieth Sulfate
Di-isobutylene
Dimeth Ameth Methacrylate
Dimeth Am Eth Meth XLF
Dimethylamine
Dinonyl Phenol Dist
Dodecyl Phenol
Dow Corning 193 Surfactant
Emersol 132 Steric Acid
Emersol 153 Steric Acid
Epal 810
Epal 1012
Epal 1275
Epon 828
Ethanol SD-3A
Ethylamine
Ethylen Clycol Meth Ether
Ethylene Glycol
Ethylene Oxide
Ethylene Oxide (CYL)
Formal 37K
Gluteraldehyde 50% Aqua
Golpanol Boz
Groco 55-1
Heptane, Normal
1 Hexadecene
Hexane
1-6 Hexanediol Diacrylat
Hexyl ALC
Hydrogen Perox 35
Hydrogen in Pipeline 1
2 Hydroxyethyl Acrylate
Hypophosphorous AC 50
Iodine FIN GRD CNS
Iodine Prill
Ionol Antioxidant
Irgacure 184
Irgacure 651
Irganox 1010
Isoamyl Alcohol
Isobutyene
Isodor P-4542
Isophrone Di-isocyanate
Isopropanol Cosmetic K
Isopropanol
Isopropyl Alcohol, ANHY
Kathon C6 Preservative
Latic Acid 88
Lauryl Alcohol Mixed
Lauryl Alcohol Tech
Lauryl Special
Maleic Anhy
Methamine Anhy
Methanol
Micro Cell B
Micro Cell "C"
Micro Cell E
Monoethanolamine
Murac Anhy CYCLS
Murac Anhy T/T
Murac CP
Nekal BX-78 SOLN NOP
Nitrogen Dry
Nonene
Nonyl Phenol
Olefin Frac C-20 C-24
Oleic Acid
Oleyl
Oleyl Alcohol Sub
Oleyl Amin T
Oleylamine Dist
Palmitic Acid
Pe Triacrylane
Phenol USP
Phenothiazine
Phos AC 85
Phos Oxy Chloride
Phos Pentoxide Mon
Phos Trichloride
Poly Clycidol
Poly Phos AC 115
Propylene Oxide
Rock Salt (Solar)



B

# Preliminary Assessment

for

RCRA Corrective Action Program

GAF Linden
Dupont Rd. Foot of Wood Ave.
Linden, Union County, NJ

N.J. Department of Environmental Protectio
Divisions of Environmental Quality
Waste Management
Water Resources

Prepared by the Division of Waste Managemen
Bureau of Hazardous Waste Planning &
Classification
November 1986

EPA

# POTENTIAL HAZARDOUS WASTE SITE
## PRELIMINARY ASSESSMENT
### PART 1 - SITE INFORMATION AND ASSESSMENT

**I. IDENTIFICATION**

| 01 STATE | 02 SITE NUMBER |
|---|---|
| | |

**II. SITE NAME AND LOCATION**

| | |
|---|---|
| 01 SITE NAME (Legal, common, or descriptive name of site): GAF | 02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER: Dupont Rd Foot of Wood Ave. |

| 03 CITY | 04 STATE | 05 ZIP CODE | 06 COUNTY | 07 COUNTY CODE | 08 CONG DIST |
|---|---|---|---|---|---|
| Linden | NJ | 0703 | Union | 20 | |

| 09 COORDINATES LATITUDE | LONGITUDE |
|---|---|
| 40 36 43.- | -74 12 50.- |

10 DIRECTIONS TO SITE (Starting from nearest public road):

**III. RESPONSIBLE PARTIES**

| 01 OWNER (if known): GAF | 02 STREET (Business, mailing, residential): 1361 ALPS Rd. | | |
|---|---|---|---|
| 03 CITY: Wayne | 04 STATE: NJ | 05 ZIP CODE: 07470 | 06 TELEPHONE NUMBER: (201) 668-3504 |
| 07 OPERATOR (if known and different from owner): | 08 STREET (Business, mailing, residential): | | |
| 09 CITY: | 10 STATE: | 11 ZIP CODE: | 12 TELEPHONE NUMBER: ( ) |

13 TYPE OF OWNERSHIP (Check one):
☒ A. PRIVATE ☐ B. FEDERAL: _____ (Agency name) ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL
☐ F. OTHER: _____ (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply):
☐ A. RCRA 3001 DATE RECEIVED: __/__/__ (MONTH DAY YEAR) ☐ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: __/__/__ (MONTH DAY YEAR) ☐ C. NONE

**IV. CHARACTERIZATION OF POTENTIAL HAZARD**

01 ON SITE INSPECTION
☒ YES DATE: __/__/86 (MONTH DAY YEAR)
☐ NO

BY (Check all that apply):
☐ A. EPA ☐ B. EPA CONTRACTOR ☒ C. STATE ☐ D. OTHER CONTRACTOR
☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: _____ (Specify)
CONTRACTOR NAME(S): _____

| 02 SITE STATUS (Check one) | 03 YEARS OF OPERATION |
|---|---|
| ☒ A. ACTIVE ☐ B. INACTIVE ☐ C. UNKNOWN | 1900's (BEGINNING YEAR) Present (ENDING YEAR) ☐ UNKNOWN |

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED
Mercury, Dichlorobenzene, Phenol, Toluene, Dioxaine, Silver, Arsenic, Propylene, Oxide.
benzene

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION
Groundwater, soil and surface water contamination on site documented.

**V. PRIORITY ASSESSMENT**

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents):
☐ A. HIGH (Inspection required promptly) ☐ B. MEDIUM (Inspection required) ☐ C. LOW (Inspect as time available basis) ☐ D. NONE (No further action needed; complete current disposition form)

**VI. INFORMATION AVAILABLE FROM**

| 01 CONTACT | 02 OF (Agency/Organization) | 03 TELEPHONE NUMBER |
|---|---|---|
| Robert Patel | NJDEP/BDWE | ( ) |

| 04 PERSON RESPONSIBLE FOR ASSESSMENT | 05 AGENCY | 06 ORGANIZATION | 07 TELEPHONE NUMBER | 08 DATE |
|---|---|---|---|---|
| Richard Gervasio | NJDEP | DHWM/BSA | 609 ) 2927696 | __/__/__ (MONTH DAY YEAR) |

EPA FORM 2070-12 (7-81)

1. BASIC PROCESS/UNIT CHARACTERISTICS

| | 1) SWMU TYPE | 2) LOCATION | 3) NO. OF UNITS OF THIS TYPE | 4) AMOUNT/SIZE | 5) KNOWN ALLEGED | 6) RCRA/ NPDES STATUS | 7) UNITS EXHIBITING OBSERVED OR SUSPECTED RELEASE |
|---|---|---|---|---|---|---|---|
| A. Landfill | A | I-4<br>J-8 | 2 | 6 acre<br>10-12 acre | Known | Registered | Observed |
| B. Surface Impoundment | B | N-9<br>I-8 | 2 | Unknown | Alleged | None | Suspected |
| C. Waste Pile | | | | | | | |
| D. Land Treament Unit | | | | | | | |
| E. Injection Well | | | | | | | |
| F. Incinerator | | | | | | | |
| TANKS | | | | | | | |
| G.1 Above Ground | G-1 | M-9 | 1 | 6,000 gal. | Known | Permitted | None |
| G.2 Underground | | | | | | | |
| H. Container Storage Unit | H | 6-7<br>H-6 | 2 | Unknown | Known | Waiting approval in closure process | |
| I. Other | LWMF | N-9 | 1 | | Known | Permit | Observed |

| SWMU TYPE | COMMENT |
| --- | --- |
| Building #207 Hazardous Waste container Storage | Building 207 ready for use drains blocked and door ways diked. Waiting for approval to be used. |
| Surface Impoundment | Area used to discharge arsenic acid waste from over head sewer line also iron sludge area now used to store building debris and drums. |
| 9 Surface Impoundment | Area is now site of Waste Treatment Plant. Dilute sulfuric acid residue from alpha athraquiones which contain mercuric sulfate and traces of entrained metallic mercury drained from building #49 via drainage ditch system to this area known as tract #9. |

ADDITIONAL COMMENTS

| SWMU TYPE | | COMMENT |
|---|---|---|
| N-9 | Industrial Waste Management Facility | Includes oil-water skimmer, to remove waste oil from waste lagoon. Oil storage tank-6000 gal used to store skimmed waste water oil. Lagoon oil manifested off site urned oil needs to be classified. |
| I-8 | Old Landfill | Observed release to both ground water and soil stand pipes on landfill have oil on wa GAF admitts to dumping chemicals off spec product, also alledged dumping of clorinated Hydrocarbons. |
| I-4 | Drum Landfill | Alledged dumping of arsenic acid residue and iron sludges from sulfunicated anthraquiones, process, also buried drums visable on various inspections. |
| H-6 | Building 53 Hazardous Waste Container Storage | This building in closure porcess. Building clear of all waste. Proposed new storage area Building 207 ready, not approved. |

SOLID WASTE MGMT. UNIT Old Landfill LOCATION J-8

EPA

# POTENTIAL HAZARDOUS WASTE SITE
## PRELIMINARY ASSESSMENT
### PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

| 01 STATE | 02 SITE NUMBER |
|---|---|
| | |

## II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [X] A. GROUNDWATER CONTAMINATION 02 [X] OBSERVED (DATE 1983) [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 12
04 NARRATIVE DESCRIPTION
Monitoring wells of LF show metals, VO contamination standpipes in surtical fill on LF contain oily liquid layer.

01 [ ] B. SURFACE WATER CONTAMINATION 02 [ ] OBSERVED (DATE: ) [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION
Landfill in existance before IWMF, contaminates from LF run to Authur Kill and Piles Creek via ditch system.

01 [ ] C. CONTAMINATION OF AIR 02 [ ] OBSERVED (DATE: ) [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

01 [ ] D. FIRE/EXPLOSIVE CONDITIONS 02 [ ] OBSERVED (DATE: ) [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

01 [ ] E. DIRECT CONTACT 02 [ ] OBSERVED (DATE: ) [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

01 [ ] F. CONTAMINATION OF SOIL 02 [ ] OBSERVED (DATE: 1983) [ ] POTENTIAL [ ] ALLEGED
03 AREA POTENTIALLY AFFECTED: 12 (Acres)
04 NARRATIVE DESCRIPTION
Soil boring in LF show metals VO contamination.

01 [ ] G. DRINKING WATER CONTAMINATION 02 [ ] OBSERVED (DATE: ) [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

01 [ ] H. WORKER EXPOSURE/INJURY 02 [ ] OBSERVED (DATE: ) [ ] POTENTIAL [ ] ALLEGED
03 WORKERS POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

01 [ ] I. POPULATION EXPOSURE/INJURY 02 [ ] OBSERVED (DATE: ) [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

SOLID WASTE MGMT. UNIT Old Landfill LOCATION J-8

EPA

# POTENTIAL HAZARDOUS WASTE SITE
## PRELIMINARY ASSESSMENT
## PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE | 02 SITE

**II. HAZARDOUS CONDITIONS AND INCIDENTS** (Continued)

01 [ ] J. DAMAGE TO FLORA — 02 [ ] OBSERVED (DATE: 1986) — [ ] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION
No growth on large portions of landfill.

01 [ ] K. DAMAGE TO FAUNA — 02 [ ] OBSERVED (DATE: ) — [ ] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)

01 [ ] L. CONTAMINATION OF FOOD CHAIN — 02 [ ] OBSERVED (DATE: ) — [ ] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] M. UNSTABLE CONTAINMENT OF WASTES (Spills/runoff, Standing liquids, Leaking drums) — 02 [ ] OBSERVED (DATE: ) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: — 04 NARRATIVE DESCRIPTION
Dumping of chemical wastes on LF ground water soils contaminated. Standpipes have oily layer of water

01 [ ] N. DAMAGE TO OFFSITE PROPERTY — 02 [ ] OBSERVED (DATE: ) — [ ] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 [ ] OBSERVED (DATE: ) — [ ] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] P. ILLEGAL/UNAUTHORIZED DUMPING — 02 [ ] OBSERVED (DATE: 1970) — [ ] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION
Facility admitts to dumping of chemical wastes including highly chlorinated hydrocarbons.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

**III. TOTAL POPULATION POTENTIALLY AFFECTED:**

**IV. COMMENTS**

**V. SOURCES OF INFORMATION** (Cite specific references, e.g., state files, sample analysis, reports)

SOLID WASTE MGMT. UNIT Drum Landfi I-4

EPA

POTENTIAL H.
PRELIMINAR.
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE | 02 SITE NUMBER

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [ ] A. GROUNDWATER CONTAMINATION
02 [ ] OBSERVED (DATE 1983) [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION
Monitoring wells down grade of LF show metals, VO contamination.

01 [ ] B. SURFACE WATER CONTAMINATION
02 [ ] OBSERVED (DATE: ) [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION
Area was site of arsenic acid disposed before Piles Creek was dammed at Dupont Ave. it intruded into this area and was allegedly affected.

