IBM INTERNATIONAL BUSINESS MACHINES CORPORATION

EAST FISHKILL FACILITY
DUTCHESS COUNTY, NEW YORK

CLOSURE REPORT FOR WASTE SOLVENT TANK SYSTEM NOS. 134, 135, 136, 137, AND 138

MAY 1989

CORDDRY CARPENTER DIETZ AND ZACK
ENGINEERS AND PLANNERS

HARRISBURG, PENNSYLVANIA

INTERNATIONAL BUSINESS MACHINES CORPORATION

EAST FISHKILL, NEW YORK

CLOSURE REPORT

FOR

WASTE SOLVENT TANK SYSTEM

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SECTION I

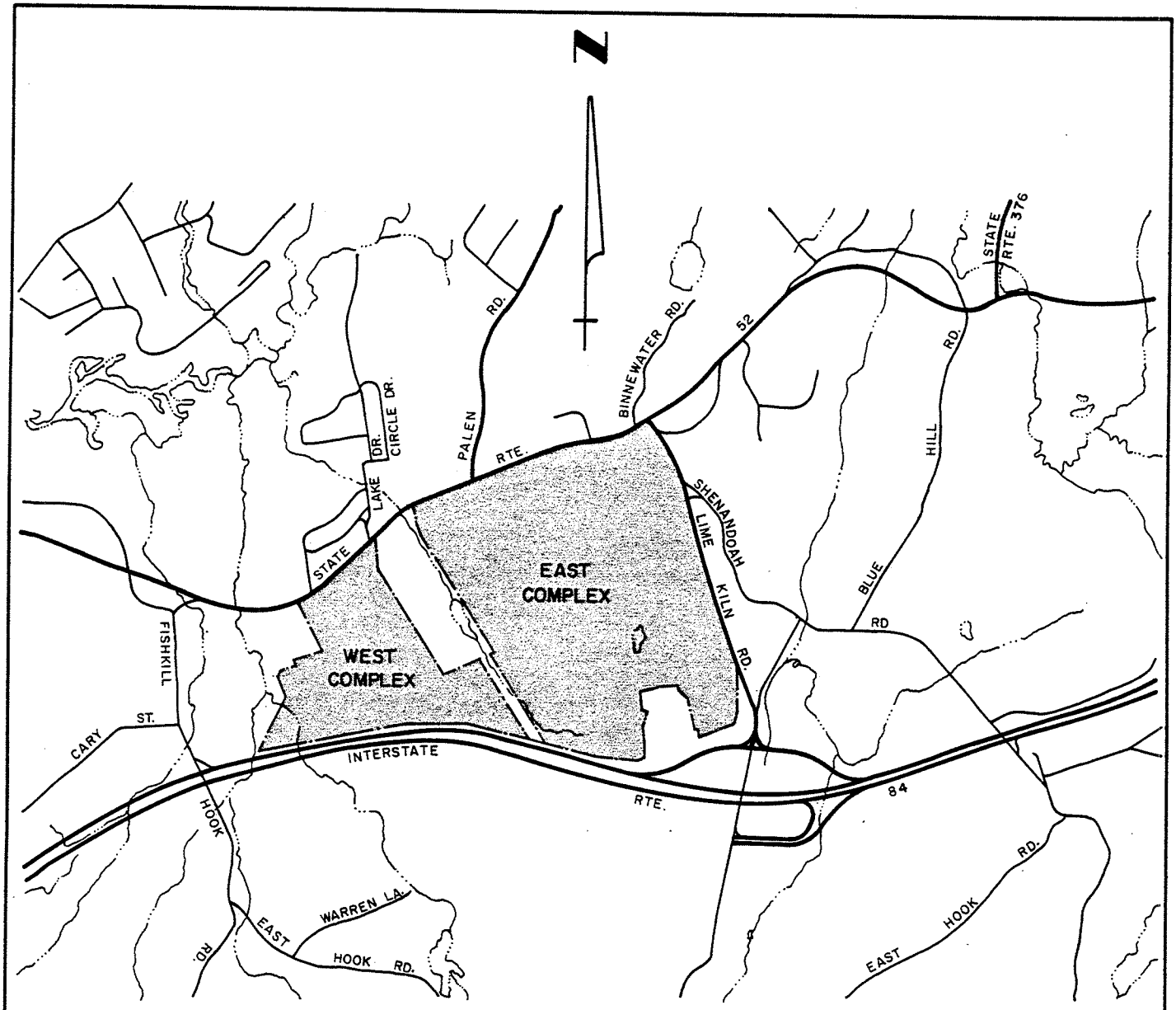
I. INTRODUCTION

The International Business Machines Corporation (IBM) operates a manufacturing plant adjacent to New York State Route 52 and Interstate 84 in East Fishkill, New York. Its general location is shown on Figure 1.

The 682-acre facility, originally constructed in 1963, supports production, administration, and research and development activities. Production centers around the manufacture of semiconductor devices.

Because the IBM East Fishkill Facility acts as a generator and storer of hazardous wastes, a closure plan for its hazardous waste operations was prepared in November 1980 in accordance with 40 CFR 264.112 of the Hazardous Waste and Consolidated Permit Regulations. These Regulations were promulgated by the U.S. Environmental Protection Agency (EPA), pursuant to the Resource Conservation and Recovery Act of 1976 (RCRA).

In May and early November of 1988, the IBM East Fishkill Facility notified the U.S. EPA Region II office of their intent to initiate closure activities on Hazardous Waste Solvent Tank System Nos. 134, 135, 136, 137 and 138 in accordance with 40 CFR 264.112, subpart G, and IBM's Hazardous Waste Closure Plan. On November 29, 1988, IBM received approval from the U.S. EPA to commence closure no later than December 13, 1988. Copies of the EPA approved Closure Plan and closure-related correspondence are provided in Appendix A.



IBM CORPORATION
EAST FISHKILL, NEW YORK

LOCATION MAP

0 1,000 2,000 3,000 6,000

SCALE IN FEET

CORDDRY CARPENTER DIETZ AND ZACK
HARRISBURG, PENNSYLVANIA

FIGURE 1

Corddry Carpenter Dietz and Zack (CCD&Z) was retained by IBM East Fishkill to perform decontamination of the tank systems' components, coordinate the other activities required for closure, and certify that the systems were closed in accordance with the EPA approved Closure Plan.

The closure activities described herein were performed from December 12, 1988 to March 26, 1989.

SECTION II

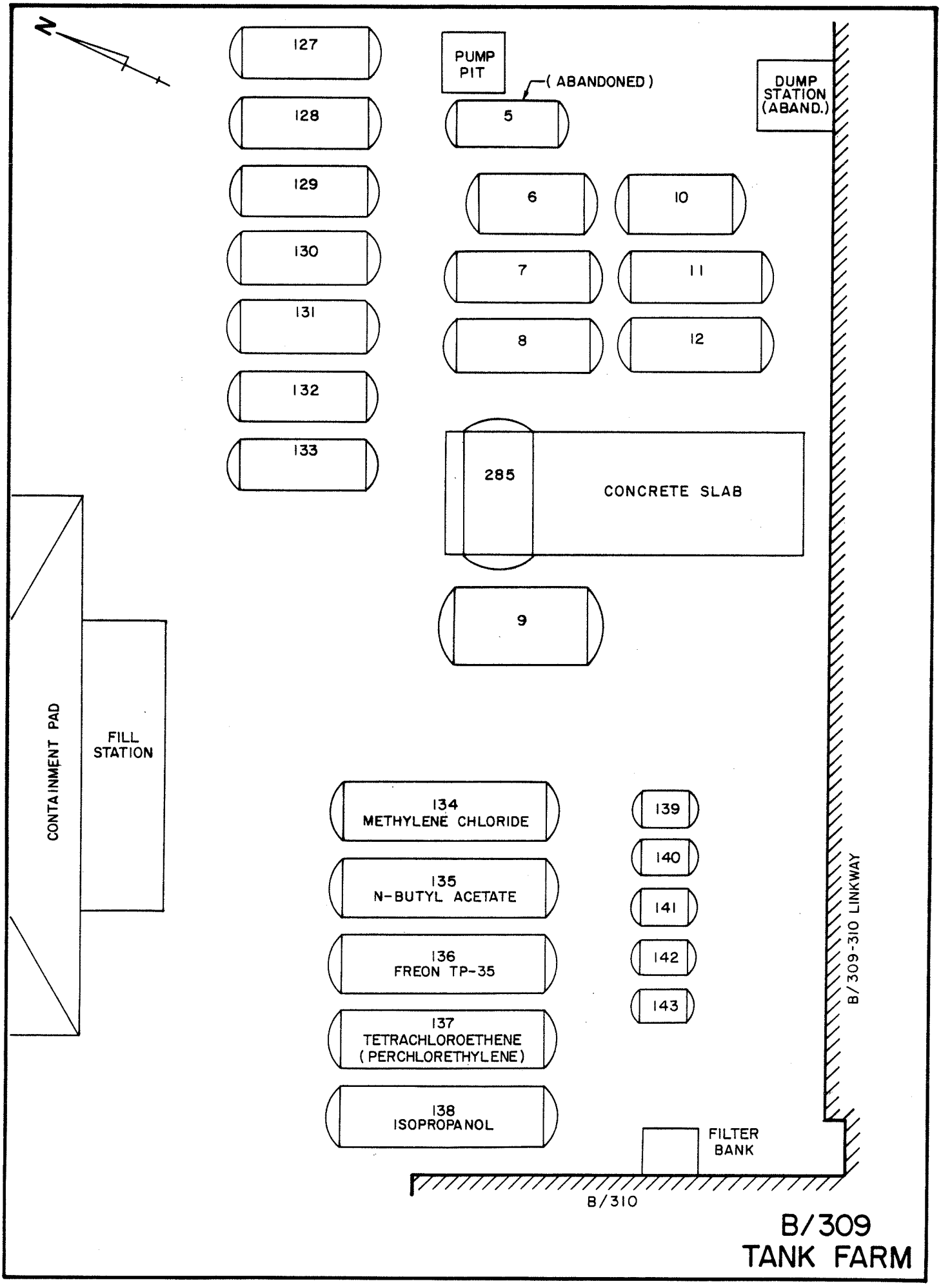
II. SYSTEM DESCRIPTION

The five, 10,000 gallon underground waste solvent storage tanks that were closed are located within a tank farm adjacent to Buildings 309 and 310 at the IBM East Fishkill, East Complex. A plan of the Building 309 tank farm is shown on Figure 2.

Each tank measures 8 feet in diameter and approximately 27 feet in length, and is constructed of 3/8-inch steel plate. Tank access was through two steel manway structures with 24-inch diameter access hatches. The five tanks were used to store segregated waste solvents as follows:

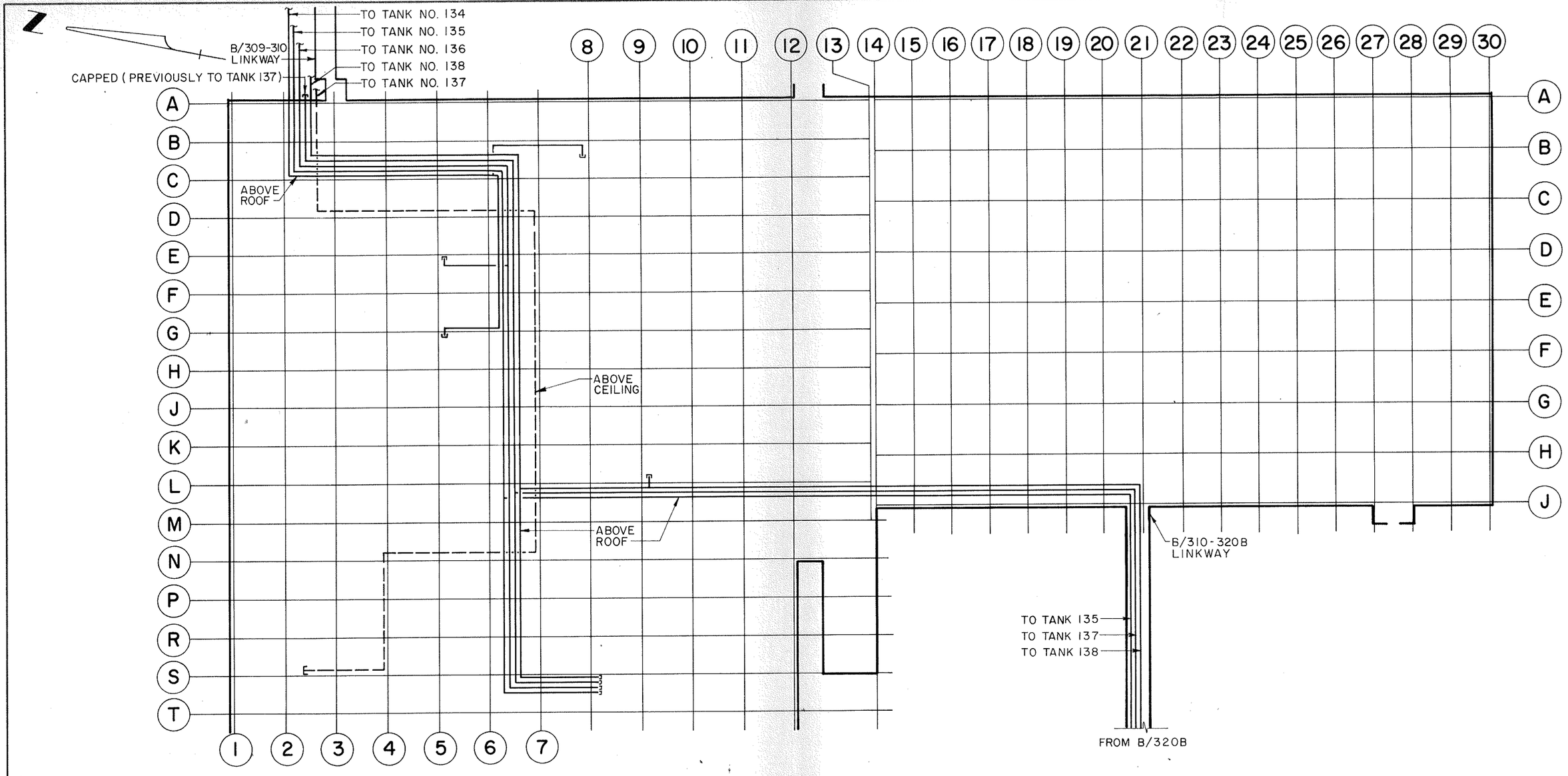
Tank No.	Waste Constituents
134	Methylene Chloride
135	N-Butyl Acetate
136	Freon TP-35
137	Tetrachloroethene (Perchlorethylene)
138	Isopropanol

Each waste solvent tank was vented and emptied through 3-inch steel piping which terminated at the truck fill station. Under normal operating conditions, the tanks were filled via steel piping routed above the roofs of Buildings 310 and 320B, aboveground along the B/309-310 linkway wall, and underground to each tank. Figures 3 and 4 show the pipe routing on the building roofs. The majority of this piping was 1½ inches in diameter.



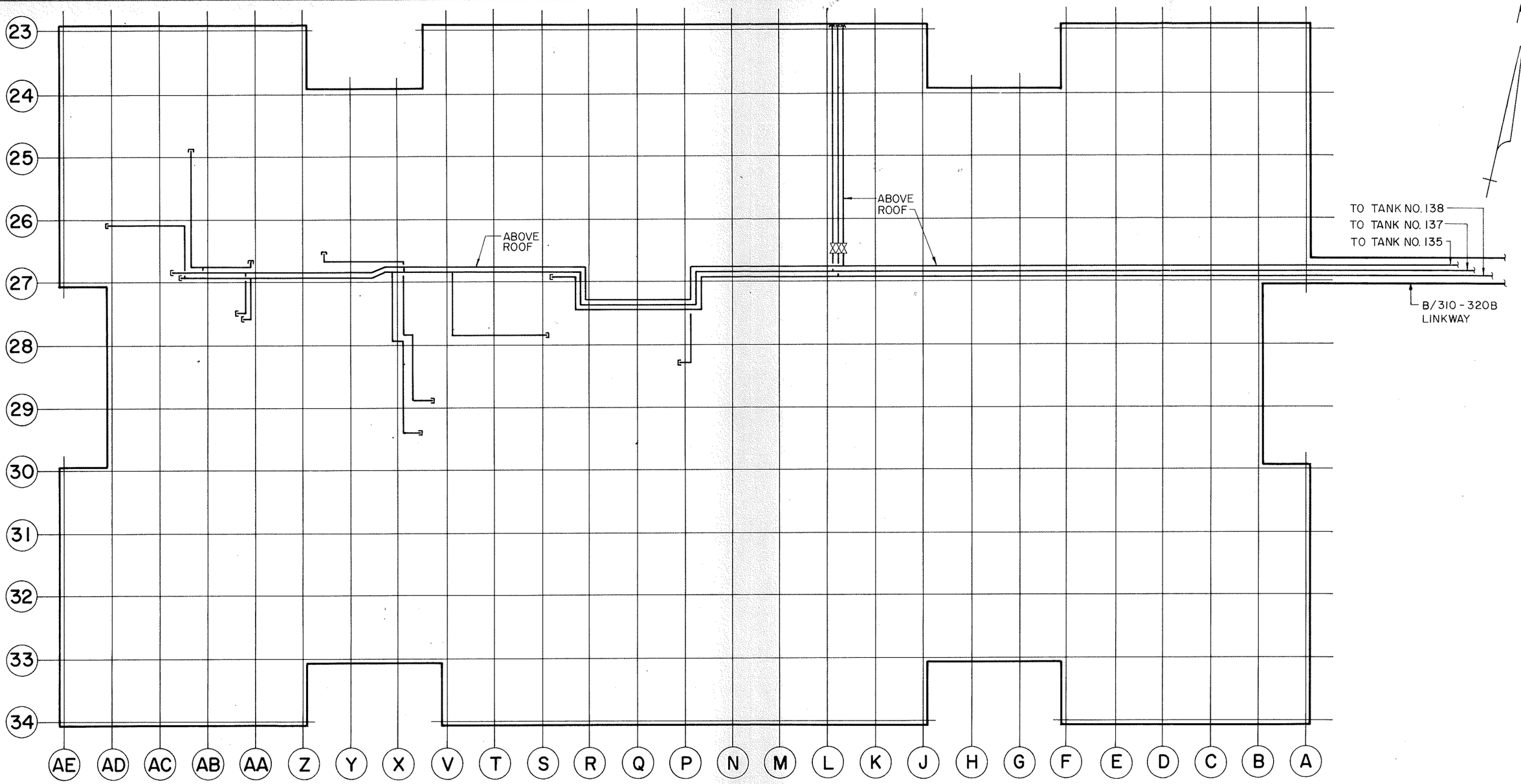
B/309 TANK FARM

FIGURE 2



WASTE SOLVENT TRANSFER PIPING TANK NOS. 134,135,136, 137 AND 138 BUILDING 310

FIGURE 3



WASTE SOLVENT
TRANSFER PIPING
TANK NOS. 135, 137 AND 138
BUILDING 320B

FIGURE 4

Additional small diameter transfer piping pertinent to Tank No. 137 was routed inside Building 310 as shown on Figure 3.

A diagram of the tank system is presented as Plate 1, showing the system configurations and summarizing the closure tasks performed on the pipelines.

SECTION III

III. DECONTAMINATION PLAN

As part of the approved Closure Plan, IBM was required to develop specific decontamination procedures for the waste solvent storage tank systems at the time of closure. Implementation of the tank systems closure, as described herein, was performed in accordance with the U.S. EPA approved Closure Plan, and the subsequent Decontamination Plan developed by IBM.

A copy of the IBM Decontamination Plan is presented in Appendix B.

SECTION IV

IV. CLOSURE ACTIVITIES

Prior to commencing closure, and in conformance with the Closure Plan, IBM discontinued usage of the five waste solvent storage tank systems and removed the residual sludge and liquid wastes within the five subject tanks. These hazardous wastes had been transferred to storage tankers provided by IBM and transported to a RCRA approved disposal site in accordance with normal IBM East Fishkill operating practices. Upon completion of the waste removal from the tanks, no additional process wastes were placed in the tanks.

A. DECONTAMINATION AND ABANDONMENT PROCEDURES

As part of the tank and pipeline closure, the following procedures were developed and utilized in accordance with the Decontamination Plan.

1. Lining of Access Excavations - Access excavations are lined with 60-mil butyl membrane as needed. This material is used because of its durability and chemical resistance. During the lining process, adequate capacity for collection of cleaning and rinsing liquids and a tight seal around the pipes are provided. Liquids from cleaning and rinsing operations are collected in the liners and pumped into storage containers such as tank trailers.

2. Purging of Vapors Inside Underground Tanks - Inside storage tanks, solvent vapors can form flammable mixtures with air. To counter the possible flammability, the tank is filled with nitrogen gas which in turn displaces any air. Monitoring of the oxygen level and the lower explosive limit (LEL) is performed continuously if possible, or at frequent intervals when continuous monitoring is not practical.

3. Pressure Tank Cleaning/Rinsing - The tank interior is cleaned and/or rinsed by means of a fluid-driven rotary tank cleaning machine which utilizes jets of pressurized water or water/detergent solution* to scour the internal tank walls.

4. Steam Cleaning - Steam is produced in a portable steam cleaning unit. The steam is injected by means of a nozzle into the tank and/or pipe system interior. Detergent* can be added during the steaming process.

* Specifications of the detergent and solution are presented in Appendix C.

5. Hydraulic Cleaning/Rinsing - Cleaning and/or rinsing of pipelines is accomplished by the means of a hydraulic pipe cleaning unit which utilizes high velocity water jets to propel its hose through the pipe and scour the internal pipe walls as the hose is retrieved. Washed out debris is then removed at the downstream access chamber or excavation.

6. Hydrostatic Cleaning/Rinsing - Where adequate external access to piping is not available, or where hydraulic cleaning/rinsing is not applicable, the piping is sealed with mechanical or inflatable plugs and filled with water, or a water/detergent solution*. After a predetermined period of time, the plug is removed and the liquid is collected for disposal.

7. High Pressure Cleaning - Aboveground pipe lengths of 20 feet or less are cleaned by means of high pressure (8-10,000 psi) water blasting equipment which utilizes water jets to scour the internal pipe walls.

8. Abandonment of Tanks - Underground tanks that have been decontaminated are filled with sand and concrete.

* Specifications of the detergent and solution are presented in Appendix C.

9. Abandonment of Piping - Piping that has been decontaminated is sealed by installing a riser pipe at the downstream and/or upstream access points. The piping is then filled with acrylamide grout*, and cleanouts are concreted and labeled as abandoned.

B. HEALTH AND SAFETY PLAN

A site health and safety plan for CCD&Z employees was developed by CCD&Z in order to establish safety procedures and personal protective equipment (PPE) required for the various work tasks involved in the closure. The health and safety plan is presented in Appendix E.

Included in the Health and Safety Plan are the required PPE decontamination procedures that were utilized during the project.

C. LABORATORY ANALYSIS

To determine if the tanks and pipelines were suitably decontaminated prior to abandonment or disposal as non-hazardous waste, duplicate final rinse water samples were gathered by CCD&Z and analyzed by the IBM East Fishkill Environmental Laboratory to determine the concentrations of any expected solvent compounds (See Appendix B - Decontamination Plan). Analyses were conducted using EPA Methods 601 and 602 for halocarbons and aromatics respectively.

* Specifications of acrylamide grout are presented in Appendix D.

It was required that the compound concentrations in the rinse samples be less than 1 part per million (ppm) in order to verify that the respective tanks and pipelines were decontaminated.

In all cases, chain of custody sample submission procedures were used. The completed chain of custody forms are presented in Appendix F and the Laboratory reports are presented in Appendix G.

SECTION V

V. TANK CLOSURE

A. TANK DECONTAMINATION

Once the residual wastes were removed from Tank Nos. 134, 135, 136, 137 and 138, access excavations were provided to expose all pipe connections to the tanks. Underground vent, discharge, transfer and level control piping was exposed and removed to the extent practical, by excavation and plumbing contractors furnished by IBM. This piping was then transferred to the fill station containment pad for subsequent decontamination and/or disposal as described in Section VII.

Each tank was purged with nitrogen gas and monitored for oxygen concentration and % LEL during decontamination. All equipment to be used in the decontamination procedure was grounded.

The following decontamination steps were performed on each of the five waste solvent tanks:

1. Initial water rinsed utilizing the pressure tank cleaning method.
2. Steam Cleaned.
3. Rinsed with water/detergent solution utilizing the pressure tank cleaning method.
4. Performed steps 2 and 3 two additional times.
5. Rinsed with water 3 times utilizing the pressure tank cleaning method. The third water rinse was sampled for laboratory analysis.

Table 1 presents a summary of the analyses performed on the initial rinse samples from the 5 tanks.

TABLE 1

DETECTED COMPOUNDS

FIRST TANK CLEANING

Tank No.	Sample ID	Date	Compound Concentrations
134	Tank 134 Rinse 3A	12/18/88	4.25 ppm Tetrachloroethene 0.0054 ppm Trichloroethene 0.052 ppm m,p-Xylene 0.0102 ppm 1,2-Dichlorobenzene 0.03 ppm o-Xylene
135	Tank 135 Rinse 3A-3B	12/14/88	>0.08 ppm Tetrachloroethene
136	Tank 136 Rinse 3A-3B	12/16/88	0.0084 ppm Tetrachloroethene 0.0108 ppm Methylene Chloride
137	Tank 137 Rinse 3A	12/15/88	0.098 ppm Tetrachloroethene 0.0048 ppm m,p-Xylene
138	Tank 138 Rinse 3A	12/14/88	0.188 ppm Tetrachloroethene 0.015 ppm Trichloroethene 0.0036 ppm m,p-Xylene 0.0062 ppm Methylene Chloride 0.0042 ppm 1,2-Dichlorobenzene 0.0064 ppm Ethyl Benzene 0.0168 ppm o-Xylene

These results indicated Tank Nos. 136, 137 and 138 met the established decontamination criterion.

Tank No. 134, exhibiting 4.25 parts per million (ppm) of tetrachloroethene (perchlorethylene) in its rinse sample, did not meet the decontamination criteria, necessitating additional cleaning.

Analysis of the Tank No. 135 rinse sample indicated the compound tetrachloroethene to be in excess of 0.08 ppm. The sample size had not been adequate to detect the concentration more accurately, therefore additional rinsing and sampling of Tank No. 135 was required.

Steam cleaning of Tank No. 134 was repeated, after which the tank was rinsed three times using the pressure tank cleaning method. Samples of the third rinse were analyzed for solvent compound concentrations.

Tank No. 135 was also rinsed three times and sampled as described above.

A summary of the analytical results of the tank recleaning is presented in Table 2.

TABLE 2

DETECTED COMPOUNDS

SECOND TANK CLEANING

Tank No.	Sample ID	Date	Compound Concentrations
134	TK-134 F Rinse	01/18/89	0.4236 ppm Tetrachloroethene 0.00052 ppm Dibromochloromethane
135	TK-135 Rinse 3	01/16/89	0.0953 ppm Tetrachloroethene

These results indicated that Tank Nos. 134 and 135 met the established decontamination criterion following the recleaning.

B. TANK ABANDONMENT

The five waste solvent tanks, having met the criteria for decontamination were prepared for permanent abandonment. The rectangular steel manways were removed and the tanks were filled with sand to a point just below the access covers. The remainder of the tanks' interiors were filled with concrete and the access covers closed and securely bolted. The above work was performed by excavation and plumbing contractors furnished by IBM.

Final backfilling and grading of the site was completed by the excavation contractor and the ground surface was dressed with crushed stone. Permanent signs were installed indicating the location of each abandoned tank.

SECTION VI

VI. VENT AND DISCHARGE PIPE CLOSURE

A. PIPE DECONTAMINATION

The 3-inch vent and discharge piping, for each of the five tanks, was decontaminated utilizing procedural steps similar to the tank cleaning. Prior to commencing with the cleaning, each access excavation was lined with butyl membrane. Once the excavations were lined, the piping was initially rinsed by either the hydraulic or hydrostatic cleaning methods. The piping was then steam cleaned and hydrostatically rinsed with a water/detergent solution three times. Three separate water rinses were performed and the third rinse was sampled for laboratory analysis.

Table 3 presents a summary of the analyses performed on the initial rinse samples from the vent and discharge pipes. These results indicated that all pipe sections met the established decontamination criterion except the discharge piping from Tank Nos. 134 and 135. Samples from these sections contained the compound tetrachloroethene in excess of 0.08 ppm. The sample size had not been adequate to detect the concentration more accurately, therefore additional rinsing and sampling of those pipe sections was required.

TABLE 3

DETECTED COMPOUNDS

FIRST VENT AND DISCHARGE PIPE CLEANING

Tank System	Pipeline	Sample ID	Date	Compound Concentrations
134	Vent	Tank 134 Vent Pipe Rinse 3A-3B	12/17/88	0.007 ppm Methylene Chloride 0.0252 ppm Tetrachloroethene
	Discharge	Tank 134 Fill Pipe Rinse 3A-3B	12/17/88	0.00003 ppm Bromoform 0.00026 ppm Chloroform 0.00048 ppm Ethyl Benzene 0.00073 ppm Bromodichloromethane 0.0017 ppm o-Xylene 0.0025 ppm m,p-Xylene 0.0026 ppm Trichloroethene >0.08 ppm Tetrachloroethene
135	Vent	Tank 135 Vent Pipe Rinse 3A-3B	12/17/88	None Detected
	Discharge	Tank 135 Fill Pipe Rinse 3A-3B	12/17/88	0.0014 ppm Bromoform 0.0042 ppm Chloroform 0.00049 ppm Ethyl Benzene 0.00099 ppm Bromodichloromethane 0.0024 ppm m,p-Xylene 0.0534 ppm Trichloroethene 0.00016 ppm Methylene Chloride 0.0019 ppm Trans-1,2-dichlorethene >0.08 ppm Tetrachloroethene
136	Vent	Tank 136 Vent Pipe Rinse 3A	12/16/88	0.0036 ppm Methylene Chloride 0.0036 ppm Tetrachloroethene
	Discharge	Tank 136 Fill Pipe Rinse 3A-3B	12/16/88	0.02 ppm Tetrachloroethene
137	Vent	Tank 137 Vent Pipe Rinse 3A-3B	12/16/88	0.0016 ppm Tetrachloroethene
	Discharge	Tank 137 Fill Pipe Rinse 3A-3B	12/15/88	0.00055 ppm Trichloroethene 0.0054 ppm Tetrachloroethene

TABLE 3 (CONTINUED)

DETECTED COMPOUNDS

FIRST VENT AND DISCHARGE PIPE CLEANING

Tank System	Pipeline	Sample ID	Date	Compound Concentrations
138	Vent	Tank 138 Vent Pipe Rinse 3A	12/19/88	0.0018 ppm Dibromochloromethane 0.1146 ppm Tetrachloroethene
	Discharge	Tank 138 Fill Pipe Rinse 3A	12/19/88	0.0024 ppm m,p-Xylene 0.0032 ppm Tetrachloroethene

The discharge pipes for Tank Nos. 134 and 135 were recleaned utilizing steam cleaning followed by water/detergent rinses and water rinses. Samples of the final water rinses were analyzed for solvent compound concentrations.

A summary of the analytical results of the pipe recleaning is presented in Table 4.

TABLE 4

DETECTED COMPOUNDS

SECOND DISCHARGE PIPE CLEANING

Tank System	Pipeline	Sample ID	Date	Compound Concentrations
134	Discharge	TK-134 F Rinse	01/17/89	0.0061 ppm Dibromochloromethane 0.5469 ppm Tetrachloroethene
135	Discharge	TK-135 F Rinse	01/17/89	0.025 ppm Trichloroethene 0.0147 ppm Dibromochloromethane 1.112 ppm Tetrachloroethene

The above results indicated that while the Tank No. 134 discharge pipe had met the established decontamination criterion, the Tank No. 135 discharge

pipe still did not. Therefore, the recleaning and sampling procedures were repeated on the Tank No. 135 piping.

The laboratory analytical results for this third cleaning cycle indicated that the decontamination criterion had been met. All solvent compounds in the final water rinse sample (I.D. TK-135 F Pipe 1/19/89) were less than the method detection limits (MDL) except tetrachloroethene, having a concentration of 0.0204 ppm.

Following decontamination of the vent and discharge piping, the butyl membrane liners were removed from each access excavation and the surrounding soil inspected to verify that no leakage of cleaning and rinsing liquids had occurred. The liners were placed in 55-gallon drums for later disposal.

B. PIPE REMOVAL AND ABANDONMENT

Upon completion of all field activities involved with the cleaning and decontamination of the vent and discharge piping between the five tanks and the fill station, approximately 333 feet of the piping was removed in lengths varying from 18 inches to 20 feet, by excavation and plumbing contractors furnished by IBM. This piping was previously cleaned and decontaminated as described above. After removal of this piping, approximately 140 lineal feet of decontaminated piping remained underground. The discharge port valves and fittings, and the vent valves, located at the truck fill station, had been removed and placed in 55-gallon drums for later disposal as hazardous waste.

The decontaminated vent and discharge piping removed by excavation and

plumbing contractors was disposed of by IBM as non-hazardous scrap metal.

The approximately 140 lineal feet of decontaminated vent and discharge piping remaining underground was filled with acrylamide grout by CCD&Z. All waste grout generated during the abandonment was collected and transferred to 55-gallon drums furnished by IBM for later disposal by IBM.

SECTION VII

VII. TRANSFER PIPE CLOSURE

A. SYSTEM DESCRIPTION

The closure of the five waste solvent tank systems included approximately 5,500 lineal feet of transfer piping from Buildings 310 and 320B which had previously been taken out of service. This piping, connected to the five waste solvent tanks, is shown on Figures 3 and 4.

One and one-half inch diameter piping was routed exposed above the roofs of Buildings 310 and 320B, supported on pipe racks. Piping along the B/309-310 linkway, as shown on Plate 1, was supported on the wall of the linkway on pipe racks before entering the ground and discharging into the appropriate waste solvent tanks.

Approximately 700 lineal feet of transfer piping inside Building 310 was routed above the ceiling and connected to the Tank 137 transfer piping outside the linkway wall. This piping, which ranged in size from 3/4-inch to 1½-inch diameter, is shown on Figure 4.

B. PIPE DISASSEMBLY

Prior to cleaning, the transfer piping on Buildings 310, 320B and the B/309-310 Linkway was cut into 20-foot lengths, where possible, by plumbing contractors furnished by IBM. The pipe sections were then transported to a storage rack, adjacent to the fill station containment pad, and segregated

into five groups according to tank system. Piping which could not be classified according to tank system, was placed in a sixth group of miscellaneous piping. Any piping too small or impractical to decontaminate (i.e. with numerous bends, valves, etc.) was placed in 55-gallon drums furnished by IBM for later disposal by IBM as hazardous waste.

The underground piping, from the linkway wall to the tank, was excavated and cut to length as above, and removed to the storage rack by contractors furnished by IBM. This piping ranged in size from 1½ inches to 2½ inches in diameter.

Table 5 lists the amounts of this transfer piping by group.

TABLE 5

B/310-320B WASTE SOLVENT TRANSFER PIPING

Tank System	Chemical Waste	Approximate Length (Feet)
134	Methylene Chloride	373
135	N-Butyl Acetate	1920
136	Freon TP-35	1182
137	Tetrachloroethene (Perchlorethylene)	402
138	Isopropanol	705
	Miscellaneous unlabeled	863
	TOTAL	5,445 feet

C. PRELIMINARY DECONTAMINATION EVALUATION

Approximately 10% by length of each transfer piping group (except the miscellaneous group) was cleaned in order to assess the efficiency and effectiveness of the decontamination procedures outlined in the Decontamination Plan. Final rinse samples for each group were analyzed for contaminant levels. Through evaluation of the field procedures and analytical results, a refined decontamination plan for the transfer piping was developed and implemented as outlined below:

- Clean utilizing the High Pressure Cleaning Method.
- Rinse with hot water/detergent solution.
- Steam clean.
- Final water rinse.

Approximately 520 lineal feet of transfer piping was cleaned as part of the preliminary evaluation of the decontamination method. A summary of the analytical results for the final rinse samples from this piping is presented in Table 6.

TABLE 6

DETECTED COMPOUNDS

PRELIMINARY TRANSFER PIPING EVALUATION

Tank System	Sample ID	Date	Compound Concentrations
134	Tank 134 Above Pipe 1A	12/14/88	None detected
	Tank 134 Above Pipe 2A	12/14/88	0.0036 ppm Tetrachloroethene
135	Tank 135 Above Pipe 1A	12/14/88	None detected
	Tank 135 Above Pipe 2A	12/14/88	0.0042 ppm Tetrachloroethene 0.0028 ppm m,p-Xylene
136	Tank 136 Above Pipe 1A	12/14/88	0.0033 ppm Tetrachloroethene
	Tank 136 Above Pipe 2A	12/14/88	0.0066 ppm Tetrachloroethene 0.0028 ppm m,p-Xylene
137	Tank 137 Above Pipe 1A	12/14/88	None detected
	Tank 137 Above Pipe 2B	12/14/88	0.0046 ppm Tetrachloroethene
138	Tank 138 Above Pipe 1A	12/14/88	0.0096 ppm Tetrachloroethene
	Tank 138 Above Pipe 2A	12/14/88	0.0044 ppm Tetrachloroethene

These results indicated this piping met the established decontamination criterion, and could be disposed of as non-hazardous waste.

D. FINAL DECONTAMINATION

The remaining 4,925 lineal feet of piping was decontaminated utilizing the steps outlined in Section VII.C. Final rinse samples (dated 1/26/89) were obtained from a representative 10% of each of the six piping groups and analyzed.

