SITE INSPECTION

Metz Metallurgical

(aka: Degussa/Degrassa Corporation)

SOUTH PLAINFIELD, MIDDLESEX COUNTY

EPA ID.: NJD002195303

Volume 2 of 2

New Jersey Department of Environmental Protection and Energy
Division of Responsible Party Site Remediation
Bureau of Site Assessment

205699

ATTACHMENT S

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

DUTY OFFICER NOTIFICATION REPORT

12/22/04

3/30

CASE NO. 89 (Yr.) - 03 (Mo) - 30 (Day) - 1329 (Time)

DATE 03 (Mo) - 30 (Day) - 89 (Yr) REC'D BY McCreary TIME 1338

INCIDENT REPORT BY:

Name Linda Brennen Phone 201-561 1100

Street

City State

Affiliation/Title Metz Metalurgical

INCIDENT LOCATION: ___ Transportation ___ Facility ___ Other:

Name (Site): Metz Metalurgical Phone

Street 3900 S. Clinton

City South Plainfield County Middlesex State N.J. Zip Code

Date of Incident: 03 (Mo) - 30 (Day) - 89 (Yr) Time: 1320

IDENTITY OF SUBSTANCE(S) SPILLED, RELEASED, ETC.: ___ Suspected ___ Unknown

Name of Substance(s) [Gas, Liquid, Solid]: Therminol 55 (Heat transfer oil

Amount Released/Spilled < 2 gal ___ Actual ___ Potential ___ Estimated Substance Contained Y (N) U

Type of Release/Spill: ___ Terminated ___ Continuous ___ Intermittent Hazardous Material (Y) N U

INCIDENT DESCRIPTION:

___ Fire ___ Explosion ___ Air Rel ✓ Spill ___ MVA ___ Derailment ___ Smoke/Dust

___ Odors ___ Sewage ___ NJPDES ___ Noise ___ Wildlife ___ Illegal Dumping ___ Drums

___ Equip Start-Up/Shutdown, Equip Fail/Upset, etc.

___ Other (specify)

Injuries	Y (N) U	Public Exposure	Y N U
Facility Evacuation	Y (N) U	Fire Department at Scene	Y N U
Population Evacuation	Y (N) U	Police at Scene	Y N U
Potable Water Source	Y N U	Assistance Requested	Y N U
Contamination of ___ Air ✓ Land ✓ Water		Precipitation	Y N U
Receiving Water Bound Brook		Wind Direction/Speed	/

Location Type: ___ Residential ___ Industrial ___ Commercial ___ Rural ___ Sensitive Population (Hosp., School, Nurs. Home)

STATUS AT INCIDENT SCENE Overflow from expansion tank caused discharge to storm drain. Area has been boomed.

RESPONSIBLE PARTY: ___ Suspected ___ Unknown

Company Name See I/L Phone

Contact Title

Street

City County State Zip Code

OFFICIALS NOTIFIED (Name/Title):

NJSP: By T.O.	/	Phone	Date/Time /	(T/M)
Local Health: ~~Total Care~~ Middlesex Co Hlth	/	Phone 201-238-3870	Date/Time 3/30/89 / 1402	(T/M)
Local Munic: By T.O.	/	Phone	Date/Time /	(T/M)
USEPA:	/	Phone	Date/Time /	(T/M)

INCIDENT REFERRED TO:

___ DEQ ___ DWR ___ DSWM ___ DHSM ✓ DHWM ___ DOH ✓ DFG ___ DPF ___ DCJ ___ DCR

Region: ___ Northern ___ Metro ✓ Central ___ Southern ___ ER1 ___ ER2 ___ BUST

1. Name/Affil Hardcorry / Phone Date/Time / (T/M)
2. Name/Affil / Phone Date/Time / (T/M)
3. Name/Affil / Phone Date/Time / (T/M)

DEP RESPONSE Emergency Immediate Priority No Response

COMMENTS ~~1132 Called Linda Brennen~~ - was out in mtg let message by pull box 822. -- Spill containment & cleanup performed. S. Plainfield HD responded. NOTIFIED

ATTACHMENT S

COPIES: White - Lead Agency Yellow - Other Pink - Other

Therminol 55: Release at Metz Metallurgical Corporation
March 30, 1989

On Thursday, March 30, 1989, a release of Therminol 55 a heat transfer fluid, occurred from Metz Metallurgical Corporation (MMC). The plant is located at 3900 South Clinton Avenue, South Plainfield, NJ. South Plainfield is located in Middlesex County.