01 [ ] C. CONTAMINATION OF AIR
02 [ ] OBSERVED (DATE: ) [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

01 [ ] D. FIRE/EXPLOSIVE CONDITIONS
02 [ ] OBSERVED (DATE: ) [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

01 [ ] E. DIRECT CONTACT
02 [ ] OBSERVED (DATE: ) [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

01 [ ] F. CONTAMINATION OF SOIL
02 [ ] OBSERVED (DATE: ) [ ] POTENTIAL [ ] ALLEGED
03 AREA POTENTIALLY AFFECTED: 6 (Acres)
04 NARRATIVE DESCRIPTION
Alleged dumping of drummed material and arsenic acid residues overflow from over head sewer line

01 [ ] G. DRINKING WATER CONTAMINATION
02 [ ] OBSERVED (DATE: ) [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

01 [ ] H. WORKER EXPOSURE/INJURY
02 [ ] OBSERVED (DATE: ) [ ] POTENTIAL [ ] ALLEGED
03 WORKERS POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

01 [ ] I. POPULATION EXPOSURE/INJURY
02 [ ] OBSERVED (DATE: ) [ ] POTENTIAL [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION

SOLID WASTE MGMT. UNIT Drum Landfill LOCATION I-4

EPA

# POTENTIAL HAZARDOUS WASTE SITE
## PRELIMINARY ASSESSMENT
### PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE | 02 SITE NUMBER

**II. HAZARDOUS CONDITIONS AND INCIDENTS** (Continued)

01 [ ] J. DAMAGE TO FLORA — 02 [ ] OBSERVED (DATE: 1986) — [ ] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION

No growth at landfill.

01 [ ] K. DAMAGE TO FAUNA — 02 [ ] OBSERVED (DATE: ____) — [ ] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)

01 [ ] L. CONTAMINATION OF FOOD CHAIN — 02 [ ] OBSERVED (DATE: ____) — [ ] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] M. UNSTABLE CONTAINMENT OF WASTES (Spills/Runoff/Standing liquids, Leaking drums) — 02 [ ] OBSERVED (DATE: 1970) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ____ 04 NARRATIVE DESCRIPTION

Area used for the disposal of arsenic acid residues and alledged drum disposal.

01 [ ] N. DAMAGE TO OFFSITE PROPERTY — 02 [ ] OBSERVED (DATE: ____) — [ ] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION

Arsenic acid residues entered Piles Creek with the flowing of tides.

01 [ ] O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 [ ] OBSERVED (DATE: ____) — [ ] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] P. ILLEGAL/UNAUTHORIZED DUMPING — 02 [ ] OBSERVED (DATE: 1970) — [ ] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION

Arsenic acid residues over flowed to this area form special sewer area

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

**III. TOTAL POPULATION POTENTIALLY AFFECTED:** ____

**IV. COMMENTS**

**V. SOURCES OF INFORMATION** (Cite specific references, e.g., State files, sample analysis, reports)

SOLID WASTE MGMT. UNIT Above ground Storage tanLOCATION G-9

EPA

# POTENTIAL HAZARDOUS WASTE SITE
## PRELIMINARY ASSESSMENT
### PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

| 01 STATE | 02 SITE NUMBER |
|---|---|
| | |

## II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [ ] A. GROUNDWATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] B. SURFACE WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] C. CONTAMINATION OF AIR
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] D. FIRE/EXPLOSIVE CONDITIONS
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] E. DIRECT CONTACT
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] F. CONTAMINATION OF SOIL
03 AREA POTENTIALLY AFFECTED: _____ (Acres)
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] G. DRINKING WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] H. WORKER EXPOSURE/INJURY
03 WORKERS POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] I. POPULATION EXPOSURE/INJURY
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

SOLID WASTE MGMT. UNIT IWMF Industrial Waste Management Facility LOCATION _____

EPA

# POTENTIAL HAZARDOUS WASTE SITE
## PRELIMINARY ASSESSMENT
### PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE | 02 SITE NUMBER

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [ ] A. GROUNDWATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

Area is alleged to have received arsenic acids, mercury compounds and from sludges open ditch system before Plant was built ground water contamination possible

01 [ ] B. SURFACE WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: ~~1977-79~~ 81) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

IWMF has exceeded discharge limits on these ocasions and has been sited by EPA and NJDEP/DWR

01 [ ] C. CONTAMINATION OF AIR
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] D. FIRE/EXPLOSIVE CONDITIONS
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] E. DIRECT CONTACT
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] F. CONTAMINATION OF SOIL
03 AREA POTENTIALLY AFFECTED: _____ (Acres)
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] G. DRINKING WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] H. WORKER EXPOSURE/INJURY
03 WORKERS POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

01 [ ] I. POPULATION EXPOSURE/INJURY
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

SOLID WASTE MGMT. UNIT Surface Impoundment LOCATION I-8

EPA

**POTENTIAL HAZARDOUS WASTE SITE**
**PRELIMINARY ASSESSMENT**
**PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS**

I. IDENTIFICATION
01 STATE | 02 SITE NUMBER

**II. HAZARDOUS CONDITIONS AND INCIDENTS**

01 [ ] A. GROUNDWATER CONTAMINATION — 02 [ ] OBSERVED (DATE _____) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION
Discharge of arsenic acid wastes from area head sewer line and burned drums observed in this area lead to concern of groundwater.

01 [ ] B. SURFACE WATER CONTAMINATION — 02 [ ] OBSERVED (DATE: _____) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION
Arsenic acid discharged to this area overflowed to area affected by Piles Creek.

01 [ ] C. CONTAMINATION OF AIR — 02 [ ] OBSERVED (DATE: _____) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

01 [ ] D. FIRE/EXPLOSIVE CONDITIONS — 02 [ ] OBSERVED (DATE: _____) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

01 [ ] E. DIRECT CONTACT — 02 [ ] OBSERVED (DATE: _____) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

01 [ ] F. CONTAMINATION OF SOIL — 02 [ ] OBSERVED (DATE: _____) — [ ] POTENTIAL — [ ] ALLEGED
03 AREA POTENTIALLY AFFECTED: _____ (Acres) — 04 NARRATIVE DESCRIPTION
Dumping of arsenic acids and iron sludges. Also drum now stored in area possible source of soil contamination.

01 [ ] G. DRINKING WATER CONTAMINATION — 02 [ ] OBSERVED (DATE: _____) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

01 [ ] H. WORKER EXPOSURE/INJURY — 02 [ ] OBSERVED (DATE: _____) — [ ] POTENTIAL — [ ] ALLEGED
03 WORKERS POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

01 [ ] I. POPULATION EXPOSURE/INJURY — 02 [ ] OBSERVED (DATE: _____) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

| SOLID WASTE MANAGEMENT UNIT | LOCATION | SUBSTANCE NAME | TYPE | PHYSICAL STATE | CHARACTERISTICS | QUANTITY | CONCENTRATI |
|---|---|---|---|---|---|---|---|
| I IWMF | N-9 | Phenol arsenic | Metal | Liquid, solid | Toxic | | |
| A | J-8 | Phenol arsenic cyanide<br>Dichlorobenzene<br>Trichlorobenzene<br>Bis (Chloromethyl ether) | Metals<br>VO's<br>Basic Neuturals<br>Acid compounds | Liquid<br>Solid | | | |
| | I-4 | arsenic, Phenol | Metals | | | | |
| I | B | arsenic, Phenol Mercury | | | | | |
| N-9 | B | Arsenic, Phenol, Mercury | | | | | |

**SWMU LEGEND:**

A= Landfill
B= Surface Impoundment
C= Waste Pile
D= Land Treatment
E= Injection Well
F= Incinerator
G.1= Tank, Above Ground
G.2= Tank, Underground
H= Container Storage Unit
I= Other

**SOURCES OF INFORMATION:**

I. Conclusions and Recommendations

Facility: GAF Linden

A. Conclusions:

01 Identify units which have had the potential for releases.

02 Identify units which have had observed releases.

B. Recommendations:

01 Should this facility be required to perform an RI/FS?

(yes/no) YES

More data needed. Specify.

The above conclusions and recommendations are accepted for purposes of the completion of RCRA facility assessment requirements.

| Signed: | Date |
|---|---|
| R. Gervasio<br>BSA Preparer | 2-9-87 |
| DHWM-BHWE | |
| DHWM-BHWP | |
| DWR | |
| Melinda Powers, Sect Chief<br>DHWM-BCM | 8-3-87 |

I. DOCUMENTS REVIEWED

| DOCUMENT NAME | DATE | AUTHOR | LOCATION | NO. P |
|---|---|---|---|---|
| 1. Hazardous Waste Container Storage Facility closure plan | 5-5-86 | ERM/Northeast | 65 Prospect St. Trenton | |
| 2. Supplimental information/ compliance Plan | 12-15-55 | A ware Inc. | " | |
| 3. EPA/EPIC | | EMSL Las vegas | " | |
| 4. Hydrogcologic Investigation GAF Linden | 4-15-83 | ERM/NE | " | 205 |
| 5. EPA Sampling Report | | J. Dresky | " | |
| 6. Reg II | | Contrac Corp. | " | 30 |
| 7. NJDEP Administration | | | " | |
| 8. Concent Order NJDEP/DSW-DGW NJ0000017 | 6-13-86 | NJDEP/DWR | " | 18 |
| 9. NJDEP response to comments from Aware submitted/Draft Permit NJ 0000017 | 2-25-86 | A. Schiffman NJDEP/ | " | 1 |
| 11. GAF response 3004(u) RCRA Amendments | 5-26-85 | Greg Andras ~~Giger Articles~~ GAF | " | |
| 12. RCRA Permits A&B Permits GAF | | Santo Guillerman GAF | 401 E. State St Trenton | |
| 13. Memo from W. Olmick | 1-13-82 | W. Olmick | 65 Prospect Trenton | 5 |
| 14. Letter to EPA | 2-19-82 | F. Inzarrilo | " | |
| 15. | | | | |

II. OFFICES CONTACTED

| OFFICE | CONTACT NAME | CONTACT TELE. NO. | CONTACT DATE |
|---|---|---|---|
| 1. NJDEP/ CSWB | R. Patel | | |
| 2. NJDEP/DWR | R. Casper | | |
| 3. NJDEP/DWR | J. Schinifser | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |

I. Conclusions and Recommendations

Facility:_____

A. Conclusions:

01 Identify units which have had the potential for releases.

02 Identify units which have had observed releases.

B. Recommendations:

01 Should this facility be required to perform an RI/FS?

(yes/no)_____

More data needed. Specify.

The above conclusions and recommendations are accepted for purposes of the completion of RCRA facility assessment requirements.

Signed: Date

_____ _____
BSA Preparer

_____ _____
DHWM-BHWE

_____ _____
DHWM-BHWP

_____ _____
DWR

# WASTE LAGOON

# GROUND-WATER MONITORING

# LCP CHEMICALS, NEW JERSEY, INC.

# LINDEN, NEW JERSEY

February 1982

Geraghty & Miller, Inc.
Consulting Ground-Water Geologists and Hydrologists
North Shore Atrium
6800 Jericho Turnpike
Syosset, New York 11791

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## APPENDICES


A. Monitoring Well Boring Logs and Construction Data

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WASTE LAGOON

GROUND-WATER MONITORING

LCP CHEMICALS, NEW JERSEY, INC.

LINDEN, NEW JERSEY

## INTRODUCTION

LCP Chemicals, New Jersey, Inc. (LCP) retained Geraghty & Miller, Inc. to conduct ground-water monitoring at a waste disposal site at their Linden, New Jersey, plant. The plant produces chlorine by the electrolytic decomposition of brine using metallic mercury as an electrode. Mercury concentrations in the process wastes are high enough so that the wastes are hazardous as defined in the Resource Conservation and Recovery Act (RCRA) of 1976.

In order to comply with both the RCRA monitoring well requirements and a consent agreement with the State of New Jersey, LCP installed monitoring wells at its waste facility. This facility consists of an active brine sludge lagoon and a small, experimental lagoon used for pilot studies of the Chem-fix process for waste stablization.

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## SUMMARY OF FINDINGS AND CONCLUSIONS

1. Geologic data from soil borings and monitoring wells show that the study area is underlain by 30 to 50 feet of unconsolidated glacial till, organic sediments, peat, and artificial fill. These deposits are generally of low or moderately low permeability and rest on bedrock, the Brunswick shale member of the Triassic Newark Group.

2. The six monitoring wells installed near the LCP brine-sludge lagoon yielded ground-water samples with mercury levels below the U.S. Environmental Agency (USEPA) Primary Interim Drinking Water Standard of 0.002 mg/L (milligrams per litre).

3. Soil samples collected in the monitoring well borings, selected surface sites, and the South Branch Creek bed showed total mercury concentrations between 0.26 and 1,580 mg (milligrams) per kg (kilogram) of soil ppm (parts per million) as received.

4. Shallow, fill soils contained the most mercury (up to 1,580 ppm) while undisturbed, deeper soils had much lower concentrations (0.4 to 6 ppm). Intermediate concentrations (10 to 40 ppm) were found in organic sediments derived from marsh deposits taken at depths up to 17 feet below grade.

5. [redacted]

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6. Higher levels of soils mercury, up to 40 ppm, indicate contamination by industrially derived fill materials, surface disposal of mercury compounds and/or selective fixation of mercury in organic sediments.

7. The difference between mercury levels in ground-water and soils samples arises because the soil components (silts, clays, and organic matter) tie up mercury through adsorption and complexation. Furthermore, many mercury compounds have low solubilities in water.

8. Water-level data do not reveal present leakage of water from the brine sludge lagoon via the subsurface.

9. Sources of mercury found in streambed sediments from South Branch Creek cannot be determined solely on the basis of soils or ground-water quality data. Potential sources, besides LCP's waste lagoon, may be atmospheric mercury "fallout," runoff, percolation through fill materials, and tide water from the Arthur Kill.