No solvent compounds were detected in the samples analyzed, indicating the transfer piping met the established decontamination criterion.

E. TRANSFER PIPING NOT DECONTAMINATED

Upon completion of the decontamination of the transfer piping removed from the building roofs and linkway wall, the 700 lineal feet of transfer piping inside Building 310 which had been previously connected to Tank No. 137 was closed. Plumbing contractors furnished by IBM removed this piping from the building, cut it into sections and placed it in 55-gallon drums for later disposal as hazardous waste.

SECTION VIII

VIII. DISPOSAL OF CLOSURE-GENERATED WASTE

A. CONTAMINATED WASTE

1. Liquid Wastes

All waste liquids generated from cleaning the waste solvent tanks and piping were collected in clean tank trailers provided by IBM and stored on the East Fishkill site for varying durations. Periodically, these liquid wastes were mixed with other solvent wastes produced during the site's daily operations, to adjust the solvent concentrations before shipping off site to an EPA licensed incinerator for burning. In all cases, the liquid wastes were transported to Rollins Environmental Services in Bridgeport, New Jersey for processing. Copies of the Uniform Hazardous Waste Manifests are presented in Appendix H.

2. Solid Wastes

During closure, the solid waste generated consisted of the following:

- Pipe elbows, valves, flame arrestors, short sections of pipe and other items removed from the waste solvent pipelines
- Sludge, sediment, and scale from inside the tanks and pipelines
- Contaminated personal protective clothing and materials including, gloves, boots, rags, paper towels, etc.

- Lining material from the pipe access excavations.

- Waste acrylamide grout.

These materials were placed in 55-gallon drums (DOT 17C) and temporarily stored in the Building 309 Drum Storage Area.

The drums were later transported to ENSCO (AOR) in El Dorado, Arkansas for processing. A copy of the Uniform Hazardous Waste Manifest is included in Appendix H.

B. NON-HAZARDOUS MATERIAL

All non-hazardous material including decontaminated pipe sections from the five tank systems was transported to Charles Effron & Son, scrap metal dealer in Poughkeepsie, New York. The Bill of Lading for this waste is presented in Appendix I.

SECTION IX

W. H. CORDDRY
1957-1969

J. D. CARPENTER
1957-1969

J. R. DIETZ
1957-1981

S. L. ZACK
1966-1972

CORDDRY CARPENTER DIETZ AND ZACK
ENGINEERS AND PLANNERS

P. O. BOX 1963
HARRISBURG, PA 17105
(717) 763-7211
CABLE ADDRESS GANFLEC - TELEX 84-2375

CERTIFICATION

This is to certify that the closure of Waste Solvent Tank System Nos. 134, 135, 136, 137 and 138 at the International Business Machines Corporation East Fishkill Facility, was performed in accordance with the specifications in the Closure Plan approved by the United States Environmental Protection Agency.

CORDDRY CARPENTER DIETZ AND ZACK

John E. Waters

JOHN E. WATERS
Registered Professional Engineer
State of New York
Registration No. 053078

5/30/89
Date

International Business Machines Corporation

East Fishkill Facility, Route 52
Hopewell Junction, New York 12533-0999
914/894-2121

CERTIFICATION

This is to certify that the closure of Waste Solvent Tank System Nos. 134, 135, 136, 137 and 138 at the International Business Machines Corporation East Fishkill Facility, was performed in accordance with the specifications in the Closure Plan approved by the United States Environmental Protection Agency.

INTERNATIONAL BUSINESS MACHINES CORPORATION

R. A. Hay for J. Hogan

JOSEPH M. HOGAN, Manager
Site Environmental Services

5/31/9
Date

PLATE 1

Plate 1 missing from original document

APPENDIX A

APPENDIX A

EPA APPROVED CLOSURE PLAN

AND CORRESPONDENCE

IBM

DATA SYSTEMS DIVISION
EAST FISHKILL, NEW YORK

ATTACHMENT VII

HAZARDOUS WASTE CLOSURE PLAN

NOVEMBER, 1980

CORDDRY CARPENTER DIETZ AND ZACK
ENGINEERS

HARRISBURG, PENNSYLVANIA

INTRODUCTION

This closure plan has been prepared in accordance with 40 CFR §265.112 of the Hazardous Waste and Consolidated Permit Regulations. These regulations were promulgated by the U.S. Environmental Protection Agency (EPA), pursuant to the Resource Conservation and Recovery Act of 1976 (RCRA).

The East Fishkill Facility of the IBM Corporation is located in Dutchess County, New York. The principal activity of the facility is the manufacturing of semi-conductor devices.

The East Fishkill Facility acts as a generator and storer of hazardous wastes and, as such, must complete a plan for closure of its hazardous waste operations at the plant that are subject to the closure requirements as follows:

1. Waste Solvent Storage

   Waste solvents are stored in five underground tanks located outside building 309. Periodically, the tank contents are removed by a contractor and properly disposed.

2. Hazardous Waste Drum Storage

   Various compounds including cyanide, mercury and arsenic are stored in drums within Building 309. Cyanides and incompatibles are stored in a separate room. These drums are periodically transported by a contract hauler to an approved disposal site.

3. Hazardous Waste Dumpster Areas

   Wastewater treatment sludge (hazardous waste Code F006) is stored in two areas. Sludge removed from a filter press is automatically dumped in a 25 cubic yard dumpster located in building 385. Once full, the dumpster is moved to the dumpster storage area located

outside building 385. The maximum number of dumpsters on-site at any given time shall not exceed four.

It should be noted that with the exception of decontaminating hazardous waste facilities, the closure procedures (i.e., final disposal of hazardous wastes) are identical to normal operating practices and will not require special handling or disposal facilities.

Figure 1 shows the location of hazardous waste storage and treatment vessels at the East Fishkill Facility.

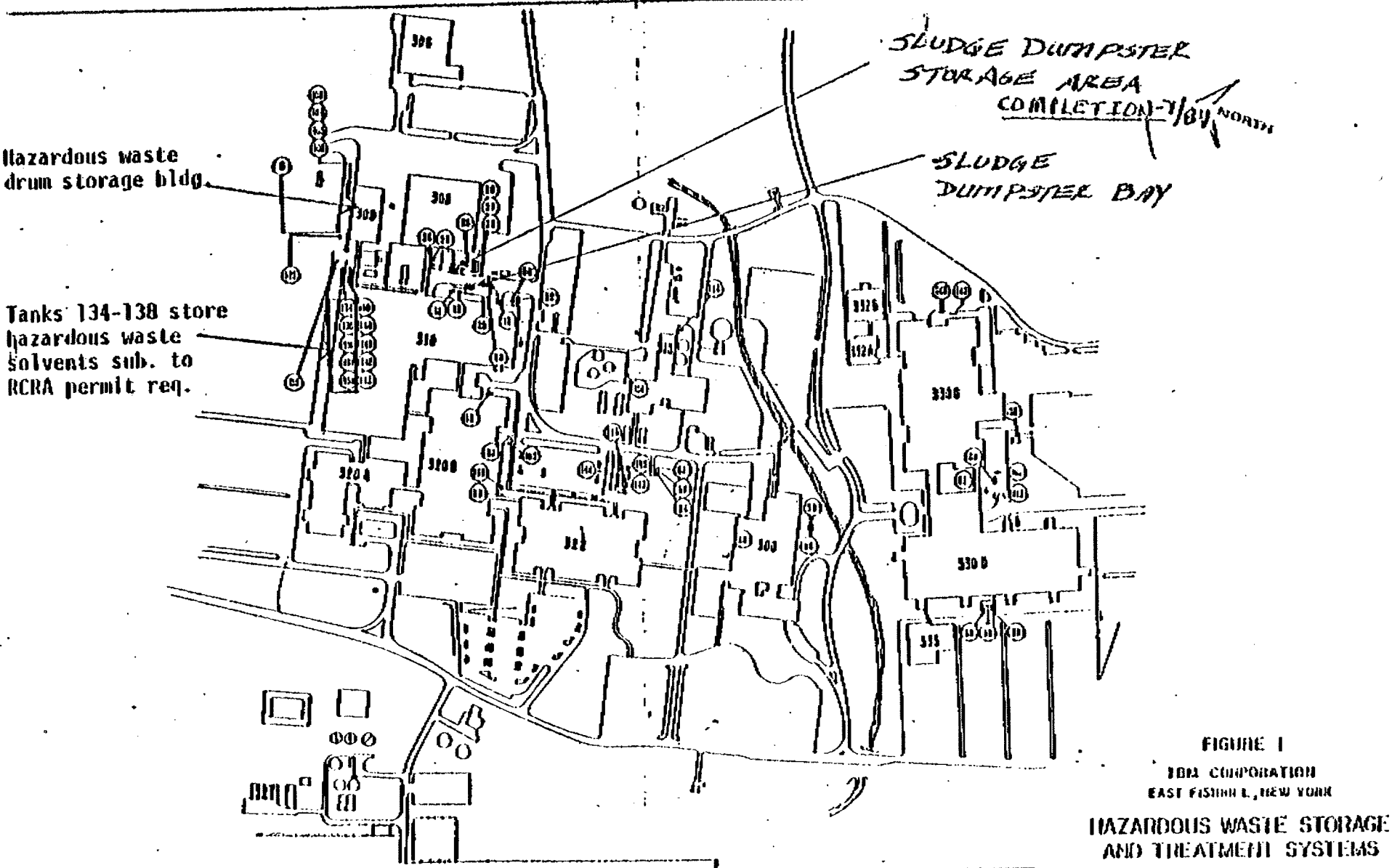


FIGURE 1

IBM CORPORATION

EAST FISHKILL, NEW YORK

HAZARDOUS WASTE STORAGE AND TREATMENT SYSTEMS

SCALE IN FEET

DESCRIPTION OF FACILITY CLOSURE

It may not seem logical to consider the East Fishkill Facility in terms of closure. The plant was constructed in 1963 and, as expected, is in excellent condition. IBM has no plans to discontinue operation of the site or individual unit processes. However, to comply with EPA hazardous waste regulations, the following closure procedures are proposed:

1. Discontinuance of Manufacturing

   The first stage of the closure plan is the stopping of plant production or at least those plant operations which generate or contribute hazardous wastes. This condition will terminate the flow of hazardous wastes (i.e., fluorides, acids, solvents) to the waste storage tanks and treatment plants.

2. Treatment of Remaining Hazardous Wastes

   In the case of waste fluorides and acids, the remainder of these materials (after discontinuance of manufacturing) will be treated in the fluoride and industrial wastewater treatment plants that are not subject to RCRA permit regulations under 40 CFR §264.1. If for some reason it is not possible to treat these wastes in this manner, the wastes will be removed by a contract hauler, transported, and disposed at an approved hazardous waste disposal site.

3. Removal of Other Hazardous Wastes

With respect to the waste solvents and sludges from the fluoride and industrial wastewater treatment plants, contract haulers would be utilized to dispose of these materials in a proper fashion after the discontinuance of manufacturing. Tank contents and drainage from all transfer lines will be placed in tank trucks after which no new hazardous wastes will be placed in these tanks.

CLOSURE SCHEDULE

As previously stated in this plan, IBM has no definite plans for closing the East Fishkill Facility (or any portion thereof). Inasmuch as the East Fishkill plant is a production facility, hazardous wastes associated with that production are generated continuously. These wastes are also continuously treated and/or removed. IBM has developed a procedure for regularly inspecting and testing all storage tanks and transfer systems, many of which handle hazardous wastes. As a result of the inspection and testing program, tanks and transfer lines are identified for replacement (or abandonment) when such inspections indicate that their service life is limited. All hazardous waste storage tanks and transfer piping are cleaned and decontaminated according to procedures set forth previously in this plan prior to disposal.

Therefore, any and all closure operations will be completed within 90 days because most operations will be handled by IBM personnel.

DECONTAMINATION OF FACILITY EQUIPMENT

Following the removal of all hazardous wastes by either treatment or contract disposal, all hazardous waste storage tanks and transfer lines will be decontaminated. Because the hazardous wastes are different with respect to physical and chemical properties, decontamination procedures will differ. In all cases, however, decontamination procedures will be developed under the guidance of IBM's Safety and Industrial Hygiene Department.

At the time of closure, specific decontamination procedures will be developed for the individual storage tanks and transfer systems, including fluoride, acid, and solvent systems. Generally, decontamination procedures would be established with consideration given to two references: (1) IBM Chemical Precaution Sheets, and (2) the Confined Space Entry Section (4-01-05A) of the IBM East Fishkill Safety Manual. The Chemical Precaution Sheets prescribe safety and health measures in handling specific chemicals used at the plant, such as hydrofluoric acid or acetone. Confined Space Entry sets forth all practices and protection (i.e., breathing apparatus, protective clothing, etc.) regarding safe activities within all designated confined spaces, including hazardous waste tanks.

MAXIMUM INVENTORY OF HAZARDOUS WASTES

The following table summarizes the estimated maximum inventory of hazardous wastes in storage or in treatment at any given time at the East Fishkill Facility.

System	Tank No.	Volume of Waste (gal)	Unit Process Contents
Tank Storage of Hazardous Waste	134	10,000	Methylene chloride
	135	10,000	n-butyl acetate
	136	10,000	1,1,2-trichloro-1,2,2-trifluoroethane
	137	10,000	Tetrachloroethylene waste (perchloroethylene)
	138	10,000	Isopropyl alcohol (Waste)
Hazardous Waste Drum Storage			
Main Room Storage Room	1,000 drums		Various hazardous wastes - consult waste analysis plan for specific waste codes.
Cyanide and Incompatible Drum Storage Room	150 drums		Cyanides, Alcohols, Aldehydes, Sulfides, Pyridine
Sludge Dumpster	100 cubic yards (4 dumpsters)		Electroplating sludge from non-cyanide operation

CLOSURE PLAN ESTIMATES - 1982 inflation adjustments calculated per Hazardous Waste Regulations Subpart II, para. 40 CFR §264.142(b)

Solvent Waste Piping - (Steel Piping)

Building 310, 320B, 330C and 330D are serviced by this system.

Cost of rinsing the system:

Manpower 400 hours @ $22/hr.		$ 8,800
Disposal of aboveground piping		$16,400
	Total	$25,200

Solvent Waste Tanks - (Steel Tanks)

Building 310	5 segregated (#134-138)	
Total Volume	50,000 gallons	
Disposal cost of liquid		$60,000
Cost of cleaning (sandblasting) @ $5,500 each tank (including disposal of residue)		$27,500
	Total	$87,500

Drum Storage Areas

	COST
Main Room	
Cost of removal of containers and disposal through a licensed vendor (max. 1,000 drums at $110/drum)	$110,000
Cost of removing liquid from the containment system and triple-rinsing the floor. Also assumes that the sump is full. Volume of containment system is 4;628 gallons. Liquid removal (full containment system plus rinsate) - 6,000 gallons	$ 6,000
Triple Rinse Labor Cost	$ 1,500
Liquid Removal - 2 trailer loads at $550/trailer with a capacity of 5,000 gallons	$ 1,100
Main Storage Room Total	$118,600
Cyanide and Incompatible Room	
Cost of removal of containers and disposal through a licensed vendor (max. 150 drums at $85/drum).	$ 14,000
Cost of removing liquid from the containment system and triple rinsing the floor. Also assumes that the sump is full. Volume of containment system is 1,042 gallons, Liquid removal - 2,000 gallons.	$ 4,000
Triple Rinse - Labor	$ 1,000
Remove liquid by trailer - 1 trailer load at $550/load	$ 550
Cyanide/Incompatible Storage Room Total	$ 19,550
Sludge Dumpster — 100 cubic yards - removal a maximum of 4 dumpsters at 25 cubic yards each.	$ 8,400
cost of rinsing containment system	$ 1,500
	9,900

Containment system will not be decontaminated because sludge is solid and covered at all times.

TOTAL COST

Drum Storage Areas

Main Storage Room	$118,600
Cyanide/Incompatible Storage Room	$ 19,550
Sludge Dumpster	$ 9,900
Solvent Waste Piping	$ 25,200
Solvent Waste Tanks	$ 87,500
Sub-Total	$260,750
Contingency 20%	$ 52,150
Professional Engineer Services	$ 27,300
Total	$340,200

ADDENDUM TO HAZARDOUS WASTE

CLOSURE PLAN

FOR

EAST FISHKILL FACILITY

IBM CORPORATION
EAST FISHKILL FACILITY
B/511, Z/9A1, D/92D
ROUTE 52
HOPEWELL JCT., NY 12533
REVISION: JANUARY 29, 1988

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DRUM STORAGE AREAS	COST
Main Room	
Cost of removal of containers and disposal through a licensed vendor (max. 1,000 drums at $132.92/drum)	$132,920
Cost of removing liquid from the containment system and triple-rinsing the floor. Also assumes that the sump is full. Volume of containment system is 4,628 gallons. Liquid removal (full containment system plus rinse) - 6,000 gallons	$ 7,250
Triple Rinse Labor Cost	$ 1,813
Liquid Removal - 2 trailer loads at $664.66/trailer with capacity of 5,000 gallons	$ 1,329
Main Storage Room Total	$143,312

CYANIDE AND INCOMPATIBLE ROOM	
Cost of removal of containers and disposal through a licensed vendor (max. 150 drums at $112.79/drum).	$ 16,919
Cost of removing liquid from the containment system and triple rinsing the floor. Also assumes that the sump is full. Volume of containment system is 1,042 gallons, liquid removal - 2,000 gallons.	$ 4,835
Triple Rinse - Labor	$ 1,208
Remove liquid by trailer - 1 trailer load at $664/load.	$ 664
Cyanide/Incompatible Storage Room Total	$ 23,626

SLUDGE DUMPSTER	
100 cubic yards - removal a maximum of 4 dumpsters at 25 cubic yards each.	$ 10,151
Cost of rinsing containment system.	$ 1,813
Total	$ 11,964

Containment system will not be decontaminated because sludge is solid and covered at all times.

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CLOSURE PLAN ESTIMATES

1987 Inflation adjustments calculated per Hazardous Waste Regulations Subpart H - Financial Requirements, 40CFR264.141(b)

SOLVENT WASTE PIPING - (Steel Piping)

Building 310, 320B, 330D are serviced by this system.

Cost of rinsing the system:

Manpower 400 hours @ $26.52/hr.		$ 10,609
Disposal of aboveground piping		$ 19,818
	Total	$ 30,427

SOLVENT WASTE TANKS - (Steel Tanks)

Building 310	5 segregated (#134-138)		
Total Volume	50,000 gallons		
Disposal cost of liquid			$ 72,508
Cost of cleaning (sandblasting) @ $6,647 each tank (including disposal of residue)			$ 33,235
		Total	$105,743

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TOTAL COST

DRUM STORAGE AREAS

Main Storage Room	$143,312
Cyanide/Incompatible Storage Room	$ 23,626
Sludge Dumpster	$ 11,964
Solvent Waste Piping	$ 30,427
Solvent Waste Tanks	$105,743
Sub-Total	$315,072
Contingency 20%	$ 63,014
Professional Engineer Services	$ 32,991
TOTAL	$411,077

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ADDENDUM TO HAZARDOUS WASTE

CLOSURE PLAN

FOR

MERRITT BROOKLANDS, INC.

EAST FISHKILL, NY

JANUARY, 1988

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The 500 Complex Closure Plan shall require decontamination of two waste holding tanks, i.e., Fluoride Waste Tank and Industrial Waste Neutralization Tank. Also the piping systems connected to these two tanks shall require decontamination. The decontaminated procedure and costs are as follows:

FLUORIDE WASTE TANK

Transfer the liquid to a tanker truck (from a licensed vendor). Rinse the piping system from the building, using fire hose, three times. Transfer the liquid to the tanker truck. Open the manhole to the tank and vent the tank using portable blower. Rinse the tank with water, using hose. Transfer the liquid, using vacuum system, to the tank truck. Repeat the procedure three times or until the pH of the liquid is approximately seven (7). Transport the liquid in the tanker to East Fishkill for treatment in the Fluoride/Heavy Metals Treatment Plant. Close the manhole cover and seal it.

Cost Estimates:

Manpower 200 hours @ $27.58/hour	$5,516
Transportation	$2,758
Total	$8,274

INDUSTRIAL WASTE NEUTRALIZATION TANK

The effluent from this tank is discharged to a biological treatment plant for Building 500 Complex. Transfer the liquid (after analyzing and adjusting pH to 7.5+ 1.0). Flush the building piping connected to this system with water, using fire hoses. Repeat this process at least three times, or until the pH of the rinse water is approximately seven (7). Open the manhole cover and vent the tank using blower. Transfer the sludge, if any, to a tanker truck (from a licensed vendor), using a vacuum system. Rinse the tank with water at least three times, or until the pH of the rinse water is approximately seven (7). Transfer the liquids to the biological treatment plant. Close the manhole of the tank and seal it. Transport the sludge to East Fishkill Facility for treatment.

Cost Estimates:

Manpower 200 hours @ $27.58/hour	$5,516
Transportation	$2,758
Total	$8,274

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CONTAINERS WITH HAZARDOUS WASTE

This involves removal of small containers throughout the Complex. The containers with waste shall be collected, analyzed, and transported to the East Fishkill Facility. These wastes shall be blended with other wastes on that site, according to the characteristics of the wastes, and shall be either treated within the East Fishkill Facility or disposed of through licensed vendor(s).

Cost Estimates:

Manpower 100 hours @ $27.58/hour	$2,758
Transportation	$2,758
Total	$5,516

SUMMARY OF COST ESTIMATES

Fluoride Waste Tank	$ 8,274
Industrial Waste Tank	$ 8,274
Containers	$ 5,516
Contingency	$ 2,758
Professional Engineer Services	$ 689
Total	$25,511

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IBM

International Business Machines Corporation

East Fishkill Facility, Route 52
Hopewell Junction, New York 12533-0999
914/894-2121

CERTIFIED MAIL RETURN RECEIPT REQUESTED
ATTN: R. A. Hay
B/511, Z/9A1

May 16, 1988

Mr. S. Siegel, Chief
U.S. Environmental Protection Agency
Hazardous Waste Facilities Branch
Region II
26 Federal Plaza
New York, NY 10278

SUBJECT: NOTIFICATION OF CLOSURE ON HAZARDOUS WASTE SOLVENT TANKS

Reference: RCRA Part B (EPA ID NYD000707901), Hazardous Waste Closure Plan, Attachment VII.
Addendum to Hazardous Waste Closure Plan for East Fishkill Facility; 1987 Closure Plan Cost Estimates.

Dear Mr. Siegel:

We are informing you of our intent to initiate closure activity on hazardous waste solvent storage tanks as of July 25, 1988 or sooner, if possible. Closure of these five tanks (indicated as tank No.'s 134, 135, 136, 137, 138) will be in accordance with 40CFR264.1), Subpart G, and our hazardous waste closure plan per RCRA part B permit, EPA ID NYD000707901.

It is expected that final closure operations will be completed within ninety (90) days as indicated in our permit closure schedule. Upon completion, professional engineer certification will be provided noting that closure has been performed as specified in the approved closure plan.

Please notify us of any concerns or further direction required relative to the subject tank closure activity. I can be reached at (914)-892-1560 or contact Mr. Frank Tortorici at (914)-892-1173. Your response is appreciated.

Sincerely yours,

INTERNATIONAL BUSINESS MACHINES

R. A. Hay, Manager
Site Environmental Engineering

rmh

A7RAH137.

Mr. D. Lanzone
U.S. Environmental Protection Agency
Hazardous Waste Facilities Branch
Region II
26 Federal Plaza
New York, NY 10278

Mr. P. Counterman, Director
Hazardous Waste Permitting Bureau
New York State Dept. of Environmental Conservation
50 Wolf Road
Albany, NY 12233

Mr. N. G. Kaul
New York State Dept. of Environmental Conservation
50 Wolf Road
Albany, NY 12233

Mr. A. Klauss, P.E.
New York State Dept. of Environmental Conservation
Region III
21 South Putt Corners Road
New Paltz, NY 12561

International Business Machines Corporation

East Fishkill Facility, Route 52
Hopewell Junction, New York 12533-0999
914/894-2121

CERTIFIED MAIL RECEIPT UPON REQUEST

ATTN: R. A. Hay
B/511, Z/9A1

November 1, 1988

Mr. S. Siegel, Chief
U.S. Environmental Protection Agency
Hazardous Waste Facilities Branch
Region III
26 Federal Plaza
New York, NY 10278

SUBJECT: CLOSURE PLAN APPROVAL FOR HAZARDOUS WASTE SOLVENT TANKS, EPA I.D. NO. NYD 000707901.

Reference: Memorandum to Mr. S. Siegel from Mr. R. A. Hay, "Notification of Closure on Hazardous Waste Solvent Tanks," dated May 16, 1988.

Dear Mr. Siegel:

The referenced memorandum indicated IBM's intent to initiate closure on five (5) hazardous waste solvent tanks located at its East Fishkill facility (EPA I.D. No. NYD 000707901).

Todate, we have not received approval to implement the subject closure plan submitted on May 16, 1988. However, the 180 day permittee notification period is due to expire on November 12, 1988. It is our understanding that after this date (180 day Notification of closure), the permittee can exercise closure activities in accordance with the schedule specified in the closure plan submitted.

Please notify us of your actions with regard to acceptance of the previously submitted plan, so that we can initiate closure activities on these tanks as soon as possible.

Sincerely yours,

INTERNATIONAL BUSINESS MACHINES

R. A. Hay

Richard A. Hay, Manager
Site Environmental Engineering

RAH/rmh

c Mr. P. Counterman, Director
New York State Department of Environmental Conservation
Hazardous Waste Permitting Bureau
50 Wolf Road
Albany, NY 12233

Mr. N. G. Kaul
New York State Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233

Mr. A. Klaus
New York State Department of Environmental Conservation
Region III
21 South Putt Corners Road
New Paltz, NY 12561

Mr. F. Langone
U.S. Environmental Protection Agency
Hazardous Waste Facilities Branch
Region III
26 Federal Plaza
New York, NY 10278

Mr. J. Reidy
New York State Department of Environmental Conservation
Region III
202 Mamaroneck Avenue
White Plains, NY 10601

bcc N. Ayengar
Z/9A1

J. M. Hogan
Z/4A1

F. Tortorici
Z/9A1

S. Tranchina
Z/9A1

D/92D File
D2.1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

NOV 2 9 1988

Mr. Richard A. Hay, Manager
Site Environmental Engineering
IBM
East Fishkill Facility
Route 52, Hopewell Junction
New York, 12533-0999

Re: Resource Conservation Recovery Act (RCRA)
EPA Permit No. NYD000707901
Closure of Waste Solvent Tanks

Dear Mr. Hay:

Concerning your notification of May 16, 1988 and November 1, 1988 regarding closure of the RCRA waste storage tanks regulated by the above referenced permit, the U.S. Environmental Protection Agency (EPA) hereby grants approval for you to commence closure. As indicated by Mr. Frank Tortorici of your staff, closure will commence no later than December 13, 1988 and will be completed in accordance with the approval closure schedule in Section L.6. of your approval Closure Plan.

Please be advised that in accordance with 40 CFR 264.115 and Section L-6 of your approved Closure Plan, IBM must submit a Closure certification within 60 days after completion of closure to this office and New York State Department of Environmental Conservation (NYSDEC) at the following addresses:

James Reidy
New York State Department of
Environmental Conservation, Region 3
202 Mamaroneck Avenue
White Plains, NY 10601

Paul Counterman, Director
Bureau of Hazardous Waste Facility Permitting
Division of Hazardous Substances Regulation
New York State Department of
Environmental Conservation
50 Wolf Road
Albany, NY 12233-0001

If you want to discuss this issue any further, Please call Ellen Stein, of my staff, at (212) 264-1362

Sincerely yours,

Frank A. Langone

Mr. Frank A. Langone, Chief
New York Facilities Section
Hazardous Waste Facilities Branch

cc: Paul Counterman, NYSDEC, Albany
Jim Reidy, NYSDEC, White Plains

APPENDIX B

APPENDIX B

DECONTAMINATION PLAN

DECONTAMINATION PROCEDURES

WASTE SOLVENT TANK SYSTEM NOS. 134, 135, 136, 137, 138

The procedures contained herein have been developed in accordance with the IBM East Fishkill Hazardous Waste Closure Plan dated November 1980, and EPA Regulation 40CFR 264.1, Subpart G. The procedures were established with consideration given to IBM Chemical Precaution Sheets and the Confined Space Entry Section (4-01-0SA) of the IBM East Fishkill Safety Manual, and under the guidance of IBM's Safety and Industrial Hygiene Department.

Once the flow of waste solvents has been terminated and the remaining waste solvents removed from the tank systems in accordance with the Closure Plan, the procedures that follow shall be employed in conjunction with the decontamination of the subject tanks and transfer piping.

1. A Health and Safety Plan shall be established to protect the health and safety of project personnel involved in the decontamination of the waste solvent tanks and piping.

2. All remaining influent transfer pipes shall be removed from the roofs of Buildings 310 and 320B and the B/310 Linkway Wall. Underground influent transfer pipes should be removed by excavations where practical. All pipe fittings, i.e., valves, tees, elbows, etc., shall be disassembled from the influent transfer piping and

placed in 55 gallon drums or other suitable type of containment. The piping shall be cut into 20 foot sections, where possible and transported to the fill station containment pad for subsequent decontamination. The piping sections shall be segregated into 5 groups according to the respective chemical storage systems.

3. Access shall be provided to all pipe connections to the five waste solvent storage tanks by excavation. Exposed vent and discharge piping shall be removed, segregated, and transported to the fill station containment pad for subsequent decontamination.

4. The pipe access excavation pits shall be lined with suitable material as required to serve as collection wells and provide containment for the pipe cleaning and rinsing decontaminates. A leak tight seal shall be made around all pipes.

5. Each tank shall be purged with nitrogen gas and then monitored for oxygen concentration and lower explosive limit (LEL) during the decontamination process.

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6. Decontaminate each tank interior by (i) rinsing with liquid by pressurized fluid jet cleaning and (ii) steam cleaning. Suitable detergent shall be used during the steaming process as required. Decontamination steps shall be performed on the tank interior as follows:

   (a) Initial water rinse.

   (b) Steam, and rinse with water/detergent solution three times.

   (c) Triple rinse with water.

   Following the above decontamination procedure take two (2) samples of the final rinse for analysis by the IBM Environmental Laboratory. The analysis on the samples shall be conducted in accordance with standard U.S. Environmental Protection Agency (EPA) Methods 601/602. A list of the solvent compounds for which the analysis shall be performed is presented in Attachment 1. Obtain results of the laboratory analysis and reclean as required if any rinse sample contains 1 part per million (PPM) or greater of any solvent compound. Collect all liquid used for decontamination and rinsing and store in tank trailers.

7. Decontaminate the solvent waste piping remaining underground between the truck fill station and Tank Nos. 134, 135, 136, 137, 138 by (i) rinsing with liquid, either by pressurized fluid jet cleaning, or where adequate external access is not available, by plugging, filling, and draining, and (ii) steam cleaning. Suitable detergent

shall be used during the steaming process as required. Decontamination steps, sampling, analysis, and recleaning (if required) shall be performed on the underground piping as provided in 6 above. Collect all liquid used for decontamination and rinsing and store in tank trailers.

8. Decontaminate all sections of segregated transfer, vent, and discharge pipe previously transported to the fill station containment pad by (i) cleaning with water using high pressure (8-10,000 psi) water jet cleaning equipment and (ii) steam cleaning. Rinse a representative 10% of each of the segregated groups. Obtain two (2) samples of each rinse for analysis by the IBM Environmental Laboratory. The analysis on the samples shall be conducted in accordance with standard U.S. EPA Methods 601/602. A list of the solvent compounds for which the analysis shall be performed is presented in Attachment 1. Obtain results of the laboratory analyses and, for each segregated group, reclean as required if any rinse sample contains 1 PPM or greater of any solvent compound. Collect all water used for decontamination and rinsing and store in tank trailers.

9. The tanks and all decontaminated underground piping runs shall be filled to capacity with solid inert material, ensuring that all voids within the tanks and piping are filled.

10. All decontaminated transfer, vent, and discharge pipe sections that are not buried shall be disposed of as non-hazardous waste at an appropriate site.

11. Contaminated liners, pipe fittings, and other waste generated during the closure work shall be collected and placed in suitable disposal containment.

12. The excavation pits shall be backfilled and grounds restored to previous conditions.

13. IBM will arrange for transportation and disposal of all contaminated materials generated during the closure work following normal IBM East Fishkill operating practices for hazardous wastes.

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ATTACHMENT 1

Laboratory analysis via standard U.S. EPA Methods 601/602 shall be conducted for the following solvent compounds:

Chloromethane
Bromomethane
Dichlorodifluoromethane
Vinyl Chloride
Chloroethane
Methylene Chloride
Trichlorofluoromethane
1,1 - Dichloroethene
1,1 - Dichloroethane
Trans - 1,2 - Dichloroethene
Chloroform
1,2 - Dichloroethane
1,1,1 - Trichloroethane
Carbon Tetrachloride
Bromodichloromethane
1,2 - Dichloropropane
CIS - 1,3 - Dichloropropene
Trichlorothene
Dibromochloromethane
1,1,2 - Trichloroethane
Trans - 1,3 - Dichloropropene
2 - Chlorovinyl Ether
Bromoform
1,1,2,2 - Tetrachloroethane
Tetrachloroethene
Chlorobenzene
1,3 - Dichlorobenzene
1,2 - Dichlorobenzene
1,4 - Dichlorobenzene
Benzene
Ethyl Benzene
Toluene
m,p - Xylene
0 - Xylene

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APPENDIX C

APPENDIX C

SPECIFICATIONS OF DETERGENT

AND WATER/DETERGENT SOLUTION

MATERIAL SAFETY DATA SHEET

SECTION I

PRODUCT NAME:	Amway Concentrated Industroclean Heavy Duty Cleaner
MANUFACTURER'S NAME:	Amway Corporation
ADDRESS:	7575 East Fulton Road, Ada, Michigan 49355
EMERGENCY PHONE NO.:	(616) 676-6307
MSDS INFORMATION NO.:	(616) 676-6876

SECTION II - HAZARDOUS INGREDIENTS [per 29CFR1910.1200]

% in Product	CAS Number	Common Name / Chemical Name
1-5	111-76-2	**Ethylene glycol monobutyl ether** / 2-Butoxyethanol
1-5	497-19-8	**Sodium carbonate** / Carbonic acid disodium salt
1-5	6834-92-0	**Sodium metasilicate** / Silicic acid disodium salt

SECTION III - PHYSICAL AND CHEMICAL CHARACTERISTICS

SPECIFIC GRAVITY [H_2O=1]:	1.04
SOLUBILITY IN WATER:	Complete
pH:	12.6 [as is]
VAPOR PRESSURE [mm Hg]:	Not determined.
VAPOR DENSITY [Air = 1]:	Not determined.
APPEARANCE AND ODOR:	Slightly hazy to clear colorless liquid with a slight solvent odor.

SECTION IV - PHYSICAL HAZARD DATA

HAZARDS: Product does not present any physical hazards as defined at 29CFR1910.1200.

FIRE HAZARDS:

FLASH POINT: Not flammable or combustible. Not expected to burn unless water content has evaporated.

FIRE FIGHTING TECHNIQUES: Standard: Wear full body protection. Wear self-contained breathing apparatus to protect against products of combustion [e.g. CO, CO_2, NO_2, $COCl_2$, HCl, smoke, soot, unidentified organics.] Use water spray, foam, dry chemical, CO_2. Cool containers with water. No explosion hazards identified.

REACTIVITY:

STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS/MATERIAL TO AVOID: Avoid excessive heat, flame, contact with acids, strong oxidizing agents.

SECTION V - HEALTH HAZARD DATA

EXPOSURE LIMIT: An exposure limit for this product has not been established. Exposure limits for product ingredients are listed below.

PRIMARY ROUTES OF EXPOSURE/ENTRY: Skin contact, eye contact, inhalation, skin absorption

SIGNS/SYMPTOMS/EFFECTS OF EXPOSURE:

SKIN CONTACT: Not a primary skin irritant per FHSA testing; however, prolonged exposure to undiluted products that contain solvent ingredients may elicit signs of irritation. [See below].

EYE CONTACT: A primary eye irritant per FHSA testing. Ingredients listed contribute to eye irritancy.

INGESTION: Possible gastrointestinal irritation, with nausea, vomiting and diarrhea.

INHALATION: See below.

AGGRAVATED MEDICAL CONDITIONS: Pre-existing skin, eye, and respiratory disorders.

NOTES: Inhalation and skin absorption effects for the product as a whole have not been determined. Inhalation and skin absorption effects of individual ingredients are listed below. A prediction as to whether these effects will be exhibited by the product as a whole is dependent on an evaluation of the product's use and extent and duration of exposure.

CONTINUED ON NEXT PAGE

UCT NAME: Amway Concentrated Industroclean Heavy Duty Cleaner

SECTION V (cont'd)

Inhalation overexposure to ethylene glycol monobutyl ether vapors (LC_{50}=450 ppm, rats, 4 hrs.) or mists may cause respiratory irritation, headache, nausea, dizziness, drowsiness and anemia (red blood cell damage). Inhalation of ethylene glycol monobutyl ether vapors at levels above the OSHA Permissible Exposure Limit and ACGIH Threshold Limit Value have produced anemia, fetal effects, liver and kidney damage in experimental animals (rats).

Ethylene glycol monobutyl ether is skin absorbed. (LD_{50} dermal = 0.4g/kg) Dermal overexposure may result in the effects previously mentioned.

The OSHA Permissible Exposure Limit Value and ACGIH Threshold Limit Value for ethylene glycol monobutyl ether are 50 PPM and 25 PPM respectively. Both exposure limits have a notation indicating skin absorption.

Inhalation overexposure to mists containing sodium carbonate and sodium metasilicate may cause respiratory irritation.

SECTION VI - EMERGENCY AND FIRST AID PROCEDURES

SKIN CONTACT: Rinse with water.

EYE CONTACT: Rinse with water for 15 minutes. Seek medical attention (opthalmologist) if irritation persists.

INGESTION: Give fluids. Seek medical attention.

INHALATION: Remove to fresh air. See medical attention.

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF SPILLED OR RELEASED: Wear appropriate protective equipment (e.g., protective clothing, respiratory protection). Contain/dike spill to prevent environmental release.

STE DISPOSAL: EPA RCRA defined hazardous waste. Dispose of in accordance with federal, state and local regulations.

SECTION VIII - HANDLING PRECAUTIONS

PROTECTIVE MEASURES: This product is a consumer product packaged in both consumer as well as larger sizes. To the extent the product is used in a fashion typical to that of a consumer, protective measures, with the exception of those indicated on the label, are not normally necessary. Where use conditions and extent and duration of exposure dictate, however, appropriate protective measures to prevent eye and prolonged or repeated skin contact (i.e., glasses, goggles, gloves, protective clothing) and minimize inhalation exposure (e.g., engineering controls-preferred, NIOSH approved respiratory protection as appropriate for hazard presented) are recommended.

WORK/HYGIENE PRACTICES: For good personal hygiene, insure prompt removal from skin, eyes, and clothing.

DISCLAIMER

The information contained herein is based on data available to us and is believed to be accurate. However, Amway Corporation makes no warranty, expressed or implied, regarding the accuracy of the data or the results to follow from the use of the product. Health and safety precautions in this data sheet may not be adequate for all individuals and product uses. It is the user's obligation to ensure the information provided is the most current, to evaluate the information contained in this sheet in connection with the uses to which the product is to be put in the workplace and to use the product safely in accordance with applicable laws and regulations. If there are any questions concerning the information contained in this sheet or its applicability to a particular use, the user is instructed to telephone 1-616-676-6876. Amway Corporation assumes no responsibility for injury from the use of the product described in this sheet.

WATER/DETERGENT SOLUTION

The water/detergent solution utilized for the rinsing cycles during the decontamination of Tank No. 5 and associated piping consisted of one part by volume of Amway Concentrated Industroclean Heavy Duty Cleaner to four parts by volume of water (1:4). The detergent is ether based, and contains no caustic or chlorinated solvents. It is non-flammable and can be used near heat sources provided adequate ventilation is available.

APPENDIX D

APPENDIX D

SPECIFICATIONS OF ACRYLAMIDE GROUT

SPECIFICATIONS OF ACRYLAMIDE GROUT

1. Description of Material:

The acrylamide grout is a mixture of two organic monomers, acrylamide and N,N'-methylene bisacrylamide - in proportions which produce very stiff gels from dilute aqueous solutions when properly catalyzed.

Catalysts - ammonium persulphate (AP)

Triethynolamine (T)

2. Viscosity vs. Time:

The solution will have a viscosity of less than 2 cps which remains constant until polymerization occurs. Reaction time is controllable from 10 second to 1 hour at varying temperatures.

3. Stability:

Under moist conditions, gels appear unchanged for at least 10 years and are resistant to attack by fungi, dilute acids, alkalies, and ordinary salts and gases normally found in the ground.

4. Toxicity:

The acrylamide monomer in the grout can be absorbed into the body through the intact unbroken skin, by inhalation of dust or vapor droplets, and by swallowing.

Single small exposures appear not to be dangerous; however, repeated exposure creates an accumulative effect which can affect the nervous system. Protective clothing and equipment is worn when the chemicals are prepared and handled.

The toxicity is removed at such time as the grout solution is polymerized (gelled).

5. Formulations (Composition of Solution by Weight)

Acrylamide Grout - 10%

Catalyst AP - 1.0% - 2.0%

Catalyst T - 1.0% - 2.0%

APPENDIX E

RINSING AND ABANDONMENT OF
TANK NOS. 134, 135, 136, 137, 138
AND PIPELINES AT BUILDING 309 TANK FARM

HEALTH AND SAFETY PLAN

FOR

IBM CORPORATION

EAST FISHKILL, NEW YORK

DECEMBER 1988

APPENDIX E

HEALTH AND SAFETY PLAN

I. INTRODUCTION

Corddry Carpenter Dietz and Zack (CCD&Z) has been given the assignment by the IBM Corporation to rinse Tank Nos. 134, 135, 136, 137, 138 and rinse and seal related pipelines with chemical grout at Building 309 Tank Farm and rinse approximately 700 lineal feet of 1½" piping at IBM East Fishkill Facility, New York. This write up addresses the Site Health and Safety Plan required to guide the activities during this assessment work.

The Health and Safety Plan is designed to protect the health of the project personnel. The Plan incorporates by reference CCD&Z's Safety Manual for Field Operations and IBM Safety Standards. The Plan also incorporates all applicable federal, state and local laws and regulations.

II. DESCRIPTION OF FIELD ACTIVITIES

A. Clean 5 tanks by (1) Rinsing utilizing a fluid driven rotary tank cleaning machine which utilizes jets of pressurized liquid to scour the internal tank walls and (2) Steam cleaning. Industrial detergent will be used as required.

Cleaning steps will be performed as follows:

1. Rinse with water.

2. Steam Clean.

3. Rinse with water/detergent solution

4. Perform steps 2 and 3 two additional items.

5. Rinse with water 3 times and sample each rinse for laboratory analysis.

B. Clean approximately 120 linear feet of 3-inch underground solvent waste piping between the fill station and each tank by (1) Rinsing with liquid utilizing hydraulic pipe cleaning equipment where applicable and where hydraulic pipe cleaning equipment cannot be used due to bends in the piping or inaccessibility, by filling with liquid and then draining and (2) Steam cleaning. Industrial detergent will be used as required.

Cleaning steps will be performed as set forth in Part I.A.

C. Fill all underground piping that is cleaned with acrylamide grout after notification by IBM that the sample and analyses are acceptable.

D. All liquid used for the cleaning will be transferred to tankers or drums supplied by IBM for disposal by IBM.

E. Clean a total of approximately 700 linear feet of 1½" aboveground solvent waste piping pertinent to the five waste solvent tanks and removed by IBM from the roof of Buildings 310 and 320B. The piping will be separated into lengths of approximately 20 linear feet by IBM. Cleaning will be performed in order to determine the most efficient methods of decontamination for the piping samples.

Cleaning procedures to be evaluated will be:

1. Water rinse using hydraulic pipe cleaning equipment.

2. Pressure clean using high pressure (10,000 psi) pipe cleaning equipment.

3. Steam cleaning.

4. Hot water/detergent rinse.

III. SITE HEALTH AND SAFETY PLAN

A. Site Description

Location: IBM Corporation, East Fishkill, New York

Hazards:

- The Chemicals in the tanks and related pipelines are the following solvents.

Tank #	Waste Chemical Stored
134	Methylene Chloride
135	N-Butyl Acetate
136	Freon TP-35
137	Perchlorethylene
138	Isopropanol

B. Task Objectives

The objective of the task is to abandon Tanks 134, 135, 136, 137, 138 and related pipelines.

C. On-site Organization and Coordination

The following personnel are designated to carry out the stated job function on-site (Note: one person may carry out more than one job function):

Project Team Leader:	Joe Scarcia
Safety Officer:	Robin Pepperman
Recordkeeper:	Jim Clark/Jim Morral (Days) Gary Shirk (Nights)
Field Team Leader:	Jim Clark/Jim Morral (Days) Gary Shirk (Nights)

All personnel arriving or departing the site should log in and out with the Recordkeeper. All on-site activities must be cleared through the Field Team Leader.

D. On-Site Control

IBM Corporation has been designated to coordinate access control and security on-site. A safe perimeter will be established at the Building 309 Tank Farm. Unauthorized personnel are not allowed in this area.

The on-site Command Post and staging area will be established at the parking area near the Building 309 Tank Farm. Control boundaries will be established, and the Exclusion Zone (the contaminated area), the Contamination Reduction Zone, and the Support Zone (clean area) will be identified and designated as follows:

o Exclusion Zone	Excavations & Tank manways at Tanks 134, 135, 136, 137, and 138.
o Contamination Reduction Zone	Upper Portion of the Building 309 Tank Farm.
o Support Zone (Clean/Area)	Command Post. (GF Vehicles & Trailers)

E. Hazard Evaluation

The following hazardous chemical constituents are expected to be present inside the tank pipelines.

Tank #	Substance
134	Methylene Chloride
135	N-Butyl Acetate
136	Freon TP-35
137	Perchlorethylene
138	Isopropanol

Sample analyses was performed on the Tank Atmosphere of each tank during cleaning work performed in June 1988. The results are as follows:

Tank #	Substance	Residue Concentration
134	N-Butyl Acetate	1 ppm
135	--	-
136	N-Butyl Acetate	2 ppm
137	N-Butyl Acetate	1 ppm
	Perchlorethylene	1 ppm
138	N-Butyl Acetate	9 ppm
	Perchlorethylene	3 ppm
	Trichloroethylene	0.4 ppm

No wastes have been deposited in these tanks since that time.

Additional hazards expected on-site:

Grout Chemicals:
- Acyralimide
- Ammonium Persulfate
- Triethanolamine

Amway Concentrated Industroclean Heavy Duty Cleaner

The material Safety Data Sheets are shown in Appendix B. These identify primary physical and health hazards of all the hazardous chemical constituents present.

F. Personnel Protective Equipment

Based on evaluation of potential hazards, the following levels of personal protection have been designated for the applicable work areas:

Exclusion Zone - Level B personnel protective equipment will be used in the exclusion Zone when the amount of solvents detected warrant Level B protection. Level C personnel protective equipment will be utilized in the Exclusion Zone at all other times.

Contamination Reduction Zone - Level D personnel protective equipment will be used in the Contamination Reduction Zone.

Specific protective equipment for each level of protection is as follows:

Level B - Chemical resistant Saranex Suits or PVC coveralls
Self contained or air line breathing apparatus
Chemical resistant gloves
Chemical resistant boots/shoes
Hard hat

Level C - Chemical resistant Saranex Suits or PVC coveralls
Air purifying respirator with organic vapor cartridge
Chemical resistant gloves
Chemical resistant boots/shoes
Hard hat

Level D - Coveralls
Safety boots/shoes
Safety glasses/chemical/splash goggles
Hard hat
Gloves

NO CHANGES TO THE SPECIFIED LEVEL OF PROTECTION SHALL BE MADE WITHOUT THE APPROVAL OF THE SAFETY OFFICER AND THE PROJECT TEAM LEADER.

G. Communication Procedures

Radio Communication will not be used in the Exclusion Zone.

Personnel in the Exclusion Zone should remain in constant communication or within sight of the Project Team Leader. Any failure of communication requires an evaluation of whether personnel should leave the Exclusion Zone.

H. Decontamination Procedures

Personnel and Equipment leaving the Exclusion Zone shall be thoroughly decontaminated. The standard decontamination protocol shall be used as indicated in Appendix A.

Detergent and water shall be used as the decontamination solution.

I. Health and Safety Plan

1. Safety Officer

Robin Pepperman has been designated Safety Officer and is directly responsible to the Project Team Leader for safety recommendations.

2. Emergency Medical Care (EMC)

- o Emergency Control is the qualified EMC on-site. Phone Number: 4-3333.

- o Local ambulance service is available from Emergency Control at Phone Number 4-3333.

- o First-aid equipment is available on-site at the following locations:

- First Aid Kit	Support Zone
- Emergency Eye Wash	Contamination Reduction Zone
- Emergency Shower	Contamination Reduction Zone

- o List of Emergency Phone Numbers:

	Phone #	Contact
Police:	4-3333	IBM Emergency Control
Fire Dept:	"	" " "
Hospital:	"	" " "

3. Environmental Monitoring

The following environmental monitoring instruments shall be used on-site at the specified intervals.

Combustible Gas/Oxygen Indicator	Periodically
Colorimetric Tubes (Gastec) for Various Solvents	Periodically

4. Emergency Procedures (this should be modified as required)

The following standard emergency procedures will be used by on-site personnel. The Field Team Leader shall be notified of any on-site emergencies and be responsible for insuring that the appropriate procedures are followed:

Personnel Injury in the Support Zone:: Upon notification of any injury in the Support Zone, the Project Team Leader and/or the Field Team Leader will assess the nature of the injury. If the cause of the injury or loss of the injure person does not affect the performance of site personnel, operation may continue, with the on-site EMC initiating the appropriate first aid and necessary follow-up as stated above. If the injury increases the risk to others, the designated emergency signal shall be sounded and all site personnel shall move to the decontamination lien for further instructions. Activities will stop until the added risk is removed or minimized.

Fire/Explosion: In the event of fire or explosion on-site, the designated emergency signal will be sounded and all affected personnel assembled at the decontamination line. The fire department shall be notified using the Emergency Phone No. 4-3333 and all personnel shall be moved to a safe distance from the involved area.

Personnel Protective Equipment Failure: If any site worker experiences a failure or alteration of protective equipment that affects the protective factor, that person and his/her buddy shall immediately leave the Exclusion Zone. Reentry shall not be permitted until the equipment has been repaired or replaced.

Other Equipment Failure: If any other equipment on-site fails to operate properly, the Field Team Leader shall be notified to determine the effect of this failure on continuing operations on-site. If the failure affects the safety of personnel or prevents completion of the Work Plan tasks, all personnel shall leave the Exclusion Zone until the situation is evaluated and actions taken.

In all situations, when an on-site emergency results in evacuation of the Exclusion Zone, personnel shall not reenter until:

a. the conditions resulting in an emergency have been corrected;
b. the hazards have been reassessed;
c. the Site Health and Safety Plan has been reviewed;
d. site personnel have been briefed on any changes in the Site Health Safety Plan.

5. All site personnel shall the above plan and be familiar with its provisions.

APPENDIX A

Minimum Measures for Decontamination

MINIMUM MEASURES FOR LEVEL B/C DECONTAMINATION

Procedure 1	Equipment Drop	Deposit equipment used on-site (tools, monitoring instruments, clipboards, etc.) on plastic drop cloths. Scrub with decon solution or detergent/water before removal from Station 1.
Procedure 2	Boots and Gloves, Wash and Rinse	Scrub outer boots, outer gloves, with decon solution or detergent/water. Rinse off using copious amounts of water.
Procedure 3	Outer Boot and Glove Removal	Remove outer boots and gloves. Air dry. When dry, inspect for cracks or tears, and if sound, reuse.
Procedure 4	Cartridge or Mask Change	If worker leaves Exclusion Zone to change cartridge (or mask), this is the last step in the decontamination procedure. Worker's cartridges are exchanged, dry outer gloves and boot covers dooned, joints taped, and worker returns to duty.
Procedure 5	Facepiece Removal	Remove facepiece. Avoid touching face with fingers. Scrub with decon solution or detergent/water. Rinse off using copious amounts of water. Sanitize and air dry.
Procedure 6	Inner Gloves and Outer Garment Removal	Remove chemical resistant suit and inner gloves. Being careful not to touch with bare skin. Deposit suit and inner gloves in container provided by IBM.
Procedure 7	Field Wash	Wash hands and face thoroughly. Shower as soon as possible.

MINIMUM MEASURES FOR LEVEL D DECONTAMINATION

1. Scrub boots/shoes, eye protection and hard hat with decon solution or detergent/water. Rinse with copious amounts of water.

2. Deposit throw away gloves in container provided by IBM.

3. Wash hands and face thoroughly. Shower as soon as possible.

APPENDIX B

Material Safety Data Sheets

MATERIAL SAFETY DATA SHEET

SECTION I

PRODUCT NAME: Amway Concentrated Industroclean Heavy Duty Cleaner
MANUFACTURER'S NAME: Amway Corporation
ADDRESS: 7575 East Fulton Road, Ada, Michigan 49355
EMERGENCY PHONE NO.: (616) 676-6307
MSDS INFORMATION NO.: (616) 676-6876

SECTION II - HAZARDOUS INGREDIENTS [per 29CFR1910.1200]

% in Product	CAS Number	Common Name / Chemical Name
1-5	111-76-2	**Ethylene glycol monobutyl ether** 2-Butoxyethanol
1-5	497-19-8	**Sodium carbonate** Carbonic acid disodium salt
1-5	6834-92-0	**Sodium metasilicate** Silicic acid disodium salt

SECTION III - PHYSICAL AND CHEMICAL CHARACTERISTICS

SPECIFIC GRAVITY (H_2O=1): 1.04
SOLUBILITY IN WATER: Complete
pH: 12.6 [as is]
VAPOR PRESSURE [mm Hg]: Not determined.
VAPOR DENSITY [Air = 1]: Not determined.
APPEARANCE AND ODOR: Slightly hazy to clear colorless liquid with a slight solvent odor.

SECTION IV - PHYSICAL HAZARD DATA

HAZARDS: Product does not present any physical hazards as defined at 29CFR1910.1200.
FIRE HAZARDS:
FLASH POINT: Not flammable or combustible. Not expected to burn unless water content has evaporated.
FIRE FIGHTING TECHNIQUES: Standard: Wear full body protection. Wear self-contained breathing apparatus to protect against products of combustion [e.g. CO, CO_2, NO_2, $COCl_2$, HCl, smoke, soot, unidentified organics.] Use water spray, foam, dry chemical, CO_2. Cool containers with water. No explosion hazards identified.
REACTIVITY:
STABILITY: Stable
HAZARDOUS POLYMERIZATION: Will not occur.
CONDITIONS/MATERIAL TO AVOID: Avoid excessive heat, flame, contact with acids, strong oxidizing agents.

SECTION V - HEALTH HAZARD DATA

EXPOSURE LIMIT: An exposure limit for this product has not been established. Exposure limits for product ingredients are listed below.
PRIMARY ROUTES OF EXPOSURE/ENTRY: Skin contact, eye contact, inhalation, skin absorption
SIGNS/SYMPTOMS/EFFECTS OF EXPOSURE:
SKIN CONTACT: Not a primary skin irritant per FHSA testing; however, prolonged exposure to undiluted products that contain solvent ingredients may elicit signs of irritation. [See below].
EYE CONTACT: A primary eye irritant per FHSA testing. Ingredients listed contribute to eye irritancy.
INGESTION: Possible gastrointestinal irritation, with nausea, vomiting and diarrhea.
INHALATION: See below.
AGGRAVATED MEDICAL CONDITIONS: Pre-existing skin, eye, and respiratory disorders.

NOTES: Inhalation and skin absorption effects for the product as a whole have not been determined. Inhalation and skin absorption effects of individual ingredients are listed below. A prediction as to whether these effects will be exhibited by the product as a whole is dependent on an evaluation of the product's use and extent and duration of exposure.

CONTINUED ON NEXT PAGE

UCT NAME: Amway Concentrated Industroclean Heavy Duty Cleaner

SECTION V (cont'd)

Inhalation overexposure to ethylene glycol monobutyl ether vapors (LC_{50}=450 ppm, rats, 4 hrs.) or mists may cause respiratory irritation, headache, nausea, dizziness, drowsiness and anemia (red blood cell damage). Inhalation of ethylene glycol monobutyl ether vapors at levels above the OSHA Permissible Exposure Limit and ACGIH Threshold Limit Value have produced anemia, fetal effects, liver and kidney damage in experimental animals (rats).

Ethylene glycol monobutyl ether is skin absorbed. (LD_{50} dermal = 0.4g/kg) Dermal overexposure may result in the effects previously mentioned.

The OSHA Permissible Exposure Limit Value and ACGIH Threshold Limit Value for ethylene glycol monobutyl ether are 50 PPM and 25 PPM respectively. Both exposure limits have a notation indicating skin absorption.

Inhalation overexposure to mists containing sodium carbonate and sodium metasilicate may cause respiratory irritation.

SECTION VI - EMERGENCY AND FIRST AID PROCEDURES

SKIN CONTACT: Rinse with water.

EYE CONTACT: Rinse with water for 15 minutes. Seek medical attention (opthalmologist) if irritation persists.

INGESTION: Give fluids. Seek medical attention.

INHALATION: Remove to fresh air. See medical attention.

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF SPILLED OR RELEASED: Wear appropriate protective equipment (e.g., protective clothing, respiratory protection). Contain/dike spill to prevent environmental release.

STE DISPOSAL: EPA RCRA defined hazardous waste. Dispose of in accordance with federal, state and local regulations.

SECTION VIII - HANDLING PRECAUTIONS

PROTECTIVE MEASURES: This product is a consumer product packaged in both consumer as well as larger sizes. To the extent the product is used in a fashion typical to that of a consumer, protective measures, with the exception of those indicated on the label, are not normally necessary. Where use conditions and extent and duration of exposure dictate, however, appropriate protective measures to prevent eye and prolonged or repeated skin contact (i.e., glasses, goggles, gloves, protective clothing) and minimize inhalation exposure (e.g., engineering controls-preferred, NIOSH aproved respiratory protection as appropriate for hazard presented) are recommended.

WORK/HYGIENE PRACTICES: For good personal hygiene, insure prompt removal from skin, eyes, and clothing.

DISCLAIMER

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ISSUED: 12-13-85
SUPERSEDES: 11-22-85
SA-5294

LAST PAGE

FMC

MATERIAL SAFETY DATA 7727 54 0

AMMONIUM PERSULFATE

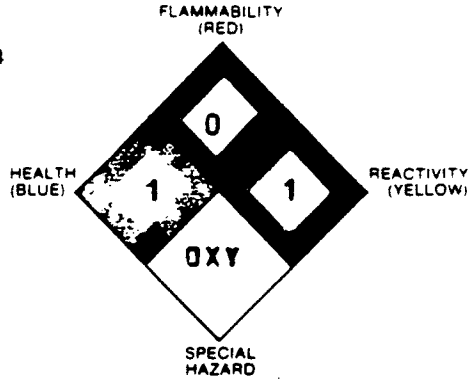
RECEIVED

JAN 24 1986

MANLEY-REGAN CHEMICALS

NFPA Designation 704

DEGREE OF HAZARD
4 = EXTREME
3 = HIGH
2 = MODERATE
1 = SLIGHT
0 = INSIGNFICANT



EMERGENCY TELEPHONE NUMBERS
MEDICAL (303) 595-9048 CALL COLLECT
CHEMTREC (800) 424-9300
OTHER (716) 876-8300 CALL COLLECT

REVISION:	EFFECTIVE: 01/10/86 PRINTED: 01/20/86
PREPARED FOR USE BY.....	MANLEY REGAN CHEMICAL CO E EMAUS STREET MIDDLETOWN PA 17057
==========	**IDENTIFICATION** ==========
INFORMATION PROVIDED BY..:	FMC CORPORATION 2000 MARKET STREET PHILADELPHIA, PA 19103
==========	**PRODUCT INFORMATION** ==========
SYNONYMS.....:	DIAMMONIUM PEROXYDISULFATE
SHIPPING NAME - DOT.....:	AMMONIUM PERSULFATE OXIDIZER
IATA.....:	AMMONIUM PERSULPHATE OXIDIZER
IMCO.....:	AMMONIUM PERSULPHATE OXIDIZER
FORMULA.....:	(NH4)2S2O8
CHEMICAL FAMILY.....:	PEROXYGEN
==========	**PRECAUTIONARY INFORMATION** ==========
PRECAUTIONARY STATEMENT..: (PLEASE USE THIS STATEMENT TO SATISFY THE IN-PLANT LABELING REQUIREMENTS OF THE OSHA HAZARD COMMUNICATIONS STANDARD 29CFR 1910.1200)	HEALTH: AIRBORNE DUST MAY BE IRRITATING TO EYES, NOSE, THROAT AND SKIN UPON CONTACT. CONTINUOUS CONTACT MAY PRODUCE SKIN DERMATITIS. INHALATION OF AIRBORNE DUST AT HIGH LEVELS MAY PRODUCE SHORTNESS OF BREATH IN ALLERGIC PERSONS. PHYSICAL: DECOMPOSES IN STORAGE UNDER CONDITIONS OF EXCESSIVE HEAT AND OR MOISTURE (WATER, WATER VAPOR) CAUSING RELEASES OF OXIDES OF SULPHUR, DENSE MIST OF SULPHURIC ACID AND OXYGEN WHICH SUPPORTS COMBUSTION. REACTS WITH ACIDS, ALKALIS, HALIDES, COMBUSTABLE AND HEAVY METALS TO RELEASE OXYGEN.
==========	**INGREDIENTS** ==========
CAS# AND COMPONENT.....:	MATERIAL/COMPONENT: DIAMMONIUM PEROXYDISULFATE PERCENT.....: 100% CAS # .....: 7727-54-0 HAZARD CLASS.....: OXIDIZER

SCD

SHEET 5

C

ATERIAL SAFETY DATA 7727 54 0

MMONIUM PERSULFATE

NFPA Designation 704

DEGREE OF HAZARD
4 = EXTREME
3 = HIGH
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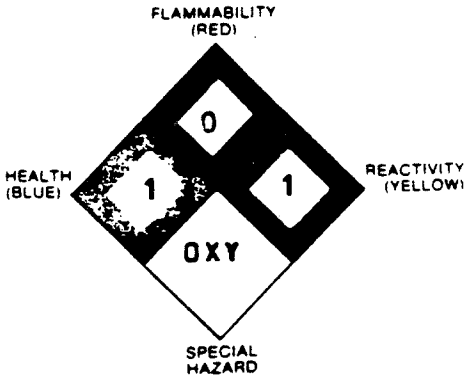

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CHEMTREC (800) 424-9300
OTHER (716) 876-8300 CALL COLLECT

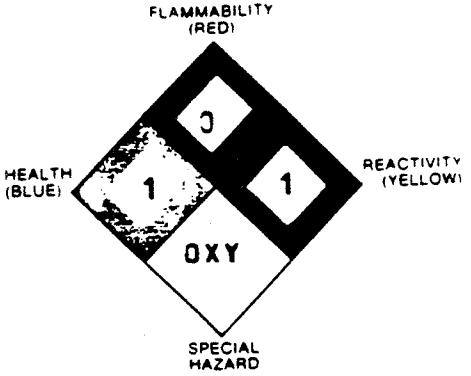
REVISION: EFFECTIVE: 01/10/86 PRINTED: 01/20/86

==========	**PHYSICAL DATA** ==========
MELTING POINT.....:	DECOMPOSES
BOILING POINT.....:	NOT APPLICABLE
VAPOR PRESSURE.....:	NONE
VAPOR DENSITY (AIR - 1)..:	NONE
ROOM TEMPERATURE APPEARANCE AND STATE:	LIGHT STRAW COLOR CRYSTALLINE POWDER
ODOR.....:	ODORLESS
SPECIFIC GRAVITY (H2O =1):	APPROX. 1.982
SOLUBILITY IN H2O % BY WT:	44%
% VOLATILES BY VOLUME....:	NOT APPLICABLE
EVAPORATION RATE (BUTYL ACETATE = 1)..:	NOT APPLICABLE
(AS IS).....:	NOT APPLICABLE
H (1% SOLUTION).....:	4.0 - 5.0
==========	**FIRE, EXPLOSION AND REACTIVITY DATA** ==========
FLASH POINT.....:	NONCOMBUSTIBLE
AUTOIGNITION TEMPERATURE.:	NONCOMBUSTIBLE
FLAMMABLE LIMITS UPPER..:	NOT APPLICABLE
(AIR) LOWER..:	NOT APPLICABLE
EXTINGUISHING MEDIA.....:	DELUGE WITH WATER
SPECIAL FIREFIGHTING PROCEDURES.....:	NONCOMBUSTIBLE - CONSIDER MATERIAL AS A STRONG OXIDIZER WITH ACIDIC MIST ALSO BEING PRESENT.
DEGREE OF FIRE AND EXPLOSION HAZARD .....:	DECOMPOSES WITH THE LIBERATION OF OXYGEN, PRESENCE OF MOISTURE ACCELERATES DECOMPOSITION.
STABILITY.....:	UNSTABLE; DECOMPOSES WITH EXOTHERMIC REACTION
HAZARDOUS POLYMERIZATION.:	WILL NOT OCCUR
CONDITIONS TO AVOID.....:	HEAT, MOISTURE, REDUCING AGENTS.
MAJOR CONTAMINANTS THAT CONTRIBUTE TO INSTABILITY..:	HEAT, MOISTURE, REDUCING AGENTS
INCOMPATIBILITY.....:	ACIDS, ALKALIS, HALIDES (FLUORIDES, CHLORIDES, BROMIDES), COMBUSTIBLE MATERIALS, HEAVY METALS.
HAZARDOUS DECOMPOSITION PRODUCTS..:	FUMES OF SULFURIC ACID MIST, OXYGEN WHICH SUPPORTS COMBUSTION AND OXIDES OF SULPHUR.

SCD

'LRIAL SAFETY DATA 7727 54 0

NFPA Designation 704



DEGREE OF HAZARD
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1ONIUM PERSULFATE

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OTHER (716) 876-8300 CALL COLLECT

VISION: EFFECTIVE: 01/10/86 PRINTED: 01/20/86

ROUTES OF EXPOSURE

		SOURCE	DATE
/E CONTACT:	NON-IRRITATING (RABBIT) REF. ICG/79.025	FMC	1979
KIN CONTACT:	NON-IRRITATING (RABBIT) MAY BE SENSITIZER TO ALLERGIC PERSONS. REF.ICG/T.79.025	FMC	1979
KIN ABSORPTION:	NO SIGNIFICANT HAZARD. LD50 ABOVE 10G/KG (RABBIT) REF. ICG/T.79.025	FMC	1979
NHALATION:	NO SIGNIFICANT HAZARD PROPOSED TLV 5MG/M3 AS S208 FOR 8 HRS. TWA 1 HR. LC50 = 520 MG/L (RAT) REF.ICG/T.79.025	ACGIH 1985-6 FMC	1979
INGESTION:	SLIGHTLY HAZARDOUS LD50 =600 MG/KG (RAT) REF. ICG/T.79.025	FMC	1979

EXPOSURE LIMITS

	SOURCE	DATE
TLV 5 MG/M3 AS S208 FOR 8 HRS.	ACGIH	1985-6

EFFECTS OF OVEREXPOSURE

ACUTE EXPOSURE: DUST MAY BE HARMFUL AND IRRITATING. MAY BE HARMFUL IF SWALLOWED.

CHRONIC EXPOSURE: ALLERGIC PERSONS MAY DEVELOP DERMATITIS AND ASTHMA. REF. RESPIRATION 38:144 (1979).

EMERGENCY AND FIRST AID PROCEDURES

EYES: WASH THOROUGHLY WITH WATER. IF IRRITATION OCCURS AND PERSISTS, SEE AN OPHTHALMOLOGIST.

SKIN: WASH THOROUGHLY WITH WATER. IF IRRITATION OCCURS AND PERSISTS, OBTAIN MEDICAL ATTENTION.

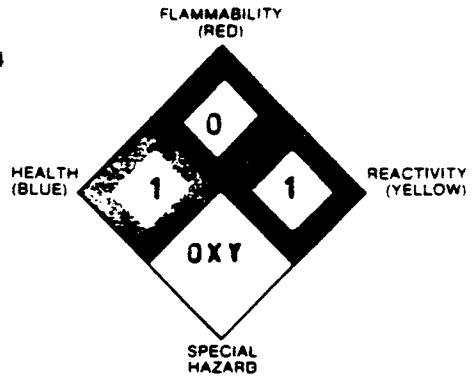
SCD

MATERIAL SAFETY DATA 7727 54 0

AMMONIUM PERSULFATE

NFPA Designation 704

DEGREE OF HAZARD
4 = EXTREME
3 = HIGH
2 = MODERATE
1 = SLIGHT
0 = INSIGNFICANT



EMERGENCY TELEPHONE NUMBERS
MEDICAL (303) 595-9048 CALL COLLECT
CHEMTREC (300) 424-9300
OTHER (716) 876-8300 CALL COLLECT

REVISION: EFFECTIVE: 01/10/86 PRINTED: 01/20/86

EMERGENCY AND FIRST AID PROCEDURES

INHALATION.....: REMOVE SUBJECT TO FRESH AIR. IF DISCOMFORT OCCURS AND PERSISTS OBTAIN MEDICAL ATTENTION.

INGESTION.....: DRINK PLENTY OF WATER. CALL PHYSICIAN.

DECONTAMINATION PROCEDURE: WASH THOROUGHLY WITH SOAP AND WATER.

NOTES TO PHYSICIAN.....: ASSIDE FROM ALLERGIC REACTIONS SUCH AS DERMATITIS AND ASTHMA REPORTED IN ONE CASE ONLY, EXPOSURE PROBLEMS ARE RELATED TO THE OXIDIZING PROPERTIES AND RESEMBLE, AND ARE TREATED LIKE, THOSE CAUSED BY STRONG ACIDS. HOWEVER, ATTEMPTS TO NEUTRALIZE WITH BASIC OR HALIDE-CONTAINING MATERIALS SHOULD BE AVOIDED BECAUSE OF POSSIBLE EXOTHERMIC REACTION. FLOODING OF EXPOSURE AREAS WITH WATER IS SUGGESTED, BUT GASTRIC LAVAGE OR EMESIS INDUCTION FOR INGESTIONS MUST CONSIDER THE POSSIBLE AGGRAVATION OF ESOPHAGEAL INJURY AND THE EXPECTED ABSENCE OF SYSTEM EFFECTS. DEMULCENTS MAY BE HELPFUL. TREATMENT OTHERWISE IS SUPPORTIVE AND SYMPTOMATIC.

SPECIAL PROTECTION

VENTILATION REQUIREMENTS.: USE ONLY IN WELL VENTILATED AREA. CONTROL DUST IN WORK PLACE AREA AT OR BELOW PROPOSED TLV (5MG/M3 AS S2O8 FOR 8 HRS.)

RECOMMENDED PERSONAL.....:
PROTECTIVE EQUIPMENT

RESPIRATORY.....: WHEN EXPOSURE ABOVE THE ESTABLISHED STANDARD IS LIKELY, A RESPIRATORY PROTECTION PROGRAM WHICH COMPLIES WITH OSHA GENERAL INDUSTRY STANDARD 1910.134(E) AND RESPIRATORY EQUIPMENT, SUCH AS A DUST MASK APPROVED BY NIOSH/MESA SHOULD BE IMPLEMENTED.

EYES.....: EYE PROTECTION, SUCH AS CHEMICAL TYPE GOGGLES OR FACE MASK, SHOULD BE WORN WHENEVER SPLASHING, SPRAYING OR OTHER EYE CONTACT IS LIKELY.

GLOVES.....: GENERAL PURPOSE NEOPRENE GLOVES ARE RECOMMENDED.

SPECIAL CLOTHING..: NEOPRENE SHOES ARE RECOMMENDED.
AND EQUIPMENT

FMC

SAFETY DATA 7727 54 0

MONIUM PERSULFATE

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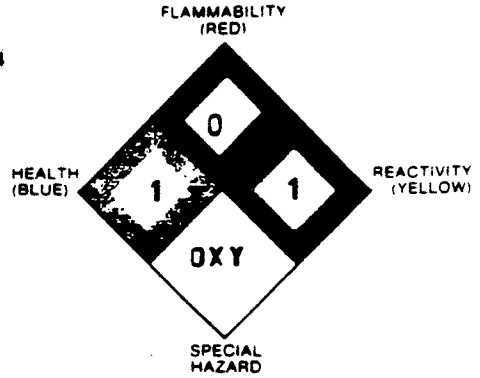

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REVISION: EFFECTIVE: 01/10/86 PRINTED: 01/20/86

STORAGE AND HANDLING

(PLEASE USE THIS STATEMENT TO SATISTY THE IN-PLANT LABELING REQUIREMENTS OF THE OSHA HAZARD COMMUNICATIONS STANDARD 29CFR 1910.1200)

STORE (UNOPENED) IN A COOL, CLEAN, DRY PLACE AND AWAY FROM POINT SOURCE HEAT I.E. RADIENT HEATERS OR STEAM PIPES. USE FIRST IN FIRST OUT STORAGE SYSTEM. AVOID CONTAMINATION OF OPENED PRODUCT. AVOID PROLONGED OR REPEATED SKIN CONTACT USING GOOD PERSONAL HYGIENE. IN CASE OF FIRE OR DECOMPOSITION CONDITIONS (SMOKING) USE SELF-CONTAINED BREATHING APPARATUS WITH FULL FACE PIECE, ACID RESISTANT CLOTHING AND DELUGE WITH PLENTY OF WATER TO CONTROL DECOMPOSITION. FOR STORAGE REQUIREMENTS, REFER TO THE NFPA BULLETIN 43A ON THE STORAGE OF LIQUID AND SOLID OXIDIZING MATERIALS.
NFPA HAZARD CLASS 1 OXIDIZER
IMCO HAZARD CLASS 5.1 OXIDIZER.

DISPOSAL, SPILL OR LEAK PROCEDURES

PROCEDURE FOR RELEASE.....: OR SPILL

MATERIAL SHOULD BE PUT INTO AN APPROVED DOT CONTAINER THEN DILUTED WITH LARGE QUANTITY OF WATER AND DISPOSED OF ACCORDING TO THE METHODS OUTLINED BELOW FOR WASTE DISPOSAL.

WASTE DISPOSAL METHOD.....:

AN ACCEPTABLE METHOD OF DISPOSAL IS TO DISSOLVE IN WATER AND DISPOSE VIA A TREATMENT SYSTEM IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL ENVIRONMENTAL LAWS, RULES, REGULATIONS, STANDARDS AND OTHER REQUIREMENTS. BECAUSE ACCEPTABLE METHODS OF DISPOSAL MAY VARY BY LOCATION, AND BECAUSE REGULATORY REQUIREMENTS MAY CHANGE, THE APPROPRIATE REGULATORY AGENCIES SHOULD BE CONTACTED PRIOR TO DISPOSAL.