How about a release by LCP?

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## RECOMMENDATIONS

1. LCP should maintain the monitoring wells in good condition for continued sampling as prescribed by RCRA. Care should be taken to avoid contamination of the wells.

2. Re-sampling and analysis of ground water (and soils, if necessary) should be performed according to the protocol currently in use (see Appendix B). All sampling procedures should be kept as constant as possible so that data from different sampling periods can be compared.

3. Water levels should be measured in each well prior to sampling using the "wetted tape" method. The date, time, tidal stage, weather conditions, and other pertinent data should be recorded along with each measurement.

4. If it becomes necessary to abandon any of the monitoring wells, closure must be performed by a licensed New Jersey water-well driller and in accord with state specifications.

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# THE HYDROGEOLOGIC INVESTIGATION

## Purpose and Scope

The New Jersey Department of Environmental Protection (NJDEP) administrative Consent Order of July 31, 1981 requires that LCP implement a monitoring program to evaluate the release of mercury and other metals to the ambient environment (see Appendix C). The monitoring program covers air, surface and ground water, and soils obtained from borings done on land and in the streambed. Geraghty & Miller, Inc., was retained to design and supervise the entire program except for the air monitoring studies, which were conducted by LCP.

The soil borings and monitoring well installations were made at five sites in the vicinity of the waste lagoons. Soils samples were described in detail with respect to lithologic and hydrologic characteristics and were retained for chemical analysis. Individual monitoring wells were screened in the most permeable soil materials penetrated at each boring site. Where more than one permeable zone was encountered, a multiple (cluster) well arrangement was used. Soil samples from four surface sites and a streambed site were also collected for mercury analysis. The soil boring, well construction and analytical procedures for water and soils chemistry followed USEPA procedures (see Appendix B) and were approved by NJDEP prior to field work.

## Monitoring Well Installation

Six monitoring wells were installed between September 29 and October

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2, 1981 by H.P. Drilling of National Park, New Jersey, a licensed New Jersey well driller. Drilling permits were obtained for each well in accordance with New Jersey State law. Permit numbers are listed on each well log given in Appendix A.

The monitoring wells were drilled to consolidated bedrock which was encountered between 42.3 and 48.5 feet below grade at the sites shown in Figure 1. The drilling was done by cased borings (Wells 1, 1A, 2, and 3) and hollow-stem auger (Wells 4 and 5) with split-spoon core samples collected at 5-foot intervals or as directed. Water used during drilling was from an approved, potable water source. A sample of this water has been analyzed by LCP.

The monitoring wells are constructed of 1.5-inch diameter PVC pipe and have 30 to 50 feet of 1.5-inch diameter PVC screen; the screen length depended on the geologic deposits encountered. The screen was set in the drilled hole and packed with clean sand of suitable grade for the 0.020-inch screen slot opening. Bentonite seals were placed above and below the screen zone to prevent vertical flow in the drilled hole near the screen. The remaining open hole around the well casing was filled with cement grout. The top of each well is protected by a vented cap and steel standpipe which extends at least 1.5 feet above grade and is embedded in the cement grout. Well 5 was finished in a curb box because it was located in a high access area.

Sediment and water removed from the borings while drilling and from the finished monitoring wells were considered to be contaminated. There-

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fore, they were deposited in the LCP waste lagoon.

After each monitoring well was completed, all temporary casings, tools, and equipment coming in contact with soils and water were cleaned with uncontaminated water to prevent cross-contamination.

Sampling Methods

Sediment and water samples collected throughout the investigation were delivered immediately after collection to the laboratory at LCP. Geraghty & Miller, Inc., and LCP have a list of samples collected, handled, and analyzed.

Sediment samples were collected while drilling with a split-spoon core barrel (2-inch outside diameter and 24 inches long) and placed in airtight, 8-ounce, clean, glass containers. Two sediment samples were collected from each spoon and are equally representative of the geologic deposits penetrated by the spoon. Water samples were collected from monitoring wells using a peristaltic pump after the wells were developed with a guzzler pump or bailer. Because the formation yield was typically very low, most wells were bailed dry and allowed to recover sufficiently to yield the required sample volume. For the few wells that could be pumped, at least ten times the volume of standing water in the well was removed before sampling as recommended by USEPA.

All tubing on the peristaltic pump was changed between samplings to prevent cross-contamination. Water samples were filtered immediately after collection by LCP laboratory personnel with a 0.45 micron (Millipore-type)

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filter and placed in a container, pre-treated with nitric acid to preserve the sample for metals analysis. Two quart-size water samples were collected from each well. Water samples were checked for temperature, pH, and specific conductance immediately after collection.

Hydrogeology

The site is located on Holocene and Pleistocene glacial deposits which thinly cover Triassic bedrock, the Brunswick Formation. The geology is typical of that recorded in eastern Union County by Nemickas (1976).

Unconsolidated geologic deposits in the study area can be separated in four distinct sedimentary units. From youngest to oldest, they are:

Unit A - Miscellaneous fill deposits
Unit B - Dark gray, organic clay
Unit C - Well sorted sands intercalated with poorly sorted gravelly sands
Unit D - Red-brown, tight silty clay, clay, and gravelly clay

The permeabilities of the four units varies because of differences in particle size, packing, and sorting. Observations of the split-spoon samples provide information on the relative permeabilities of these units (Table 1). A description of each unit follows.

Unit A is thin, but covers the study area continuously. It is a heterogeneous mixture of silt, sand, and gravel-sized particles with artificial components, such as slag, crushed stone, and brick. This fill layer varies in thickness from 4.5 feet near the tidal creek to 13.5 feet upgradient of the waste lagoon. The age, source and overall composition of this unit is unknown but was in place before LCP occupied the site. No informa-

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tion about the unit was available in records from the previous plant operator, GAF Corporation. Soil boring records from Hazen and Sawyer (1969) covering the general plant area show this unit to be extensive.

Due to the assortment of grain sizes and tight packing, permeabilities are relatively low. However, the base of the fill appears to be saturated. Well 1A was screened only at the base of the fill and top of Unit B, since this was recognized to be a thin, but semi-permeable zone.

Unit B is characterized by a dark gray clay with organic matter (tidal grasses) appearing throughout. Thin (2- to 12-inch) layers of brown peat are present near the top of this unit.. Lenses of gray silt are also present but are generally thin and horizontally limited.

The organic clay is very cohesive and dry when examined in the sample spoons and did not yield significant water during drilling. This unit is present at all sites except five, where a dark gray, organic silty sand with pelecypods and gastropods, is found at the same horizon. This silty sand probably represents a tidal channel where water movement during the time of deposition was faster than in the rest of the area which was a tidal flat.

Unit C is present at well Sites 3, 4, and 5 and varies in thickness from 4.5 to 18 feet. This unit consists of well-sorted sand layers separated by poorly sorted gravelly sand layers. However, they are relatively thin, separated by tight, poorly sorted layers (where present) and are not present at all sites. It appears that this unit is of limited stratigraph-

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ic and lateral extent in this area.

Unit D is present at all sites and varies in thickness from about 14 to 29 feet. This unit is a till which is a heterogeneous mixture of particles deposited by a glacier. The upper part of this till unit is a silty clay or clayey silt with occasional occurrences of pebbles and cobble gravel. The middle horizons are composed predominantly of clay, with other sized particles present in trace amounts. The lower horizons above the bedrock surface are very coarse with cobbles and pebbles floating in a tight, clay matrix. The permeability of this unit is very low due to poor sorting of grain sizes, predominance of clay-sized particles, and tight packing of the individual grains. Wells screened in this unit yield water sparingly and recover very slowly after evacuation.

Bedrock was intercepted between 42.3 and 48.5 feet at the well sites. Clasts of Brunswick-type lithologices (siltstone and shale) were found in the coarse till above the bedrock surface.

Table 2 summarizes where each well has been screened with respect to geologic units present at the site.

## Water and Soils Chemistry

Water samples bailed from each monitoring well were analyzed by LCP's laboratory for dissolved mercury according to approved procedures. Results are shown in Table 3. Water samples were also sent to Princeton Testing Laboratory to confirm the mercury analyses and to provide results for calcium, barium, and iron. These results appear in Table 4.

Table 1. Permeabilities of Various Units Under the LCP Site.

| Unit[1)] | Relative Permeability | Probable Range of K (feet per year)[2)] |
|---|---|---|
| A | Semi-permeable | 0.1 - 100 |
| B | Low-permeability | 0.01 - 10 |
| C | Well sorted sands -- permeable | 500 |
| | Poorly sorted sands -- semi-permeable | 0.1 - 500 |
| D | Low-permeability | 0.01 - 1 |

1) Units are defined in the text.

2) From Sherard, et al. (1963).

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Table 2. Units in Which Wells are Screened.

| Well No. | Screen Zone | Units Screened In |
|---|---|---|
| 1 | 18.5 - 38.5 | D |
| 1A | 5 - 10 | Bottom of A/top of B |
| 2 | 18 - 28 | Top of D |
| 3 | 15 - 30 | Bottom of B, C, and top of D |
| 4 | 18 - 38 | C/top of D |
| 5 | 8 - 38 | Bottom of A, B, C, and D |

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Table 3. Dissolved Mercury Concentrations in Ground-Water Samples (concentrations in mg/L or ppm).

| Well No. | Sampling Date 10-6-81 | 10-15-81 |
|---|---|---|
| 1 | <0.0002 | 0.0006 |
| 1A | <0.0002 | 0.0009 |
| 2 | <0.0002 | <0.0002 |
| 3 | <0.0002 | <0.0002 |
| 4 | <0.0002 | <0.0002 |
| 5 | <0.0002 | <0.0002 |

Samples analyzed by the LCP Laboratory, Linden, New Jersey.

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Table 4. Results of Ground-Water Quality Analyses (concentrations in mg/L or ppm).

| Well No. | Calcium | Barium | Iron | Mercury |
|---|---|---|---|---|
| 1 | 1,100 | 3.5 | 5.9 | < 0.001 |
| 1A | 2,700 | 7.0 | 0.10 | < 0.001 |
| 2 | 1,000 | 3.0 | 2.2 | < 0.001 |
| 3 | 800 | 3.0 | 0.10 | < 0.001 |
| 4 | 500 | 2.5 | 0.06 | < 0.001 |
| 5 | 500 | 2.0 | 0.50 | < 0.001 |

Note: Samples were received for analysis on November 25, 1981 at the Princeton Testing Laboratory, Princeton, New Jersey.

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Soil samples from monitoring well borings and from the land surface were analyzed by the LCP laboratory for total desorbable mercury content. Samples were leached according to USEPA protocol and filtered. The filtrate was then analyzed for mercury. The results of soils mercury analyses from borings are given in Table 5.

Surface soil samples and a tidal creek bed sample were collected on October 15, 1981 by hand, retained and analyzed for total mercury in the same way as the other soil samples. Locations of these sampling sites are shown on Figure 1 and analytical results are given in Table 6.

The results of water and soils mercury analysis shows (1) surficial soil contamination with mercury which decreases with depth, and (2) ground water which is essentially free of mercury. Both results indicate little, if any, subsurface migration of mercury from the brine sludge lagoon. Subsurface soil types and calculated permeability values do not appear to allow significant fluid migration from the lagoon. Furthermore, the settled brine sludge itself has very low permeability.

Elevated mercury values in soils collected at depths to a maximum of 12 to 15 feet below grade are more difficult to interpret and might relate to the composition of the fill materials used to reclaim the present indus-industrial site from its past, tidal marsh condition. Ground-water samples from this zone do not contain high levels of mercury, indicating that the metal is bound to the soil particles. In general, the soils penetrated in the well borings (silts and clays predominating) would be expected to trap mercury resulting in the low mercury levels found in ground water.

Table 5. Mercury Concentrations in Soil Boring Samples (depth in feet below grade; concentrations in ppm).

| Sample | Depth | Mercury |
|---|---|---|
| **Well 1** | | |
| 1-1 | 0 - 2 | 225 |
| 1-2 | 5 - 7 | 17.4 |
| 1-3 | 10 - 12 | 1.72 |
| 1-4 | 15 - 17 | 1.3 |
| 1-5 | 20 - 22 | 1.04 |
| 1-6 | 25 - 27 | 0.89 |
| 1-7 | 30 - 32 | 2.81 |
| 1-8 | 35 - 37 | 1.74 |
| 1-9 | 40 - 42 | 0.82 |
| **Well 2** | | |
| 2-1 | 0 - 2 | 68.1 |
| 2-2 | 5 - 7 | 2.1 |
| 2-3 | 10 - 12 | 1.0 |
| 2-4 | 15 - 17 | 0.32 |
| 2-5 | 20 - 22 | 0.91 |
| 2-6 | 25 - 27 | 0.26 |
| 2-7 | 30 - 32 | 0.34 |
| 2-8 | 35 - 37 | 0.34 |
| 2-9 | 40 - 42 | 0.79 |
| **Well 3** | | |
| 3- 1 | 0 - 2 | 101 |
| 3- 2 | 5 - 7 | 528 |
| 3- 3 | 10 - 12 | 9.12 |
| 3- 4 | 15 - 17 | 0.68 |
| 3- 5 | 20 - 22 | 1.00 |
| 3- 6 | 25 - 27 | 0.40 |
| 3- 7 | 30 - 32 | 1.18 |
| 3- 8 | 35 - 37 | 0.48 |
| 3- 9 | 40 - 42 | 0.85 |
| 3-10 | 45 - 47 | 0.60 |
| **Well 4** | | |
| 4- 1 | 0 - 2 | 772 |
| 4- 2 | 5 - 7 | 163 |
| 4- 3 | 10 - 12 | 19.84 |
| 4- 4 | 15 - 17 | 33.69 |
| 4- 5 | 20 - 22 | 0.57 |
| 4- 6 | 25 - 27 | 0.58 |
| 4- 7 | 30 - 32 | 0.65 |
| 4- 8 | 34 - 36 | 0.72 |
| 4- 9 | 40 - 42 | 1.16 |
| 4-10 | 45 - 47 | 3.47 |
| **Well 5** | | |
| 5- 1 | 0 - 2 | 35.71 |
| 5- 2 | 5 - 7 | 33.39 |
| 5- 3 | 10 - 12 | 37.02 |
| 5- 4 | 15 - 17 | 1.99 |
| 5- 5 | 20 - 22 | 5.73 |
| 5- 6 | 25 - 27 | 0.83 |
| 5- 7 | 30 - 32 | 5.28 |
| 5- 8 | 35 - 37 | 0.42 |
| 5- 9 | 40 - 42 | 0.60 |
| 5-10 | 43.5 - 45.5 | 4.59 |

Samples analyzed by the LCP Laboratory, Linden, New Jersey.