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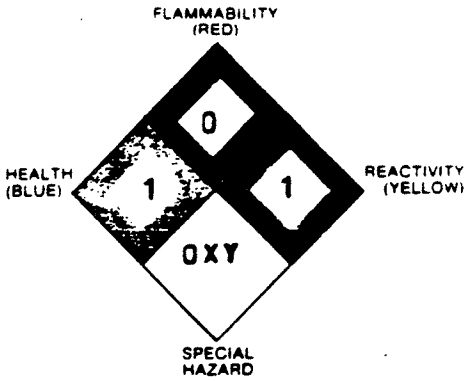

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REVISION: EFFECTIVE: 01/10/86 PRINTED: 01/20/86

TRANSPORTATION DATA

DOT PROPER SHIPPING NAME.:	AMMONIUM PERSULFATE
DOT CLASSIFICATION.....:	OXIDIZER
DOT LABELS.....:	OXIDIZER
DOT MARKING.....:	AMMONIUM PERSULFATE UN 1444
DOT PLACARD.....:	OXIDIZER
UN NUMBER.....:	1444
HAZARDOUS SUBSTANCE/RQ...:	NOT LISTED
49 STCC NUMBER.....:	4913733
EMERGENCY ACCIDENT PRECAUTIONS AND PROCEDURE:	WASH AREA WITH LARGE AMOUNTS OF WATER.
PRECAUTIONS TO BE TAKEN..: IN TRANSPORTATION	KEEP MATERIAL COOL AND DRY.
CHEMCARD NUMBER.....:	NONE
TYPE PACKAGES.....:	225 LB. FIBRE DRUM DOT 21C250 W/ POLYLINER 55 LB. POLY BAG DOT 44P 1000-2000 LB. IBC DOT EXEMPTION E8489
OTHER SHIPPING IDS.....:	

ADDITIONAL REGULATORY INFORMATION

MATERIAL IS REPORTED IN EPA TSCA INVENTORY LIST?	YES
MATERIAL IS LISTED AS A CARCINOGEN/POTENTIAL CARCINOGEN IN FOLLOWING	
NTP ANNUAL REPORT... ?	NO
IARC MONOGRAPHS..... ?	NO
OSHA 29CFR PART 1910 SUBPART Z ?	NO

ADDITIONAL INFORMATION

AQUATIC TOXICITY CLASSIFICATION - NIOSH RTECS NO. 79-100
EFFECTS OF LOW CONCENTRATION ON AQUATIC LIFE NOT DETERMINED.

SCD

ICI Americas Inc.

MATERIAL SAFETY DATA SHEET

HAZARDOUS PRODUCTS USED IN PLACES OF EMPLOYMENT

#M3503-A

section 1 name & product

manufacturer's name (a) ICI Americas Inc.		emergency phone no. (24 hours) (b) 302/575-3000
street address (c) Concord Pike & Murphy Rd.	for latest data, consult manufacturer.	date this form written (d) 10/22/80
city, state, zip code (e) Wilmington, DE 19897		signature of certifying company official (f)

chemical name, trade name, and synonyms
(g) TRIETHANOLAMINE-85

formula of primary component(s)
Triethanolamine, $N(CH_2CH_2OH)_3$

(h)

section 2 ingredients	%	TLV (units)
Triethanolamine	85	
Diethanolamine (low volatility)	15	*3 ppm
*Note: Appears in 1979 ACGIH TLV Tables as Intended Change however inadvertently was left out of 1980 revision. It should be there.		
(not specification values)		

section 3 physical data

1 boiling point (°F.) @ 5mm	(347-375.8°)or(175-191°C)	6 specific gravity	1.122 20/20°C
2 vapor pressure (mmHg at 20°c)	0.01	7 % volatile by volume	100
4 vapor density (air = 1)	--	8 color and odor	Pale yellow/slight ammoniacal odor
5 solubility in water	Completely miscible	9 physical state	Liquid (viscous)

section 4 fire and explosion hazard data

10 flash point (and method used)
375°F PMCC or 190°C

11 flammable limits (STP)
L.F.L. No data U.F.L. No data

12 extinguishing media: [X] water fog [ ] foam [X] alcohol foam [X] CO_2 [X] dry chemical [ ] other

13 special fire fighting protective equipment

Use self-contained breathing apparatus in close proximity of any serious chemical fire. See #18.

14 unusual fire and explosion hazards

None

section 5 reactivity data

15 stability: Stable	normal conditions	X	16 conditions to avoid
	fire conditions		See #18
17 incompatibility (materials to avoid)	[ ] water [X] acid [ ] base [ ] corrosive [X] oxidizing material		
	[ ] other		

hazardous decomposition products
Thermal decomposition products include CO and nitrogen oxides.

19 hazardous polymerization	may occur		20 conditions to avoid
	will not occur	X	

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tion 6 health hazard data

ingestion
Rat acute oral LD50: approx. 5.0 g/kg. (DEA). 0.710 g/kg.

eye contact
vere irritant. May cause eye burns.

skin contact
derate irritant. Repeated or prolonged contact can cause skin burns.

skin absorption
EA) Not likely to be absorbed in toxic amounts. (DEA) No data.

inhalation (TLV or suggested control figure)
ee Section 2. Low volatility. If heated, may be irritating.

effects of overexposure
ee 22 & 23. Can be irritating.

first aid procedures For eyes - Immediately flush with plenty of water for at least 15 minutes nd call a physician. For skin - Immediately flush with plenty of water for at least 5 minutes while removing contaminated clothing and shoes. Call a physician. Wash lothing and decontaminate shoes before reuse. If inhaled, remove to fresh air. Administer oxygen if available. Call a physician. If swallowed, immediately induce vomiting by giving one or two glasses of water to drink and sticking finger down throat. Call a physician.

tion 7 spill or leak procedures

steps to be taken in case material is released or spilled
entilate spill area. Soak up with an inert absorbent. Shovel into waste container nd remove waste from workplace. Wear eye protection, protective clothing and respiratory protection during cleanup.

disposal method
ispose of waste material in accordance with local, state and federal pollution uidelines. Waste may be burned in an approved incinerator that is equipped with an fter-burner and scrubber to control oxides of nitrogen.

tion 8 special protection information

ventilation
local exhaust: Yes, to maintain vapor conc. in work area below TLV or if mist or aerosol generated.
special:
mechanical (general): General dilution
other:

1 respiratory protection (specify type) Not normally needed if local exhaust satisfactory. If needed, se MSHA-NIOSH approved respirator for substance with TLV not less than 0.05 mg/M^3 for erosol generation in combination with approved respirator for ammonia and methyl mines. Caution, do not use respirators beyond their capabilities.

2 protective clothing Use clothing with sleeves. Impervious gloves, apron, and shoe protection boots) if necessary.

3 eye protection ☐ safety glasses with side shields ☒ chemical workers goggles ☐ gas tight goggles or equivalent ☒ other Use full face shield in addition, if splashing possible.

4 other protective equipment Recommend safety shower and eye-wash station in exposure area. For emergencies: Use self-contained breathing apparatus or full face respirator with supplied air.

tion 9 special precautions or other comments

5 precautions to be taken in handling and storing
Avoid breathing vapors if generated and avoid skin and eye contact. Store in well-ventilated area away from acids and oxidizing agents.

6 other precautions

Triethanolamine is a combustible liquid

7 references Chem. Dictionary, 8th ed., Haz. Materials Spill Monitoring Safety Handbook and ical Haz. Guide, PB-295-954 Jan. '79, ACGIH TLV Tables, 1979.

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1367

MATERIAL SAFETY DATA SHEET Nov. 14, 1985

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

CHEMTREC 800 424-9300

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
Nitto Chemical Industry Co., LTD.	Tokyo (271) 0251, 0351

ADDRESS (Number, Street, City, State, and ZIP Code)
New Marunouchi Bldg. 5-1, Marunouchi 1-Chome, Chiyodaku, Tokyo

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
Mixture of Acrylamide and Methylenebisacrylamide	"AV-100"
CHEMICAL FAMILY [redacted]	FORMULA $CH_2=CHCONH_2$ & $CH_2CHCONHCH_2HNCOCHCH_2$

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS		N/A	BASE METAL		N/A
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
LVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
TIVES			OTHERS		
THERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Acrylamide (includes Methylenebisacrylamide)	96	

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	184	SPECIFIC GRAVITY (H_2O=1)	1.123(86F)
VAPOR PRESSURE (mm Hg.)	4mmHg (212F)	PERCENT, VOLATILE BY VOLUME (%)	N/A
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____=1)	N/A
SOLUBILITY IN WATER	204gr/water 100gr 86F		

APPEARANCE AND ODOR : White powder, odorless

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
None	N/A		

EXTINGUISHING MEDIA : Water drainage

SPECIAL FIRE FIGHTING PROCEDURES : Extinguish fire and apply plenty of water.

UNUSUAL FIRE AND EXPLOSION HAZARDS : Contact with fire causes rapid polymerization and release heat.

SHEET 2

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
: Avoid direct contact with skin.

EFFECTS OF OVEREXPOSURE
: Skin may peel and acrylamide may be absorbed through skin, causing disturbance of nervous system.

EMERGENCY AND FIRST AID PROCEDURES
: 1) Wash contacted areas on body with plenty of water ; 2) apply "vitamine" 150mg/day and rest ; 3) if patient feels sick or sluggish or suffers eczema or any abnormal condition while working with the product, stop work and apply "vitamine" (thiamine propyl disulfide).

SECTION VI - REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		Avoid direct contact with sunlight or moisture.
	STABLE		

INCOMPATABILITY (Materials to avoid)
Avoid oxidizers such as ammonium persulfate or potassium persulfate.

HAZARDOUS DECOMPOSITION PRODUCTS
Polimerizes to a polimer or copolimer.

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR	X	Direct sun, humidity and fire.
	WILL NOT OCCUR		

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
1) Roads : Wash using plenty of water (one hundred times as much water as product).
2) Floor : Sweed product into safe area and burn completely or dispose of in approved area. Material remaining on floor should be mixed using mop with 3 gallons warm potassium persulfate.

WASTE DISPOSAL METHOD
: Sodium metabissulfite solution : allow to stand 30min. then flush with water. Place in waste disposal bag and burn at approved area or bury in approval location.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)
: Respirator

VENTILATION		
	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General) : fan	OTHER

PROTECTIVE GLOVES
Rubber or plastic gloves

EYE PROTECTION
: Goggles

OTHER PROTECTIVE EQUIPMENT

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
: Store in well-ventilated place.

OTHER PRECAUTIONS
: Protect empty or full bags of AV-100. Dispose of used bags in solids collection system or bury in approved landfill. Do not reuse bags for any purpose.

3524

2-PROPANOL
2-PROPANOL
2-PROPANOL

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
CHEMICAL DIVISION
1 REAGENT LANE
FAIR LAWN NJ 07410
(201) 796-7100

EMERGENCY CONTACTS
GASTON L. PILLORI
(201) 796-7100

DATE: 03/29/86
PO NBR: N/A
ACCT: 395985-02
INDEX: N/A
CAT NO: A4154

SUBSTANCE IDENTIFICATION

SUBSTANCE: **2-PROPANOL**

CAS-NUMBER 67-63-0

TRADE NAMES/SYNONYMS: ISOPROPANOL; DIMETHYLCARBINOL; IPA; N-PROPAN-2-OL; PRO; PROPAN-2-OL; 2-PROPANOL; ISO-PROPYL ALCOHOL; SEC-PROPYL ALCOHOL; UN 1219

CHEMICAL FAMILY:
HYDROXYL, ALIPHATIC

MOLECULAR FORMULA: C3-H8-O MOL WT: 60.10

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=3 REACTIVITY=0 PERSISTENCE=0
NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=3 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

PERCENT: 100 COMPONENT: 2-PROPANOL

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
400 PPM OSHA TWA;
400 PPM ACGIH TWA; 500 PPM ACGIH STEL;
400 PPM NIOSH RECOMMENDED TWA; 800 PPM NIOSH RECOMMENDED 15 MINUTE CEILING

PHYSICAL DATA

DESCRIPTION: COLORLESS LIQUID WITH A SLIGHT ODOR RESEMBLING A MIXTURE OF ACETONE AND ETHANOL. THE ODOR TAKEN WITH IRRITANT EFFECTS IS CONSIDERED TO GIVE ADEQUATE WARNING. BOILING POINT: 181 F (83 C)

MELTING POINT: -127 F (-89 C) SPECIFIC GRAVITY: 0.8

VAPOR PRESSURE: 33 MM HG @ 20 C SOLUBILITY IN WATER: MISCIBLE

SOLVENT SOLUBILITY: ALCOHOL, ETHER, CHLOROFORM ODOR THRESHOLD: 50 PPM

VAPOR DENSITY: 2.1

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
DANGEROUS FIRE/NEGLIGIBLE EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE ABOVE FLASH POINT.

FLASH POINT: 53 F (12 C) (CC) UPPER EXPLOSION LIMIT: 12.7% @ 93 C

LOWER EXPLOSION LIMIT: 2.0% AUTOIGNITION TEMP.: 750 F (399 C)

FLAMMABILITY CLASS(OSHA): IB

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR ALCOHOL FOAM (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FOR LARGE FIRES, USE DRY CHEMICAL, CARBON DIOXIDE, OR ALCOHOL FOAM (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

FIREFIGHTING:
WEAR PERSONAL PROTECTIVE EQUIPMENT. MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. COOL FIRE-EXPOSED CONTAINERS WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT. FOR MASSIVE FIRE IN STORAGE AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES, ELSE WITHDRAW FROM AREA AND LET FIRE BURN. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING SAFETY DEVICE OR ANY DISCOLORATION OF STORAGE TANK DUE TO FIRE (1984 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.3).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED; USE WATER IN FLOODING AMOUNTS AS FOG, SOLID STREAMS MAY NOT BE EFFECTIVE. COOL CONTAINERS WITH FLOODING QUANTITIES OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING TOXIC VAPORS, KEEP UPWIND (BUREAU OF EXPLOSIVES, EMERGENCY HANDLING OF HAZARDOUS MATERIALS IN SURFACE TRANSPORTATION, 1981).

WATER MAY BE INEFFECTIVE (NFPA FIRE PROTECTION GUIDE ON HAZARDOUS MATERIALS, EIGHTH EDITION).

USE ALCOHOL FOAM (NFPA FIRE PROTECTION GUIDE ON HAZARDOUS MATERIAL, EIGHTH EDITION).

TOXICITY

ISOPROPYL ALCOHOL: 20 PPM EYE-HUMAN IRRITATION; 16 MG EYE-RABBIT IRRITATION;

400 PPM INHALATION-MAN TCLO; 8600 MG/KG ORAL-MAN LDLO; 15,710 MG/KG ORAL-HUMAN TDLO; 5840 MG/KG ORAL-RAT LD50; 933 MG/KG INTRAPERITONEAL-MOUSE LD50; 16000 PPM/8 HOURS INHALATION-RAT LC50; 6150 MG/KG ORAL-DOG LD50; 5120 MG/KG INTRAVENOUS-DOG LDLO; 1963 MG/KG INTRAVENOUS-CAT LDLO; 5000 MG/KG ORAL-RABBIT LDLO; 13 GM/KG SKIN-RABBIT LD50; MUTAGENIC DATA (RTECS).
ISOPROPYL ALCOHOL IS A SKIN AND MUCOUS MEMBRANE IRRITANT, SEVERE EYE IRRITANT AND CENTRAL NERVOUS SYSTEM DEPRESSANT.

HEALTH EFFECTS AND FIRST AID

INHALATION:
IRRITANT/NARCOTIC.
20,000 PPM ISOPROPYL ALCOHOL IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.
ACUTE EXPOSURE- ISOPROPYL ALCOHOL CAUSES DIZZINESS, INCOORDINATION, HEADACHE, CONFUSION, PERSISTENT NAUSEA, HEMATEMESIS, ABDOMINAL PAIN, STUPOR, HYPOTENSISON, ANEMIA, REFRACTORY NARCOSIS, AREFLEXIA, DEPRESSED RESPIRATION, OLIGURIA FOLLOWED BY DIURESIS, AND UREMIA. TENDERNESS AND EDEMA OF MUSCLES MAY ALSO OCCUR. SEVERE CASES MAY CAUSE COMA. NO REACTION AT 2050 PPM/480 MINUTES (MOUSE).

CHRONIC EXPOSURE-
SEE MUTAGENIC DATA REFERENCE IN TOXICITY SECTION.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND AT REST.
ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
IRRITANT/NARCOTIC.
ACUTE EXPOSURE- ISOPROPYL ALCOHOL CAUSES NARCOSIS WITH NAUSEA, VOMITING, HYPOTENSION, DEPRESSED RESPIRATION, ANEMIA, UREMIA, AND COMA.

CHRONIC EXPOSURE- ISOPROPYL ALCOHOL MAY CAUSE DERMATITIS DUE TO THE DEFATTING ACTION ON THE SKIN.
SEE MUTAGENIC DATA REFERENCE IN TOXICITY SECTION.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
CORROSIVE.
ACUTE EXPOSURE: ISOPROPYL ALCOHOL VAPORS MAY BE IRRITATING AND CAUSE PROFUSE LACRIMATION. DIRECT CONTACT MAY CAUSE IRRITATION, BURNS AND PERMANENT CORNEAL DAMAGE.

CHRONIC EXPOSURE: PROLONGED OR REPEATED EXPOSURE TO ISOPROPYL ALCOHOL VAPORS MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). IN CASE OF BURNS, APPLY STERILE BANDAGES LOOSELY WITHOUT MEDICATION. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
NARCOTIC.
ACUTE EXPOSURE- ISOPROPYL ALCOHOL CAUSES NARCOSIS WITH HEADACHE, NAUSEA, HEMATEMESIS, DIZZINESS, INCOORDINATION, ABDOMINAL PAIN, STUPOR, DEPRESSED RESPIRATION, OLIGURIA, UREMIA, DIURESIS, AND COMA. DEATH MAY OCCUR FROM RESPIRATORY PARALYSIS.

FIRST AID- GET MEDICAL ATTENTION IMMEDIATELY. IF MEDICAL ATTENTION IS NOT IMMEDIATELY AVAILABLE, AND IF VICTIM IS CONSCIOUS, ATTEMPT TO INDUCE VOMITING BY TOUCHING FINGER TO BACK OF THROAT.

REACTIVITY

REACTIVITY:
STABLE UNDER NORMAL PRESSURES AT LEAST UP TO THE BOILING POINT, 83 C.

INCOMPATIBILITIES:
OXIDIZERS AND OTHER MATERIALS, EXAMPLES FOLLOW:
PHOSGENE: IN THE PRESENCE OF IRON SALTS, MAY EXPLODE.
NITROFORM (>50%): DISSOLVES LIBERATING HEAT AND POSSIBLY EXPLODING.
TRINITROMETHANE: POSSIBLE EXPLOSION.
HYDROGEN: WHEN A STREAM OF HYDROGEN ENTRAINED ISOPROPYL ALCOHOL VAPORS AND PALLADIUM PARTICLES, THE MIXTURE CAUGHT FIRE UPON CONTACT WITH AIR.
POTASSIUM TERT-BUTOXIDE: IGNITION.
DIOXYGENYL TETRAFLUOROBORATE: IGNITION AT AMBIENT TEMPERATURES.
CHROMIUM TRIOXIDE (GRANULAR): IGNITION.
2-BUTANONE: ACCELERATES THE PEROXIDATION OF THE ALCOHOL, RESULTING IN FORMATION OF POTENTIALLY EXPLOSIVE PRODUCTS.
HYDROGEN PEROXIDE: FORMATION OF A SHOCK- OR HEAT-SENSITIVE, DETONATABLE PRODUCT.
OXYGEN (GAS): AUTOXIDATION, ON EXPOSURE TO LIGHT, RESULTS IN FORMATION OF POTENTIALLY EXPLOSIVE KETONES AND HYDROGEN PEROXIDE.
OLEUM: REACTS WITH AN INCREASE IN TEMPERATURE AND PRESSURE.
ALUMINUM: DISSOLUTION IS EXOTHERMIC.
STRONG OXIDIZERS: FIRE AND EXPLOSION HAZARD.
METAL ALKYLS, E.G. TRI-ISOBUTYL ALUMINUM

DECOMPOSITION:
COMBUSTION MAY RELEASE TOXIC OXIDES OF CARBON.

POLYMERIZATION:
WILL NOT OCCUR.

****

CONDITIONS TO AVOID

MAY BE IGNITED BY HEAT, SPARKS OR FLAMES. CONTAINER MAY EXPLODE IN HEAT OF FIRE. VAPOR EXPLOSION HAZARD INDOORS, OUTDOORS OR IN SEWERS. RUN-OFF TO SEWER MAY CREATE FIRE OR EXPLOSION HAZARD. AVOID CONTACT WITH OR STORAGE WITH INCOMPATIBLE MATERIALS.

****

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:
SHUT OFF IGNITION SOURCES. PROVIDE EXPLOSION PROOF VENTILATION. WEAR PERSONAL PROTECTIVE EQUIPMENT. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL, CLOSE TIGHTLY AND LABEL 'FLAMMABLE'. FOR LARGER SPILLS, DIKE AS CLOSE TO SPILL AS PRACTICAL TO MINIMIZE ENVIRONMENTAL CONTAMINATION. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA. KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND DENY ENTRY. KEEP OUT OF SEWERS AND WATER SOURCES.

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST VENTILATION OR PROCESS ENCLOSURE TO MEET PERMISSIBLE EXPOSURE LIMIT REQUIREMENTS. EQUIPMENT MUST BE EXPLOSION-PROOF. ODOR DETECTION ALONE MUST NOT BE USED AS A SUBSTITUTE FOR MONITORING METHODS.

RESPIRATOR:
1000 PPM- CHEMICAL CARTRIDGE RESPIRATOR WITH AN ORGANIC VAPOR CARTRIDGE AND A FULL FACEPIECE.

5000 PPM- CHIN STYLE GAS MASK WITH AN ORGANIC VAPOR CANISTER.

> 5000 PPM, INCLUDING THE IDLH LEVEL, 20,000 PPM
SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE. OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE, OR USE EQUIVALENT RESPIRATOR.

FIREFIGHTING- SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR IMPERVIOUS PROTECTIVE CLOTHING AND EQUIPMENT TO AVOID REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR IMPERVIOUS GLOVES TO AVOID REPEATED OR PROLONGED CONTACT WITH THIS SUBSTANCE; USE BUTYL, NEOPRENE OR NITRILE RUBBER GLOVES.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF SAFETY GOGGLES WHENEVER OR WHEREVER THERE IS A REASONABLE PROBABILITY OF LIQUID CONTACT. DO NOT WEAR CONTACT LENSES WHEN WORKING WITH CHEMICALS.

AUTHORIZED - ALLIED FISHER SCIENTIFIC
CREATION DATE: 08/09/85 REVISION DATE: 10/29/85

-ADDITIONAL INFORMATION-

4318

American Burdick & Jackson
Material Safety Data Sheet

MATERIAL SAFETY DATA SHEET

METHYLENE CHLORIDE

emergency telephone no 312/973-3600 (American Scientific Products)
chemtrec telephone no 800/424-9300
information telephone no 616/726-3171 (American Burdick & Jackson)

I. Identification

chemical name Methylene Chloride — molecular weight 84.93
chemical family Chlorinated Hydrocarbon — formula CH_2Cl_2
synonyms Dichloromethane, Methylene Dichloride
DOT proper shipping name Methylene Chloride or Dichloromethane
DOT hazard class ORM-A
DOT identification no UN1593 — CAS no. 75-09-2

II. Physical and Chemical Data

boiling point, 760mm Hg 39.75°C — freezing point -95.14°C — evaporation rate (ether=1) ca 0.7
vapor pressure at 20 C 350 mm Hg — vapor density (air = 1) 2.9 — solubility in water @ 20°C 1.6%
% volatiles by volume ca 100 — specific gravity (H_2O = 1) @ 20°C 1.33 — stability Stable
hazardous polymerization Not expected to occur.
appearance and odor Clear, colorless liquid with a sweet ether-like odor.
conditions to avoid Heat, sparks, open flame, open containers, poor ventilation, and moisture.
materials to avoid Active metals and strong alkaline solutions.
hazardous decomposition products Phosgene, hydrogen chloride, and chlorine.

III. Fire and Explosion Hazard Data

flash point, (test method) None (closed cup) — auto ignition temperature 556°C
flammable limits in air % by volume lower limit 12.0 — upper limit 19.0
unusual fire and explosion hazards Concentrated vapors can be ignited by high intensity heat source or flame. Toxic and corrosive gases are formed on contact with flames or hot glowing surfaces.
extinguishing media Non-flammable material. Use dry chemical, carbon dioxide, foam, or water spray as appropriate for surrounding fire and materials.
special fire fighting procedures Non-flammable material. Wear full protective clothing and self-contained breathing apparatus. Heat will build pressure and may rupture closed storage containers. Keep fire-exposed containers cool with water spray.

IV. Hazardous Components

Methylene Chloride — % ca 100 — TLV 100 ppm — CAS no 75-09-2

American Burdick & Jackson — Subsidiary of American Hospital Supply Corporation — 1953 South Harvey Street, Muskegon MI 49442

V. Health Hazards

Occupational Exposure Limits

OSHA	8-hour PEL	500 ppm
	Ceiling	1000 ppm
	Peak	2000 ppm
ACGIH	TLV-TWA	100 ppm
	TLV-STEL (15-min)	500 ppm
NIOSH	TLV-TWA	75 ppm
	TLV-C (1-hour)	500 ppm

Concentration Immediately Dangerous to Health

OSHA/NIOSH 5000 ppm

Odor Threshold

OHS	200 ppm
NSC	200 ppm

Carcinogenic, Mutagenic, and Teratogenic Data

Indefinite animal carcinogen (IARC)
Experimental carcinogen (NTP)
Positive mutagen (RTEC)

Primary Routes of Entry

Methylene chloride may exert its effects through inhalation, skin absorption, and ingestion.

Industrial Exposure: Route of Exposure/Signs and Symptoms

Inhalation: Exposure can cause light-headedness, vertigo, drowsiness, narcosis, headache and dizziness, unconsciousness, and even death in extreme cases. Exposure to vapors can elevate carboxyhemoglobin levels in the cardiovascular system.

Eye Contact: Liquid or high vapor concentration can cause pain and irritation with slight corneal injury possible.

Skin Contact: Prolonged or repeated skin contact can cause irritation and dermatitis through defatting of skin.

Ingestion: Can cause burning of throat and mouth.

Effects of Overexposure

Acute inhalation or ingestion causes mild central nervous system depression. The primary toxic effect is narcosis. Other toxic effects are pulmonary edema, encephalopathy, and hemolysis. Methylene chloride irritates the eyes, skin and respiratory tract. No systemic effects have been reported in humans, although excessive concentrations have caused liver and kidney damage in animals.

Medical Condition Aggravated by Exposure

Preclude from exposure individuals with diseases of liver, kidneys, cardiovascular and central nervous systems, and heavy smokers. Simultaneous exposure to methylene chloride and alcohol can increase the toxic hazards of methylene chloride.

Emergency First Aid

Inhalation: Immediately remove to fresh air. If not breathing, administer mouth-to-mouth resuscitation. If there is no pulse, administer cardiopulmonary resuscitation (CPR). Contact physician immediately.

Eye Contact: Rinse with copious amounts of water for at least 15 minutes. Get emergency medical assistance.

Skin Contact: Flush thoroughly for at least 15 minutes. Wash affected skin with soap and water. Remove contaminated clothing and shoes. Wash clothing before re-use and discard shoes. Get emergency medical assistance.

Ingestion: Call local Poison Control Center for assistance. Contact a physician immediately. Never induce vomiting or give anything by mouth to a victim unconscious or having convulsions.

VI. Safety Measures and Equipment

Ventilation: Adequate ventilation is required to protect personnel from exposure to chemical vapors exceeding the PEL. The choice of ventilation equipment, either local or general, will depend on conditions of use, quantity of material, and other operating parameters.

Respiratory: Use approved respirator equipment. Follow NIOSH and equipment manufacturer's recommendations to determine appropriate equipment (air-purifying, air-supplied, or self-contained breathing apparatus).

Eyes: Safety glasses are considered minimum protection. Goggles or face shield may be necessary depending on quantity of material and conditions of use.

Skin: Protective gloves and clothing are recommended. The choice of material must be based on chemical resistance and other user requirements. Generally, neoprene or Buna-N offers acceptable chemical resistance. Individuals who are acutely and specifically sensitive to methylene chloride may require additional protective equipment.

Storage: Methylene chloride should be protected from moisture, temperature extremes, and direct sunlight. Proper storage of methylene chloride must be determined based on other materials stored and their hazards and potential chemical incompatibility. In general, methylene chloride should be stored in a cool, well ventilated and secure toxic storage room.

Other: Emergency eye wash fountains and safety showers should be available in the vicinity of any potential exposure.

VII. Spill and Disposal Data

Spill Control: Wear protective clothing and use approved respirator equipment. Absorb spilled material in an absorbent recommended for solvent spills and remove to a safe location for disposal by approved methods. If released to the environment, comply with all regulatory notification requirements.

Waste Disposal: Dispose of methylene chloride as an EPA hazardous waste. Hazardous waste number - U080(Toxic).

Revision Date: 1/85

KEY

ca	Approximately	STEL	Short Term Exposure Level
na	Not applicable	TLV	Threshold Limit Value
C	Ceiling	TWA	Time Weighted Average
PEL	Permissable Exposure Level	BuAc	Butyl Acetate

NSC National Safety Council ("Fundamentals of Industrial Hygiene", 1983)
OHS Occupational Health Services ("Hazardline")

THE DOW CHEMICAL U.S.A. MIDLAND, MI 48674 EMERGENCY PHONE: 517-636-4400

PRODUCT NAME: PERCHLOROETHYLENE INDUSTRIAL

EFFECTIVE DATE: 02/17/86 DATE PRINTED: 08/27/86 MSD: 000190

2. INGREDIENTS:

TETRACHLOROETHYLENE CAS# 000127-18-4 99.9%

3. PHYSICAL DATA:

BOILING POINT: 250F (121.1C)
VAP PRESS: 13 MMHG @ 20C
VAP DENSITY: 5.76
SOL. IN WATER: 0.015 G/100G 25C
SP. GRAVITY: 1.619 @ 25/25C
APPEARANCE: COLORLESS LIQUID.
ODOR: NOT AVAILABLE.

3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: NONE
METHOD USED: TOC, TCC, COC

FLAMMABLE LIMITS
LFL: NONE
UFL: NONE

EXTINGUISHING MEDIA: NON-FLAMMABLE MATERIAL.

FIRE & EXPLOSION HAZARDS: NO AUTOIGNITION TEMPERATURE.

FIRE-FIGHTING EQUIPMENT: WEAR POSITIVE PRESSURE SELF-CONTAINED RESPIRATORY EQUIPMENT.

4. REACTIVITY DATA:

STABILITY: (CONDITIONS TO AVOID) AVOID OPEN FLAMES, WELDING ARCS, OR OTHER HIGH TEMPERATURE SOURCES WHICH INDUCE THERMAL DECOMPOSITION.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) STRONG ACIDS AND OXIDIZING MATERIALS.

HAZARDOUS DECOMPOSITION PRODUCTS: INVOLVEMENT IN FIRE FORMS HYDROGEN CHLORIDE AND SMALL AMOUNTS OF PHOSGENE AND CHLORINE.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: SMALL LEAKS - MOP UP, WIPE UP,

(CONTINUED ON PAGE 2)

5. ENVIRONMENTAL AND DISPOSAL INFORMATION: (CONTINUED)

OR SOAK UP IMMEDIATELY. REMOVE TO OUT OF DOORS. LARGE SPILLS - EVACUATE AREA. CONTAIN LIQUID; TRANSFER TO CLOSED METAL CONTAINERS. KEEP OUT OF WATER SUPPLY.

DISPOSAL METHOD: WHEN DISPOSING OF THE UNUSED CONTENTS, THE PREFERRED OPTIONS ARE TO SEND TO LICENSED RECLAIMER, OR TO PERMITTED INCINERATORS, IN COMPLIANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS INCLUDING SUBTITLE C OF THE RESOURCE CONSERVATION AND RECOVERY ACT. DUMPING INTO SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER IS STRONGLY DISCOURAGED, AND MAY BE ILLEGAL. CONSULT THE DOW CHEMICAL COMPANY FOR FURTHER INFORMATION.

6. HEALTH HAZARD DATA:

EYE: MAY CAUSE PAIN, AND SLIGHT TRANSIENT (TEMPORARY) IRRITATION. VAPORS MAY IRRITATE THE EYES AT ABOUT 100 PPM.

SKIN CONTACT: SHORT SINGLE EXPOSURE NOT LIKELY TO CAUSE SIGNIFICANT SKIN IRRITATION. PROLONGED OR REPEATED EXPOSURE MAY CAUSE SKIN IRRITATION, EVEN A BURN. REPEATED CONTACT MAY CAUSE DRYING OR FLAKING OF SKIN.

SKIN ABSORPTION: A SINGLE PROLONGED EXPOSURE IS NOT LIKELY TO RESULT IN THE MATERIAL BEING ABSORBED THROUGH SKIN IN HARMFUL AMOUNTS. THE LD50 FOR SKIN ABSORPTION IN RABBITS IS >10,000 MG/KG.

INGESTION: SINGLE DOSE ORAL TOXICITY IS LOW. THE LD50 FOR RATS IS >5000 MG/KG. IF ASPIRATED (LIQUID ENTERS THE LUNG), MAY BE RAPIDLY ABSORBED THROUGH THE LUNGS AND RESULT IN INJURY TO OTHER BODY SYSTEMS.

INHALATION: DIZZINESS MAY OCCUR AT 200 PPM; PROGRESSIVELY HIGHER LEVELS MAY ALSO CAUSE NASAL IRRITATION, NAUSEA, INCOORDINATION, DRUNKENNESS; AND OVER 1000 PPM, UNCONSCIOUSNESS AND DEATH. A SINGLE BRIEF (MINUTES) INHALATION EXPOSURE TO LEVELS ABOVE 6000 PPM MAY BE IMMEDIATELY DANGEROUS TO LIFE. IN CONFINED OR POORLY VENTILATED AREAS VAPORS CAN READILY ACCUMULATE AND CAN CAUSE UNCONSCIOUSNESS AND DEATH. ALCOHOL CONSUMED BEFORE OR AFTER EXPOSURE MAY INCREASE ADVERSE EFFECTS.

SYSTEMIC & OTHER EFFECTS: EXCESSIVE EXPOSURE MAY CAUSE LIVER AND/OR KIDNEY EFFECTS. SIGNS AND SYMPTOMS OF EXCESSIVE EXPOSURE MAY BE CENTRAL NERVOUS SYSTEM EFFECTS AND ANESTHETIC

(CONTINUED ON PAGE 3)

5. HEALTH HAZARD DATA: (CONTINUED)

OR NARCOTIC EFFECTS. PERCHLOROETHYLENE HAS BEEN SHOWN TO INCREASE THE RATE OF SPONTANEOUSLY OCCURRING MALIGNANT TUMORS IN CERTAIN LABORATORY RATS AND MICE. OTHER LONG-TERM INHALATION STUDIES IN RATS FAILED TO SHOW A TUMORIGENIC RESPONSE. EPIDEMIOLOGY STUDIES ARE LIMITED AND HAVE NOT ESTABLISHED AN ASSOCIATION BETWEEN PERCHLOROETHYLENE EXPOSURE AND CANCER. PERCHLOROETHYLENE IS NOT BELIEVED TO POSE A MEASURABLE CARCINOGENIC RISK TO MAN WHEN HANDLED AS RECOMMENDED. BIRTH DEFECTS ARE UNLIKELY. EXPOSURES HAVING NO EFFECT ON THE MOTHER SHOULD HAVE NO EFFECT ON THE FETUS. DID NOT CAUSE BIRTH DEFECTS IN ANIMALS; OTHER EFFECTS WERE SEEN IN THE FETUS ONLY AT DOSES WHICH CAUSED TOXIC EFFECTS TO THE MOTHER. RESULTS OF IN VITRO ('TEST TUBE') MUTAGENICITY TESTS HAVE BEEN NEGATIVE.

7. FIRST AID:

EYES: IRRIGATE IMMEDIATELY WITH WATER FOR AT LEAST 5 MINUTES.

SKIN: WASH OFF IN FLOWING WATER OR SHOWER. WASH CONTAMINATED CLOTHING BEFORE REUSE.

INGESTION: DO NOT INDUCE VOMITING. CALL A PHYSICIAN AND/OR TRANSPORT TO EMERGENCY FACILITY IMMEDIATELY.

INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE MOUTH-TO-MOUTH RESUSCITATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. CALL A PHYSICIAN.

NOTE TO PHYSICIAN: BECAUSE RAPID ABSORPTION MAY OCCUR THROUGH LUNGS IF ASPIRATED AND CAUSE SYSTEMIC EFFECTS, THE DECISION OF WHETHER TO INDUCE VOMITING OR NOT SHOULD BE MADE BY A PHYSICIAN. IF LAVAGE IS PERFORMED, SUGGEST ENDOTRACHEAL AND/OR ESOPHAGEAL CONTROL. DANGER FROM LUNG ASPIRATION MUST BE WEIGHED AGAINST TOXICITY WHEN CONSIDERING EMPTYING THE STOMACH. IF BURN IS PRESENT, TREAT AS ANY THERMAL BURN, AFTER DECONTAMINATION. EXPOSURE MAY INCREASE "MYOCARDIAL IRRITABILITY". DO NOT ADMINISTER SYMPATHOMIMETIC DRUGS UNLESS ABSOLUTELY NECESSARY. NO SPECIFIC ANTIDOTE. SUPPORTIVE CARE. TREATMENT BASED ON JUDGMENT OF THE PHYSICIAN IN RESPONSE TO REACTIONS OF THE PATIENT.