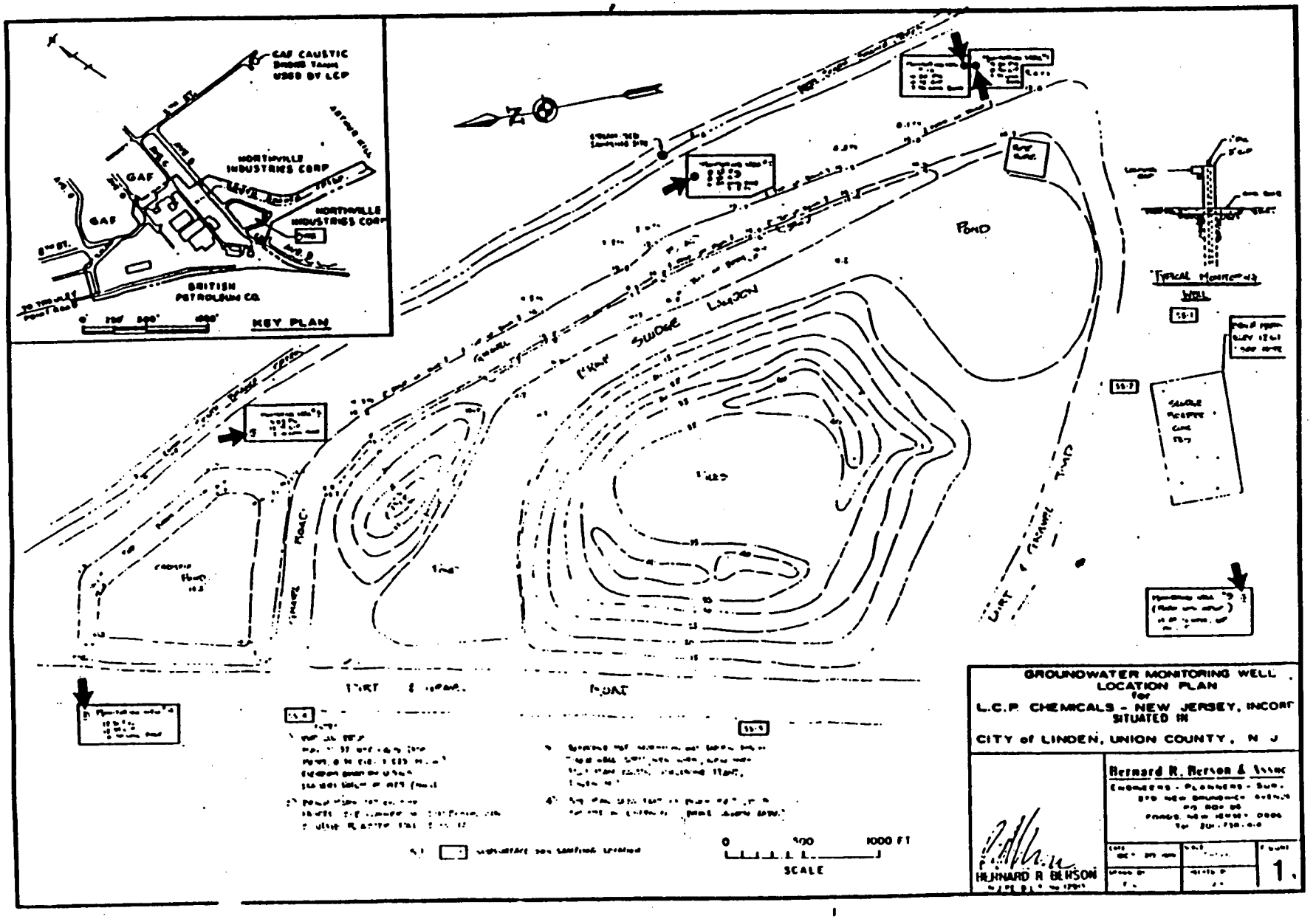
B

Table 6. Mercury Concentrations in Surface Soil and Tidal Creek Bed Samples (concentrations in ppm).

| Sample No. | Mercury |
|---|---|
| S-1 | 558 |
| S-2 | 27.45 |
| S-3 | 1,070 |
| S-4 | 1,580 |
| Tidal Creek Bed | 46.42 |

Samples analyzed by the LCP Laboratory, Linden, New Jersey.

ATTACHMENT B


GAF CAUSTIC
USED BY LCP
NORTHVILLE INDUSTRIES CORP
GAF
GAF
NORTHVILLE INDUSTRIES CORP
BRITISH PETROLEUM CO.
KEY PLAN
POND
BRAY SLUDGE LAGOON
TYPICAL MONITORING WELL
DIRT & GRAVEL ROAD
DIRT & GRAVEL ROAD
0 500 1000 FT
SCALE
GROUNDWATER MONITORING WELL
LOCATION PLAN
for
L.C.P. CHEMICALS - NEW JERSEY, INCORP
SITUATED IN
CITY of LINDEN, UNION COUNTY, N J
Bernard R. Berson & Assoc
ENGINEERS - PLANNERS - SURV.
BERNARD R BERSON
1

The meaning of the mercury levels found in soils at LCP is difficult to assess except in a relative sense. Natural mercury concentrations in rocks average from 0.01 to 20 ppm, with igneous rocks on the low end, and organic-rich sediments on the high end of this range (Wallace, et al., 1971). Higher concentrations may be found in areas of hydrothermal mineral deposition such as along major fault and orogenic belts. The mercury detected in soils beneath the study area most likely represent low solubility mercury compounds such as sulfides, phosphates or carbonates (Mortvedt, et al., 1972).

Pierce, et al. (1970) consider any mercury levels in soils exceeding 1 ppm, to be significant as evidence of mercury mineralization or surface contamination by mercuric wastes. Urbanized, industrial areas are known to have higher background levels of airborne mercury which is disposited on land by precipitation. Unfortunately, no published data on background levels of soil mercury in the Linden, New Jersey, area could be found.

The naturally occurring glacial tills penetrated by the monitoring well borings do not appear to show evidence of mercury contamination by human activities. Mercury levels above 1 ppm, especially near the [illegible] contact may relate to ancient hydrothermal activity associated with tectonics and igneous intrusion of the Triassic sediments (Brunswick shale) underlying the site. Organic deposits, such as the peat, show high mercury levels (about 10 to 30 ppm) down to a maximum depth of 17 feet below land surface. These levels probably reflect the strong organic chelation of mercury derived from several possible sources: from surface contamination.

ATTACHMENT B

mercury wastes in the artificial fill, the decay of mercury containing minerals, and from mercury contained in atmospheric precipitation. Comparatively high mercury levels (up to 1,500 ppm) occurring in soils obtained at land surface are the likely result of present and/or prior land use.

Respectfully submitted,

GERAGHTY & MILLER, INC.

James DeMarcinis
Senior Hydrogeologist

Michael J. McEachern
Senior Scientist

William J. Seevers
Vice President

February 11, 1982

ATTACHMENT B

LCP CHEMICALS
FOOT OF SOUTH WOOD AVENUE
LINDEN, UNION COUNTY, NJ
EPA ID# NJD079303020

## I. FACILITY OWNERSHIP/BACKGROUND INFORMATION

OWNERSHIP:
LCP Chemicals purchased the 26 acre chlorine production facility in 1972 from General Aniline and Film Corp. (GAF) who owned the facility since 1942. E.I. Dupont owned the land, which according to aerial photographs was coastal marshland, prior to GAF.

LCP leases two sections of their property. The Western section near the guard house, is leased by Union Carbide. They have been leasing the building and property since 1959 when the property was owned by GAF. The other leased section is Building 231. This building is leased by Microcell Technologies, Inc. They have leased the building since 1987. LCP also leased to Kuehne Chemical from 1974 to 1981, who operated in the area that is adjacent to Building 220 (presently a parking lot).

FACILITY OPERATIONS:
GAF began producing chlorine in 1961 by utilizing a "mercury cell electrolysis process". The process involved the electrolysis of a sodium chloride (brine) solution in the presence of metalic mercury. The residual mercury-sodium solution is then used to hydrolize water, forming sodium hydroxide and hydrogen gas. The metalic mercury was partially recovered and recycled in a brine purification process. The remaining mercury tainted sludge was placed into the Brine Sludge Lagoon. When LCP purchased the property they continued to process chlorine using the same process method with a few minor modifications. In 1975, LCP modified the electrolysis process by switching from a graphite anode to a dimensionally stable anode. The components of this anode would allow the leaching of the mercury so that the brine sludge could be recycled. Other products produced at LCP are caustic soda, hydrogen chloride and bleach. (Preliminary Report on Brine Sludge Lagoon).

In 1976, LCP investigated ways to clean the Brine Sludge Lagoon and remove mercury from the wastes that were being produced. They contracted Chem-fix of Pittsburgh to set up a temporary lab and to construct the Chem-fix Lagoon to receive non-contaminated wastes. They operated the lagoon for six days and determined that this was not a practicle means of clean-up and the lagoon was abandoned. LCP investigated the possibility of mercury recovery from the brine sludge via a roasting system in 1978. The roaster was designed and built to vaporize mercury from steam dried sludge. This would allow the solid waste to be shipped off site to a sanitary landfill. An Administrative Consent Order (ACO), issued September 1, 1981, required LCP to submit an application for a hazardous waste facility permit to operate the roaster unit. On June 30, 1982 the Bureau of Hazardous Waste Engineering denied the permit and LCP subsequently abandoned the process. Since the permit was not approved, LCP was also required to close the Brine Sludge Lagoon under the September 1, 1981 ACO.

Closure Plans for the two lagoons were submitted by February 1983 and approved on November 7, 1983. During the Closure of the lagoons, LCP closed down the production facilities in order to eliminate employee exposure to mercury. The closure of the lagoons was completed in 1984.

In June of 1984, LCP submitted a facility closure plan to NJDEP. This included the complete closure of all production areas due to economic reasons. The closure was completed in 1985. Since the closure of the production areas, LCP has operated as a storage and transfer station for methylene chloride, potassium hydroxide, sodium hydroxide and hydrochloric acid that is produced by other LCP facilities. The caustics and methylene chloride are stored in above ground tanks (five tanks, maximum volume 122,800 gallons). Hydrochloric Acid is pumped directly from tank cars to tank trucks.

Operations conducted by Union Carbide include the bottling, storing and transferring of hydrogen. They compress liquid hydrogen to hydrogen gas, bottle it and ship it to their clients. Occasionally they produce gas mixtures of hydrogen with either argon or nitrogen.

Union Carbide has had two environmental releases. One was an air release, which occurred on September 15, 1988 when a safety valve blew off a truck causing a release of hydrogen gas (60,000 cubic feet). The other was a series of oil releases that occurred over a period of several years. The soil contamination was reported by Union Carbide on October 14, 1987 to NJDEP's Division of Hazardous Waste, Metro Bureau of Enforcement. Union Carbide was issued a Notice of Violation (NOV) on December 1, 1987 for the discharge of a hazardous substance. They responded to the violation by contracting IT Corp to excavate the oil contaminated soil near their past waste oil storage area. The soil was excavated and backfilled to conform to the sites topography in May 1988.

Also in 1988, Union Carbide underwent a plant upgrading that was overseen by IT Corp. This included the dismantling of a hydrogen tank, cleaning and replacing of compressor parts and pipelines. A small amount of mercury was recovered from the area of the hydrogen tank by IT Corp.

Microcell Technologies Inc. is a pilot plant that produces small, hollow glass spheres that are used as a strengthener in steel. Microcell does not store, treat or process any hazardous substances. They have a completely closed cooling system so there is no requirement for a discharge permit. There is no evidence of environmental releases at this site.

Kuehne Chemical Company was contracted by LCP to handle the loading of LCP's products. Kuehne also manufactured sodium hypochlorite and chlorine gas. On January 8, 1981 an NJDEP inspector visited Kuehne and had noted a violation in their NPDES #NJ0027707 discharge to surface water permit. Kuehne's discharge had both high and low pH levels and elevated levels of free chlorine. On October 7, 1981 NJDEP Division of Water Resources issued an Administrative Penalty Assessment against Kuehne for $17,500.00. Kuehne ceased operations at the site on January 27, 1981.

LOCAL DEMOGRAPHICS:
LCP is located on 26 acres of filled marshland in the city of Linden, Union County, New Jersey. The property is located in an industrial area along the Arthur Kill. The site is bordered by the Kill (to the east), GAF Corp. (to the west and north) and Linden Roselle Sewage Authority and Northville Industries Corp. (to the south). Densely populated residential areas are located approximately 1.5 miles to the west with the nearest residential home being approximately 0.5 miles west on S. Wood Avenue. The estimated populations living within a one mile and a three mile radius of the site are 7 and 62,000 people, respectively.

TOPOGRAPHY/HYDROGEOLOGY:
According to aerial photographs there are three major topographic changes at the LCP site. Originally S. Branch Creek flowed through the LCP property to the Arthur Kill. Between 1974 and 1977 the creek was damned on both sides of the production area. This resulted in two small ponds on GAF's property. The creek presently flows from LCP's storage tanks to the Kill. The other two changes regard the Chem-fix Lagoon and the Brine Sludge Lagoon.

The Chem-fix Lagoon was constructed and operated in 1976. The Brine Sludge Lagoon was constructed by erecting earthen dikes to contain the sludge in the early 1960's. In 1984, the Chem-fix Lagoon was dewatered, excavated and back filled to conform with the site's topography and the Brine Sludge Lagoon was dewatered and capped closed. The 20 plus years of filling has caused the Brine Sludge Lagoon to be elevated approximately 40 feet above sea level.

LCP is underlain by the Brunswick Formation which consists mostly of organic clays, silt, sand, gravel and a shale bedrock. The first 10 to 15 feet below the surface of LCP is unconsolidated fill composed of silts, sands, gravel, crushed stone and brick. Beneath the fill is a dark gray organic clay layer that extends to the bedrock. Throughout the clay layer there are lenses of sand and gravel. Also between the fill and clay layers there are occasionally peat mats. The red-brown shale bedrock is encountered between 40 and 50 feet below the surface.

The groundwater in this area is not used as a potable water source due to the salt intrusion from nearby coastal waters. There are two public supply well fields within a four mile radius of LCP. One belongs to the Elizabethtown Water Company and is located approximately 3.5 miles northwest of LCP. The other well field is owned by the City of Rahway and located approximately 3.5 miles west of LCP. The wells range from 50 to 350 feet in depth and are all screened in the Brunswick Formation.

LCP monitors its groundwater under NJPDES permit (NJ0003778). The six monitoring wells currently maintained by LCP were installed along the perimeter of the Brine Sludge Lagoon in 1981. The following table lists the well numbers, total depth and screened interval.

| WELL NO. | TOTAL DEPTH (feet) | SCREENED INTERVAL (feet) |
|---|---|---|
| MW1 | 38.50 | 18.00-38.50 |
| MW1A | 10.00 | 5.00-10.00 |
| MW2 | 39.48 | 18.00-28.00 |
| MW3 | 31.77 | 15.00-30.00 |
| MW4 | 39.18 | 18.00-38.00 |
| MW5 | 38.00 | 8.00-38.00 |

LCP currently monitors five of the six wells (not MW1A) to determine the impact of the Brine Sludge Lagoon on the groundwater. Past monitoring reports have indicated that groundwater quality criteria had been exceeded for iron, manganese, total organic halogens (TOX), arsenic, cadmium, chromium, lead, mercury, selenium, silver and radium. During RCRA Facility Assessment visual site inspections (VSI) conducted by NJDEP Bureau of Planning and Assessment on December 20, 1987 and April 13, 1989, the presence of volatile organic (VO) vapors were detected in headspace of Monitoring Wells 1, 2, 3, and 4. The wells are sampled quarterly for total organic carbon (TOC), TOX, phenols, dissolved metals and a few other inorganics.

LCP was required to install four new monitoring wells under their final NJPDES permit issued on October 30, 1987. LCP wished to contest the well installation and requested an adjudicator hearing on February 25, 1988. On March 28, 1988, Donald DeNoon and Karl DeVoe of LCP, Michael McEachern of Geraghty and Miller, LCP's hydrogeologic consultant, and representatives of the Division of Water Resources (DWR) met to discuss the installation of new wells and the adequacy of the present monitoring system.

The DWR had three concerns with the present monitoring system. They were:

- The well screens are not all the same length and the wells are not all the same depth.

- A release from the facility might be diluted to a concentration below the detection limits.

- A leak from the lagoon might be moving above the main groundwater system as "perched water" because of the natural glacial deposits beneath the lagoon are low in permeability (G & M proposal 5/10/88).

To address these concerns Geraghty and Miller proposed that the wells be monitored with the use of a temporary "packer" or plug that would isolate the top five feet of screen that is below the water table. The DWR agreed that the study should be conducted.

In July and August 1988 Geraghty and Miller collected groundwater samples and analyzed them for antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, nickel, selenium, silver, thallium and pH. The samples collected on July 27, and August 30 were conduted with the use of a temporary packer and the August 29 sampling was conducted without the use of the temporary packer. MW1 and MW1A did

not utilize a packer during the July 27 and August 30 sampling. This is because MW1A is a shallow well and MW1 was filled with sediment isolating only the top four feet of screen below the water level. The analysis indicated that MW1A exceeded the New Jersey Groundwater Quality Standard of 50 ppb, for arsenic, with levels of 73 ppb, 76 ppb, and 96 ppb. All other parameters monitored were below New Jersey Groundwater Quality Standards (NJGWQS) for all samples from all wells.

A comparison of the analytical results for wells sampled with a packer (July 27) and without a packer (August 29 & 30) revealed no significant differences, except in MW2, which exhibited an increase in barium when the packer was utilized. The concentration without the packer was 390 ppb while the concentrations with the packer were 750 ppb and 670 ppb. All concentrations were below the NJGWQS limit of 1,000 ppb. Mercury was detected only in MW1A. The concentrations for all three sampling dates were nearly identical; 0.58 ppb, 0.57 ppb, and 0.58 ppb. Again all of the concentrations were below the NJGWQS limit of 2 ppb. Also, a trace amount (8 ppb) of lead was detected in MW3 on the July 27 sampling round. Lead was not detected in any of the other wells or during either of the August sampling episodes. The lead concentration was below the NJGWQS limit of 50 ppb.

These analyses lead Geraghty and Miller to conclude that since there was no significant differences, except for barium in MW2, that there is no dilution occurring in the deep wells. Also, based on data provided by LCP, it has been determined that LCP has never used arsenic, therefore, the presence of arsenic is due to an outside source of contamination. The relatively invariant contaminant concentrations and the proximity of the well to the Arthur Kill suggest that the mercury and arsenic detected in the well represent background conditions in the Arthur Kill rather than contamination resulting from the LCP facility. (G & M January 89 Sam Report).

As of April 1989, the DWR had not yet reached a decision as to whether LCP would be required to install the additional monitoring wells. They also are considering amending the permit to include an analysis of volatile organics based on the findings of the December 22, 1987 VSI.

SURFACE WATER:
The surface waters of concern are the Arthur Kill, which borders the site on the east, and South Branch Creek, which flows through a section of the site and is a tributary to the Arthur Kill. The Arthur Kill is classified as "Saline Estuarine Waters: SE2" by the DWR and is used for recreational boating. The Peregrine Falcon, an endangered species, is known to hunt in the salt marshes near the Kill.

LCP operates a waste water treatment plant. When the plant was in full operation the waste waters from the electrolysis and sludge roaster as well as the plant's surface water run-off were treated and discharge to South Branch Creek under NJPDES permit NJ0003778. However, since the shut down of the plant's processing units, only surface run-off is treated. After treatment, the water is stored in an above ground tank. Due to the small amount of treated water, LCP discharges about two times a year.

From May 23 to May 26, 1988, Cosper Environmental Services Inc. performed a bioassay on LCP's effluent. The effluent samples collected were clear with no noticeable odor. There was a small amount of sediment present. The test organism for the bioassay was the sheeps-head minnow. There was no detection of the disease in the brood stock. For this bioassay, there was a 5.0% mortality at 100% effluent. The results were satisfactory with a LC50 of >100% effluent.

II. PERMITS:

1. NJPDES: LCP was issued a surface water discharge permit NJ0003778 on August 10, 1987, which expires April 30, 1991. The permit allows LCP to discharge treated surface run-off and spill wash-down to South Branch Creek (classified SE-3).

   LCP was issued a groundwater discharge permit NJ0003778 on October 30, 1987, which expires November 29, 1992. The permit requires LCP to continue to monitor the wells surrounding the closed Brine Sludge Lagoon in order to determine the impact of the lagoon on the groundwater.

2. Air: Currently LCP has a grandfathered air pollution control permit #076565, which is for the vents on their methylene chloride storage tanks. Previously LCP had eight air permits for hydrogen chloride tanks and several chlorine process apparatus. Due to the closure of the production areas at LCP, these permits have been deleted.

3. LCP submitted their Part A RCRA application on August 13, 1980. Since the only RCRA regulated unit was certified closed in September 1985, a Part B application was considered unnecessary in lieu of a post closure permit.

III. SOLID WASTE MANAGEMENT UNITS:
Twelve solid waste management units were identified at the LCP facility. The units are: The Brine Sludge Lagoon, the Chem-fix Lagoon, the 500K Tank, the Waste Oil Drum Storage Area, Area Between Building 231 and Railroad Tracks, South Branch Creek, the Bullet Tanks, Sludge Roaster, Salt Silo 4, past GAF Waste Water Treatment Area, the cracks in Building 230 and 240, and the Effluent Treatment Building. The only RCRA regulated unit is the Brine Sludge Lagoon.

UNITS SUMMARY:

1. Brine Sludge Lagoon: The lagoon is an unlined earthen surface impoundment, which is surrounded by earth dikes that extend about seven feet higher than the facility's average ground level. The lagoon is trapezium in shape, approximately 275 feet by 200 feet by 220 feet by 80 feet. The total waste volume is estimated to be 30,900 cubic yards, which was accumulated for over 20 years before the lagoon was closed in 1984.

   Under an Administrative Consent Order dated September 1, 1981, LCP agreed to submit a closure plan to the NJDEP for the lagoon. LCP submitted the plan on July 16, 1982. The plan was amended on February 28, 1983 and approved by the NJDEP on November 7, 1983. The lagoon

received the excavated waste from the Chem-fix Lagoon, which was dewatered, compressed and covered with a two foot clay cap. The cap was then covered with a foot of soil and seeded. The closure was completed in November 1984. During the closure of the lagoon, NJDEP and USEPA required LCP to suspend chlorine productions to eliminate worker exposure to mercury.

In 1981, LCP installed six monitoring wells to determine if there was any impact on the groundwater from the lagoon. These wells are sampled quarterly for TOC, TOX, phenols, dissolved metals and a few other inorganics. On several occasions between 1982 and 1987 quarterly reports indicate that concentrations of lead, chromium, cadmium, mercury, selenium and silver have exceeded the NJPDES permitted level.

Under the July 31, 1981 NJDEP Administrative Consent Order, LCP was required to implement a monitoring program to evaluate the release of mercury and other metals to the ambient environment. The program includes air, groundwater and soils obtained from land borings and creek sediments. Geraghty and Miller were retained to conduct all sampling except air. Recon Systems was contracted to perform air sampling. (Attachment B).

Recon collected two sets of sampling data on June 4, 1981. The first set of samples was collected three feet above the surface of the waste pile. Concentrations of mercury ranged from 1000 to 5000 nanogram/cubic meter ($ng/m^3$) to 12,600 $ng/m^3$ of mercury with an average concentration of 6400 $ng/m^3$. Based on the mercury contamination levels, crosswind speed and the lagoons dimensions an approximately 113 g/day of mercury is emitted by the lagoon.

Groundwater samples were taken on October 6, 1981 and October 15, 1981 and analyzed by LCP's lab for dissolved mercury. All samples were below the USEPA Primary Interim Drinking Water Standard of 0.002 ppm. The water samples were also sent to Princeton Testing Labs to be analyzed for calcium, barium, iron and mercury. Again all wells had levels below 0.002 ppm for mercury. However, the levels of barium ranged from 2.0 ppm to 7.0 ppm which exceed the NJDEP Action/Cleanup Level of 1 ppm.

Soil samples were taken from the monitoring well borings for MW1, MW2, MW3, MW4, MW5. The samples were analyzed by LCP for desorbable mercury with samples taken every 6 inches from the surface to the total depth of each well. Levels of mercury ranged from 0.26 ppm to 772 ppm, with the concentrations decreasing with depth. Surface soil samples were also taken near the sludge roaster and across Avenue B near the railroad tracks. The samples were analyzed in the same manner as the previous samples and had recorded levels of mercury ranging from 27.45 ppm to 1,580 ppm. Also, one creek-bed sediment sample was taken and analyzed by LCP for mercury. The sample contained 46.42 ppm of mercury. All of the surface samples exceeded the NJDEP Action/Cleanup Level of 1 ppm for mercury.