8. HANDLING PRECAUTIONS:

EXPOSURE GUIDELINE(S): PERCHLOROETHYLENE: ACGIH TLV IS 50 PPM (STEL IS 200 PPM); OSHA PEL IS 100 PPM.

(CONTINUED ON PAGE 4)

8. HANDLING PRECAUTIONS: (CONTINUED)

VENTILATION: CONTROL AIRBORNE CONCENTRATIONS BELOW THE EXPOSURE GUIDELINE. USE ONLY WITH ADEQUATE VENTILATION. LOCAL EXHAUST VENTILATION MAY BE NECESSARY FOR SOME OPERATIONS. LETHAL CONCENTRATIONS MAY EXIST IN AREAS WITH POOR VENTILATION.

RESPIRATORY PROTECTION: ATMOSPHERIC LEVELS SHOULD BE MAINTAINED BELOW THE EXPOSURE GUIDELINE. WHEN RESPIRATORY PROTECTION IS REQUIRED FOR CERTAIN OPERATIONS, USE AN APPROVED AIR-PURIFYING RESPIRATOR. FOR EMERGENCY AND OTHER CONDITIONS WHERE THE EXPOSURE GUIDELINE MAY BE GREATLY EXCEEDED, USE AN APPROVED AIR-PURIFYING RESPIRATOR. IN CONFINED OR POORLY VENTILATED AREAS, USE AN APPROVED POSITIVE PRESSURE SELF-CONTAINED BREATHING APPARATUS.

SKIN PROTECTION: FOR BRIEF-CONTACT, NO PRECAUTIONS OTHER THAN CLEAN BODY-COVERING CLOTHING SHOULD BE NEEDED. WHEN PROLONGED OR FREQUENTLY REPEATED CONTACT COULD OCCUR, USE PROTECTIVE CLOTHING IMPERVIOUS TO THIS MATERIAL. SELECTION OF SPECIFIC ITEMS SUCH AS GLOVES, BOOTS, APRON, OR FULL BODY SUIT WILL DEPEND ON OPERATION.

EYE PROTECTION: USE SAFETY GLASSES. WHERE CONTACT WITH LIQUID IS LIKELY, CHEMICAL GOGGLES ARE RECOMMENDED BECAUSE EYE CONTACT WITH THIS MATERIAL MAY CAUSE PAIN, EVEN THOUGH IT IS UNLIKELY TO CAUSE INJURY.

9. ADDITIONAL INFORMATION:

SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: HANDLE WITH REASONABLE CARE AND CAUTION. AVOID BREATHING VAPORS. VAPORS OF THIS PRODUCT ARE HEAVIER THAN AIR AND WILL COLLECT IN LOW AREAS SUCH AS PITS, DEGREASERS, STORAGE TANKS, AND OTHER CONFINED AREAS. DO NOT ENTER THESE AREAS WHERE VAPORS OF THIS PRODUCT ARE SUSPECTED UNLESS SPECIAL BREATHING APPARATUS IS USED AND AN OBSERVER IS PRESENT FOR ASSISTANCE.

MSDS STATUS: REVISED 6 AND 8.

Form Approved
Budget Bureau No. 44-R1387
Approval Expires April 30, 1971

Form OSHA 20

Form No. LSB-OOS-4
May 1969

U.S. DEPARTMENT OF LABOR

WORKPLACE STANDARDS ADMINISTRATION

Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME: Vulcan Materials Co., Chemicals Division	EMERGENCY TELEPHONE NO.: 316-524-4211
ADDRESS (Number, Street, City, State, and ZIP Code): P. O. Box 545, Wichita, Kansas 67201	
CHEMICAL NAME AND SYNONYMS: 1,1,1 Trichloroethane - Methyl Chloroform	TRADE NAME AND SYNONYMS: Solvent 111
CHEMICAL FAMILY: Chlorinated Hydrocarbon	FORMULA: ($C Cl_3 \cdot CH_3$)

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)

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	170°	SPECIFIC GRAVITY (H_2O=1)	1.348
VAPOR PRESSURE (mm Hg.)	110	PERCENT VOLATILE BY VOLUME (%)	100
VAPOR DENSITY (AIR=1)	4.5	EVAPORATION RATE (Ether =1)	0.35
SOLUBILITY IN WATER	Slight		
APPEARANCE AND ODOR	Colorless heavy liquid - pleasant etheral odor		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used): None	FLAMMABLE LIMITS: N/A	Lel	Uel
EXTINGUISHING MEDIA: N/A			
SPECIAL FIRE FIGHTING PROCEDURES: N/A			
UNUSUAL FIRE AND EXPLOSION HAZARDS: May ignite where high vapor concentrations are mixed in air and exposed to high energy sources.			

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: 350 ppm

EFFECTS OF OVEREXPOSURE: Anesthesia

EMERGENCY AND FIRST AID PROCEDURES: Prompt removal from exposure. Contaminated clothing should be removed. All affected areas should be washed with soap and water. Wash eyes with copious quantities of water. If taken internally, induce vomiting. Call a physician.

SECTION VI - REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*: Aluminum

HAZARDOUS DECOMPOSITION PRODUCTS: Phosgene and Hydrogen Chloride

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Contain material in as small an area as possible. Keep persons out of high vapor concentrations.

WASTE DISPOSAL METHOD: Confine in small area of dry sand, earth or ashes at safe distance from occupied areas and allow to evaporate. For large quantities contact supplier.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*: Canister with organic vapor cartridge.

VENTILATION		
	LOCAL EXHAUST: Adequate ventilation required	SPECIAL
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES: Polyvinyl alcohol or PVC-coated

EYE PROTECTION: Safety glasses - goggles - face shield

OTHER PROTECTIVE EQUIPMENT: Use rubber suit & shoes for liquid protection.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Avoid breathing vapors or contact with skin. Container or tank vents should be piped outdoors.

OTHER PRECAUTIONS: Prevent contact with moisture, i.e. atmospheric air.

DUPONT

MATERIAL SAFETY DATA SHEET

IDENTIFICATION

Name:
Freon® TF Solvent
Freon® PCA

Chemical Family:
Halogenated Hydrocarbon

Synonyms:
Trichlorotrifluoroethane
R-113, FC-113

Formula:
CCl_2FCClF_2

CAS Name:
Ethane, 1,1,2-Trichloro-1,2,2-Trifluoro

CAS Registry No.
76-13-1

Manufacturer/Distributor:
E. I. du Pont de Nemours & Co. (Inc.)

Medical Emergency Phone:
(800) 441-3637

Address:
Freon® Products Division
Wilmington, DE 19898

Transportation Emergency Phone:
CHEMTREC (800) 424-9300

PHYSICAL DATA

Boiling Point(°F): 117.6

Percent Volatile by Volume: 100%

Density: 1.57 g/cc @/77°F

Vapor Pressure: 334mm Hg @/77°F

Vapor Density (Air = 1): 6.5

Solubility in H_2O: 0.02% by wt. @ 77°F

pH Information: Neutral

Evaporation Rate (CCl_4 = 1): 0.1

Form: Liquid

Appearance: Clear

Color: Colorless

Odor: Slight Ethereal Odor

HAZARDOUS COMPONENTS

Material(s):
Trichlorotrifluoroethane

Approximate % :
100

HAZARDOUS REACTIVITY

Stability:
Material is stable. However, avoid open flames and high temperatures.

Incompatibility:
Alkali or alkaline earth metals - powdered Al, Zn, Be, etc.

Decomposition:
This compound can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrochloric and hydrofluoric acids - possible carbonyl halides.

Polymerization:
Will not occur

FIRE AND EXPLOSION DATA

Flash Point:
None

Method:
TOC

Autoignition Temperature:
Not Determined

Flammable Limits in Air, % by Vol.
Lower: Nonflammable
Upper: Nonflammable

Autodecomposition Temperature:
Not Determined

Fire and Explosion:
Drums may rupture under fire conditions. Decomposition may occur.

Extinguishing Media:
Nonflammable

Special Fire Fighting Instructions:
Self-contained breathing apparatus (SCBA) may be required if drums rupture and contents are spilled under fire conditions.

HEALTH HAZARD INFORMATION

Principal Health Hazards:

Inhalation: Vapor is heavier than air and can cause suffocation by reducing oxygen available for breathing. Breathing high concentrations of vapor may cause light-headedness, giddiness, shortness of breath, and may lead to narcosis, cardiac irregularities, unconsciousness or death. LC 50 Rats 52,000 ppm/4 hrs.

Note: In screening studies with experimental animals, exposure at approximately 5000 ppm (v/v) and above, followed by a large intravenous epinephrine challenge, has induced serious cardiac irregularities.

Skin: Not a corrosive or irritant after single contact; however, repeated liquid contact can cause defatting of the skin resulting in irritation. This material is poorly absorbed through the skin (Rabbit ALD >11,000 mg/kg).

Eye: Liquid contact can cause discomfort, usually no extended effect.

Oral: Although oral toxicity is low [LD 50 Rat 43000 mg/kg], ingestion of FC-113 is to be avoided.

Exposure Limits:

PEL (OSHA)	1,000 ppm
TLV® TWA (ACGIH)	1,000 ppm

Safety Precautions:
Avoid breathing vapors and prolonged skin exposure. Use only in well ventilated area.

First Aid:

Inhalation: Remove to fresh air, call a physician. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Do not give epinephrine or similar drugs.

Note to Physician: Because of a possible increased risk of eliciting cardiac dysrythmias, catecholamine drugs, such as epinephrine, should be considered only as a last resort in life threatening emergencies.

Eye: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

Skin: Flush with water. Get medical attention if irritation is present.

Oral: No specific intervention is indicated as the compound is not likely to be hazardous by ingestion. However, consult a physician if necessary. Do not induce vomiting as the hazard of aspirating the material into the lungs is a greater hazard than allowing it to progress through the intestinal tract.

Medical Conditions Possibly Aggravated by Exposure:

Cardiovascular Disease: See Principal Hazards: Inhalation Section.

Other Health Hazards:

Freon® 113 is not listed as a carcinogen by IARC, NTP or OSHA. Based on animal studies and human experiences this fluorocarbon poses no hazard to man relative to systemic toxicity, carcinogenicity, mutagenicity, or teratogenicity when occupational exposures are below its TLV®.

PROTECTION INFORMATION

Generally Applicable Control Measures:

Normal ventilation for standard manufacturing procedures is generally adequate. Local exhaust should be used when large amounts are released. Mechanical ventilation should be used in low places.

Personal Protective Equipment:

Butyl gloves should be used to avoid prolonged or repeated exposure. Chemical splash goggles should be available for use as needed to prevent eye contact. Under normal manufacturing conditions no respiratory protection is required when using this product. Self-contained breathing apparatus (SCBA) is required if a large spill occurs.

DISPOSAL INFORMATION

Spill, Leak or Release:
Ventilate area. Do not flush into sewers. Dike spill. Collect on absorbent material and transfer to steel drums for recovery or disposal. Comply with federal, state and local regulations on reporting releases.

Waste Disposal: Comply with federal, state and local regulations. Remove to a permitted waste disposal facility. EPA Hazardous Waste Nos. F001 and F002 may apply to waste materials.

SHIPPING INFORMATION

Domestic - Other Than Air (DOT)

Proper Shipping Name	Not Regulated

International Water or Air (IMO/ICAO)

Proper Shipping Name	Not Regulated

Other Information

Shipping Containers	Drums, tank trucks, tank cars
Storage Conditions	Clean, dry area. Do not heat above 125°F.

Date Revised: 10/85
Person responsible: T. D. Armstrong, C&P Dept., Freon® Products Lab, Chestnut Run, Bldg. 711, Wilmington, DE 19898 (302) 999-3847 or (302) 999-4338.

DUPONT

6/81

Allied Chemical

CHEMICALS COMPANY

PRODUCT SAFETY DATA SHEET

A. GENERAL INFORMATION

TRADE NAME (COMMON NAME OR SYNONYM)	☒ C.A.S. NO. ☐ ALLIED PRODUCT CODE #
n-BUTYL ACETATE, SL Grade PARTICU-LO™ Grade	123-86-4

CHEMICAL NAME: n-Butyl Acetate

FORMULA	MOLECULAR WEIGHT
$CH_3COOCH_2CH_2CH_2CH_3$	116.18 (formula weight)

COMPANY/PLANT ADDRESS (No., STREET, CITY, STATE AND ZIP CODE)
CHEMICALS COMPANY
POB 1139R
Morristown, N.J. 07960

CONTACT	PHONE NUMBER	ISSUED DATE	REVISED DATE
Director, Product Safety	(201) 455-4157	Nov., 1977	Jul., 1980

B. FIRST AID MEASURES

EMERGENCY PHONE NUMBER (201) 455-2000

Inhalation: remove to fresh air; if unconscious, give artificial respiration and oxygen if qualified operator available. Call a physician. Keep warm and comfortable. Eye: wash with water for 15 minutes. Skin: wash with soap and water. Ingestion: if conscious, give 2 to 4 glasses of water and induce vomiting by sticking finger down throat. Call a physician. Keep warm and recumbent.

C. HAZARDS INFORMATION

FIRE AND EXPLOSION

FLASH POINT	AUTO IGNITION TEMPERATURE	FLAMMABLE LIMITS IN AIR (% BY VOL.)
22 °C ☐ OPEN CUP ☒ CLOSED CUP	425 °C	LOWER 1.7 UPPER 7.6

UNUSUAL FIRE AND EXPLOSION HAZARDS

Toxic decomposition products - see Section VI. Vapors may travel a considerable distance to an ignition point and flash back.

HEALTH

INHALATION
Irritant to eyes, throat, and respiratory passages. (Human studies at 200 ppm - quite severe at 300 ppm). CNS depressant. Gradual narcosis. Recovery is slow after exposure ceases.

INGESTION
Irritant to throat and digestive tract. Same CNS depressant action expected as for inhalation. LD_{50} (rat): 14,000 mg/kg. LDLo (human): 500 mg/kg.

SKIN
Extended exposure may irritate.

EYES
See Inhalation, above (vapor contact).
Liquid contact may irritate.

PERMISSIBLE CONCENTRATION: AIR (SEE SECTION J) 150 ppm.
TLV: The Same.
BIOLOGICAL: None Established.

UNUSUAL CHRONIC TOXICITY
See subacute data, Section K.

Attachment: Facsimile Label

F. PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS):	APPEARANCE AND ODOR	
☒ LIQUID ☐ SOLID ☐ GAS ☐ _____	Colorless liquid, fruity odor. 8-pint bottle in box or 55-gal. drum. Outer container has a red label.	
BOILING POINT 127 °C MELTING POINT (solidifies) −77 °C	SPECIFIC GRAVITY (H_2O = 1) (liquid) 0.88	VAPOR DENSITY (AIR = 1) 4.0
SOLUBILITY IN WATER (% by weight) 0.5	pH N.A. (non-aqueous) Estimated to be neutral when dissolved in water.	VAPOR PRESSURE (mm Hg at 20° C) 15
EVAPORATION RATE (Butyl Acetate = 1) Unity	% VOLATILES BY VOLUME (At 20° C) 100	

G. REACTIVITY DATA

STABILITY	CONDITIONS TO AVOID
☐ UNSTABLE ☒ STABLE	N.A.

INCOMPATIBILITY (MATERIALS TO AVOID)

Oxidants, particularly nitrates. Strong alkalies, strong acids.

HAZARDOUS DECOMPOSITION PRODUCTS

We have no data on this, but on combustion we would expect CO and CO_2, at least.

HAZARDOUS POLYMERIZATION	CONDITIONS TO AVOID
☐ MAY OCCUR ☒ WILL NOT OCCUR	N.A.

H. HAZARDOUS INGREDIENTS (Mixtures Only) (N.A.)

MATERIAL OR COMPONENT	%	HAZARD DATA (SEE SECT. J)

D. PRECAUTIONS/PROCEDURES

VENTILATION

ocal exhaust: where liquid is being poured, or otherwise open (explosion-proof).

Mechanical (General): adequate in storage areas.

NORMAL HANDLING

Follow OSHA Regulations for Flammable Liquids, Para. 1910.106, and also NFPA No. 30, Ref. (a), Section J.

STORAGE

Store in cool, well-ventilated area. Protect from physical damage. Follow references under "Normal Handling." Keep container closed.

PRECAUTIONARY LABEL ☒ ATTACHED ☐ NOT ATTACHED DOT Classification: Flammable Liquid.
Allied Chemical Label 119-003659-15.1-78 (typical). WARNING! FLAMMABLE. HARMFUL IF INHALED. CAUSES IRRITATION. Label facsimile is attached.

SPILL OR LEAK

Station fire hose team and back-up team. Eliminate ignition sources. Use water spray to disperse vapors and protect men attempting to stop any leak. Provide respiratory protection, Section VIII. Water will raise flash point. Small spills: mop up, wipe up, or soak up immediately. Remove to out-of-doors. Place soaked wiping materials in a metal container and seal. Large spills: dike up liquid; transfer to closed metal containers. Keep out of sewers.

FIRE EXTINGUISHING AGENTS **RECOMMENDED**

"Alcohol" type foam.

ECIAL FIRE FIGHTING PRECAUTIONS

Wear self-contained breathing apparatus approved by NIOSH. Keep containers cool with water spray. Remove contaminated clothing.

FIRE EXTINGUISHING AGENTS TO **AVOID**

Water may be ineffective in lowering fuel temperature.

SPECIAL PRECAUTIONS/PROCEDURES

"EMPTY" containers should be assumed to have the same hazards as the full ones unless thoroughly cleaned. Consequently, do not weld or otherwise over-heat these drums. Although DOT portion of label must be removed on emptying, remainder of labeling should be retained.

E. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION

Under normal ventilation, respiratory protective equipment not required. For exposure potentials > TLV (150 ppm), universal gas mask or special canister gas mask. Above approximately 7500 ppm, use self-contained breathing apparatus or air-supplied respirator.

EYES AND FACE

Chemical goggles. Do not wear contact lenses.

HANDS, ARMS, AND BODY

tective gloves: polyvinyl alcohol. Rubber apron.

OTHER CLOTHING AND EQUIPMENT

Boots when handling drums.

WARNING!

FLAMMABLE.
HARMFUL IF INHALED.
CAUSES IRRITATION.
Keep away from heat, sparks and open flame.
Avoid breathing vapor.
Use with adequate ventilation.
Avoid contact with eyes, skin and clothing.
Keep container closed.
Wash thoroughly after handling.
FIRST AID: If inhaled, remove to fresh air. If not breathing, give artificial respiration, preferably mouth to mouth. If breathing is difficult, give oxygen.
Call a physician.
In case of contact immediately flush eyes with plenty of water for at least 15 minutes. Call a physician. Flush skin with water.
In case of spill: Dike up large spills; transfer to closed containers. Small spills: mop up immediately. Place in closed containers. Do not sewer.
In case of fire: Use "alcohol type" foam. Wear self-contained breathing apparatus.

Analytical data on the product in this package is available on request and may be sent where required — the process area, the laboratory, or the office.

Storage and Handling:

1. Store out of sun and away from heat.
2. Remove closures carefully to relieve possible internal pressure.
3. Keep upright.

Allied Chemical Corporation
Morristown, New Jersey 07960

Allied Chemical

n-Butyl Acetate

Code 119-002659

Semiconductor Low Mobile Ion Grade

Meets Reagent, ACS and SEMI specifications

$C_6H_{12}O_2$ F.W. 116.16
Assay ($C_6H_{12}O_2$) ..... 99.0% Min.

For manufacturing use only.
Not for food or drug use.

This case contains:
4 × 8 Pt. bottles
(4 × 3.79 Liter) bottles
(4 × 7.4 lbs.)

Not a photochemically reactive solvent.

ARROW MUST POINT TO TOP

119 002659-32-80

I. ENVIRONMENTAL

DEGRADABILITY

OD (% of theoretical) 5-day: 7%

OCTANOL/WATER PARTITION COEFFICIENT

Unknown.

WASTE DISPOSAL METHODS*

Disposal of n-Butyl Acetate may be subject to federal, state, and local regulations. Users of this product should review their operations in terms of applicable federal, state, and local laws and regulations, then consult with appropriate regulatory agencies before discharging or disposing of waste material or the virgin commodity.

*DISPOSER MUST COMPLY WITH FEDERAL, STATE AND LOCAL DISPOSAL OR DISCHARGE LAWS.

J. REFERENCES

PERMISSIBLE CONCENTRATION REFERENCES

OSHA Regulations, 29CFR 1910.1000. TLV from the ACGIH 1979 List, "Threshold Limit Values For Chemical Substances. . ."

REGULATORY STANDARDS

DOT Hazardous Materials Table: 49CFR 172.101.

GENERAL

(a) NFPA No. 30, "Flammable and Combustible Liquids Code," National Fire Protection Association, 570 Atlantic Ave., Boston, MA 02210.
(b) AIHA, Hygienic Guide, 1977.
(c) NIOSH Registry, Sequence No. AF 73500 (1978).
(d) E. Browning, Toxicity and Metabolism of Industrial Solvents, 1965, pp. 529-532, 591-593, Elsevier, NYC. (continued Section K)

K. ADDITIONAL INFORMATION

(continued from Section J)

(e) *Querci, Vittoria; Mascia, D (1970), (1st Med. Legale University Siena, Siena, Italy) Med. Lav. 61 (10) pp. 524-30.

Section C - Chronic (Cont'd.)

Subacute Data: "*Rabbits exposed to approximately thirty times the TLV (22-30 mg/l) for 1 hour daily for 15 five-day weeks were shown to have developed degenerative changes in the liver. Early lesion activity and fibrogenic stimulation were also observed." Ref. (e).

Occupational Health Guideline for Isopropyl Alcohol

INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

SUBSTANCE IDENTIFICATION

- Formula: $CH_3CHOHCH_3$
- Synonyms: Isopropanol; IPA; 2-propanol; sec-propyl alcohol
- Appearance and odor: Colorless liquid with an odor of rubbing alcohol.

PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for isopropyl alcohol is 400 parts of isopropyl alcohol per million parts of air (ppm) averaged over an eight-hour work shift. This may also be expressed as 980 milligrams of isopropyl alcohol per cubic meter of air (mg/m^3). NIOSH has recommended that the permissible exposure limit be changed to 400 ppm averaged over a work shift of up to 10 hours per day, 40 hours per week, with a ceiling of 800 ppm averaged over a 15-minute period. The NIOSH Criteria Document for Isopropyl Alcohol should be consulted for more detailed information.

HEALTH HAZARD INFORMATION

- **Routes of exposure**

Isopropyl alcohol can affect the body if it is swallowed, is inhaled, or comes in contact with the skin or eyes.

- **Effects of overexposure**

1. Short-term Exposure: Exposure to high air concentrations of isopropyl alcohol may cause mild irritation of the eyes, nose, and throat. Drowsiness, headache, and incoordination may also occur. Swallowing isopropyl alcohol may cause drowsiness, unconsciousness, and death. Gastrointestinal pain, cramps, nausea, vomiting, and diarrhea may also result from swallowing this alcohol.

2. Long-term Exposure: Drying and cracking of the skin may result from prolonged skin exposure. Epidemiological investigations have established that a carcinogenic substance is present in isopropyl alcohol manufacturing areas, but have not confirmed isopropyl alcohol as a causative agent of cancer.

3. Reporting Signs and Symptoms: A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to isopropyl alcohol.

- **Recommended medical surveillance**

The following medical procedures should be made available to each employee who is exposed to isopropyl alcohol at potentially hazardous levels:

1. Initial Medical Examination:

—A complete history and physical examination: The purpose is to detect pre-existing conditions that might place the employee at increased risk, and to establish a baseline for future health monitoring. Examination of the skin, liver, kidneys, and respiratory system should be stressed.

—Skin disease: Isopropyl alcohol is a defatting agent and can cause dermatitis on prolonged exposure. Persons with pre-existing skin disorders may be more susceptible to the effects of this agent.

—Liver disease: Although isopropyl alcohol is not known as a liver toxin in humans, the importance of this organ in the biotransformation and detoxification of foreign substances should be considered before exposing persons with impaired liver function.

—Kidney disease: Although isopropyl alcohol is not known as a kidney toxin in humans, the importance of this organ in the elimination of toxic substances justifies special consideration in those with impaired renal function.

—Chronic respiratory disease: In persons with impaired pulmonary function, especially those with obstructive airway diseases, the breathing of isopropyl

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service Centers for Disease Control
National Institute for Occupational Safety and Health

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

alcohol might cause exacerbation of symptoms due to its irritant properties.

2. Periodic Medical Examination: The aforementioned medical examinations should be repeated on an annual basis.

• **Summary of toxicology**

The most important toxic effect of isopropyl alcohol is narcosis, which occurs in mice at vapor concentrations of 3000 ppm, the effects increasing with the duration of exposure. Exposure to higher concentrations results in ataxia, followed by deep narcosis and death. Reversible changes occurred in the liver fat of mice repeatedly exposed to high concentrations of vapor. Isopropyl alcohol is metabolized fairly rapidly, and acetone may be detected in the urine following heavy exposures. Human volunteers reported mild irritation of the eyes, nose, and throat after 3 to 5 minutes exposure to vapor at 400 ppm; at 800 ppm the results were not severe, but most subjects found the atmosphere to be objectionable. Accidental, extensive wetting of the skin could occur in industrial situations and as isopropyl alcohol is absorbed readily through the skin, the additive effect of inhalation and skin absorption could have serious results. Similarly, there is a risk of deliberate ingestion of isopropyl alcohol as a substitute for ethyl alcohol, which would add to the effects of inhalation. The defatting action of isopropyl alcohol can cause mild skin irritation, but a small percentage of workers may develop contact dermatitis of a more serious nature. No chronic systemic effects have been reported in humans.

CHEMICAL AND PHYSICAL PROPERTIES

• **Physical data**

1. Molecular weight: 60
2. Boiling point (760 mm Hg): 82 C (180 F)
3. Specific gravity (water = 1): 0.78
4. Vapor density (air = 1 at boiling point of isopropyl alcohol): 2.1
5. Melting point: −89 C (−128 F)
6. Vapor pressure at 20 C (68 F): 33 mm Hg
7. Solubility in water, g/100 g water at 20 C (68 F): Miscible in all proportions
8. Evaporation rate (butyl acetate = 1): 2.83

• **Reactivity**

1. Conditions contributing to instability: Heat
2. Incompatibilities: Contact with strong oxidizers may cause fires and explosions.
3. Hazardous decomposition products: Toxic gases and vapors (such as carbon monoxide) may be released in a fire involving isopropyl alcohol.
4. Special precautions: Isopropyl alcohol will attack some forms of plastics, rubber, and coatings. It may also react with metallic aluminum at high temperatures.

• **Flammability**

1. Flash point: 12 C (53 F) (closed cup)
2. Autoignition temperature: 399 C (750 F)
3. Flammable limits in air, % by volume: Lower: 2.0; Upper: 12.0
4. Extinguishant: Alcohol foam, dry chemical, carbon dioxide

• **Warning properties**

1. Odor Threshold: Patty reports, "Scherberger et al. stated that the concentration with identifiable odor of isopropyl alcohol is 200 ppm." May reports an odor threshold of 45 ppm.
2. Irritation Level: According to Patty, "mild irritation of the eyes, nose, and throat was induced in human subjects exposed by Nelson and associates for 3 to 5 minutes to 400 ppm of isopropyl alcohol."
3. Evaluation of Warning Properties: Through its odor and irritant effects, isopropyl alcohol can be detected below or at the permissible exposure limit. For the purposes of this guideline, therefore, it is treated as a material with adequate warning properties.

MONITORING AND MEASUREMENT PROCEDURES

• **Eight-Hour Exposure Evaluation**

Measurements to determine employee exposure are best taken so that the average eight-hour exposure is based on a single eight-hour sample or on two four-hour samples. Several short-time interval samples (up to 30 minutes) may also be used to determine the average exposure level. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee).

• **Ceiling Evaluation**

Measurements to determine employee ceiling exposure are best taken during periods of maximum expected airborne concentrations of isopropyl alcohol. Each measurement should consist of a fifteen (15) minute sample or series of consecutive samples totalling fifteen (15) minutes in the employee's breathing zone (air that would most nearly represent that inhaled by the employee). A minimum of three (3) measurements should be taken on one work shift and the highest of all measurements taken is an estimate of the employee's exposure.

• **Method**

Sampling and analyses may be performed by collection of isopropyl alcohol vapors using an adsorption tube with subsequent desorption with 2-butanol in carbon disulfide and gas chromatographic analysis. Also, detector tubes certified by NIOSH under 42 CFR Part 84 or other direct-reading devices calibrated to measure isopropyl alcohol may be used. An analytical method for isopropyl alcohol is in the *NIOSH Manual of Analytical Methods,* 2nd Ed., Vol. 2, 1977, available from the Government Printing Office, Washington, D.C. 20402 (GPO No. 017-033-00260-6).

RESPIRATORS

• Good industrial hygiene practices recommend that engineering controls be used to reduce environmental

concentrations to the permissible exposure level. However, there are some exceptions where respirators may be used to control exposure. Respirators may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. Respirators may also be used for operations which require entry into tanks or closed vessels, and in emergency situations. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration (formerly Mining Enforcement and Safety Administration) or by the National Institute for Occupational Safety and Health.

- In addition to respirator selection, a complete respiratory protection program should be instituted which includes regular training, maintenance, inspection, cleaning, and evaluation.

PERSONAL PROTECTIVE EQUIPMENT

- Employees should be provided with and required to use impervious clothing, gloves, face shields (eight-inch minimum), and other appropriate protective clothing necessary to prevent repeated or prolonged skin contact with liquid isopropyl alcohol.
- Any clothing which becomes wet with liquid isopropyl alcohol should be removed immediately and not reworn until the isopropyl alcohol is removed from the clothing.
- Clothing wet with liquid isopropyl alcohol should be placed in closed containers for storage until it can be discarded or until provision is made for the removal of isopropyl alcohol from the clothing. If the clothing is to be laundered or otherwise cleaned to remove the isopropyl alcohol, the person performing the operation should be informed of isopropyl alcohol's hazardous properties.
- Employees should be provided with and required to use splash-proof safety goggles where liquid isopropyl alcohol may contact the eyes.

SANITATION

- Skin that becomes wet with liquid isopropyl alcohol should be promptly washed or showered to remove any isopropyl alcohol.

COMMON OPERATIONS AND CONTROLS

The following list includes some common operations in which exposure to isopropyl alcohol may occur and control methods which may be effective in each case:

Operation	Controls
Use as a solvent in spray and heat applications of surface coatings, including stain, varnish, nitrocellulose lacquers, and quick-drying inks and paints	General dilution ventilation; personal protective equipment
Use as a solvent in application other than spray or heat of surface coatings, including stain, varnish, nitrocellulose lacquers, quick-drying inks and paints, textile coatings and dyes, dopes, and polishes	General dilution ventilation; personal protective equipment
Use in manufacture and liberation during packing of acetone	General dilution ventilation; personal protective equipment
Use as a solvent in manufacture of surface coatings and thinners	General dilution ventilation; personal protective equipment
Use in organic synthesis for isopropyl derivatives, including phenols, acetates, xanthates, ether, amines, myristate, palmitate, nitrite, and glycerin	General dilution ventilation; personal protective equipment
Use in manufacture of cosmetics, including liniments, skin lotions, permanent wave lotions, and color hair rinses	General dilution ventilation; personal protective equipment
Liberation during use as a disinfectant and sanitizer; use during cleaning and degreasing operations	General dilution ventilation; personal protective equipment
Use in preparation, manufacture, and packaging of disinfectants and sanitizers, including rubbing alcohol, other antiseptic solutions, skin astringents, mouth washes, and medicated sprays	General dilution ventilation; personal protective equipment

Operation	Controls
Use in manufacture of cleaning and degreasing agents, including stain and spot removers, glass cleaners, rug and uphostery cleaning, tar remover, liquid soap, and windshield cleaner fluid; use in manufacture of de-icing, de-fogging, and anti-freeze products	General dilution ventilation; personal protective equipment
Use in extraction and purification of alkaloids, proteins, chlorophyll, perfumes, sulfuric acid, vitamins, kelp, pectin, resins, gums, and waxes	General dilution ventilation; personal protective equipment
Use in manufacture of rubber products; use as an additive in anti-stalling gasoline, lubricants, denatured ethyl alcohol, hydraulic brake fluids, and rocket fuel	General dilution ventilation; personal protective equipment
Use in manufacture of adhesives, including nitrocellulose film and microfilm cement; use in manufacture of safety glass	General dilution ventilation; personal protective equipment

EMERGENCY FIRST AID PROCEDURES

In the event of an emergency, institute first aid procedures and send for first aid or medical assistance.

• **Eye Exposure**

If isopropyl alcohol gets into the eyes, wash eyes immediately with large amounts of water, lifting the lower and upper lids occasionally. Get medical attention as soon as possible. Contact lenses should not be worn when working with this chemical.

• **Skin Exposure**

If isopropyl alcohol gets on the skin, flush the contaminated skin with water. If isopropyl alcohol soaks through the clothing, remove the clothing immediately and flush the skin with water. If there is skin irritation, get medical attention.

• **Breathing**

If a person breathes in large amounts of isopropyl alcohol, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.

• **Swallowing**

When isopropyl alcohol has been swallowed, get medical attention immediately. If medical attention is not immediately available, get the afflicted person to vomit by having him touch the back of his throat with his finger or by giving him syrup of ipecac as directed on the package. This non-prescription drug is available at most drug stores and drug counters and should be kept with emergency medical supplies in the workplace. Do not make an unconscious person vomit.

• **Rescue**

Move the affected person from the hazardous exposure. If the exposed person has been overcome, notify someone else and put into effect the established emergency rescue procedures. Do not become a casualty. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises.

SPILL, LEAK, AND DISPOSAL PROCEDURES

• Persons not wearing protective equipment and clothing should be restricted from areas of spills or leaks until cleanup has been completed.

• If isopropyl alcohol is spilled or leaked, the following steps should be taken:

1. Remove all ignition sources.
2. Ventilate area of spill or leak.
3. For small quantities, absorb on paper towels. Evaporate in a safe place (such as a fume hood). Allow sufficient time for evaporating vapors to completely clear the hood ductwork. Burn the paper in a suitable location away from combustible materials. Large quantities can be collected and atomized in a suitable combustion chamber. Isopropyl alcohol should not be allowed to enter a confined space, such as a sewer, because of the possibility of an explosion.

• Waste disposal methods:

Isopropyl alcohol may be disposed of:

1. By absorbing it in vermiculite, dry sand, earth or a similar material and disposing in a secured sanitary landfill.
2. By atomizing in a suitable combustion chamber.

REFERENCES

• American Conference of Governmental Industrial Hygienists: "Isopropyl Alcohol," *Documentation of the Threshold Limit Values for Substances in Workroom Air* (3rd ed., 2nd printing), Cincinnati, 1974.

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• Grant, W. M.: *Toxicology of the Eye* (2nd ed.), C. C. Thomas, Springfield, Illinois, 1974.

• Henson, E. V.: "Toxicology of Some Aliphatic Alcohols – Part II," *Journal of Occupational Medicine*, 2:497-502, 1960.

• International Labour Office: *Encyclopedia of Occupational Health and Safety*, McGraw-Hill, New York, 1971.

• Manufacturing Chemists Association, Inc.: *Chemical Safety Data Sheet SD-98, Isopropyl Alcohol*, Washington, D.C., 1972.

• May, J.: "Solvent Odor Thresholds for the Evaluation of Solvent Odors in the Atmosphere," *Staub-Reinhalt*, 26:9, 385-389, 1966.

• National Institute for Occupational Safety and Health, U.S. Department of Health, Education, and Welfare: *Criteria for a Recommended Standard . . . . Occupational Exposure to Isopropyl Alcohol*, HEW Publication No. (NIOSH) 76-142, GPO No. 017-033-00165-1, U.S. Government Printing Office, Washington, D.C., 1976.

• Patty, F. A. (ed.): *Toxicology*, Vol. II of *Industrial Hygiene and Toxicology* (2nd ed. rev.), Interscience, New York, 1963.

• Union Carbide Corporation, Industrial Medicine and Toxicology Department: *Toxicology Studies – Isopropyl Alcohol*, New York, 1970.

RESPIRATORY PROTECTION FOR ISOPROPYL ALCOHOL

Condition	Minimum Respiratory Protection* Required Above 400 ppm
Vapor Concentration	
1000 ppm or less	A chemical cartridge respirator with a full facepiece and an organic vapor cartridge(s).
5000 ppm or less	A gas mask with a chin-style organic vapor canister.
20,000 ppm or less	A gas mask with a front- or back-mounted organic vapor canister. Any supplied-air respirator with a full facepiece, helmet, or hood. Any self-contained breathing apparatus with a full facepiece.
Greater than 20,000 ppm or entry and escape from unknown concentrations	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Fire Fighting	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.
Escape	Any gas mask providing protection against organic vapors. Any escape self-contained breathing apparatus.

*Only NIOSH-approved or MSHA-approved equipment should be used.

Occupational Health Guideline for Methylene Chloride

INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

SUBSTANCE IDENTIFICATION

- Formula: CH_2Cl_2
- Synonyms: Dichloromethane; methylene dichloride
- Appearance and odor: Colorless liquid with an odor like chloroform.

PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for methylene chloride is 500 parts of methylene chloride per million parts of air (ppm) averaged over an eight-hour work shift, with an acceptable ceiling level of 1000 ppm and a maximum peak concentration of 2000 ppm for 5 minutes in any two-hour period. NIOSH has recommended that the permissible exposure limit be reduced to 75 ppm averaged over a work shift of up to 10 hours per day, 40 hours per week, with a ceiling level of 500 ppm averaged over a 15-minute period. NIOSH further recommends that permissible levels of methylene chloride be reduced where carbon monoxide is present. The NIOSH Criteria Document for Methylene Chloride should be consulted for more detailed information.