On April 13, 1989 the Bureau of Planning and Assessment (BPA) conducted a RCRA Visual Site Inspection (VSI) of the LCP facility. The closed lagoon appeared secure. During the investigation of the

monitoring wells, volatile organics were detected in the headspace of the wells by both the OVA and Hnu meter with readings ranging from 2 ppm to 350 ppm. Also, on a previous VSI conducted by the BPA on December 22, 1987, organic vapors were detected in MW1 and MW2 with the Hnu meter. Due to the presence of organic vapors in the headspace of the wells, it is recommended that the NJPDES 30 year post closure monitoring program be expanded to include an initial scan for priority pollutants and volatile organics. Due to the presence of mercury contamination, a RFI is recommended for this unit to determine the extent of the contamination. The RFI should consist of soil sampling around the perimeter of the lagoon to determine if any hazardous materials have leached from the lagoon. The sample analysis should include, but not be limited to, total mercury, total barium, volatile organics and priority pollutants. If this sampling indicates significant levels of contamination exist, a more detailed RFI is recommended.

2. The Chem-fix Lagoon: The Chem-fix Lagoon was an earthen surface impoundment which was in operation for a few months in 1976. The lagoon dikes were constructed to a height of eight feet with an earthen core and crushed stone cover. Two 0.20 mil thick visquene plastic liners were installed in the lagoon which was also equipped with a perforated under drain system for leachate collection. Any leachate collected was pumped to the effluent treatment plant. The lagoon received approximately 460 cubic yards of treated brine sludge.

   The Chem-fix Lagoon was closed in 1983. The contents of lagoon were excavated and placed into the Brine Sludge Lagoon. It was then back filled, graded and seeded. The proximity of the Chem-fix Lagoon to the Brine Sludge Lagoon allows the NJPDES permitted wells to monitor any leachate releases to the groundwater from either lagoon. During the VSI an April 13, 1989, the lagoon appeared secure and there is no evidence of releases. Due to the proximity of this lagoon to the Brine Sludge Lagoon and the potential to have received mercury waste; a limited RFI is recommended. The RFI should consist of soil sampling to determine if hazardous wastes have leached from the lagoon. The sample analysis should be identical to the analysis of the Brine Sludge Lagoon.

3. The Waste Oil Drum Storage Area: The Container Storage Area is a 300 square foot concrete pad, one foot thick, with a six inch curb. During full plant operations up to 40 (55 gallon) drums of waste lubricating oils, transformer oils, degreasing solvents, and dewatered brine sludges could be stored there. These wastes were shipped off-site for proper disposal within 90 days.

   During the December 22, 1987 VSI, there were no drummed waste being stored, however the pad was covered with an absorbant material and oily residues were noted on the gravel in the surrounding area. During the April 13, 1989 VSI, stained soils were also noted. Using air monitoring equipment (Hnu and OVA), organic vapors were detected in the soil (10 ppm on the OVA and 6 ppm on the Hnu). It is recommended that a RFI be conducted on this unit to determine the extent of the release. The RFI should consist of soil sampling and the analysis should include, but not be limited to, petroleum hydrocarbons, volatile organics, total mercury and priority

pollutants. Based on the results of the soil sampling it may be required that the groundwater be monitored.

4. Area Between Building 231 and Railroad Track: In August 1980, NJDEP was contacted by a LCP employee. The employee stated that one day in 1973 or 1974, LCP used a steam shovel to take some of the brine sludge from the lagoon and spread it on the ground behind the compressor building (#231). In 1981, during the Geraghty and Miller sampling episode, two surface soil samples (S-3, S-4) were taken near this area. The samples were analyzed for desorbed mercury. The results were: S-3, 1070 ppm and S-4, 1580 ppm of mercury. These levels of mercury are the highest detected in any sampling conducted on the LCP site. These concentrations are 300 ppm greater than the soil samples near the Brine Sludge Lagoon. Due to the presence of mercury contamination, a RFI is recommended for this unit to determine the extent of the contamination. The RFI should consist of soil sampling which includes, but not be limited to, total mercury and priority pollutants. If the results of the soil sampling indicate significant contamination, further investigation will be necessary to determine the extent.

5. 500K Tank and Surrounding Areas: The 500,000 gallon tank is located between Avenue C and Avenue B. The tank has served two purposes. Originally the tank was used to store sodium hydroxide and later became incorporated with the effluent treatment system and was used as a storage tank for wastewater. Presently the tank is not used. The area surrounding the tank was paved in 1982.

   From 1980 to 1982, a series of NJDEP Hazardous Waste Enforcement inspections revealed several releases in the area of the 500K Tank. The releases in this area are:

   | | |
   |---|---|
   | 9/17/80 | Brine Sludge was observed on the gravel near the 500K "collection tank." |
   | 1/21/81 | During the inspection a liquid was observed spewing from a cracked PVC pipe near the 500K Tank and pump pit. |
   | 10/22/81 | A brine sludge slurry release from a transfer line was evidenced by a 1 by 15 foot spill area located on Avenue B between the pump pit and the Brine Sludge Lagoon. There was also a hydrochloric acid spill approximately 15 feet northwest of the 500K Tank. |
   | 4/13/82 | Sodium sulfide crystals were evident on the gravel surface in the pump pit area. |

   Due to documented releases, a limited RFI is recommended for this unit. The RFI should consist of soil sampling and the analysis should include, but not be limited to, total mercury, hydrochloric acid, sodium hydroxide, sodium sulfide, and priority pollutants. A more in-depth RFA may be required based on the results of the soil sampling.

6. South Branch Creek: South Branch Creek is a tidal arm of the Arthur Kill that flows along the eastern border of the LCP property. Since

1974, LCP has had three discharges to the creek. On or about October 30, 1972 and February 7, 1974, there was an overflow of supernatant in contact with brine muds from LCP's Brine Sludge Lagoon into South Branch Creek. LCP pled guilty to violation 3 USC 1311 (a) for both occurrences on September 25, 1975. A fine of $5,000 was levied for each occurrence. The third incident occurred on August 15, 1979. Due to a sodium chloride block in LCP's east saturator an excess of mercury tainted brine overflowed the saturator. The surge of flow exceeded the surge capacity of the wastewater system. This caused an estimate of 10,000 to 20,000 gallons of brine to flow into South Branch Creek. LCP notified NJDEP and the EPA samples taken by the Coast Guard revealed the mercury contamination of the spill was 8.6 ppm.

In 1981, a sediment sample was taken from the creek. The sample was analyzed by LCP's Labs for mercury. The mercury concentration was 46 ppm, which exceeds NJDEP action/clean-up level of 1 ppm. Due to past releases to the South Branch Creek a limited RFI is recommended for this unit. The RFI should consist of sediment sampling and surface water sampling both upstream and downstream of LCP's discharge (DSN 001). The sample analysis should include, but not be limited to, total mercury, barium and priority pollutants.

7. Bullet Tanks: These tanks have been abandoned since about 1983. The Bullet Tanks were used to store brine sludge. A series of NJDEP Hazardous Waste Enforcement inspections have revealed that there were continual problems with brine containment in the area under the tanks. From September 17, 1980 until April 13, 1982 the inspections stated that the containment area had brine residues. On October 9, 1980 and January 22, 1981 the area was full with the potential to overflow.

   Due to the potential for a release to exposed soils a limited RFI is recommended for this unit. The RFI should consist of soil samples around the bermed area of the abandoned Bullet Tanks. The sample analysis should include, but not be limited to, total mercury, acid-base extractables and priority pollutants. Based on the results of the soil sampling it may be required that an additional investigation be conducted.

8. The Sludge Roaster: The Sludge Roaster was constructed in 1978 to vaporize mercury from steam dried brine sludge. The roaster was built on a 16 x 40 foot concrete pad, one foot thick, with drain channnels, that connect to the effluent treatment plant, and a cinder block curb around the pad.

   Under an Administrative Order issued on September 1, 1981, LCP was required to submit an application for a Hazardous Waste Facility permit to operate the roaster unit. The permit was denied on June 30, 1982 by the Bureau of Hazardous Waste Engineering (BHWE) and LCP subsequently abandoned the process.

   An enforcement inspection by the Division of Environmental Quality, Air Pollution Control Program on November 5, 1981 disclosed a hole in a muffler plate on the sludge roaster. This allowed an excessive quantity of mercury vapors to be released to the atmosphere.

In 1985, the sludge roaster was dismantled and most of its components were shipped to other LCP facilities. No further action is necessary for the roaster unit, at this time.

9. Salt Silo 4: This silo was used to store the brine sludge prior to disposal in the lagoon. During the October 9, 1980 inspection brine sludge was observed on the ground around the silo. The silos were removed in 1985. A limited RFI is recommended on this unit due to the potential of releases to the soil. Soil sampling should be conducted and the analysis should include, but not be limited to, total mercury and priority pollutants. An additional investigation may be required based on the soil results.

10. The Effluent Building : This building was originally used as a brine filtering facility. LCP began wastewater treatment in this building around the time of the lagoon closures. The October 9, 1980 inspection indicates that there was brine caked on the floor near the filters. This was washed to the sump next to the 500K Tank and eventually treated. Because there are no documents of a hazardous release from this area, no further investigations are warranted at this time.

11. Past GAF Waste Water Treatment Area: From past GAF and LCP site maps it appears that the waste water treatment plant that was operated by GAF was located on the western side of building 220. It is believed that the plant was used primarily for pH neutralization from the 1950's to the early 1970's. The site presently is paved over and supporting a transformer substation. No further investigation is warranted at this time.

12. Cracks in the Floor of Building 230 and 240: The employee complaint also stated that because of Occupational Safety and Health Administrative visits LCP re-cemented the floors of Buildings 230 and 240 to cover cracks. According to the employee these cracks may have exposed soils that could have been contaminated with mercury. The employee felt that this was not investigated by LCP.

    In 1976, OSHA inspected the buildings and did report openings in the floor and wall of these rooms. However, there was no indication of possible soil contamination with mercury.

    OSHA also conducted a health survey in April 1985. This survey concluded that any workers in Buildings 230 and 240 are exposed to mercury and mercury vapors above the OSHA 8 hr-time weighted average permissible exposure limit. According to the Plant Manager, John Canonton, LCP still monitors for mercury vapors and worker exposure even though they no longer produce chlorine.

    Due to the potential of soil exposure to mercury, a limited RFI is recommended for this unit. Soil sampling should be conducted and the analyses should include, but not be limited to, total mercury and priority pollutants.

    ADDITIIONAL CONCERN:
    The 1982 Waste Lagoon-Ground Water Monitoring Report submitted by Geraghty and Miller stated that a possible source for the mercury

contamination at LCP was due to contaminated fill. There are three conditions which suggest that this is not the case. The data presented in the report indicate that soil samples below the fill layer have levels of mercury exceeding 1 ppm, the NJDEP action level. Based on the history of the site, the soils at GAF and LCP should have a similar composition. However, soil sampling conducted at GAF by NJDEP Bureau of Planning and Assessment, in December 1988 (data not reviewed for QA/QC), indicated lower mercury levels than LCP. GAF had levels of mercury ranging from <0.1 ppm to 347.8 ppm (Ave 29.1 ppm) and the levels of mercury for LCP ranged from <0.1 ppm to 1,580 ppm (Ave 102.4 ppm). The highest levels of mercury 1,070 ppm and 1,580 ppm are in the area of alledged surface dumping, it is likely that this is a probable cause of mercury contamination. It is suggested that if the recommended soil sampling yields mercury levels similar to those of 1982, LCP should submit a remedial plan to address the contaminated soil.

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State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
CN 029
TRENTON, NEW JERSEY 08625

GEORGE G. McCANN, P.E.
DIRECTOR

DIRK C. HOFMAN,
DEPUTY DIRECT

# M E M O R A N D U M

To: Brian Crisafulli
Bureau of Compliance and Technical Services
Division of Hazardous Waste Management

Through: Tracy Wagner, Supervisor; Kenneth Siet, Chief
Bureau of Ground Water Pollution Abatement
Division of Water Resources

From: Jill Monroe, Geologist
Bureau of Ground Water Pollution Abatement
Division of Water Resources

Subject: CME for LCP Chemicals and Plastics, Inc.
Linden, New Jersey

## Background and Facility Information:

LCP Chemicals and Plastics, Inc. (LCP) is located on Tremley Point in Union County, New Jersey. LCP owns the 26 acre site which contains a chemical manufacturing facility which produced liquid chlorine. The Tremley Point area has been developed for industry, with manufacturers and tank farms located in the immediate area of LCP. The Point extends to the Arthur Kill, a tidal waterway used for recreational purposes and a wildlife habitat.

LCP operated a liquid chlorine manufacturing process at the facility between 1972 and 1985. Prior to LCP ownership, GAF owned the facility and also manufactured liquid chlorine. The process used by both GAF and LCP was the "mercury cell process" which yielded a chlorine gas through the electrolysis of a sodium chloride (brine) solution in the presence of metallic mercury. Other products included sodium hydroxide and hydrogen gas.

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LCP employed a brine purification process to recover and recycle metallic mercury. The process was incomplete and a waste product of mercury contaminated brine sludge resulted. An unlined surface impoundment was used in the brine purification process, as well as being the deposition site for the mercury contaminated brine sludge. Between GAF and LCP, the unlined surface impoundment was used for approximately 20 years, between 1962 and 1982. In 1982, LCP removed the unit from operation.

The unlined surface impoundment was constructed above grade, according to the available records, by the construction of berms. It rested on fill placed on the site in the 1950's over the native tidal wetland sediments. The surface impoundment is located on the eastern edge of the site, adjacent to a tidal creek named South Branch Creek, and the neighboring tank farm of Northville Industries. South Branch Creek flows immediately adjacent to the surface impoundment and into the Arthur Kill located approximately 1100 feet to the east of the surface impoundment.