HEALTH HAZARD INFORMATION

- **Routes of exposure**

Methylene chloride can affect the body if it is inhaled or if it comes in contact with the eyes or skin. It can also affect the body if it is swallowed.

- **Effects of overexposure**

1. Short-term Exposure: Methylene chloride is an anesthetic. Inhaling the vapor may cause mental confusion, light-headedness, nausea, vomiting, and headache. Continued exposure may cause increased light-headedness, staggering, unconsciousness, and death. High vapor concentrations may also cause irritation of the eyes and respiratory tract. Exposure to this chemical may make the symptoms of angina worse. Skin exposure to the liquid may cause irritation. If the liquid is held in contact with the skin, it may cause skin burns. Splashes of the liquid into the eyes may cause irritation.

2. Long-term Exposure: Prolonged or repeated exposure to methylene chloride may cause irritation of the skin.

3. Reporting Signs and Symptoms: A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to methylene chloride.

- **Recommended medical surveillance**

The following medical procedures should be made available to each employee who is exposed to methylene chloride at potentially hazardous levels:

1. Initial Medical Examination:

—A complete history and physical examination: The purpose is to detect pre-existing conditions that might place the employee at increased risk, and to establish a baseline for future health monitoring. Examination of the skin, liver, kidneys, cardiovascular system, and blood should be stressed. Clinical impressions of the autonomic nervous system and pulmonary function should be made, with additional tests conducted where indicated.

—Skin disease: Methylene chloride can cause dermatitis on prolonged exposure. Persons with pre-existing skin disorders may be more susceptible to the effects of this agent.

—Liver function test: Methylene chloride causes liver damage in animals and this justifies consideration before exposing persons with impaired liver function. A profile of liver function should be obtained by utilizing a medically acceptable array of biochemical tests.

—Kidney disease: Methylene chloride causes kidney damage in animals and this justifies special considera-

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tion before exposing persons with impaired renal function.

—Cardiovascular disease: Because of reports of excessive carbon monoxide levels following exposure to methylene chloride, persons with cardiac disease may be at increased risk.

—A complete blood count: A complete blood count should be performed, including a red cell count, a white cell count, a differential count of a stained smear, as well as hemoglobin and hematocrit. Carboxyhemoglobin values should also be determined periodically, and any level above 5% should prompt an investigation of the worker and his workplace.

2. Periodic Medical Examination: The aforementioned medical examinations should be repeated on an annual basis.

• **Summary of toxicology**

Methylene chloride vapor is a mild narcotic. Exposure of animals to 15,000 ppm for 7 hours was fatal. Animal experiments have shown that continuous exposure to 1,000 ppm can be lethal in 5 to 7 weeks for dogs and that fatty livers, icterus, pneumonia, and splenic atrophy developed in dogs. Cardiac arrhytmias attributed to sensitization of the myocardium have been observed following exposure to high concentrations of some chlorinated hydrocarbons, but dogs exposed to 10,000 and 20,000 ppm of methylene chloride did not show this phenomenon. In human experiments, inhalation of 500 to 1000 ppm for 1 to 2 hours resulted in lightheadedness; there was sustained elevation of carboxyhemoglobin level. High exposures have resulted in deaths in industrial situations. Lower but unknown concentrations have caused such symptoms as lightheadedness, weakness, nausea, and "drunken behavior," resulting in mistakes and accidental falls. Phosgene poisoning has been reported to occur in several cases where methylene chloride was used in the presence of an open fire. Liquid methylene chloride is irritating to the skin on repeated contact. Splashed in the eye, it is painfully irritating, but is not likely to cause serious injury.

CHEMICAL AND PHYSICAL PROPERTIES

• **Physical data**

1. Molecular weight: 84.9
2. Boiling point (760 mm Hg): 39.8 C (104 F)
3. Specific gravity (water = 1): 1.3
4. Vapor density (air = 1 at boiling point of methylene chloride): 2.9
5. Melting point: −97 C (−142 F)
6. Vapor pressure at 20 C (68 F): 350 mm Hg
7. Solubility in water, g/100 g water at 20 C (68 F): 1.32
8. Evaporation rate (butyl acetate = 1): 27.5

• **Reactivity**

1. Conditions contributing to instability: Heat and moisture
2. Incompatibilities: Contact with strong oxidizers, strong caustics, and chemically active metals such as aluminum or magnesium powder, sodium and potassium may cause fires and explosions.
3. Hazardous decomposition products: Toxic gases and vapors (such as hydrogen chloride, phosgene, and carbon monoxide) may be released in a fire involving methylene chloride.
4. Special precautions: Liquid methylene chloride will attack some forms of plastics, rubber, and coatings.

• **Flammability**

1. Flash point: None with normal test method
2. Autoignition temperature: 556 C (1033 F)
3. Flammable limits in air, % by volume: (at elevated temperatures) Lower: 12; Upper: 19
4. Extinguishant: Dry chemical, carbon dioxide, foam

• **Warning properties**

1. Odor Threshold: Different authors have reported varying odor thresholds for methylene chloride. Summer and May both report 150 ppm; Kirk-Othmer and Sax both report 25 to 50 ppm; Spector reports 320 ppm. Patty, however, states that since one can become adapted to the odor, it cannot be considered an adequate warning property.
2. Eye Irritation Level: Grant reports that methylene chloride "presents no particular hazard to the eyes." Kirk-Othmer, however, reports that "methylene chloride vapor is seriously damaging to the eyes." Sax agrees with Kirk-Othmer's statement.

The *Documentation of TLV's* states that irritation of the eyes has been observed in workers who had been exposed to concentrations up to 5000 ppm, but that neurasthenic disorders were found in 50% and digestive disturbances in 30% of the persons exposed.

3. Other Information: Gleason reports that methylene chloride may be "irritating to the respiratory tract and may produce pulmonary edema" but gives no quantitative information. The *Documentation of TLV's* reports that in one investigation, irritation of the respiratory passages was observed in workers who had been exposed to concentrations up to 5000 ppm.
4. Evaluation of Warning Properties: Since no detailed information is available relating the irritant effects of methylene chloride to air concentrations and since adaptation to the odor occurs, methylene chloride is treated as a material with poor warning properties.

MONITORING AND MEASUREMENT PROCEDURES

• **Eight-Hour Exposure Evaluation**

Measurements to determine employee exposure are best taken so that the average eight-hour exposure is based on a single eight-hour sample or on two four-hour samples. Several short-time interval samples (up to 30 minutes) may also be used to determine the average exposure level. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee).

• **Ceiling Evaluation**

Measurements to determine employee ceiling exposure are best taken during periods of maximum expected airborne concentrations of methylene chloride. Each measurement should consist of a fifteen (15) minute sample or series of consecutive samples totalling fifteen (15) minutes in the employee's breathing zone (air that would most nearly represent that inhaled by the employee). A minimum of three (3) measurements should be taken on one work shift and the highest of all measurements taken is an estimate of the employee's exposure.

• **Peak Above Ceiling Evaluation**

Measurements to determine employee peak exposure should be taken during periods of maximum expected airborne concentration of methylene chloride. Each measurement should consist of a 30-minute sample or a series of consecutive samples totalling 30 minutes in the employee's breathing zone (air that would most nearly represent that inhaled by the employee). A minimum of three measurements should be taken on one work shift and the highest of all measurements taken is an estimate of the employee's exposure.

• **Method**

Sampling and analyses may be performed by collection of vapors using an adsorption tube with subsequent desorption with carbon disulfide and gas chromatographic analysis. Also, detector tubes certified by NIOSH under 42 CFR Part 84 or other direct-reading devices calibrated to measure methylene chloride may be used. An analytical method for methylene chloride is in the *NIOSH Manual of Analytical Methods,* 2nd Ed., Vol. 3, 1977, available from the Government Printing Office, Washington, D.C. 20402 (GPO No. 017-033-00261-4).

RESPIRATORS

• Good industrial hygiene practices recommend that engineering controls be used to reduce environmental concentrations to the permissible exposure level. However, there are some exceptions where respirators may be used to control exposure. Respirators may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. Respirators may also be used for operations which require entry into tanks or closed vessels, and in emergency situations. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration (formerly Mining Enforcement and Safety Administration) or by the National Institute for Occupational Safety and Health.

• In addition to respirator selection, a complete respiratory protection program should be instituted which includes regular training, maintenance, inspection, cleaning, and evaluation.

PERSONAL PROTECTIVE EQUIPMENT

• Employees should be provided with and required to use impervious clothing, gloves, face shields (eight-inch minimum), and other appropriate protective clothing necessary to prevent repeated or prolonged skin contact with liquid methylene chloride.

• Non-impervious clothing which becomes wet with liquid methylene chloride should be removed promptly and not reworn until the methylene chloride is removed from the clothing.

• Employees should be provided with and required to use splash-proof safety goggles where liquid methylene chloride may contact the eyes.

SANITATION

• Skin that becomes wet with liquid methylene chloride should be promptly washed or showered with soap or mild detergent and water to remove any methylene chloride.

COMMON OPERATIONS AND CONTROLS

The following list includes some common operations in which exposure to methylene chloride may occur and control methods which may be effective in each case:

Operation	Controls
Use as a solvent in paint and varnish removers; manufacture of aerosols; cold cleaning and ultrasonic cleaning; and as an extraction solvent for foods and furniture processing	General dilution ventilation; local exhaust ventilation; personal protective equipment
Use as a cooling solvent in manufacture of cellulose acetate; in organic synthesis; and in plastics processing	Process enclosure; local exhaust ventilation
Use as a solvent in vapor degreasing of thermal switches and thermometers	Process enclosure; local exhaust ventilation
Use as a secondary refrigerant in air conditioning and scientific testing	General dilution ventilation; local exhaust ventilation; personal protective equipment

Operation	Controls
Use as an extraction solvent for edible fats, coca, butter, beer flavoring in hops, decaffeinated coffee, oleoresin manufacture, oils, waxes, perfumes, flavorings, and drugs	General dilution ventilation; local exhaust ventilation; personal protective equipment
Use as a solvent for paints, lacquers, varnishes, enamels, adhesives, rubber cements, manufacture of printed circuit boards, as a carrier for pharmaceutical tablet coatings, shrink-fitting of synthetic rubber covers, and dyeing of synthetic fibers	General dilution ventilation; local exhaust ventilation; personal protective equipment

EMERGENCY FIRST AID PROCEDURES

In the event of an emergency, institute first aid procedures and send for first aid or medical assistance.

• **Eye Exposure**

If methylene chloride gets into the eyes, wash eyes immediately with large amounts of water, lifting the lower and upper lids occasionally. If irritation is present after washing, get medical attention. Contact lenses should not be worn when working with this chemical.

• **Skin Exposure**

If methylene chloride gets on the skin, promptly wash the contaminated skin using soap or mild detergent and water if the methylene chloride has not already evaporated. If methylene chloride soaks through the clothing, remove the clothing promptly and wash the skin using soap or mild detergent and water. If irritation persists after washing, get medical attention.

• **Breathing**

If a person breathes in large amounts of methylene chloride, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.

• **Swallowing**

When methylene chloride has been swallowed, get medical attention immediately. If medical attention is not immediately available, get the afflicted person to vomit by having him touch the back of his throat with his finger or by giving him syrup of ipecac as directed on the package. This non-prescription drug is available at most drug stores and drug counters and should be kept with emergency medical supplies in the workplace. Do not make an unconscious person vomit.

• **Rescue**

Move the affected person from the hazardous exposure. If the exposed person has been overcome, notify someone else and put into effect the established emergency rescue procedures. Do not become a casualty. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises.

SPILL AND LEAK PROCEDURES

• Persons not wearing protective equipment and clothing should be restricted from areas of spills or leaks until cleanup has been completed.

• If methylene chloride is spilled or leaked, the following steps should be taken:

1. Remove all ignition sources.
2. Ventilate area of spill or leak.
3. Collect for reclamation or absorb in vermiculite, dry sand, earth, or a similar material.

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RESPIRATORY PROTECTION FOR METHYLENE CHLORIDE

Condition	Minimum Respiratory Protection* Required Above 500 ppm
Vapor Concentration	
5000 ppm or less	Any supplied-air respirator with a full facepiece, helmet, or hood. Any self-contained breathing apparatus with a full facepiece.
Greater than 5000 ppm or entry and escape from unknown concentrations	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Fire Fighting	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.
Escape	Any gas mask providing protection against organic vapors. Any escape self-contained breathing apparatus.

*Only NIOSH-approved or MSHA-approved equipment should be used.

Occupational Health Guideline for Butyl Acetate

INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

SUBSTANCE IDENTIFICATION

- Formula: $CH_3COO(CH_2)_3CH_3$
- Synonyms: n-Butyl acetate; butyl ethanoate; acetic acid butyl ester
- Appearance and odor: Colorless liquid with a fruity odor.

PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for butyl acetate is 150 parts of butyl acetate per million parts of air (ppm) averaged over an eight-hour work shift. This may also be expressed as 710 milligrams of butyl acetate per cubic meter of air (mg/m^3).

HEALTH HAZARD INFORMATION

- **Routes of exposure**

Butyl acetate can affect the body if it is inhaled, comes in contact with the eyes or skin, or is swallowed.

- **Effects of overexposure**

1. Short-term Exposure: Overexposure to butyl acetate may cause irritation of the eyes, nose, and throat. Severe overexposure may cause weakness, drowsiness, and unconsciousness.

2. Long-term Exposure: Prolonged overexposure may produce irritation of the skin.

3. Reporting Signs and Symptoms: A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to butyl acetate.

- **Recommended medical surveillance**

The following medical procedures should be made available to each employee who is exposed to butyl acetate at potentially hazardous levels:

1. Initial Medical Screening: Employees should be screened for history of certain medical conditions (listed below) which might place the employee at increased risk from butyl acetate exposure.

—Skin disease: Butyl acetate is a mild defatting agent and can cause dermatitis on prolonged exposure. Persons with pre-existing skin disorders may be more susceptible to the effects of this agent.

—Kidney disease: Although butyl acetate is not known as a kidney toxin in humans, the importance of this organ in the elimination of toxic substances justifies special consideration in those with possible impairment of renal function.

—Chronic respiratory disease: In persons with impaired pulmonary function, especially those with obstructive airway diseases, the breathing of butyl acetate might cause exacerbation of symptoms due to its irritant properties.

—Liver disease: Although butyl acetate is not known as a liver toxin in humans, the importance of this organ in the biotransformation and detoxification of foreign substances should be considered before exposing persons with impaired liver function.

2. Periodic Medical Examination: Any employee developing the above-listed conditions should be referred for further medical examination.

- **Summary of toxicology**

The principal effect of overexposure to butyl acetate is irritation of the eyes and nose, which occurs at 200 to 300 ppm and is marked at concentrations over 3000 ppm. Butyl acetate splashed in the eye causes marked irritation, but recovery is rapid. Anesthetic effects have been observed in animals at very high concentrations. Levels of 400 to 600 ppm in exposures of 2 to 3 hours' duration did not cause anesthetic effects in man. No chronic systemic effects have been reported in humans.

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CHEMICAL AND PHYSICAL PROPERTIES

- **Physical data**
  1. Molecular weight: 116
  2. Boiling point (760 mm Hg): 126 C (260 F)
  3. Specific gravity (water = 1): 0.88
  4. Vapor density (air = 1 at boiling point of butyl acetate): 4.0
  5. Melting point: −74 C (−101 F)
  6. Vapor pressure at 20 C (68 F): 10 mm Hg
  7. Solubility in water, g/100 g water at 20 C (68 F): 0.68
  8. Evaporation rate (butyl acetate = 1): 1.0
- **Reactivity**
  1. Conditions contributing to instability: Heat
  2. Incompatibilities: Contact with nitrates, strong oxidizers, strong alkalies, and strong acids may cause fires and explosions.
  3. Hazardous decomposition products: Toxic gases and vapors (such as carbon monoxide) may be released in a fire involving butyl acetate.
  4. Special precautions: Butyl acetate will dissolve many plastics and resins.
- **Flammability**
  1. Flash point: 22 C (72 F) (closed cup)
  2. Autoignition temperature: 425 C (797 F)
  3. Flammable limits in air, % by volume: Lower: 1.7; Upper: 7.6
  4. Extinguishant: Dry chemical, carbon dioxide, foam
- **Warning properties**
  1. Odor Threshold: Summer and May report odor thresholds for butyl acetate of 7 ppm and 20 ppm, respectively.
  2. Eye Irritation Level: Grant reports that the vapor of butyl acetate "causes irritation of the eyes and nose, first noticeable to human beings at a concentration of 300 ppm in air, and objectionable at 3300 ppm; higher concentrations cause tearing and hyperemia of the conjunctiva."
  3. Evaluation of Warning Properties: Butyl acetate can be detected below the TLV through its odor, and at a concentration of only twice the TLV through its irritant effects. For the purposes of this guideline, therefore, butyl acetate is considered to have good warning properties.

MONITORING AND MEASUREMENT PROCEDURES

- **General**

Measurements to determine employee exposure are best taken so that the average eight-hour exposure is based on a single eight-hour sample or on two four-hour samples. Several short-time interval samples (up to 30 minutes) may also be used to determine the average exposure level. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee).

- **Method**

Sampling and analyses may be performed by collection of butyl acetate vapors using an adsorption tube with subsequent desorption with carbon disulfide and gas chromatographic analysis. Also, detector tubes certified by NIOSH under 42 CFR Part 84 or other direct-reading devices calibrated to measure butyl acetate may be used. An analytical method for butyl acetate is in the *NIOSH Manual of Analytical Methods,* 2nd Ed., Vol. 2, 1977, available from the Government Printing Office, Washington, D.C. 20402 (GPO No. 017-033-00260-6).

RESPIRATORS

- Good industrial hygiene practices recommend that engineering controls be used to reduce environmental concentrations to the permissible exposure level. However, there are some exceptions where respirators may be used to control exposure. Respirators may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. Respirators may also be used for operations which require entry into tanks or closed vessels, and in emergency situations. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration (formerly Mining Enforcement and Safety Administration) or by the National Institute for Occupational Safety and Health.
- In addition to respirator selection, a complete respiratory protection program should be instituted which includes regular training, maintenance, inspection, cleaning, and evaluation.

PERSONAL PROTECTIVE EQUIPMENT

- Employees should be provided with and required to use impervious clothing, gloves, face shields (eight-inch minimum), and other appropriate protective clothing necessary to prevent repeated or prolonged skin contact with liquid butyl acetate.
- Clothing wet with liquid butyl acetate should be placed in closed containers for storage until it can be discarded or until provision is made for the removal of butyl acetate from the clothing. If the clothing is to be laundered or otherwise cleaned to remove the butyl acetate, the person performing the operation should be informed of butyl acetate's hazardous properties.
- Any clothing which becomes wet with liquid butyl acetate should be removed immediately and not reworn until the butyl acetate is removed from the clothing.
- Employees should be provided with and required to use splash-proof safety goggles where liquid butyl acetate may contact the eyes.

SANITATION

• Skin that becomes wet with liquid butyl acetate should be promptly washed or showered with soap or mild detergent and water to remove any butyl acetate.

COMMON OPERATIONS AND CONTROLS

The following list includes some common operations in which exposure to butyl acetate may occur and control methods which may be effective in each case:

Operation	Controls
Use during application of nitrocellulose by spraying, brushing, or dipping	Local exhaust ventilation; general dilution ventilation; personal protective equipment
Use during application of surface coatings other than nitrocellulose lacquers, including paper coatings, leather coatings, and airplane dope enamel	Local exhaust ventilation; general dilution ventilation; personal protective equipment
Liberation during manufacture of nitrocellulose lacquers	Local exhaust ventilation
Liberation during production of lacquer thinner	General dilution ventilation
Liberation during use as a solvent for oils, pitch, camphor, ethyl cellulose acetate, and chlorinated rubber	General dilution ventilation
Liberation during use as a solvent in production of artificial leather	General dilution ventilation
Liberation during use of protective coatings in automobile industry	Local exhaust ventilation
Liberation during use as a solvent for vinyl, polystyrene, and methacrylate plastics	Local exhaust ventilation
Liberation during manufacture of safety glass; during production of flavorings and perfumes; during manufacture of cosmetics, adhesives, shoe polishes, and stain removers	Local exhaust ventilation

EMERGENCY FIRST AID PROCEDURES

In the event of an emergency, institute first aid procedures and send for first aid or medical assistance.

• **Eye Exposure**

If butyl acetate gets into the eyes, wash eyes immediately with large amounts of water, lifting the lower and upper lids occasionally. Get medical attention as soon as possible. Contact lenses should not be worn when working with this chemical.

• **Skin Exposure**

If butyl acetate gets on the skin, promptly flush the contaminated skin with water. If butyl acetate soaks through the clothing, remove the clothing immediately and flush the skin with water. If there is skin irritation, get medical attention.

• **Breathing**

If a person breathes in large amounts of butyl acetate, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.

• **Swallowing**

When butyl acetate has been swallowed, get medical attention immediately. If medical attention is not immediately available, get the afflicted person to vomit by having him touch the back of his throat with his finger or by giving him syrup of ipecac as directed on the package. This non-prescription drug is available at most drug stores and drug counters and should be kept with emergency medical supplies in the workplace. Do not make an unconscious person vomit.

• **Rescue**

Move the affected person from the hazardous exposure. If the exposed person has been overcome, notify someone else and put into effect the established emergency rescue procedures. Do not become a casualty. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises.

SPILL, LEAK, AND DISPOSAL PROCEDURES

• Persons not wearing protective equipment and clothing should be restricted from areas of spills or leaks until cleanup has been completed.

• If butyl acetate is spilled or leaked, the following steps should be taken:

1. Remove all ignition sources.
2. Ventilate area of spill or leak.
3. For small quantities, absorb on paper towels. Evaporate in a safe place (such as a fume hood). Allow sufficient time for evaporating vapors to completely clear the hood ductwork. Burn the paper in a suitable location away from combustible materials. Large quantities can be collected and atomized in a suitable combustion chamber. Butyl acetate should not be allowed to

enter a confined space, such as a sewer, because of the possibility of an explosion.

• Waste disposal methods:

Butyl acetate may be disposed of:

1. By absorbing it in vermiculite, dry sand, earth or a similar material and disposing in a secured sanitary landfill.

2. By atomizing in a suitable combustion chamber.

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RESPIRATORY PROTECTION FOR BUTYL ACETATE

Condition	Minimum Respiratory Protection* Required Above 150 ppm
Vapor Concentration	
1000 ppm or less	A chemical cartridge respirator with a full facepiece and an organic vapor cartridge(s).
5000 ppm or less	A gas mask with a chin-style organic vapor canister.
7500 ppm or less	A gas mask with a chin-style or a front- or back-mounted organic vapor canister. Any supplied-air respirator with a full facepiece, helmet, or hood. Any self-contained breathing apparatus with a full facepiece.
10,000 ppm or less	A Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure mode or with a full facepiece, helmet, or hood operated in continuous-flow mode.
Greater than 10,000 ppm or entry and escape from unknown concentrations	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Fire Fighting	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.
Escape	Any gas mask providing protection against organic vapors. Any escape self-contained breathing apparatus.

*Only NIOSH-approved or MSHA-approved equipment should be used.

APPENDIX F

APPENDIX F

CHAIN OF CUSTODY FORMS

CHAIN OF CUSTODY
SAMPLE SUBMISSION RECORD

GANNETT FLEMING
ENVIRONMENTAL LABORATORIES
209 SENATE AVE., CAMP HILL, PA 17011
717-763-7211

LAB CLIENT NO. _____

LAB PROJECT NO. _____

REPORT TO: IBM EAST FISHKILL
DEPT. 92D, BLDG. 511, Z-9A1
~~HOPEWELL~~ ROUTE 52
HOPEWELL JUNCTION NY 12533

PROJECT NO.

PROJECT NAME
SOLVENT WASTE TANK CLOSURE
TANKS 134 to 138

ATTN: SAL TRANCHINA PHONE: 914 892-1629

INVOICE TO:

PURCHASE ORDER NO.

ANALYSES TO BE PERFORMED

DO NOT USE SHADED AREA BELOW		SAMPLE DESCRIPTION/LOCATION		DATE OF SAMPLING	TIME OF SAMPLING	SAMPLER (INITIALS)	TOTAL NO. CONTAINERS	SOLVENTS* SEE REMARKS
	1	TANK #138 RINSE 1A	X	12/14/88	1100	JDS	1	
	2	TANK #138 RINSE 1B	X	12/14/88	1100	JDS	1	
	3	TANK #138 RINSE 2A	X	12/14/88	1135	JDS	1	
	4	TANK #138 RINSE 2B	X	12/14/88	1135	JDS	1	
	5	TANK #138 RINSE 3A	✓	12/14/88	1205	JDS	1	
	6	TANK #138 RINSE 3B	✓	12/14/88	1205	JDS	1	
	7	TANK #134 ABOVE PIPE 1A	✓	12/14/88	1710	[redacted]	1	
	8	TANK #134 ABOVE PIPE 1B	✓	12/14/88	1710	[redacted]	1	
	9	TANK #136 ABOVE PIPE [redacted] 1A	✓	12/14/88	1723	BSH	1	
	10	TANK #136 ABOVE PIPE [redacted] 1B	✓	12/14/88	1723	BSH	1	

ANALYSIS TURNAROUND SERVICE DESIRED

- ☐ ROUTINE
- ☐ GUARANTEED
- ☐ PRIORITY
- ☐ EMERGENCY

Due Date:

Deadlines and turnaround services other than Routine require a Lab acceptance signature. Priority and Emergency services are not always available. Please schedule in advance when possible.

Laboratory Acceptance

REMARKS
HOLD UNTIL CONTACTED BY SAL TRANCHINA WITH INSTRUCTIONS.

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Bob Howard	12/15/88	1220		12/15/88	1220
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY: (SIGNATURE)	DATE	TIME

IBM-EF-77

CHAIN OF CUSTODY
SAMPLE SUBMISSION RECORD

LAB CLIENT NO. _____
LAB PROJECT NO. _____

GANNETT FLEMING
ENVIRONMENTAL LABORATORIES
209 SENATE AVE., CAMP HILL, PA 17011
717-763-7211

REPORT TO: IBM EAST FISHKILL
DEPT 92D, BLDG. 511, Z-9A-1
ROUTE 52
HOPEWELL JUNCTION NY. 12533

PROJECT NO.

PROJECT NAME
SOLVENT WASTE TANK CLEANING
TANKS 134 TO 138

ATTN: SAL TRANCHINA PHONE: 914-892-1629

INVOICE TO:

PURCHASE ORDER NO.

ANALYSES TO BE PERFORMED

DO NOT USE SHADED AREA BELOW	SAMPLE DESCRIPTION/LOCATION	DATE OF SAMPLING	TIME OF SAMPLING	SAMPLER (INITIALS)	TOTAL NO. CONTAINERS	SOLVENTS X see REMARKS	ANALYSIS TURNAROUND SERVICE DESIRED
✓	1 TANK # 135 ABOVE PIPE [redacted] 1A	12/14/88	1733	BSH	1		
✓	2 TANK # 135 ABOVE PIPE [redacted] 1B	12/14/88	1733	BSH	1		
✓	3 TANK # 137 ABOVE PIPE [redacted] 1A	12/14/88	1753	BSH	1		
✓	4 TANK # 137 ABOVE PIPE [redacted] 1B	12/14/88	1753	BSH	1		
✓	5 TANK # 138 ABOVE PIPE [redacted] 1A	12/14/88	1806	BSH	1		
✓	6 TANK # 138 ABOVE PIPE [redacted] 1B	12/14/88	1806	BSH	1		
	7						
	8						
	9						
	10						

☐ ROUTINE
☐ GUARANTEED
☐ PRIORITY
☐ EMERGENCY

Due Date:

Deadlines and turnaround services other than Routine require a Lab acceptance signature. Priority and Emergency services are not always available. Please schedule in advance when possible.

Laboratory Acceptance

REMARKS HOLD UNTIL CONTACTED BY SAL TRANCHINA WITH INSTRUCTIONS

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Bob Abbatiello	12/15/88	1200	[signature]	12/15/88	1220
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
			[signature]		
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY: (SIGNATURE)	DATE	TIME

IBM-EF- 77

CHAIN OF CUSTODY
SAMPLE SUBMISSION RECORD

LAB CLIENT NO. _____
LAB PROJECT NO. _____

GANNETT FLEMING
ENVIRONMENTAL LABORATORIES
209 SENATE AVE., CAMP HILL, PA 17011
717-763-7211

REPORT TO: IBM EAST FISHKILL
DEPT 92D, BLDG 511, Z-9A1
ROUTE 52
HOPEWELL JUNCTION NY. 12533

PROJECT NO.

PROJECT NAME
SOLVENT WASTE TANK CLEANING
TANKS 134 TO 138

ATTN: SAL TRANCHINA PHONE: 914-892-1629

INVOICE TO:

PURCHASE ORDER NO.

ANALYSES TO BE PERFORMED

DO NOT USE SHADED AREA BELOW	SAMPLE DESCRIPTION/LOCATION	DATE OF SAMPLING	TIME OF SAMPLING	SAMPLER (INITIALS)	TOTAL NO. CONTAINERS	SOLVENTS/X SEE REMARKS
✓	1 TANK # 134 ABOVE PIPE 2A X ✓	12/15/88	1003	BSH	1	
✓	2 TANK # 134 ABOVE PIPE 2B X ✓	12/15/88	1003	BSH	1	
✓	3 TANK # 135 ABOVE PIPE 2A X ✓	12/15/88	1005	BSH	1	
✓	4 TANK # 135 ABOVE PIPE 2B X ✓	12/15/88	1005	BSH	1	
✓	5 TANK # 136 ABOVE PIPE 2A X ✓	12/15/88	1008	BSH	1	
✓	6 TANK # 136 ABOVE PIPE 2B X ✓	12/15/88	1008	BSH	1	
✓	7 TANK # 137 ABOVE PIPE 2A X ✓	12/15/88	1012	BSH	1	
✓	8 TANK # 137 ABOVE PIPE 2B X ✓	12/15/88	1012	BSH	1	
✓	9 TANK # 138 ABOVE PIPE 2A X ✓	12/15/88	1015	BSH	1	
✓	10 TANK # 138 ABOVE PIPE 2B X ✓	12/15/88	1015	BSH	1	

ANALYSIS TURNAROUND SERVICE DESIRED

- ☐ ROUTINE
- ☐ GUARANTEED
- ☐ PRIORITY
- ☐ EMERGENCY

Due Date:

Deadlines and turnaround services other than Routine require a Lab acceptance signature. Priority and Emergency services are not always available. Please schedule in advance when possible.

Laboratory Acceptance

REMARKS

HOLD UNTIL CONTACTED BY SAL TRANCHINA WITH INSTRUCTIONS

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Bob Howard	12/15/88	1200	Stephen Brannon	12/15/88	1220
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY: (SIGNATURE)	DATE	TIME

IBM-EF- 77

CHAIN OF CUSTODY
SAMPLE SUBMISSION RECORD

GANNETT FLEMING
ENVIRONMENTAL LABORATORIES
209 SENATE AVE., CAMP HILL, PA 17011
717-763-7211

LAB CLIENT NO. _____
LAB PROJECT NO. _____

REPORT TO: IBM EAST FISHKILL
DEPT 92D, BLDG. 511 #9A1
ROUTE 52
HOPEWELL JUNCTION, NY. 12533

PROJECT NO.
PROJECT NAME
SOLVENT WASTE TANK CLOSURE
TANKS 134 to 138

ATTN: SAL TRANCHINA PHONE: 914 892 1629

INVOICE TO:

PURCHASE ORDER NO.

ANALYSES TO BE PERFORMED

DO NOT USE SHADED AREA BELOW	SAMPLE DESCRIPTION/LOCATION	DATE OF SAMPLING	TIME OF SAMPLING	SAMPLER (INITIALS)	TOTAL NO. CONTAINERS	SOLVENTS * see Remarks
	1 TANK # 137 FILL PIPE RINSE 3A	12/15/88	1920	BSH	1	✓
	2 TANK # 137 FILL PIPE RINSE 3B	12/15/88	1920	BSH	1	✓
	3 TANK # 137 VENT PIPE RINSE 3A	12/16/88	1500	BSA	1	✓
	4 TANK # 137 VENT PIPE RINSE 3B	12/16/88	1300	BSA	1	✓
	5 TANK # 136 FULL PIPE RINSE 3A	12/16/88	2105	BKS	1	✓
	6 TANK # 136 FULL PIPE RINSE 3B	12/16/88	2105	BKS	1	✓
	7 TANK # 136 RINSE 3A	12/16/88	1855	BSH	1	✓
	8 TANK # 136 RINSE 3B	12/16/88	1855	BSH	1	✓
	9 TANK # 136 VENT PIPE RINSE 3A	12/16/88	2040	BKS	1	✓
	10 TANK # 136 VENT PIPE RINSE 3B	12/16/88	2040	BKS	1	✓

ANALYSIS TURNAROUND SERVICE DESIRED

- ☐ ROUTINE
- ☐ GUARANTEED
- ☐ PRIORITY
- ☐ EMERGENCY

Due Date:

Deadlines and turnaround services other than Routine require a Lab acceptance signature. Priority and Emergency services are not always available. Please schedule in advance when possible.

Laboratory Acceptance

REMARKS HOLD UNTIL CONTACTED BY SAL TRANCHINA WITH INSTRUCTIONS

	DATE	TIME		DATE	TIME
RELINQUISHED BY: (SIGNATURE) Brian K. Schaffer	12/16/88	0730	RECEIVED BY: (SIGNATURE)	12/17	0731
RELINQUISHED BY: (SIGNATURE)	12/19	12	RECEIVED BY: (SIGNATURE)	12/19	17
RELINQUISHED BY: (SIGNATURE)	12/19		RECEIVED FOR LABORATORY: (SIGNATURE)	12/19	

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2629 pg 529 (539) 5-1

CHAIN OF CUSTODY
SAMPLE SUBMISSION RECORD

LAB CLIENT NO.
LAB PROJECT NO.

GANNETT FLEMING
ENVIRONMENTAL LABORATORIES
209 SENATE AVE., CAMP HILL, PA 17011
717-763-7211

REPORT TO: IBM EAST FISHKILL
Dept 920, BLDG. E11 Z9A1
Route: 52
Hopewell Junction NY. 12533

PROJECT NO.
PROJECT NAME
SOLVENT WASTE TANK CLEANING
TANKS 134 TO 138

ATTN: SAL TRANCHINA PHONE: 914-892-1629

INVOICE TO:

PURCHASE ORDER NO.

ANALYSES TO BE PERFORMED

DO NOT USE SHADED AREA BELOW	SAMPLE DESCRIPTION/LOCATION	DATE OF SAMPLING	TIME OF SAMPLING	SAMPLER (INITIALS)	TOTAL NO. CONTAINERS	SOLVENTS * See Remarks	
	1 TANK # 135 FILL PIPE/ RINSE 3A	12/17/88	0936	BSH	1		
	2 TANK # 135 FILL PIPE RINSE 3B	12/17/88	0936	BSH	1		
	3 TANK # 135 VENT PIPE RINSE 3A	12/17/88	0930	BSH	1		
	4 TANK # 135 VENT PIPE RINSE 3B	12/17/88	0930	BSH	1		
	5 TANK # 134 VENT PIPE RINSE 3A	12/17/88	6:01 PM	BSH	1		
	6 TANK # 134 VENT PIPE RINSE 3B	12/17/88	6:06 PM	BSH	1		
	7 TANK # 134 FILL PIPE RINSE 3A	12/17/88	1810	BSH	1		
	8 TANK # 134 FILL PIPE RINSE 3B	12/17/88	1811	BSH	1		
	9 TANK # 135 RINSE 3A	12/17/88	2040	BKS	1		
	10 TANK # 135 RINSE 3B	12/17/88	2040	BKS	1		

ANALYSIS TURNAROUND SERVICE DESIRED

- ☐ ROUTINE
- ☐ GUARANTEED
- ☐ PRIORITY
- ☐ EMERGENCY

Due Date:

Deadlines and turnaround services other than Routine require a Lab acceptance signature. Priority and Emergency services are not always available. Please schedule in advance when possible.

Laboratory Acceptance

REMARKS
HOLD, UNTIL CONTACTED BY SAL TRANCHINA WITH INTRUCTIONS

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Brian K. Schaffner	12/18/88	0730	[illegible]	12/18/88	0730
RELINQUISHED BY: (SIGNATURE) Steve DiMauro	DATE 12/19	TIME 1224	RECEIVED BY: (SIGNATURE) Sal Tranchina	DATE 12/19	TIME 12:26
RELINQUISHED BY: (SIGNATURE) Salvatore J Tranchina	DATE 12/19	TIME	RECEIVED FOR LABORATORY: (SIGNATURE) [illegible]	DATE 12/19	TIME

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CHAIN OF CUSTODY
SAMPLE SUBMISSION RECORD

LAB CLIENT NO. _____
LAB PROJECT NO. _____

GANNETT FL
ENVIRONMENT
209 SENATE AVE., CA...
717-763-7211

REPORT TO: IBM EAST FISHKILL
DEPT 92D BLDG 511 = 9A1
R=

PROJECT NO.
PROJECT NAME

ATTN: PHONE:

INVOICE TO:

PURCHASE ORDER NO.