The mercury contaminated brine sludge (200-500 ppm of mercury) was closed in place in the unlined surface impoundment when the unit was closed. An estimated waste volume of 30,900 cubic yards currently remains in the unit. Closure involved drying the sludge, regrading, and the placement of a clay cap over the unit, followed by the placement of topsoil and the establishment of a vegetative cover in accordance with the November 7, 1983 closure/post closure approval issued by the Bureau of Hazardous Waste Engineering, Division of Waste Management. The closure/post closure plans were submitted in accordance with an Administrative Consent Order signed by LCP and the Department on September 16, 1981.

The facility had been required to monitor existing ground water monitor wells and to maintain the cover soil and cover vegetation on the closed in place surface impoundment under a NJPDES-DGW permit (NJ0003778). This permit was recently reissued on October 30, 1987. Conditions in the final permit related to the installation of new ground water monitor wells are being contested by LCP. The Department is currently discussing with LCP a means to settle the differences.

A possible means to settle the contested permit conditions related to the installation of new ground water monitor wells involves an "interim" ground water monitoring program. LCP recently submitted a proposal to monitor the single shallow monitor well, MW 1-A, and the top five (5) feet of ground water in all of the other monitor wells, MW's 1, 2, 3, 4 and 5, by using a well packer. This proposal, submitted under cover of letter dated May 5, 1988 by Geraghty and Miller, was approved with minor changes by the Department on May 24, 1988. The proposal should

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lend additional insight on water quality in the fill/native soil interface. Further, by isolating the top five (5) feet of ground water in each well, information will be obtained on the quality of the water closest to the base of the closed in place surface impoundment at each monitor well site. This should clarify some questions related to the adequacy of the existing ground water monitoring system.

Geology/Geohydrology and Ground Water Monitoring:

The LCP facility is located on heterogeneous fill material. The area was originally a tidal wetland area influenced by the nearby Arthur Kill. The fill is composed of sand, gravel, brick and slag and is approximately 10 - 15 feet thick across most of the site but being shallower, approximately 5 feet in thickness, near South Branch Creek. The fill was placed over tidally deposited sands, silts, clays and peats. Beneath the tidal sediments are glacial till deposits overlying the Brunswick formation. A sandy "channel" appears to exist beneath the surface impoundment which may have been a tidal stream bed at one time. Bedrock is located approximately 40 feet below grade.

The site is hydrogeologically complicated due to the variability in the tidal and glacial deposits and the fill materials, and due to the proximity of the tidal waterways which influence ground water quality and water levels in the wells. Further, adjacent industrial land use may be impacting ground water quality as well as recharge/discharge characteristics and ground water contours.

LCP installed a detection ground water monitoring system in 1981 in accordance with the above referenced Administrative Consent Order. Five (5) monitor wells were installed along the edge of the surface impoundment, between the surface impoundment and South Branch Creek. One (1) well was installed in what was considered an upgradient location inland from the tidal creek but still adjacent to the surface impoundment. Monitoring of these wells during closure and post closure was required in the November 7, 1983 approval granted by the Bureau of Hazardous Waste Engineering, and the NJPDES-DGW permit issued by the Division of Water Resources on December 23, 1983 specified the monitoring of five (5) of the six (6) existing wells. MW 1-A was not required to be monitored under the December 23, 1983 NJPDES-DGW permit.

The monitor well boring logs (attached to this checklist) and LCP's consultant indicate that 1 1/2 inch diameter monitor wells were installed and screened in what was determined to be the most permeable lithologies. The screen length was chosen to obtain an "adequate" sample, given the slow permeability of the sediments. The screen location was chosen to detect a vertical migrating release from the surface impoundment through the fill, the tidal

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sediments and the glacial till. Only one monitor well screen was set at a shallow enough depth to sample ground water at the fill/native soil interface which could also establish the existence of a vertical gradient since it was installed adjacent to a deeper monitor well.

The most recent ground water quality data (January, 1988) indicates that ground water quality criteria for iron and manganese have been exceded, and that TOX levels in all of the wells adjacent to the South Branch Creek are greater than 1000 ppb. Between 1982 and 1987, ground water monitoring results have been exceeded for arsenic selenium, silver, lead, chromium, cadmium, mercury and radium. The RCRA-RFA investigation also revealed the presence of organic vapors in the head space of existing monitor wells 1 and 2 which may correlate with elevated levels of Total Organic Halogen results in the ground water sample analyses.

Conclusions and Recommendations:

The Department's review of the ground water monitor well locations and construction specifications, consultant reports and data reveal the following concerns:

1. There are currently no consistant ground water quality results from the "shallow" monitor well, labeled 1-A, which monitors the ground water in the zone of the fill/native soil interface.

The implication of this is that a possible route for contaminant release is not monitored. The February, 1982 report prepared by LCP's consultant, Geraghty and Miller, indicated that the base of the fill appeared saturated. The unlined surface impoundment was constructed over heterogeneous fill, presumably more permeable than the native underlying sediments. If leachate was being generated from the surface impoundment, or if through vertical movement of the water table contaminants are being solubilized from the waste materials closed in the surface impoundment, this water could be moving horizontally above the less permeable sediments of the tidal deposits and glacial till in the direction of decreasing hydraulic head. The discharge point for shallow ground water is assumed to be South Branch Creek.

2. The horizontal and vertical gradients and flow paths, and the degree of hydraulic connection between the fill, the tidal sediments and the glacial till, are site characteristics which have not been adequately defined.

The implication of this is that a vertical flow gradient cannot be determined. Without a determination on whether the ground water beneath the unit behaves as one system, or if some ground

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water exists under semi-confined or confined conditions, the water levels in the existing ground water monitoring wells are useless in determining the horizontal direction of ground water flow necessary to identify upgradient and downgradient monitoring locations. The need for this information may be represented by the apparent shifts in upgradient and downgradient monitoring points

3. The existing, deeper, wells screen a large segment of the underlying sediments.

The implication of this is that ground water contaminants may be diluted with ground water that is not contaminated. Further, the monitoring system should be sampling the water in the uppermost aquifer, or portion of the uppermost aquifer, which appears to be the saturated zone at the fill/native soil interface.

4. Statistical comparison of upgradient and downgradient wells screened at different depths, finished with different screen lengths, and constructed through different techniques, etc. may not be valid. As such, the RCRA and the NJPDES regulations may not be able to be complied with.

LCP has not met the statistical requirements for RCRA or NJPDES. Their argument is based on the tidal influence on the indicator parameters required to be analyzed, i.e. sulfate, total dissolved solids, etc. LCP has not proposed specific alternate parameters to be analyzed which would more adequately reflect a release from the surface impoundment, but the question remains on whether a positive or negative result to the test would be meaningful given the current monitoring system design.

In closing, LCP has successfully argued in the past that the existing wells are screened in the sediments most likely to detect a release, although the screens of most wells are separated from the base of the surface impoundment by tidal muds and glacial till which have restrictive permeabilities and have low transmissivity. The Dearment's main belief is that the avenue of release which is not being monitored is the fill/native soil interface. Although the surface impoundment wastes are [illegible] to prevent infiltration from generating leachate, any shallow ground water migrating horizontally beneath the surface impoundment and above the tighter native sediments could flush contaminants from the soil and into the South Branch Creek. This shallow, horizontal migration route, which may be seasonal, should not be neglected in the ground water monitoring program.

Another point which must be considered is that although the existing ground water monitoring system does not appear to strictly meet the letter of the regulations, the existing ground water monitoring data indicates periodic elevations in specific

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metals and Total Organic Halogen. These results should be further investigated, in addition to the work needed to define the geologic parameters influencing ground water movement and the surface features which may also influence ground water movement and quality. The "interim" ground water monitoring program, described above, should provide some valuable information needed to evaluate the ability of the existing monitor wells to detect a release from the closed in place surface impoundment.

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# RESULTS OF THE JULY/AUGUST 1988 GROUND-WATER SAMPLING PROGRAM, LCP CHEMICALS-NEW JERSEY LINDEN, NEW JERSEY

January 1989

Geraghty & Miller, Inc.
Ground-Water Services
125 East Bethpage Road
Plainview, New York 11803

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RESULTS OF THE JULY/AUGUST
1988 GROUND-WATER SAMPLING PROGRAM,
LCP CHEMICALS-NEW JERSEY
LINDEN, NEW JERSEY

## INTRODUCTION

In July and August 1988, Geraghty & Miller, Inc. personnel collected ground-water samples from an existing monitoring well network at LCP Chemicals-New Jersey (LCP), Linden, New Jersey (Figure 1). The sampling was performed under special sampling conditions in accordance with the "Technical Proposal for Monitoring Well Sampling and Evaluation for NJPDES Compliance," dated May 5, 1988.

As described in the sampling plan, the purpose of the sampling program was to verify the adequacy of the existing monitoring well network to monitor any contaminants migrating from the closed brine lagoons. The protocols specified in the plan required that samples be collected from all monitoring wells with the entire screen length open to the formation. The wells were also to be sampled after the upper 5 ft of each well screen, below the water table, were isolated by use of a temporary "packer" or plug. Water passing through the well screen above the packer provides a sample representative of the isolated zone of interest. A description of the packer installation technique is provided in Appendix A. The constituents for which the wells were sampled are as follows: antimony, arsenic, barium,



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beryllium, cadmium, lead, mercury, nickel, selenium, silver, hexavalent chromium, thallium, and pH.

Laboratory analyses were performed by Environmental Testing and Certification (ETC), Edison, New Jersey, according to the U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program (CLP) Protocols. The Geraghty & Miller ground-water sampling protocols used for the special sampling program are provided in Appendix A and laboratory analysis reports in Appendix B. This report provides a summary of the special sampling program and its results.

## METHODOLOGY

### July 27, 1988 Sampling Round

On July 27, 1988, samples were collected from Monitoring Wells MW-1 through MW-5. Prior to evacuation of the wells, static water level and well depth measurements were collected. The depth to water and calculated mean sea level water-level elevations are shown in Table 1. The configuration of the shallow water table, based on the July 27 measurements, is presented on Figure 2.

Measurement of the depth of Well MW-1 indicated that silt had collected in the well to a depth of 22.5 ft below land surface. The open screen length available was limited

to the top 4 ft of the well screen. The installation of the packer system for Well MW-1 was, therefore, not applicable. The packer assembly was also not used during sample collection from Well MW-1A since this well was constructed with a 5 ft screen. Wells MW-1 and MW-1A were evacuated with a centrifugal pump and sampled with a peristaltic pump.

Field analyses of pH, specific conductance, and temperature are provided in Table 2. The packer system was installed on Wells MW-2, MW-3, MW-4, and MW-5, as described in Appendix A. A replicate sample was collected at Well MW-5 and labeled MW-6. A summary of the analytical results from the July 27, 1988 sampling round is provided in Table 3.

August 29, 1988 Sampling Round

Samples were collected from all wells in accordance with New Jersey Pollutant Discharge Elimination System (NJPDES) permit requirements and use of CLP protocols, (i.e., without the use of the temporary packer). Depth-to-water measurements and calculated mean sea level water-level elevations are provided in Table 1. The configuration of the shallow water table, based on these measurements, is presented on Figure 3. Field parameter analyses are provided in Table 4.



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As in the July sampling, a replicate sample was collected at Well MW-5 and labeled MW-6. A summary of the laboratory results for the samples collected August 29, 1988 is provided in Table 5.

August 30, 1988 Sampling Round

Samples were collected August 30, 1988 from Wells MW-1A through MW-5. The packer was installed in Wells MW-2 through MW-5. Well MW-1 was not sampled. Depth-to-water measurements and calculated mean sea level water-level elevations are provided in Table 1, and field parameter analyses are provided in Table 6. The water-table configuration, based on measurements made August 30, 1988, is shown on Figure 4.

The replicate sample was collected at Well MW-4 and labeled MW-6. A summary of the analytical results from the August 30, 1988 sampling round is provided in Table 7.

## WATER QUALITY

All sample results were below New Jersey Ground-Water Quality Standards for the constituents analyzed, except for Well MW-1A. Slightly elevated levels of arsenic were detected in all three sampling rounds from this well (a maximum of 96 micrograms per liter [ug/L] versus the New



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Jersey standard of 50 ug/L). The well had a 5-ft screen section so no packer/non-packer comparison was possible.

As with Well MW-1A, Well MW-1 was sampled without the use of the packer since it is silted in and has only 4 ft of screen open for sampling. A comparison of analytical results from the July 27 and August 29 Well MW-1 samples detected only insignificant concentration differences.

A comparison of analytical results for wells sampled with packer (July 27) and resampling without packers, (August 29 and 30) reveals no significant differences, except in Well MW-2, which exhibited a slight increase in detected barium after installation of packer. The concentration detected without a packer (August 29) was 390 ug/L. Concentrations detected with packers July 27 and August 30 were 750 ug/L and 670 ug/L (respectively). All concentrations detected were below the New Jersey Ground-Water Quality Standards (1,000 ug/L).

Laboratory results for mercury were nearly identical for all three sampling rounds. Mercury was not detected in any well other than Well MW-1A. The results for mercury analyses of Well MW-1A samples were as follows: 0.58 ug/L (July 27), 0.57 ug/L (August 29), 0.59 ug/L (August 30).All results were below New Jersey Ground-Water Quality Standards (2 ug/L).