ANALYSES TO BE PERFORMED

DO NOT USE SHADED AREA BELOW	SAMPLE DESCRIPTION/LOCATION	DATE OF SAMPLING	TIME OF SAMPLING	SAMPLER (INITIALS)	TOTAL NO. CONTAINERS	Solvents * See Remarks
	1 Tank #134 Rinse 3A	12/18/88	1620	GSA	1	
	2 Tank #134 Rinse 3B	12/18/88	1620	GSA	1	
	3 Tank #137 Rinse 3A	12/15/88	1210	RSH	1	
	4 Tank # 137 Rinse 3B	12/15/88	1816	RSH	1	
	5					
	6					
	7					
	8					
	9					
	10					

ANALYSIS TURNAROUND SERVICE DESIRED

- ☐ ROUTINE
- ☐ GUARANTEED
- ☐ PRIORITY
- ☐ EMERGENCY

Due Date:

Deadlines and turnaround services other than Routine require a Lab acceptance signature. Priority and Emergency services are not always available. Please schedule in advance when possible.

Laboratory Acceptance

REMARKS

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
James O'Mara	12/19	1224	Arlinda L Tranchina	12/19	12:2[illegible]
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
RELINQUISHED BY: (SIGNATURE) Arlinda L Tranchina	DATE 12/19	TIME	RECEIVED FOR LABORATORY: (SIGNATURE)	DATE 12/19	TIME

IBM-EF-77

CHAIN OF CUSTODY
SAMPLE SUBMISSION RECORD

LAB CLIENT NO. _____
LAB PROJECT NO. _____

GANNETT FLEMING
ENVIRONMENTAL LABORATORIES
209 SENATE AVE., CAMP HILL, PA 17011
717-763-7211

REPORT TO: IBM EAST FISHKILL
DEPT 92D BLDG. 511, 2ND FL
ROUTE 52
HOPEWELL JUNCTION, NY 12533

PROJECT NO.

PROJECT NAME
SOLVENT WASTE TANK CLEANING
TANKS 134 TO 138

ATTN: SAL TRANCHINA PHONE: 914-892-1629

INVOICE TO:

PURCHASE ORDER NO.

ANALYSES TO BE PERFORMED

DO NOT USE SHADED AREA BELOW	SAMPLE DESCRIPTION/LOCATION	DATE OF SAMPLING	TIME OF SAMPLING	SAMPLER (INITIALS)	TOTAL NO. CONTAINERS	SOLVENTS * see Remarks
	1 TANK # 138 FILL PIPE RINSE	12/19/88	12 10	BSH	1	
	2 TANK # 138 FILL PIPE RINSE	12/19/88	12 10	BSH	1	
	3 TANK # 138 VENT PIPE RINSE	12/19/88	12 30	BSH	1	
	4 TANK # 138 VENT PIPE RINSE	12/19/88	12 30	BSH	1	
	5					
	6					
	7					
	8					
	9					
	10					

ANALYSIS TURNAROUND SERVICE DESIRED

- ☐ ROUTINE
- ☐ GUARANTEED
- ☐ PRIORITY
- ☐ EMERGENCY

Due Date:

Deadlines and turnaround services other than Routine require a Lab acceptance signature. Priority and Emergency services are not always available. Please schedule in advance when possible.

Laboratory Acceptance

REMARKS

HOLD UNIT CONTACTED BY SAL TRANCHINA WITH INSTRUCTIONS

		DATE	TIME		DATE	TIME
RELINQUISHED BY: (SIGNATURE)	James O'Connell	12/19	1349	RECEIVED BY: (SIGNATURE)	12/19/88	1349
RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
RELINQUISHED BY: (SIGNATURE)		DATE	TIME	RECEIVED FOR LABORATORY: (SIGNATURE)	DATE 12/19/88	TIME

IBM-EF-77

1/16

CHAIN OF CUSTODY
SAMPLE SUBMISSION RECORD

GANNETT FLEMING
ENVIRONMENTAL LABORATORIES
209 SENATE AVE., CAMP HILL, PA 17011
717-763-7211

LAB CLIENT NO. _____
LAB PROJECT NO. _____

REPORT TO: IBM E. Fishkill
Dept. 92D, Bldg 511, 7, 911

PROJECT NO. 26194-1666
PROJECT NAME
Tank # 135 Closure

ATTN: Sal. Tranchina PHONE: 892-1629

INVOICE TO:

PURCHASE ORDER NO.

ANALYSES TO BE PERFORMED

DO NOT USE SHADED AREA BELOW	SAMPLE DESCRIPTION/LOCATION	DATE OF SAMPLING	TIME OF SAMPLING	SAMPLER (INITIALS)	TOTAL NO. CONTAINERS								
	1 Tank # 135 Rinse # 1	1/16-89	1417	JM	3		Solvents						
	2 Tank # 135 Rinse # 2	1/16-89	1500	JM	3		Solvents						
	3 Tank # 135 Rinse # 3 A	1/16-89	1610	JM	3		Solvents						
	4												
	5												
	6												
	7												
	8												
	9												
	10												

ANALYSIS TURNAROUND SERVICE DESIRED

- ☐ ROUTINE
- ☐ GUARANTEED
- ☐ PRIORITY
- ☐ EMERGENCY

Due Date:

Deadlines and turnaround services other than Routine require a Lab acceptance signature. Priority and Emergency services are not always available. Please schedule in advance when possible.

Laboratory Acceptance

REMARKS

	DATE	TIME		DATE	TIME
RELINQUISHED BY: (SIGNATURE) James B. Brunel	1-16	1715	RECEIVED BY: (SIGNATURE) Salvatore J. Tranchina	1-16	
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
RELINQUISHED BY: (SIGNATURE)	DATE 1-16	TIME	RECEIVED FOR LABORATORY: (SIGNATURE)	DATE 3/19/89	TIME

IBM-EF-89

CHAIN OF CUSTODY
SAMPLE SUBMISSION RECORD

LAB CLIENT NO. _____

LAB PROJECT NO. _____

GANNETT FLEMING
ENVIRONMENTAL LABORATORIES
209 SENATE AVE., CAMP HILL, PA 17011
717-763-7211

REPORT TO: IBM - E. Fishkill, N.Y.
Dept. 92D, Bldg 511, Z - 9A1

PROJECT NO. 26194-0010

PROJECT NAME
#134 Fill Pipe Closure

ATTN: Sal Tranchinia PHONE: 892-1629

INVOICE TO:

PURCHASE ORDER NO.

ANALYSES TO BE PERFORMED

DO NOT USE SHADED AREA BELOW	SAMPLE DESCRIPTION/LOCATION	DATE OF SAMPLING	TIME OF SAMPLING	SAMPLER (INITIALS)	TOTAL NO. CONTAINERS								
	1 Fill Pipe #134 Final Rinse A	1-17	1449	JM	3	SOLVENTS							
	2												
	3												
	4												
	5												
	6												
	7												
	8												
	9												
	10												

ANALYSIS TURNAROUND SERVICE DESIRED

- ☐ ROUTINE
- ☐ GUARANTEED
- ☐ PRIORITY
- ☐ EMERGENCY

Due Date:

Deadlines and turnaround services other than Routine require a Lab acceptance signature. Priority and Emergency services are not always available. Please schedule in advance when possible.

Laboratory Acceptance

REMARKS

	DATE	TIME		DATE	TIME
RELINQUISHED BY: (SIGNATURE) James J. Moura	1-17		RECEIVED BY: (SIGNATURE)	1-17	
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
RELINQUISHED BY: (SIGNATURE) X	DATE 1-17	TIME	RECEIVED FOR LABORATORY: (SIGNATURE)	DATE 5/09/90	TIME

IBM-EE-77

CHAIN OF CUSTODY
SAMPLE SUBMISSION RECORD

GANNETT FLEMING
ENVIRONMENTAL LABORATORIES
209 SENATE AVE., CAMP HILL, PA 17011
717-763-7211

LAB CLIENT NO. _____
LAB PROJECT NO. _____

REPORT TO: IBM East Fishkill
DEPT. 92D, BLDG. 311, Z-9A1

PROJECT NO. 26194-0060
PROJECT NAME
Tank #135 Closure

ATTN: Sal Tranchina PHONE: 892-4629

INVOICE TO:

PURCHASE ORDER NO.

DO NOT USE SHADED AREA BELOW	SAMPLE DESCRIPTION/LOCATION	DATE OF SAMPLING	TIME OF SAMPLING	SAMPLER (INITIALS)	TOTAL NO. CONTAINERS	ANALYSES TO BE PERFORMED										ANALYSIS TURNAROUND SERVICE DESIRED
	1 Tank #135 Final Rinse	1-18	0945	JM	3	SOLVENTS										☐ ROUTINE
	2 Tank #134 Final Rinse	1-18	1625	JM	3	SOLVENTS										☐ GUARANTEED
	3															☐ PRIORITY
	4															☐ EMERGENCY
	5															Due Date:
	6															Deadlines and turnaround services other than Routine require a Lab acceptance signature. Priority and Emergency services are not always available. Please schedule in advance when possible.
	7															
	8															
	9															
	10															

REMARKS

Laboratory Acceptance

RELINQUISHED BY: (SIGNATURE) James Monks	DATE 1/18/94	TIME	RECEIVED BY: (SIGNATURE)	DATE 1-18	TIME
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
RELINQUISHED BY: (SIGNATURE)	DATE 1/18	TIME	RECEIVED FOR LABORATORY: (SIGNATURE)	DATE	TIME

CHAIN OF CUSTODY
SAMPLE SUBMISSION RECORD

GANNETT FLEMING
ENVIRONMENTAL LABORATORIES
209 SENATE AVE., CAMP HILL, PA 17011
717-763-7211

LAB CLIENT NO. _____
LAB PROJECT NO. _____

REPORT TO: IBM - East Fishkill, N.Y.
DEPT. 9CD, BLDG. 511, Z - 9A1

PROJECT NO. 26194-6660
PROJECT NAME
Tank # 135 Fill Pipe

ATTN: Sal Tranchinia PHONE: 892-1629

INVOICE TO:

PURCHASE ORDER NO.

DO NOT USE SHADED AREA BELOW	SAMPLE DESCRIPTION/LOCATION	DATE OF SAMPLING	TIME OF SAMPLING	SAMPLER (INITIALS)	TOTAL NO. CONTAINERS	ANALYSES TO BE PERFORMED								ANALYSIS TURNAROUND SERVICE DESIRED
	1 Tank # 135 Fill Pipe Final Rinse	1-19	1400	JM	3	SOLVENTS								
	2													
	3													
	4													
	5													
	6													
	7													
	8													
	9													
	10													

☐ ROUTINE
☐ GUARANTEED
☐ PRIORITY
☐ EMERGENCY

Due Date:

Deadlines and turnaround services other than Routine require a Lab acceptance signature. Priority and Emergency services are not always available. Please schedule in advance when possible.

REMARKS

Laboratory Acceptance

	DATE	TIME		DATE	TIME
RELINQUISHED BY: (SIGNATURE) James D'Amico	1-19	1430	RECEIVED BY: (SIGNATURE)	1/19	1430
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
RELINQUISHED BY: (SIGNATURE) X	DATE	TIME	RECEIVED FOR LABORATORY: (SIGNATURE)	DATE 1/22	TIME

IBM-EF- 77 TRM-EF- 77

TRACE ORGANIC LABORATORY
SAMPLE LOG/CHAIN OF CUSTODY
D/76D-4A1 ROUTE 52
EAST FISHKILL, NY 12533

IBM-EF-

DATE 1-25-89

#	T.O.L. ID #	LOCATION/DESCRIPTION/REQUESTOR ID #	DATE	TIME	BOTTLE QUANTITY	ANALYSES REQUIRED
1		XYLENE PIPING - 10% SAMPLE @ 583' = 60'	1-25-89	4:25	2	VOC
2		IPA PIPING - 10% SAMPLE @ 625' - 60'			2	"
3		METHYLENE CHLORIDE PIPING 10% SAMPLE @ 333' = 40'			2	
4		FREON PIPING - 10% SAMPLE @ 1082' = 120'			2	
5		NBA PIPING - 10% SAMPLE @ 1640' = 180'			2	
6		MISC. PIPING - 10% SAMPLE @ 583' = 60'		"	2	"
7						
8						
9						
10						

* VOC - P+T/GC INORG - INORGANICS DW - DRINKING WATER 624,625 - MASS SPEC

SAMPLER SIGNATURE/DATE Thomas C. Quinn COMMENTS: Report To Soil Trenching

The A sample is to be used only as a backup if necessary

RECEIVER SIGNATURE/DATE Reid Dykeman COMMENTS:

ANALYTES VENDORED _____ VENDOR Coddon Carpenin Dict. SIGNATURE _____
Track

IBM-EF- 77

APPENDIX G

APPENDIX G

LABORATORY REPORTS

SOLVENT WASTE TANK CLEANING SAMPLES - EPA METHODS 601/602 REQUESTOR: S. TRANCHINA D/92D B-511-9A1

ALL VALUES ARE PPB OR ug/l

COMPOUND	TANK 134 RINSE 3A	TANK 134 ABOVE PIPE 1A	TANK 134 ABOVE PIPE 2A	TANK 134 FILL PIPE RINSE 3A-3B	TANK 134 VENT PIPE RINSE 3A-3B	TANK 135 ABOVE PIPE 1A	TANK 135 RINSE 3A-3B	TANK 135 VENT PIPE RINSE 3A-3B	TANK 135 FILL PIPE RINSE 3A-3B
CHLOROMETHANE	<3.4	<3.4	<3.4	<0.17	<0.17	<3.4	<0.17	<0.17	<0.17
BROMOMETHANE	<20.	<20.	<20.	<1.0	<1.0	<20.	<1.0	<1.0	<1.0
DICHLORODIFLUOROMETHANE	<2.6	<2.6	<2.6	<0.13	<0.13	<2.6	<0.13	<0.13	<0.13
VINYL CHLORIDE	<4.4	<4.4	<4.4	<0.22	<0.22	<4.4	<0.22	<0.22	<0.22
CHLOROETHANE	<2.4	<2.4	<2.4	<0.12	<0.12	<2.4	<0.12	<0.12	<0.12
METHYLENE CHLORIDE	<0.6	<0.6	<0.6	<0.03	* 7.0 *	<0.6	<0.03	<0.03	* 0.16 *
TRICHLOROFLUOROMETHANE	<2.6	<2.6	<2.6	<0.13	<0.13	<2.6	<0.13	<0.13	<0.13
1,1-DICHLOROETHENE	<3.0	<3.0	<3.0	<0.15	<0.15	<3.0	<0.15	<0.15	<0.15
1,1-DICHLOROETHANE	<2.4	<2.4	<2.4	<0.12	<0.12	<2.4	<0.12	<0.12	<0.12
TRANS-1,2-DICHLOROETHENE	<4.8	<4.8	<4.8	<0.24	<0.24	<4.8	<0.24	<0.24	* 1.9 *
CHLOROFORM	<1.2	<1.2	<1.2	* 0.26 *	<0.06	<1.2	<0.06	<0.06	* 0.42 *
1,2-DICHLOROETHANE	<1.8	<1.8	<1.8	<0.09	<0.09	<1.8	<0.09	<0.09	<0.09
1,1,1-TRICHLOROETHANE	<3.0	<3.0	<3.0	<0.15	<0.15	<3.0	<0.15	<0.15	<0.15
CARBON TETRACHLORIDE	<2.4	<2.4	<2.4	<0.12	<0.12	<2.4	<0.12	<0.12	<0.12
BROMODICHLOROMETHANE	<2.4	<2.4	<2.4	* 0.73 *	<0.12	<2.4	<0.12	<0.12	* 0.99 *
1,2-DICHLOROPROPANE	<1.2	<1.2	<1.2	<0.06	<0.06	<1.2	<0.06	<0.06	<0.06
CIS-1,3-DICHLOROPROPENE	<10	<10	<10	<0.50	<0.50	<10	<0.50	<0.50	<0.50
TRICHLOROETHENE	* 5.4 *	<3.0	<3.0	* 2.6 *	<0.15	<3.0	<0.15	<0.15	* 53.4 *
DIBROMOCHLOROMETHANE	<1.2	<1.2	<1.2	<0.06	<0.06	<1.2	<0.06	<0.06	<0.06
1,1,2-TRICHLOROETHANE	<2.4	<2.4	<2.4	<0.12	<0.12	<2.4	<0.12	<0.12	<0.12
TRANS-1,3-DICHLOROPROPENE	<10	<10	<10	<0.50	<0.50	<10	<0.50	<0.50	<0.50
2-CHLOROVINYL ETHER	<10	<10	<10	<0.50	<0.50	<10	<0.50	<0.50	<0.50
BROMOFORM	<0.6	<0.6	<0.6	<0.03	<0.03	<0.6	<0.03	<0.03	* 1.4 *
1,1,2,2-TETRACHLOROETHANE	<0.6	<0.6	<0.6	<0.03	<0.03	<0.6	<0.03	<0.03	<0.03
TETRACHLOROETHENE	* 4250 *	<2.4	* 3.6 *	* >80 *	* 25.2 *	<2.4	* >80 *	<0.12	* >80 *
CHLOROBENZENE	<1.8	<1.8	<1.8	<0.09	<0.09	<1.8	<0.09	<0.09	<0.09
1,3-DICHLOROBENZENE	<1.8	<1.8	<1.8	<0.09	<0.09	<1.8	<0.09	<0.09	<0.09
1,2-DICHLOROBENZENE	<1.2	<1.2	<1.2	<0.06	<0.06	<1.2	<0.06	<0.06	<0.06
1,4-DICHLOROBENZENE	<1.8	<1.8	<1.8	<0.09	<0.09	<1.8	<0.09	<0.09	<0.09
BENZENE	<1.8	<1.8	<1.8	<0.09	<0.09	<1.8	<0.09	<0.09	<0.09
ETHYL BENZENE	* 10.2 *	<1.8	<1.8	* 0.48 *	<0.09	<1.8	<0.09	<0.09	* 0.49 *
TOLUENE	<3.0	<3.0	<3.0	<0.15	<0.15	<3.0	<0.15	<0.15	<0.15
m,p-XYLENE	* 62 *	<2.4	<2.4	* 2.5 *	<0.12	<2.4	<0.12	<0.12	* 2.4 *
o-XYLENE	* 30 *	<3.0	<3.0	* 1.7 *	<0.15	<3.0	<0.15	<0.15	<0.15

NOTES

A < SIGN PRECEDING A VALUE DENOTES THE METHOD DETECTION LIMIT (MDL) FOR THAT COMPOUND.
BECAUSE OF THE NECESSITY FOR DILUTION THERE ARE TWO MDL'S LISTED FOR EACH COMPOUND.

VALUES ENCLOSED BY ASTERISKS * (VALUE) * ARE GREATER THAN THE MDL.

 ANALYST C.P. 1-4-89 APPROVED BY K.B.

SOLVENT WASTE TANK CLEANING SAMPLES - EPA METHODS 601/602 REQUESTOR: S. TRANCHINA D/92D B-511-9A1

ALL VALUES ARE PPB OR ug/l

COMPOUND	TANK 135 ABOVE PIPE 2A	TANK 136 ABOVE PIPE 1A	TANK 136 ABOVE PIPE 2A	TANK 136 RINSE 3A-3B	TANK 136 FILL PIPE RINSE 3A-3B	TANK 136 VENT PIPE RINSE 3A	TANK 137 RINSE 3A	TANK 137 FILL PIPE RINSE 3A-3B	TANK 137 VENT PIPE RINSE 3A-3B
CHLOROMETHANE	<3.4	<3.4	<3.4	<0.17	<0.17	<3.4	<3.4	<0.17	<0.17
BROMOMETHANE	<20.	<20.	<20.	<1.0	<1.0	<20.	<20.	<1.0	<1.0
DICHLORODIFLUOROMETHANE	<2.6	<2.6	<2.6	<0.13	<0.13	<2.6	<2.6	<0.13	<0.13
VINYL CHLORIDE	<4.4	<4.4	<4.4	<0.22	<0.22	<4.4	<4.4	<0.22	<0.22
CHLOROETHANE	<2.4	<2.4	<2.4	<0.12	<0.12	<2.4	<2.4	<0.12	<0.12
METHYLENE CHLORIDE	<0.6	<0.6	<0.6	* 10.8 *	<0.03	* 3.6 *	<0.6	<0.03	<0.03
TRICHLOROFLUOROMETHANE	<2.6	<2.6	<2.6	<0.13	<0.13	<2.6	<2.6	<0.13	<0.13
1,1-DICHLOROETHENE	<3.0	<3.0	<3.0	<0.15	<0.15	<3.0	<3.0	<0.15	<0.15
1,1-DICHLOROETHANE	<2.4	<2.4	<2.4	<0.12	<0.12	<2.4	<2.4	<0.12	<0.12
TRANS-1,2-DICHLOROETHENE	<4.8	<4.8	<4.8	<0.24	<0.24	<4.8	<4.8	<0.24	<0.24
CHLOROFORM	<1.2	<1.2	<1.2	<0.06	<0.06	<1.2	<1.2	<0.06	<0.06
1,2-DICHLOROETHANE	<1.8	<1.8	<1.8	<0.09	<0.09	<1.8	<1.8	<0.09	<0.09
1,1,1-TRICHLOROETHANE	<3.0	<3.0	<3.0	<0.15	<0.15	<3.0	<3.0	<0.15	<0.15
CARBON TETRACHLORIDE	<2.4	<2.4	<2.4	<0.12	<0.12	<2.4	<2.4	<0.12	<0.12
BROMODICHLOROMETHANE	<2.4	<2.4	<2.4	<0.12	<0.12	<2.4	<2.4	<0.12	<0.12
1,2-DICHLOROPROPANE	<1.2	<1.2	<1.2	<0.06	<0.06	<1.2	<1.2	<0.06	<0.06
CIS-1,3-DICHLOROPROPENE	<10	<10	<10	<0.50	<0.50	<10	<10	<0.50	<0.50
TRICHLOROETHENE	<3.0	<3.0	<3.0	<0.15	<0.15	<3.0	<3.0	* 0.55 *	<0.15
DIBROMOCHLOROMETHANE	<1.2	<1.2	<1.2	<0.06	<0.06	<1.2	<1.2	<0.06	<0.06
1,1,2-TRICHLOROETHANE	<2.4	<2.4	<2.4	<0.12	<0.12	<2.4	<2.4	<0.12	<0.12
TRANS-1,3-DICHLOROPROPENE	<10	<10	<10	<0.50	<0.50	<10	<10	<0.50	<0.50
2-CHLOROVINYL ETHER	<10	<10	<10	<0.50	<0.50	<10	<10	<0.50	<0.50
BROMOFORM	<0.6	<0.6	<0.6	<0.03	<0.03	<0.6	<0.6	<0.03	<0.03
1,1,2,2-TETRACHLOROETHANE	<0.6	<0.6	<0.6	<0.03	<0.03	<0.6	<0.6	<0.03	<0.03
TETRACHLOROETHENE	* 4.2 *	* 3.8 *	* 6.6 *	* 8.4 *	* 20.0 *	* 3.6 *	* 98.0 *	* 5.4 *	* 1.6 *
CHLOROBENZENE	<1.8	<1.8	<1.8	<0.09	<0.09	<1.8	<1.8	<0.09	<0.09
1,3-DICHLOROBENZENE	<1.8	<1.8	<1.8	<0.09	<0.09	<1.8	<1.8	<0.09	<0.09
1,2-DICHLOROBENZENE	<1.2	<1.2	<1.2	<0.06	<0.06	<1.2	<1.2	<0.06	<0.06
1,4-DICHLOROBENZENE	<1.8	<1.8	<1.8	<0.09	<0.09	<1.8	<1.8	<0.09	<0.09
BENZENE	<1.8	<1.8	<1.8	<0.09	<0.09	<1.8	<1.8	<0.09	<0.09
ETHYL BENZENE	<1.8	<1.8	<1.8	<0.09	<0.09	<1.8	<1.8	<0.09	<0.09
TOLUENE	<3.0	<3.0	<3.0	<0.15	<0.15	<3.0	<3.0	<0.15	<0.15
m,p-XYLENE	* 2.8 *	<2.4	* 2.8 *	<0.12	<0.12	<2.4	* 4.8 *	<0.12	<0.12
o-XYLENE	<3.0	<3.0	<3.0	<0.15	<0.15	<3.0	<3.0	<0.15	<0.15

A < SIGN PRECEEDING A VALUE DENOTES THE METHOD DETECTION LIMIT (MDL) FOR THAT COMPOUND.
BECAUSE OF THE NECESSITY FOR DILUTION THERE ARE TWO MDL'S LISTED FOR EACH COMPOUND.

VALUES ENCLOSED BY ASTERISKS * (VALUE) * ARE GREATER THAN THE MDL.

 ANALYST G.P. 1-4-89 APPROVED BY

SOLVENT WASTE TANK CLEANING SAMPLES - EPA METHODS 601/602 REQUESTOR: S. TRANCHINA D/92D B-511-9A1

ALL VALUES ARE PPB OR ug/l

COMPOUND	TANK 137 ABOVE PIPE 2B	TANK 137 ABOVE PIPE 1A	TANK 138 ABOVE PIPE 1A	TANK 138 RINSE 2A	TANK 138 RINSE 3A	TANK 138 ABOVE PIPE 2A	TANK 138 VENT PIPE RINSE 3A	TANK 138 FILL PIPE RINSE 3A	TANK 138 RINSE 1B
CHLOROMETHANE	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4	<3.4
BROMOMETHANE	<20.	<20.	<20.	<20.	<20.	<20.	<20.	<20.	<20.
DICHLORODIFLUOROMETHANE	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6
VINYL CHLORIDE	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4
CHLOROETHANE	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4
METHYLENE CHLORIDE	<0.6	<0.6	<0.6	* 8.6 *	* 6.2 *	<0.6	<0.6	<0.6	* 6.2 *
TRICHLOROFLUOROMETHANE	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6	<2.6
1,1-DICHLOROETHENE	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
1,1-DICHLOROETHANE	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4
TRANS-1,2-DICHLOROETHENE	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8	<4.8
CHLOROFORM	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
1,2-DICHLOROETHANE	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
1,1,1-TRICHLOROETHANE	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
CARBON TETRACHLORIDE	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4
BROMODICHLOROMETHANE	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4
1,2-DICHLOROPROPANE	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
CIS-1,3-DICHLOROPROPENE	<10	<10	<10	<10	<10	<10	<10	<10	<10
TRICHLOROETHENE	<3.0	<3.0	<3.0	* 19.4 *	* 15.0 *	<3.0	<3.0	<3.0	* 22.0 *
DIBROMOCHLOROMETHANE	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	* 1.8 *	<1.2	<1.2
1,1,2-TRICHLOROETHANE	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4
TRANS-1,3-DICHLOROPROPENE	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-CHLOROVINYL ETHER	<10	<10	<10	<10	<10	<10	<10	<10	<10
BROMOFORM	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
1,1,2,2-TETRACHLOROETHANE	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
TETRACHLOROETHENE	* 4.6 *	<2.4	* 9.6 *	* 232 *	* 188.0 *	* 4.4 *	* 114.6 *	* 3.2 *	* 218.0 *
CHLOROBENZENE	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
1,3-DICHLOROBENZENE	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
1,2-DICHLOROBENZENE	<1.2	<1.2	<1.2	* 5.8 *	* 4.2 *	<1.2	<1.2	<1.2	* 8.6 *
1,4-DICHLOROBENZENE	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
BENZENE	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
ETHYL BENZENE	<1.8	<1.8	<1.8	* 8.0 *	* 6.4 *	<1.8	<1.8	<1.8	* 9.2 *
TOLUENE	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
m,p-XYLENE	<2.4	<2.4	<2.4	* 48 *	* 3.6 *	<2.4	<2.4	* 2.4 *	* 52.0 *
o-XYLENE	<3.0	<3.0	<3.0	* 22 *	* 16.8 *	<3.0	<3.0	<3.0	<3.0

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VALUES ENCLOSED BY ASTERISKS * (VALUE) * ARE GREATER THAN THE MDL.

 ANALYST GP 1-4-89 APPROVED BY ICB

EPA METHODS 601/602

ALL VALUES ARE IN PARTS PER BILLION

REQUESTOR: S. TRANCHINA - D/92D E.F.

********	MDL *****	SAMP ID ******* TK-135 RINSE 3 1/16/89	SAMP ID ******* TK-135 F RINSE 1/17/89	SAMP ID ******* TK-134 F RINSE 1/17/89	SAMP ID ******* TK-134 F RINSE 1/18/89	SAMP ID ******* TK-135 F PIPE 1/19/89
CHLOROMETHANE	1.7	ND	ND	ND	ND	ND
BROMOMETHANE	10	ND	ND	ND	ND	ND
DICHLORODIFLUOROMETHANE	1.3	ND	ND	ND	ND	ND
VINYL CHLORIDE	2.2	ND	ND	ND	ND	ND
CHLOROETHANE	1.2	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	0.3	ND	ND	ND	ND	ND
TRICHLOROFLUOROMETHANE	1.3	ND	ND	ND	ND	ND
1,1-DICHLOROETHENE	1.5	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	1.2	ND	ND	ND	ND	ND
TRANS-1,2-DICHLOROETHENE	2.4	ND	ND	ND	ND	ND
CHLOROFORM	0.6	ND	ND	ND	ND	ND
1,2-DICHLOROETHANE	0.9	ND	ND	ND	ND	ND
1,1,1-TRICHLOROETHANE	1.5	ND	ND	ND	ND	ND
CARBON TETRACHLORIDE	1.2	ND	ND	ND	ND	ND
BROMODICHLOROMETHANE	1.2	ND	ND	ND	ND	ND
1,2-DICHLOROPROPANE	0.6	ND	ND	ND	ND	ND
CIS-1,3-DICHLOROPROPENE	5	ND	ND	ND	ND	ND
TRICHLOROETHENE	1.5	ND	25.0	ND	ND	ND
DIBROMOCHLOROMETHANE	6.1	ND	14.7	6.1	0.52	ND
1,1,2-TRICHLOROETHANE	1.2	ND	ND	ND	ND	ND
TRANS-1,3-DICHLOROPROPENE	5	ND	ND	ND	ND	ND
2-CHLOROETHYLVINYL ETHER	5	ND	ND	ND	ND	ND
BROMOFORM	0.3	ND	ND	ND	ND	ND
1,1,2,2-TETRACHLOROETHANE	0.3	ND	ND	ND	ND	ND
TETRACHLOROETHENE	1.2	95.3	1112.0	546.9	423.6	20.4
CHLOROBENZENE	0.9	ND	ND	ND	ND	ND
1,3-DICHLOROBENZENE	0.9	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	0.6	ND	ND	ND	ND	ND
1,4-DICHLOROBENZENE	0.9	ND	ND	ND	ND	ND
BENZENE	0.9	ND	ND	ND	ND	ND
ETHYL BENZENE	0.9	ND	ND	1.6	ND	ND
TOLUENE	1.5	ND	ND	ND	ND	ND
M,P XYLENE	1.2	ND	ND	4.3	ND	ND
0 XYLENE	1.5	ND	ND	4.4	ND	ND

ND = LESS THAN THE METHOD DETECTION LIMIT (MDL)

ANALYST: Geo J Patentes

EPA METHODS 601/602

ALL VALUES ARE IN PARTS PER BILLION

REQUESTOR: S. TRANCHINA - D/92D E.F.

********	MDL *****	SAMP ID ******* IBM #1 XYL PIPE 1/26/89	SAMP ID ******* IBM #2 IPA PIPE 1/26/89	SAMP ID ******* IBM #3 MCL PIPE 1/26/89	SAMP ID ******* IBM #4 FTF PIPE 1/26/89	SAMP ID ******* IBM #5 NBA PIPE 1/26/89	SAMP ID ******* IBM #6 MISC PIPE 1/26/89
CHLOROMETHANE	1.7	ND	ND	ND	ND	ND	ND
BROMOMETHANE	10	ND	ND	ND	ND	ND	ND
DICHLORODIFLUOROMETHANE	1.3	ND	ND	ND	ND	ND	ND
VINYL CHLORIDE	2.2	ND	ND	ND	ND	ND	ND
CHLOROETHANE	1.2	ND	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	0.3	ND	ND	ND	ND	ND	ND
TRICHLOROFLUOROMETHANE	1.3	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHENE	1.5	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	1.2	ND	ND	ND	ND	ND	ND
TRANS-1,2-DICHLOROETHENE	2.4	ND	ND	ND	ND	ND	ND
CHLOROFORM	0.6	ND	ND	ND	ND	ND	ND
1,2-DICHLOROETHANE	0.9	ND	ND	ND	ND	ND	ND
1,1,1-TRICHLOROETHANE	1.5	ND	ND	ND	ND	ND	ND
CARBON TETRACHLORIDE	1.2	ND	ND	ND	ND	ND	ND
BROMODICHLOROMETHANE	1.2	ND	ND	ND	ND	ND	ND
1,2-DICHLOROPROPANE	0.6	ND	ND	ND	ND	ND	ND
CIS-1,3-DICHLOROPROPENE	5	ND	ND	ND	ND	ND	ND
TRICHLOROETHENE	1.5	ND	ND	ND	ND	ND	ND
DIBROMOCHLOROMETHANE	6.1	ND	ND	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	1.2	ND	ND	ND	ND	ND	ND
TRANS-1,3-DICHLOROPROPENE	5	ND	ND	ND	ND	ND	ND
2-CHLOROETHYLVINYL ETHER	5	ND	ND	ND	ND	ND	ND
BROMOFORM	0.3	ND	ND	ND	ND	ND	ND
1,1,2,2-TETRACHLOROETHANE	0.3	ND	ND	ND	ND	ND	ND
TETRACHLOROETHENE	1.2	ND	ND	ND	ND	ND	ND
CHLOROBENZENE	0.9	ND	ND	ND	ND	ND	ND
1,3-DICHLOROBENZENE	0.9	ND	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	0.6	ND	ND	ND	ND	ND	ND
1,4-DICHLOROBENZENE	0.9	ND	ND	ND	ND	ND	ND
BENZENE	0.9	ND	ND	ND	ND	ND	ND
ETHYL BENZENE	0.9	ND	ND	ND	ND	ND	ND
TOLUENE	1.5	ND	ND	ND	ND	ND	ND
M,P XYLENE	1.2	ND	ND	ND	ND	ND	ND
O XYLENE	1.5	ND	ND	ND	ND	ND	ND

ND = LESS THAN THE METHOD DETECTION LIMIT (MDL)

ANALYST: Gus Palentino

APPENDIX H

APPENDIX H

MANIFESTS FOR CONTAMINATED WASTES

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No.

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: N Y D 0 0 0 7 0 7 9 0 1 | Manifest Document No.: 0 6 3 | 0 9

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address

IBM CORP. ATTN: MGR. D92D 9A1
RTE. 52 HOPEWELL JCT. NY 12533

A. State Manifest Document Number: NJA 0538194

B. State Generator's ID: SAME

4. Generator's Phone: 914-892-1173

5. Transporter 1 Company Name: ROLLINS ENVIRONMENTAL SERVICE

6. US EPA ID Number: N J D 0 5 3 2 8 8 2 3 9

C. State Trans. ID: AC 20564

D. Transporter's Phone: (609) 467-3100

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Trans. ID

F. Transporter's Phone: SAME

9. Designated Facility Name and Site Address

ROLLINS ENVIRONMENTAL SERVICE
ROUTE 322 WEST - BOX 337
BRIDGEPORT NJ

10. US EPA ID Number: N J D 0 5 3 2 8 8 2 3 9

G. State Facility's ID

H. Facility's Phone: 609-467-3100

GENERATOR

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993, (F001,F002,F003,F005), RQ		0 0 1	TT	3 8 4 8 0	P	F001,F00 F003,F00
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above

a. ME2CO<47%,FREON<36%,IPA<99%,MEOH<99%,ME2CL2<53%, NBA<66%,PERC<93%,TOL<34%,H2O<95%XYL<27%,L,I,T

b. | c. | d.

K. Handling Codes for Wastes Listed Above

a. T03 | b. | c. | d.

15. Special Handling Instructions and Additional Information

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.

If I am a large quantity generator, I certify that I have a 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 of 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 quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: ANTHONY CRISCI | Signature: [signature] | Month Day Year: 1 1 2 1 6

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: THOMAS J. MCCARTHY | Signature: [signature] | Month Day Year: 1 1 2 1 6

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name | Signature | Month Day Year

EPA Form 8700-22 (Rev. 3/88) Previous editions are obsolete.

1 — TSD MAIL TO TSD'S STATE

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

In case of emergency or spill, call the National Response Center 1-800-424-8802 if the emergency occurred in and the N.J. Dept. of Environmental Protection, (609) 292-5560 (Day) (609) 292-7172 (Night).

TRM-EF-70

Form Approved. OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N Y D 0 0 0 7 0 7 9 0 1 1 0 0 3 1 0 8 — Manifest Document No.

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

3. Generator's Name and Mailing Address
BM CORP. ATTN: MGR. D92D 9A1
TE 52 HOPEWELL JCT. NY 12533
Generator's Phone (914-892-1173

4. A. State Manifest Document Number NJA 0538193

B. State Generator's ID SAME

5. Transporter 1 Company Name — 6. US EPA ID Number
A & J TRANSPORTATION COMPANY — N J D 0 7 1 6 2 9 9 7 6

C. State Trans. ID NJDEPSD 3214-0-22537

Transporter 2 Company Name — 8. US EPA ID Number

D. Transporter's Phone (609) 769-2741

E. State Trans. ID

9. Designated Facility Name and Site Address — 10. US EPA ID Number
ROLLINS ENVIRONMENTAL SERVICE
ROUTE 322 WEST - BOX 337
BRIDGEPORT NJ — N J D 0 5 3 2 8 8 2 3 9

F. Transporter's Phone ( )

G. State Facility's ID SAME

H. Facility's Phone (609-467-3100)

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993, (F001,F002,F003,F005), RQ	0 0 1	TT	3 8 1 6 0	P	F001,F002 F003,F005

J. Additional Descriptions for Materials Listed Above
ME2CO<47%,FREON<36%,IPA<99%,MEOH<99%,ME2CL2<53%,
BA<66%,PERC<93%,TOL<34%,H2O<95%XYL<27%,I,I,T

K. Handling Codes for Wastes Listed Above
a. T03 b. c. d.

15. Special Handling Instructions and Additional Information

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Printed/Typed Name: THONY CRISCI — Signature: [signature] — Month Day Year: 1 2 1 6 8 8

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: BILL MOORE — Signature: Bill Moore — Month Day Year: 1 2 1 6 8 8

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 (Rev. 3/88) Previous editions are obsolete.