A trace amount of lead (8 ug/L) was detected in Well MW-3 with the packer installed on the July 27 sample round. However, lead was not detected with the packer installed on the August 30 sample, nor without the packer on the August 29 sample. The detected value of July 27 (8 ug/L) was below the New Jersey Ground-Water Quality Standard (50 ug/L).

Ground-Water Flow

Review of the water-table contour maps (Figures 2,3, and 4) indicates that the general direction of the horizontal component of ground-water flow was from the lagoon towards South Branch Creek during the July 27, 1988 sampling round. The direction of ground-water flow was reversed during the August 29 and 30, 1988 sampling rounds. The observed directional changes in ground-water flow reflect tidal variations.

## CONCLUSIONS

1. No substantive differences were observed between the packed and unpacked sampling events.

2. Well MW-1A, which has a 5-ft screen, was the only well with any detected mercury concentrations.

3. During both the July and August sampling rounds, mercury and arsenic were detected in monitoring well

MW-1A. The contaminant concentrations did not vary much between the two rounds or whether the samples were collected during a rising or falling tide. Based on data provided by LCP, it has been determined that arsenic was never used at the Linden facility, therefore, the presence of arsenic is indicative of an outside source of contamination. The relatively invarient contaminant concentrations and the proximity of the well to the Arthur Kill suggest that the mercury and arsenic detected in the well represent background conditions in the Arthur Kill rather than contamination resulting from the LCP facility. The current monitoring well network can therefore be used to monitor any impacts from the former lagoons and the construction of additional wells is unnecessary.

## RECOMMENDATIONS

Well MW-1 should be redeveloped to remove silt and ensure that the entire screen length is open to the formation for future sampling.

Respectfully submitted,

GERAGHTY & MILLER, INC.

Robert M. Alvey
Principal Scientist/
Project Manager

Gregory Shkuda
Associate/
Project Officer

RMA/GS:jb
January 4, 1989



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Table 1. Depth to Water and Water-Level Elevations of Monitoring Wells, LCP Chemicals-New Jersey, Linden, New Jersey.

| | | Date Measured: 7/27/88 | | 8/29/88 | | 8/30/88 | |
|---|---|---|---|---|---|---|---|
| Monitoring Well Designation | Measuring Point Elevation[a] | Depth to Water[b] | Water-Level Elevation[a] | Depth to Water[b] | Water-Level Elevation[a] | Depth to Water[b] | Water-Level Elevation |
| MW-1 | 8.65 | 3.95 | 4.70 | 3.58 | 5.07 | 4.36 | 4.29 |
| MW-1A | 10.32 | 5.09 | 5.23 | 4.44 | 5.88 | 5.53 | 4.79 |
| MW-2 | 7.66 | 3.14 | 4.52 | 2.68 | 4.98 | 3.64 | 4.02 |
| MW-3 | 13.39 | 7.98 | 5.41 | 7.66 | 5.73 | 8.09 | 5.30 |
| MW-4 | 11.28 | 5.66 | 5.62 | 5.59 | 5.69 | 5.86 | 5.42 |
| MW-5 | 11.57 | 5.73 | 5.84 | 6.99 | 4.58 | 7.50 | 4.07 |

[a] Ft above mean sea level.
[b] Ft below measuring point.

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Table 2. Summary of Field Parameters Measured for Ground-Water Samples Collected July 27, 1988, LCP Chemicals-New Jersey, Linden, New Jersey.

| Well | pH (standard units) | Specific Conductance (umhos/cm at 25°C) | Temperature (°C) | Remarks |
|---|---|---|---|---|
| MW-1 | 6.70 | 11,400 | 17 | Red/brown, very turbid |
| MW-1A | 6.95 | 7,000 | 22 | Colorless, clear |
| MW-2 | 6.85 | 11,000 | 18 | Red/brown, very turbid |
| MW-3 | 7.15 | 12,000 | 18 | Pale green, clear |
| MW-4 | 6.95 | 12,000 | 20 | Lt. brown, cloudy |
| MW-5 | 7.05 | 1,400 | 20 | Pink, cloudy |

Table 3. Summary of Analytical Results for Metals in Ground-Water Samples Collected July 27, 1988, LCP Chemicals-New Jersey, Linden, New Jersey.

| Parameter (ug/L) | New Jersey Ground-Water Quality Standards (ug/L) | Sample Designation: MW-1 | MW-1A | MW-2 | MW-3 | MW-4 | -----Replicates----a MW-5 | MW-6 | Field Blank |
|---|---|---|---|---|---|---|---|---|---|
| Antimony | NS | -- | -- | -- | -- | -- | -- | -- | -- |
| Arsenic | 50 | -- | 73 | BMDL | BMDL | BMDL | BMDL | BMDL | BMDL |
| Barium | 1000 | 290 | BMDL | 750 | 330 | 90 | 140 | 140 | |
| Beryllium | NS | -- | -- | -- | -- | -- | -- | -- | -- |
| Cadmium | 10 | -- | BMDL | -- | -- | -- | -- | -- | -- |
| Chromium (Hex) | 50 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Lead | 50 | -- | -- | BMDL | 8 | -- | -- | -- | -- |
| Mercury | 2 | -- | 0.58 | -- | -- | -- | -- | -- | -- |
| Nickel | NS | -- | -- | -- | BMDL | BMDL | -- | -- | -- |
| Selenium | NS | BMDL | -- | -- | -- | -- | -- | -- | -- |
| Silver | 50 | BMDL | -- | BMDL | -- | -- | -- | BMDL | -- |
| Thallium | NS | -- | -- | -- | -- | -- | -- | -- | -- |

Laboratory Analysis by Environmental Testing and Certification.

ug/L Micrograms per liter.
NS No standard has been established.
-- Not detected.
BMDL Below method detection limit. (Refer to Appendix B)
a Replicate samples from Well MW-5.

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FIGURES

Table 4. Summary of Field Parameters Measured for Ground-Water Samples Collected August 29, 1988, LCP Chemicals-New Jersey, Linden, New Jersey,

| Well | pH (standard units) | Specific Conductance (umhos/cm at 25°C) | Temperature (°C) | Remarks |
|---|---|---|---|---|
| MW-1 | 6.60 | >20,000 | 18 | Red/brown, very turbid |
| | 6.65 | >20,000 | | |
| | 6.70 | >20,000 | | |
| | 6.70 | >20,000 | | |
| MW-1A | 6.90 | 14,500 | 21 | Colorless, clea |
| | 7.00 | 14,000 | | |
| | 7.00 | 13,500 | | |
| | 7.00 | 13,500 | | |
| MW-2 | 6.70 | 20,000 | 18 | Red/brown, very turbid |
| | 6.75 | 20,000 | | |
| | 6.75 | 20,000 | | |
| | 6.75 | 20,000 | | |
| MW-3 | 7.05 | >20,000 | 18 | Colorless, clea |
| | 7.05 | >20,000 | | |
| | 7.05 | >20,000 | | |
| | 7.05 | >20,000 | | |
| MW-4 | 7.15 | >20,000 | 19 | Brown/black, slightly turbid |
| | 7.15 | >20,000 | | |
| | 7.15 | >20,000 | | |
| | 7.15 | >20,000 | | |
| MW-5 | 6.95 | 5,000 | 18 | Red/brown, turbid |
| | 6.95 | 5,000 | | |
| | 6.95 | 5,000 | | |
| | 6.95 | 5,000 | | |



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Table 5. Summary of Analytical Results for Metals in Ground-Water Samples Collected August 29, 1988, LCP Chemicals-New Jersey, Linden, New Jersey.

| Parameter (ug/L) | New Jersey Ground-Water Quality Standards (ug/L) | Sample Designation: MW-1 | MW-1A | MW-2 | MW-3 | MW-4 | -----Replicates---a MW-5 | MW-6 | Field Blank |
|---|---|---|---|---|---|---|---|---|---|
| Antimony | NS | -- | BMDL | -- | -- | -- | -- | -- | -- |
| Arsenic | 50 | -- | 76 | BMDL | BMDL | 13 | BMDL | BMDL | -- |
| Barium | 1000 | 350 | 30 | 390 | 350 | 98 | 190 | 190 | -- |
| Beryllium | NS | -- | -- | -- | -- | -- | -- | -- | -- |
| Cadmium | 10 | -- | BMDL | -- | -- | BMDL | -- | -- | -- |
| Chromium (Hex) | 50 | <10 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Copper | 1000 | BMDL | BMDL | -- | BMDL | BMDL | -- | BMDL | -- |
| Lead | 50 | -- | -- | -- | BMDL | BMDL | BMDL | BMDL | -- |
| Mercury | 2 | -- | 0.57 | -- | -- | -- | -- | -- | -- |
| Nickel | NS | -- | -- | -- | -- | -- | -- | BMDL | -- |
| Selenium | NS | BMDL | -- | -- | -- | -- | -- | -- | -- |
| Silver | 50 | BMDL | -- | -- | -- | BMDL | -- | -- | -- |
| Thallium | NS | -- | -- | -- | -- | -- | -- | -- | -- |

Laboratory Analysis by Environmental Testing and Certification.

ug/L Micrograms per liter.

NS No standard has been established.

-- Not detected.

BMDL Below method detection limit. (Refer to Appendix B)

a Replicate samples from Well MW-5.

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Table 6. Summary of Field Parameters Measured for Ground-~~Water~~ Samples Collected August 30, 1988, LCP Chemicals - New Jersey, Linden, New Jersey.

| Well | pH (standard units) | Specific Conductance (umhos/cm at 25°C) | Temperature (°C) | Remarks |
|---|---|---|---|---|
| MW-1A | 6.75 | 11,500 | 20 | Colorless, clear |
| MW-2 | 6.85 | 17,000 | 17 | Red/brown, very turbid |
| MW-3 | 7.10 | 17,500 | 17 | Brown/green, cloudy |
| MW-4 | 7.10 | 19,000 | 17 | Colorless, clear |
| MW-5 | 7.00 | 2,500 | 22 | Colorless, clear |



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Table 7. Summary of Analytical Results for Metals in Ground-Water Samples Collected August 30, 1988, LCP Chemicals-New Jersey, Linden, New Jersey.

| Parameter (ug/L) | New Jersey Ground-Water Quality Standards (ug/L) | Sample Designation: MW-1A | MW-2 | MW-3 | ------Replicates----a MW-4 | MW-6 | MW-5 | Field Blank |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 50 | 96 | BMDL | 12 | 14 | 13 | BMDL | -- |
| Barium | 1000 | 26 | 670 | 310 | 87 | 92 | 140 | -- |
| Beryllium | NS | -- | -- | -- | -- | -- | -- | -- |
| Cadmium | 10 | BMDL | BMDL | -- | -- | BMDL | -- | -- |
| Chromium (Hex) | 50 | <10 | <10 | <10 | <10 | <10 | <10 | <10 |
| Lead | 50 | -- | -- | -- | BMDL | -- | -- | -- |
| Mercury | 2 | 0.59 | -- | -- | -- | -- | -- | -- |
| Nickel | NS | -- | -- | -- | -- | -- | -- | -- |
| Selenium | NS | -- | -- | -- | -- | -- | -- | -- |
| Silver | 50 | -- | -- | -- | -- | BMDL | -- | -- |

Laboratory Analysis by Environmental Testing and Certification.

ug/L Micrograms per liter.
NS No standard has been established.
-- Not detected.
BMDL Below method detection limit. (Refer to Appendix B)
a Replicate samples from Well MW-4.

GERAGHTY & MILLER, INC.

ATTACHMENT F

ATTACHMENT #1
PAST OPERATIONS

## ATTACHMENT #1

### Item 1B: Past Operations

Prior to UCC-Linde Divisions operations, the property was vacant and owned by GAF. GAF leased the property to Linden Chemical and Plastics (LCP) Inc. who in turn subleased the property to UCC-Linde. In December 1971, LCP purchased the property from GAF. Union Carbide Corporation, Linde Division, operated the Linden facility as a hydrogen transfill and repackaging plant from 1957 to 1989. In January 1989, Union Carbide transferred the assets of this industrial gases operation to a wholly-owned subsidiary, Linde Gases of the Mid-Atlantic, the operation did not change and continued to date.

There are currently 3 - 4 employees at the facility. Operations conducted are as follows:

Hydrogen gas, generated by LCP was delivered to the Linde Plant via pipeline. It was a well known fact that due to the process at LCP, the hydrogen would be contaminated with mercury. The hydrogen was purified prior to containerization by Linde.

LCP stopped supplying pipeline hydrogen in late 1980. Liquid cryogenic hydrogen was then delivered by trailer to the Linde facility and stored in an aboveground 18,000-gallon storage tank. The liquid hydrogen was vaporized to its gaseous form and pumped by compressor through the purification system into DOT approved cylinders and high pressure tube trailers for delivery to customers. Hydrogen product, in cylinders and tube trailers, were then analyzed for conformance with customer or sales specifications. Mixtures of hydrogen and nitrogen or hydrogen and argon were also made upon customer request. In July, 1988, the purification system was removed and the hydrogen was pumped by either compressor or high pressure pump.

Cylinder maintenance activities include: hydrostatic pressure testing of cylinders in compliance with DOT cylinder specifications; valve removal, replacement and repair; and routine brush or roller painting of cylinders as needed.

Routine plant maintenance activities include: periodic dismantlement and

reassembly of the compressor to repair or replace broken or worn parts, changing lubricating oil on the compressor and vacuum pumps, and welding, cutting and brazing of filling manifolds and equipment.