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

1 — TSD MAIL TO TSD'S STATE

TBWEF 70

NJA 0538193

IBM-EF-10

(HW-001 (REV. 9/86)

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N Y D 0 0 0 7 0 7 9 0 1 — Manifest Document No. 0 0 3 1 1

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
IBM CORP. ATTN: MGR. D92D 9A1
RTE. 52 HOPEWELL JCT. NY 12533

4. Generator's Phone (914→892-1173

A. State Manifest Document Number **NJA 0538192**

B. State Generator's ID SAME

5. Transporter 1 Company Name: ROLLINS ENVIRONMENTAL SERVICE
6. US EPA ID Number: N J D 0 5 3 2 8 8 2 3 9
NJ DEP S.3978 XXX RS 20563
C. State Trans. ID XXXXXXXXXXXXXX RS

7. Transporter 2 Company Name
8. US EPA ID Number
D. Transporter's Phone (609 467-3100
E. State Trans. ID

9. Designated Facility Name and Site Address
ROLLINS ENVIRONMENTAL SERVICE
ROUTE 322 WEST - BOX 337
BRIDGEPORT NJ
10. US EPA ID Number: N J D 0 5 3 2 8 8 2 3 9
F. Transporter's Phone XXXXXX RS
G. State Facility's ID SAME
H. Facility's Phone (609-467-3100

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993, (F001,F002,F003,F005), RQ	0 0 1	TT	3 9 6 8 0	P	F001,F002 F003,F005
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
a. ME2CO<47%,FREON<36%,IPA<99%,MEOH<99%,ME2CL2<53%,
NBA<66%,PERC<93%,TOL<34%,H2O<95%XYL<27%,L,I,T
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. T03
b.
c.
d.

15. Special Handling Instructions and Additional Information

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.

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Printed/Typed Name	Signature	Month Day Year
ROBERT SANTIMAW	Robert Santimaw BC	1 2 2 0 8 8

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year
MICKEY HOGLEN	Mickey Hoglen	1 2 2 0 8 8

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month Day Year

GENERATOR

TRANSPORTER

FACILITY

IBM-EF-7

NJA 0538192

COPIES

REV. 9/86)

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N Y D 0 0 0 7 0 7 9 0 1 — Manifest Document No. 0 0 3 1 2

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
IBM CORP. ATTN: MGR. D92D 9A1
RTE. 52 HOPEWELL JCT. NY 12533

4. Generator's Phone (914) 892-1173

A. State Manifest Document Number: NJA 0538191

B. State Generator's ID: SAME

5. Transporter 1 Company Name: ROLLINS ENVIRONMENTAL SERVICE

6. US EPA ID Number: N J D 0 5 3 2 8 8 2 3 9

C. State Trans. ID: 609 467 3100

7. Transporter 2 Company Name:

8. US EPA ID Number:

D. Transporter's Phone (609) 467-3100

E. State Trans. ID:

9. Designated Facility Name and Site Address
ROLLINS ENVIRONMENTAL SERVICE
ROUTE 322 WEST - BOX 337
BRIDGEPORT NJ

10. US EPA ID Number: N J D 0 5 3 2 8 8 2 3 9

F. Transporter's Phone: SAME

G. State Facility's ID: SAME

H. Facility's Phone (609) 467-3100

	11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	Waste No.
a.	WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993, (F001,F002,F003,F005), RQ	001	TT	36780	P	F001,F002 F003,F005
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a. ME2CO<47%,FREON<36%,IPA<99%,MEOH<99%,ME2CL2<53%, NBA<66%,PERC<93%,TOL<34% H2O<95%XYL<27%,L,I,T

K. Handling Codes for Wastes Listed Above
a. T03
b.
c.
d.

15. Special Handling Instructions and Additional Information

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.

If I am a large quantity generator, I certify that I have a 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 of 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 quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: ROBERT SANTIMAW — Signature: Robert Santimaw — Month Day Year: 12218

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: MICKEY HOGLEN — Signature: Mickey Hoglen — Month Day Year: 12218

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name: — Signature: — Month Day Year:

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name: — Signature: — Month Day Year:

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

NJA 0538191

GENERATOR

TRANSPORTER

FACILITY

IBM-EF-TRM-EF-

HW-001 (REV. 9/86)

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N|Y|D|0|0|0|7|0|7|9|0|1 — Manifest Document No. 00813

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

3. Generator's Name and Mailing Address
IBM CORP. ATTN: MGR. D92D 9A1
RTE. 52 HOPEWELL JCT. NY 12533

A. State Manifest Document Number **NJA 0538190**

4. Generator's Phone (914) 892-1173

B. State Generator's ID SAME

5. Transporter 1 Company Name — 6. US EPA ID Number
S&J TRANSPORTATION COMPANY — N|J|D|0|7|1|6|2|9|9|7|6

C. State Trans. ID XXX 22536

7. Transporter 2 Company Name — 8. US EPA ID Number

D. Transporter's Phone (609) 769-2741

E. State Trans. ID

9. Designated Facility Name and Site Address — 10. US EPA ID Number
ROLLINS ENVIRONMENTAL SERVICE
ROUTE 322 WEST - BOX 337
BRIDGEPORT NJ — N|J|D|0|5|3|2|8|8|2|3|9

F. Transporter's Phone (XXX)

G. State Facility's ID SAME

H. Facility's Phone (609) 467-3100

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993, (F001,F002,F003,F005), RQ	001	TT	42220	P	F001,F002 F003,F005
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

a. ME2CO<47%,FREON<36%,IPA<99%,MEOH<99%,ME2CL2<53%, NBA<66%,PERC<93%,TOL<34%,H2O<95%XYL<27%,L,I,T

b.

d.

K. Handling Codes for Wastes Listed Above

a. T03

b.

c.

d.

15. Special Handling Instructions and Additional Information

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.

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Printed/Typed Name: ROBERT SANTIMAW — Signature: Robert Santimaw — Month Day Year: 12 21 88

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: JEFFERY LONG — Signature: Jeffery Long — Month Day Year: 12 21 88

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name — Signature — Month Day Year

GENERATOR — TRANSPORTER — FACILITY

NJA 0538190

309-00328
001

IWM-EF-22

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

9/90/90

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039 Expires 9-30-92

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NYD000707901 Manifest Document No. 00528

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

3. Generator's Name and Mailing Address
IBM CORP. ATTN: MGR. D92D 9A1
RTE. 52 HOPEWELL JCT. NY 12533

A. State Manifest Document Number: **NJA** 0538185

4. Generator's Phone: 914-892-1173

B. State Generator's ID: SAME

5. Transporter 1 Company Name: ROLLINS ENVIRONMENTAL SERVICE

6. US EPA ID Number: NJD053282392

C. State Trans. ID: [illegible]

D. Transporter's Phone: 609 467-3100

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Trans. ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
ROLLINS ENVIRONMENTAL SERVICE
ROUTE 322 WEST - BOX 337
BRIDGEPORT NJ

10. US EPA ID Number: NJD053282392

G. State Facility's ID: SAME

H. Facility's Phone: 609-467-3100

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No:	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993, (F001,F002,F003,F005), RQ	001	TT	3672	P	F001,F002 F003,F005
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
ME2CO<47%,FREON<36%,IPA<99%,MEOH<99%,ME2CL2<53%, NBA<66%,PERC<93%,TOL<34%,H2O<95%XYL<27%,L,I,T

K. Handling Codes for Wastes Listed Above: T03

15. Special Handling Instructions and Additional Information

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.

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Printed/Typed Name: ROBERT SANTIMAW — Signature: Robert Santimaw — Month Day Year: 01 03 89

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: MICKEY HOGLEN — Signature: Mickey Hoglen — Month Day Year: 01 03 89

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19

Printed/Typed Name — Signature — Month Day Year

GENERATOR — TRANSPORTER — FACILITY

3—TSD MAIL TO GENERATOR

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

In case of an emergency or spill immediately call the state the emergency occurred in and the N.J. Dept. of Environmental Protection: (609) 292-5900 (day) (609) 292-7172 (night)

NJA 0538185

309-00331

001

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters (Form designed for use on elite (12-pitch) typewriter)

Form Approved OMB No. 2050-0039

9/30/90 XXXX

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator US EPA ID: NYD000707901003 31 | Number: 1

3. Generator's Name and Mailing Address
IBM CORP. ATTN: MGR. D92D 9A1
RTE. 52 HOPEWELL JCT. NY 12533
4. Generator's Phone: 914-892-1173

NJA 0538183

B. State Generator's ID: SAME

5. Transporter 1 Company Name: ROLLINS ENVIRONMENTAL SERVICE
6. US EPA ID Number: NJD053282823
C. State Trans. ID: NJDEPS3978 20562
D. Transporter's Phone: 609 467-3100

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

9. Designated Facility Name and Site Address
ROLLINS ENVIRONMENTAL SERVICE
ROUTE 322 WEST - BOX 337
BRIDGEPORT NJ
10. US EPA ID Number: NJD053282823
G. State Facility's ID: SAME
H. Facility's Phone: 609-467-3100

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.	Waste No.
a. WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993, (F001,F002,F003,F005), RQ	001	TT	38440	P	F001,F002 F003,F005
b.					
c.					
d.					

13. Additional Descriptions for Materials Listed Above
ME2CO<47%,FREON<36%,IPA<99%,MEOH<99%,ME2CL2<53%, NBA<66%,PERC<93%,TOL<34%,H2O<95%XYL<27%,L,I,T

T03

15. Special Handling Instructions and Additional Information

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Printed/Typed Name: ROBERT SANTIMAW
Signature: Robert Santimaw
Month Day Year: 01 06 89

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: MICKEY HOGLEN
Signature: Mickey Hoglen
Month Day Year: 01 06 89

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name:
Signature:
Month Day Year:

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name:
Signature:
Month Day Year:

3 — TSD MAIL TO GENERATOR

GENERATOR TRANSPORTER FACILITY

IBM-EF-70

NJA 0538183

(REV. 9/86)

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9/30/90

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N Y D 0 0 0 7 0 7 9 0 1 — Manifest Document No. 0 0 3 3 5

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

Generator's Name and Mailing Address
BM CORP. ATTN: MGR. D92D 9A1
TE. 52 HOPEWELL JCT. NY 12533
Generator's Phone (914 892-1173

A. State Manifest Document Number **NJA 0538180**

B. State Generator's ID SAME

Transporter 1 Company Name: &J TRANSPORTATION COMPANY
6. US EPA ID Number: N J D 0 7 1 6 2 9 9 7 6

C. State Trans. ID: NJDEPS03217 22536

Transporter 2 Company Name:
8. US EPA ID Number:

D. Transporter's Phone (609 769-2741

E. State Trans. ID:

Designated Facility Name and Site Address:
OLLINS ENVIRONMENTAL SERVICE
OUTE 322 WEST - BOX 337
RIDGEPORT NJ
10. US EPA ID Number: N J D 0 5 3 2 8 8 2 3 9

F. Transporter's Phone (SAME

G. State Facility's ID SAME

H. Facility's Phone (609-467-3100

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993, (F001,F002,F003,F005), RQ	0 0 1	TT	4 5 6 6 0	P	F001,F002 F003,F005

J. Additional Descriptions for Materials Listed Above
ME2CO<47%,FREON<36%,IPA<99%,MEOH<99%,ME2CL2<53%,
NBA<66%,PERC<93%,TOL<34%,H2O<95%XYL<27%,L,I,T

K. Handling Codes for Wastes Listed Above
a. T03
b.
c.
d.

15. Special Handling Instructions and Additional Information

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.

If I am a large quantity generator, I certify that I have a 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 of 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 quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month	Day	Year
ROBERT SANTIMAW	Robert Santimaw	1 0	1 1	0 8 9

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
ENNETH WILLIAMS	Kenneth Williams	1 0	1 1	0 8 9

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year

9

SIGNATURE AND INFORMATION MUST BE LEGIBLE ON ALL COPIES

1 = TSD MAIL TO = TSD'S STATE

NJA 0538180

IBM-EF-70

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

309-00001

9/30/90

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039 Expires

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJD007907100 | Manifest Document No. | Page 1 of 1 | Information in the shaded areas is not required by Federal law

3. Generator's Name and Mailing Address
IBM CORP. ATTN: MGR. D92D 9A1
RTE. 52 HOPEWELL JCT. NY 12533
4. Generator's Phone: 914-892-1173

NJA 0538178

5. Transporter 1 Company Name | 6. US EPA ID Number: NJD053282839 | A. State Transporter's ID: SAME | B. Transporter 1 Phone: NJDEPSO3976TRAP

7. Transporter 2 Company Name | 8. US EPA ID Number | C. State Transporter's ID: [illegible] | D. Transporter 2 Phone: 609 467-3100

9. Designated Facility Name and Site Address | 10. US EPA ID Number | E. State Transp. ID: [illegible] | F. Transporter's Phone: [illegible]

ROLLINS ENVIRONMENTAL SERVICE
ROUTE 322 WEST - BOX 337
BRIDGEPORT NJ | NJD053282839 | G. State Facility's ID: SAME | H. Facility's Phone: 609-467-3100

	11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	Unit Wt./Vol.	14. Waste No.
a.	WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993, (F001,F002,F003,F005), RQ	001	TT	35180	P	F001,F002 F003,F005
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above: ME2CO<47%,FREON<36%,IPA<99%,MEOH<99%,ME2CL2<53%, NBA<66%,PERC<93%,TOL<34%,H2O<95%XYL<27%,L,I,T | K. Handling Codes for Wastes Listed Above: T03

15. Special Handling Instructions and Additional Information

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.

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Printed/Typed Name: ROBERT SANTIMAN | Signature: Robert Santiman | Month Day Year: 01 16 89

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: MICKEY HOGLEN | Signature: Mickey Hoglen | Month Day Year: 01 16 89

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: 9/89 | Signature | Month Day Year

3 — TSD MAIL TO GENERATOR

IBM-EF-70

NJA 0538178

IBM-EF-0

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

CN 033, Trenton, NJ 08625

910

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J D 0 0 0 7 0 7 9 0 1 0 | Manifest Document No. 0 0 0 0 4 | Page 1 of | Information in the shaded areas is not required by federal law

2. A. State Manifest Document Number: NJA 0538176

3. Generator's Name and Mailing Address
IBM CORP. ATTN: MGR. D92D 9A1
RTE. 52 HOPEWELL JCT. NY 12533

4. Generator's Phone: 914-892-1173

B. State Generator's ID: SAME

5. Transporter 1 Company Name: ROLLINS ENVIRONMENTAL SERVICE
6. US EPA ID Number: N J D 0 5 3 2 6 8 2 3 9

NJDEP 5997820563

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

D. Transporter's Phone: 609-467-3100

9a. Designated Facility Name and Site Address
ROLLINS ENVIRONMENTAL SERVICE
ROUTE 322 WEST - BOX 337
BRIDGEPORT NJ
10. US EPA ID Number: N J D 0 5 3 2 8 8 2 3 9

E. State Transporter's ID:

F. Transporter's Phone ( ):

G. State Facility's ID: SAME

H. Facility's Phone: 609-467-3100

	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.
GENERATOR a.	WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993, (F001,F002,F003,F005, RQ	001	TT	3880	P	F001,F002 F003,F005
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
1.ME2CO<47%,FREON<36%,IPA<99%,MEOH<99%,ME2CL2<53%,
2.NBA<66%,PERC<93%,TOL<34%,H2O<95%XYL<27%,L,I,T

K. Handling Codes for Wastes Listed Above
T03

15. Special Handling Instructions and Additional Information

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.

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Printed/Typed Name: ROBERT SANTIMAW
Signature: Robert Santimaw
Month Day Year: 0 1 2 0 8 9

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: KENNETH W. GARDNER
Signature: Kenneth W. Gardner
Month Day Year: 0 1 2 0 8 9

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name:
Signature:
Month Day Year:

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19
Printed/Typed Name:
Signature:
Month Day Year:

EPA Form 8700-22 (Rev. 3/86) Previous editions are obsolete.

3 — TSD MAIL TO GENERATOR

SIGNATURE AND INFORMATION ... ON ALL COPIES

IBM-EF-22

IBM-EF-701

IBM-EF-52

IBM-EF-0

In case of an emergency or spill immediately call the state the emergency occurred in and the N.J. Dept. of Environmental Protection (609) 292-6560 (Day) (609) 292-7172 (Night)

NJA 0538176

Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

9-30-96

Type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N Y D 0 0 0 7 0 7 9 0 1 | Manifest Document No. 0 0 0 0 0 5

2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

Generator's Name and Mailing Address

3M CORP. ATTN: MGR. D92D 9A1
E. 52 HOPEWELL JCT. NY 12533
Generator's Phone (914-892-1173

A. State Manifest Document Number **NJA 0538175**

B. State Generator's ID SAME

C. State Trans. ID NJDEP-S 3217 22586

D. Transporter's Phone 609-769-2741

E. State Trans. ID

F. Transporter's Phone ( )

G. State Facility's ID SAME

H. Facility's Phone (609-467-3100

Transporter 1 Company Name: J TRANSPORTATION COMPANY | 6. US EPA ID Number: N J D 0 7 1 6 2 9 9 7 6

Transporter 2 Company Name | 8. US EPA ID Number

Designated Facility Name and Site Address: OLLINS ENVIRONMENTAL SERVICE
OUTE 322 WEST - BOX 337
RIDGEPORT NJ | 10. US EPA ID Number: N J D 0 5 3 2 8 8 2 3 9

US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993, (F001,F002,F003,F005), RQ	0 0 1	TT	4 0 4 4 0	P	F001,F002 F003,F005

Additional Descriptions for Materials Listed Above
ME2CO<47%,FREON<36%,IPA<99%,MEOH<99%,ME2CL2<53%,
NBA<66%,PERC<93%,TOL<34%,H2O<95%XYL<27%,L,I,T

K. Handling Codes for Wastes Listed Above
a. T03 b. c. d.

Special Handling Instructions and Additional Information

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.

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Printed/Typed Name	Signature	Month	Day	Year
BERT SANTIMAW	Robert Santimaw	0 1	2 0	8 9

Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
AN DAVIS	Alan Davis	0 1	2 0	8 9

Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

Discrepancy Indication Space

Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year

9

1 — TSD MAIL TO - TSD'S STATE

NJA 0538175

Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039, Expires 9/30/90

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N Y D 0 1 0 7 0 7 9 0 1 | Manifest Document No. 1 0 0 0 1 0 6 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
IBM CORP. ATTN: MGR. D92D 9A1
RTE. 52 HOPEWELL JCT. NY 12533

4. Generator's Phone (914) 892-1173

A. State Manifest Document Number: NJA 0538174

B. State Generator's ID: SAME

5. Transporter 1 Company Name: S&J TRANSPORTATION COMPANY | 6. US EPA ID Number: N J D 0 7 1 6 2 9 9 7 6

C. State Trans. ID: 22545

7. Transporter 2 Company Name | 8. US EPA ID Number

D. Transporter's Phone: 609-769-2744

9. Designated Facility Name and Site Address
ROLLINS ENVIRONMENTAL SERVICE
ROUTE 322 WEST - BOX 337
BRIDGEPORT NJ | 10. US EPA ID Number: N J D 0 5 3 2 8 8 2 3 9

E. State Trans. ID:

F. Transporter's Phone:

G. State Facility's ID: SAME

H. Facility's Phone: (609) 467-3100

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt./Vol.	I. Waste No.
a. WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993, (F001, F002, F003, F005), RQ		0 0 1	TT	4 0 9 6 0	P	F001, F002 F003, F005
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
ME2CO<47%, FREON<36%, IPA<99%, MEOH<99%, ME2CL2<53%, NBA<66%, PERC<93%, TOL<34%, H2O<95%, XYL<27%, L,I,T

K. Handling Codes for Wastes Listed Above
a. T03 | b. | c. | d.

15. Special Handling Instructions and Additional Information
NJDEPSO 3217 - 22545

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.

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Printed/Typed Name: WILLIAM CURETON | Signature: William Cureton | Month 0 1 | Day 2 4 | Year 8 9

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: KEN WILLIAMS | Signature: Ken Williams | Month 0 1 | Day 2 4 | Year 8 9

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month | Day | Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.

Printed/Typed Name | Signature | Month | Day | Year

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

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

1 — TSD MAIL TO - TSD'S STATE

GENERATOR | TRANSPORTER | FACILITY

NJA 0538174

IBM-EF.

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

309-007

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039 Expires 9-30-85

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N Y D 0 0 0 7 0 7 9 0 1 | Manifest Document No. 0 0 0 0 7

2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
IBM CORP. ATTN: MGR. D92D 981
RTE. 52 HOPEWELL JCT. NY 12533

4. Generator's Phone (914-892-1173

A. State Manifest Doc. No. **NJA 0538173**

B. State Generator's ID SAME

5. Transporter 1 Company Name: ROLLINS ENVIRONMENTAL SERVICE | 6. US EPA ID Number: N J D 0 5 3 2 8 8 2 3 9

C. State Trans. ID TEMP

7. Transporter 2 Company Name | 8. US EPA ID Number

D. Transporter's Phone 609-467-3100

E. State Trans. ID

9. Designated Facility Name and Site Address
ROLLINS ENVIRONMENTAL SERVICE
ROUTE 322 WEST - BOX 337
BRIDGEPORT NJ

10. US EPA ID Number: N J D 0 5 3 2 8 8 2 3 9

F. Transporter's Phone

G. State Facility's ID SAME

H. Facility's Phone 609-467-3100

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	Unit Wt./Vol.	Waste No.
a. WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993, (F001,F002,F003,F005), RQ	0 0 1	TT	4 1 0 4 0	P	F001,F002 F003,F005
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
a. ME2CO<47%,FREON<36%,IPA<99%,MEOH<99%,ME2CL2<53%, NBA<66%,PERC<93%,TOL<34%,H2O<95%XYL<27%,L,I,T

K. Handling Codes for Wastes Listed Above
a. T03 b. c. d.

15. Special Handling Instructions and Additional Information

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Printed/Typed Name: ROBERT SANTIMAW | Signature: Robert Santimaw | Month Day Year: 0 1 2 4 8 9

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: THOMAS J. MCCARTHY | Signature: [signature] | Month Day Year: 0 1 2 4 8 9

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space
FL C: 53777

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19

Printed/Typed Name: Gus Parra | Signature: Gus Parra | Month Day Year

GENERATOR | TRANSPORTER | FACILITY

TBM-EF-70

NJA 0538173

3—TSD MAIL TO GENERATOR

309-012

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

UNIFORM HAZARDOUS WASTE MANIFEST

Generator's US EPA ID No. NYD007079100012 | Page 1 of 1 | Manifest Doc. No. NJA 0538148

2. Generator's Name and Mailing Address
IBM CORP. ATTN: MGR. D92D 9A1
RTE. 52 HOPEWELL JCT. NY 12533

4. Generator's Phone (914-892-1173)

5. Transporter 1 Company Name: G&J TRANSPORTATION COMPANY | 6. US EPA ID Number: NJD071629976 | A. State Trans. ID: 22537 | C. Transporter's Phone: 609-769-2741

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

9. Designated Facility Name and Site Address
ROLLINS ENVIRONMENTAL SERVICE
ROUTE 322 WEST - BOX 337
BRIDGEPORT NJ

10. US EPA ID Number: NJD053288239 | G. State Facility's ID: SAME | H. Facility's Phone: 609-467-3100

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. WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993, (F001,F002,F003,F005), RQ	001	TT	38080	P	F001,F002 F003,F005
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
ME2CO<47%,FREON<36%,IPA<99%,MEOH<99%,ME2CL2<53%, NMA<66%,PERC<93%,TOL<34%,H2O<95%XYL<27%,L,I,T

K. Handling Codes for Wastes Listed Above
T03

15. Special Handling Instructions and Additional Information

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.

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Printed/Typed Name: ROBERT SANTIMAN | Signature: Robert Santiman | Month Day Year: 01 27 89

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: LINDY DORRELL | Signature: L. Dorrell | Month Day Year: 01 27 89

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: Gus Parra | Signature: Gus Parra | Month Day Year: 01 29 89

3 — TSD MAIL TO GENERATOR

NJA 0538148

IBM-EF-

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 0825

309-014

91

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No: N Y D 0 0 0 7 0 7 9 0 1 | 2. Page 1 of 1 | Information in the shaded areas is not required by Federal law

3. Generator's Name and Mailing Address
IBM CORP. ATTN: MGR. D92D 9A1
RTE. 52 HOPEWELL JCT. NY 12533

4. Generator's Phone: 914-892-1173

A. State Manifest Doc. No.: **NJA 0538149**

B. State Generator's ID: SAME

5. Transporter 1 Company Name: ROLLINS ENVIRONMENTAL SERVICE | US EPA ID Number: N J D 0 5 3 2 8 8 2 3 9

C. State Trans. ID: 20563

6. Transporter 2 Company Name | US EPA ID Number

D. Transporter's Phone: 609-467-3100

E. State Trans. ID

9. Designated Facility Name and Site Address
ROLLINS ENVIRONMENTAL SERVICE
ROUTE 322 WEST - BOX 337
BRIDGEPORT NJ

10. US EPA ID Number: N J D 0 5 3 2 8 8 2 3 9

F. Transporter's Phone

G. State Facility's ID: SAME

H. Facility's Phone: 609-467-3100

11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	Unit Wt./Vol.	14. Waste No.
a. WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993, (F001,F002,F003,F005), RQ	001	TT	40780	P	F001,F002 F003,F005
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above: ME2CO<47%,FREON<36%,IPA<99%,MEOH<99%,ME2CL2<53%, NBA<66%,PERC<93%,TOL<34%,H2O<95%XYL<27%,L,I,T

K. Handling Codes for Wastes Listed Above: T03

a. | b. | c. | d.

15. Special Handling Instructions and Additional Information: NJDEPS039738

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.

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Printed/Typed Name: ROBERT SANTIMAW | Signature: Robert Santimaw | Month Day Year: 01 31 89

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: THOMAS J. MCCARTHY | Signature | Month Day Year: 01 31 89

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space

Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name | Signature | Month Day Year

GENERATOR | TRANSPORTER | FACILITY

IBM-EF-70

NJA 0538149

3—TSD MAIL TO GENERATOR

VHW-001 (REV. 9/86)

ROLLINS ENVIRONMENTAL

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

309-018

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No: N Y D 0 0 0 7 0 7 9 0 1 | Manifest Document No. 0 0 0 1 8 | 2. Page 1 of 1

A. State Manifest Document Number: NJA 0538150

3. Generator's Name and Mailing Address
IBM CORP. ATTN: MGR. D92D 9A1
RTE. 52 HOPEWELL JCT. NY 12533

4. Generator's Phone ( ) 914-892-1173

B. State Generator's ID: SAME
NJDEP S 3217

5. Transporter 1 Company Name: S&J TRANSPORTATION COMPANY
6. US EPA ID Number: N J D 0 7 1 6 2 9 9 7 6
C. State Trans. ID: 22550
D. Transporter's Phone: 609-769-2741

7. Transporter 2 Company Name: NONE
8. US EPA ID Number:
E. State Trans. ID:
F. Transporter's Phone:

9. Designated Facility Name and Site Address
ROLLINS ENVIRONMENTAL SERVICE
ROUTE 322 WEST - BOX 337
BRIDGEPORT NJ
10. US EPA ID Number: N J D 0 5 3 2 8 8 2 3 9
G. State Facility's ID: SAME
H. Facility's Phone: 609-467-3100

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. WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993, (F001,F002,F003,F005), RQ (001)	0 0 1	TT	4 2 9 6 0	P	F001,F002 F003,F005
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
ME2CO<47%,FREON<36%,IPA<99%,MEOH<99%,ME2CL2<53%,
NBA<66%,PERC<93%,TOL<34%,H2O<95%XYL<27%,L,I,T

K. Handling Codes for Wastes Listed Above
a. T03

15. Special Handling Instructions and Additional Information

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.

If I am a large quantity generator, I certify that I have a 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 of 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 quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: ROBERT SANTIMAN | Signature: Robert Santiman | Month Day Year: 0 2 0 3 8 9

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: ALAN DAVIS | Signature: Alan Davis | Month Day Year: 0 2 0 3 8 9

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: | Signature: | Month Day Year:

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: M. A. DAVIS | Signature | 020389

In case of an emergency or spill immediately call the state the emergency occurred in and the N.J. Dept. of Environmental Protection, (609) 292-5560 (Day) (609) 292-7172 (Night)

IBM-EF-22 IBM-EF-70

2. TSD MAIL TO GENERATOR

IBM-EF-270

In case of an emergency or spill immediately call the state the emergency occurred in and the N.J. Dept. of Environmental Protection (609) 292-5560 (Day) (609) 292-7172 (Night)

IBM-EF-270

IBM-EF-22

Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter)

Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No: N Y D 0 0 7 0 7 9 0 1 0 0 0 2 0
Manifest Document No:

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

3. Generator's Name and Mailing Address
IBM CORP. ATTN: MGR. D92D 9A1
RTE. 52 HOPEWELL JCT. NY 12533

4. Generator's Phone (914-892-1173

A. State Manifest Document Number: NJA 0538151

B. State Generator's ID: SAME

5. Transporter 1 Company Name: ROLLINS ENVIRONMENTAL SERVICE
6. US EPA ID Number: N J D 0 5 3 2 8 8 2 3 9

C. State Trans ID: 20564

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

D. Transporter's Phone: 609-467-3100

E. State Trans ID:

9. Designated Facility Name and Site Address: ROLLINS ENVIRONMENTAL SERVICE
ROUTE 322 WEST - BOX 337
BRIDGEPORT NJ
10. US EPA ID Number: N J D 0 5 3 2 8 8 2 3 9

F. Transporter's Phone ( )

G. State Facility's ID: SAME

H. Facility's Phone: 609-467-3100

	11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993, (F001,F002,F003,F005), RQ 001	0 0 1	TT	2 3 9 8 0	P	F001,F002 F003,F005
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
ME2CO<47%,FREON<36%,IPA<99%,MEOH<99%,ME2CL2<53%,
NBA<66%,PERC<93%,TOL<34%,H2O<95%XYL<27%,L,I,T

K. Handling Codes for Wastes Listed Above
a. T03
b.
c.
d.

15. Special Handling Instructions and Additional Information

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.

If I am a large quantity generator, I certify that I have a 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 of 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 quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: WILLIAM CURETON
Signature: William Cureton
Month Day Year: 02038

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: THOMAS J MCCARTHY
Signature:
Month Day Year: 02038

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 19.
Printed/Typed Name: M A Owens
Signature:
Month Day Year: 02038

3—TSD MAIL TO GENERATOR

HW-001 (REV. 9/86)

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. / Manifest Document No.: NYD007079011 / 00217

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
IBM CORP. ATTN: MGR. D92D 9A1
RTE. 52 HOPEWELL JCT. NY 12533

4. Generator's Phone (914) 892-1173

A. State Manifest Document Number: NJA 0538153

B. State Generator's ID: SAME

5. Transporter 1 Company Name: S&J TRANSPORTATION COMPANY

6. US EPA ID Number: NJD071629976

C. State Trans. ID: 22537

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone: 609-769-2741

E. State Trans. ID

9. Designated Facility Name and Site Address
ROLLINS ENVIRONMENTAL SERVICE
ROUTE 322 WEST - BOX 337
BRIDGEPORT NJ

10. US EPA ID Number: NJD053288239

F. Transporter's Phone ( )

G. State Facility's ID: SAME

H. Facility's Phone: 609-467-3100

	11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	WASTE FLAMMABLE LIQUID, N.O.S. FLAMMABLE LIQUID UN1993, (F001,F002,F003,F005), RQ	001	TT	1840	P	F001, F002 F003, F005
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above
a. ME2CO<47%, FREON<36%, IPA<99%, MEOH<99%, ME2CL2<53%, NBA<66%, PERC<93%, TOL<34% H2O<95% XYL<27%, L, I, T
b.
d.

K. Handling Codes for Wastes Listed Above
a. T03
b.
c.
d.

15. Special Handling Instructions and Additional Information

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.

If I am a large quantity generator, I certify that I have a 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 of 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 quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month	Day	Year
ROBERT SANTIMAW	Robert Santimaw	10	21	89

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
GREGG REAL	Gregg Real	10	21	89

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day

Previous editions are obsolete.

SIGNATURE AND PRINTED NAME MUST BE LEGIBLE

GENERATOR

TRANSPORTER

FACILITY

1 — TSD MAIL TO - TSD'S STATE

NJA-0538153

1

STATE OF ARKANSAS
Department of Pollution Control and Ecology
P. O. Box 9583 Little Rock, Arkansas 72219
Telephone 501-562-7444

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: NYD000707901 — Manifest Document No.: 00081
2. Page 1 of 1
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
IBM CORP. ATTN: MGR. D92D 9A1
RTE. 52 HOPEWELL JCT. NY 12533
4. Generator's Phone ( ) 914-892-1173

A. State Manifest Document Number: AR-109768
B. State Generator's ID: SAME

5. Transporter 1 Company Name: ENSCO (AOR)
6. US EPA ID Number: ARD069748192
C. State Transporter's ID: ST915574AR
D. Transporter's Phone: 501-863-7173

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
ENSCO (AOR)
AMERICAN OIL ROAD
EL DORADO AR
10. US EPA ID Number: ARD069748192
G. State Facility's ID:
H. Facility's Phone: 501-863-7173

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. HAZARDOUS WASTE, SOLID, N.O.S. ORM-E NA9189, (F001), (F002), RQ	056	DM	11320	P	F001,F002 F003,F005
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
if no alternate TSDF, return to generator

K. Handling Codes for Wastes Listed Above
B WILLIAM CURETON
914-894-3256

15. Special Handling Instructions and Additional Information
51874

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 Arkansas state regulations.
If I am a large quantity generator, I certify that I have a 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 of 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 quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month	Day	Year
WILLIAM CURETON	William Cureton	04	10	89

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
GEORGE CUMMINS	George Cummins	04	10	89

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year

EPA Form 8700-22 (Rev. 4-85) Previous edition is obsolete.

NOTICE: THE ORIGINAL AND NOT LESS THAN TWO (2) COPIES MUST MOVE WITH THE HAZARDOUS WASTE SHIPMENT. ONCE DELIVERED, THE TREATMENT/STORAGE/DISPOSAL FACILITY MUST RETURN THIS ORIGINAL COPY TO THE GENERATOR.

APPENDIX I

APPENDIX I

BILL OF LADING FOR NON-HAZARDOUS WASTE

IBM

STRAIGHT BILL OF LADING — SHORT FORM — CARRIER'S COPY — Not Negotiable

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading.

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classification in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment. Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

From
International Business Machines Corp. 146-A

2

SHIPPER'S NUMBER **990- 009702**

CITY	DATE	B/O	P.O. NO.(S)	CARRIER'S NUMBER
EAST FISHKILL, NJ	2/14/89			

CONSIGNED TO (Mail or Street Address of Consignee—For purposes of notification only.)

DESTINATION CHARLES EFFRON
COUNTY 167 SMITH ST.
STATE POUGHKEEPSIE, NY 12601
ROUTE
DELIVERING
CARRIER TOP JOB

Carrier Type
Freight Type 1, 4
Car or Vehicle Initials No.

SPECIAL INSTRUCTIONS: INVOICE PREPAID SHIPMENTS TO:

IBM MHV TRAFFIC
Dept. L30A/944
P.O. BOX 1650
KINGSTON, NY 12401

TALLY # 25685

Subject to Section 7 of Conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement.
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of consignor)

FREIGHT CHARGES ☐ PREPAID ☒ COLLECT

Received $
to apply in prepayment of the charges on the property described hereon.

Agent or Cashier.
Per
(The signature here acknowledges only the amount prepaid.)
Charges advanced: $

NO. PKGS.	HM	KIND OF PACKAGE, DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	*WEIGHT (SUB. TO COR.)	CLASS OR RATE	CK. COL.	IBM PRODUCT CODE/DESCRIPTION OF ARTICLES
		FREIGHT ALL KINDS, BUSINESS OR OFFICE MACHINE SYSTEMS OR DEVICES, DATA PROCESSING AND/OR PARTS, SUPPLIES, AND MATERIALS USED IN THE DEVELOPMENT, MANUFACTURING, MAINTENANCE AND DISTRIBUTION THEREOF.				IBM 00404
ONE		SCRAP METAL, TRUCK	WCR			

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

SIGNATURE

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight." NOTE—Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.
The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding
Per

AGENT
PER
AGENT'S NO.

INTERNATIONAL BUSINESS MACHINES CORP. — SHIPPER
PER ..... DATE 2/14/89

Permanent post office address of shipper.
Route 52, Hopewell Junction, NY 12533-0999

M30-7188-0 U/M 03 REV. 9/87

Mark with "X" or "RQ" if appropriate to designate Hazardous Materials or Hazardous Substances as defined in the Department of Transportation Regulations governing the transportation of hazardous materials. The use of this column is an optional method for identifying hazardous materials on bills of lading per Section 172.201(a)(1)(iii) of Title 49 Code of Federal Regulations. Also when shipping hazardous materials the shipper's certification statement prescribed in Section 172.204(a) of the Federal Regulations must be

MAY-18-1989 12:00 FROM