The source of the release was an overflow from an expansion tank located on the roof. Some of the oil escaped down the roof drain, the remainder was absorbed with oil selective booms and pillows, as well as sawdust, before reaching the drain. The soaked absorbents were drummed and are currently being accumulated on site prior to proper disposal.

Approximately 1 to 2 gallons of Therminol 55 escaped the control of MMC. Through the use of absorbent pillows and booms, 80 to 90% of the estimated ten gallons released into the NJPDES permitted outfall (#0034835) was recovered. In addition to the mitigation efforts of MMC, the South Plainfield Fire Department set up two additional oil absorbent booms downstream of MMC and the release.

The booms and pillows placed by MMC have been removed. Therminol 55 which collected in the boomed area, had been skimmed out prior to the removal of the booms. The booms placed by the Fire Department were removed with the Local Emergency Management Coordinator's approval.

In order to prevent a reoccurrence of this event, all oil expansion tanks will have their overflows redirected inside the plant and not onto the roof.

ATTACHMENT S-2

ATTACHMENT T

SILVER CHLORIDE RELEASE SEPTEMBER 13, 1989

At approximately 10:00 a.m. on September 13, 1989, Metz Metallurgical Corporation discovered a release of silver chloride from their facility at 3900 South Clinton Avenue, South Plainfield, Middlesex County, New Jersey 07080. The material entered the plant non-contact cooling water collection system and discharge into an unnamed FW-2 NT stream via a NJPDES permitted outfall (NJ0034835). As an immediate mitigating action, the cooling water discharge from the plant was shut down and the stream was dammed on the Metz site (location A) at 10:15 a.m. The New Jersey Department of Environmental Protection (NJDEP) was notified at 10:07 a.m., the Local Emergency Planning Commission (LEPC) was notified at 10:18 a.m. and the Middlesex County Hazardous Materials Response Unit at 10:20. The total amount of silver chloride released from the facility is estimated at well less than 100 lbs.

During the initial stage of the release mitigation, it was not known that the silver was released only in the insoluble silver chloride form. As a precautionary measure, approximately 200 lbs. of salt (sodium chloride) was distributed through a portion of the stream to stabilized the silver as an insoluble precipitate. It was subsequently learned that the salt had been unnecessary.

A private environmental emergency response company, American Industrial Marine (AIM) was called at 10:25 a.m. and arrived on site at approximately 10:45 a.m. The LEPC had arrived on site at 10:40 a.m. and dammed the receiving stream at the end of Century Avenue, (location B). Under the direction of facility personnel, AIM removed approximately 5000 gallons of contaminated water from behind the dam on the company property (location A) first, and then removed all the water from behind the dam at location B, thereby removing any contamination that had traveled that far. Facility personnel then directed AIM to removed the contaminated water that had collected behind the on site dam (location A) to relieve the hydraulic pressure.

The contaminated water removed from the two locations by AIM was discharged into the Metz wastewater treatment plant to recover the contained silver value.

After the contaminated water was removed from behind the dam at location B, a sample was taken of the small puddles remaining, and analyzed for silver content. The concentration of silver was found to be 1.2 ppm. In concurrence with the LEPC and the County Hazmat Unit, it was agreed that the dam (location B) would be left in place and allowed to breach during the natural course of events.

ATTACHMENT I-1

The purpose of this was to allow a portion of the stream to form a low velocity to facilitate settling of any residual silver chloride.

All evidence points to the cause of the release being blocked overflow pipes from a receiver tank. Normally, should the receiver tank be overfilled, the overflow pipes would carry the material to a "safety tank" which is equipped with a high level alarm. Because the overflow pipes were blocked, material overflowed the tank and entered the plant non-contact cooling water collection system, and discharged through the NJPDES outfall, aided by the normal discharge of non-contact cooling water. To prevent a recurrence of this event, a secondary containment will be provided around the receiver tank to prevent the escape of any of the material in the tank.

Metz has engaged CH2M Hill, an environmental consulting firm, to conduct a sampling program of the stream sediment, and to design a remediation program. Initial sampling will be conducted during the week of September 18, 1989 or as soon thereafter as weather permits. Sediment samples will be collected upstream and downstream from the temporary dam at the end of Century Avenue (location B) and analyzed for silver to determine the end point of the contamination zone. The NJDEP Guideline of 5 mg/kg (ppm) will be adopted as an action level for remediation purposes. All analyses will be performed by a NJDEP certified laboratory and NJDEP Tier II Quality Assurance/Quality Control procedures will be followed.

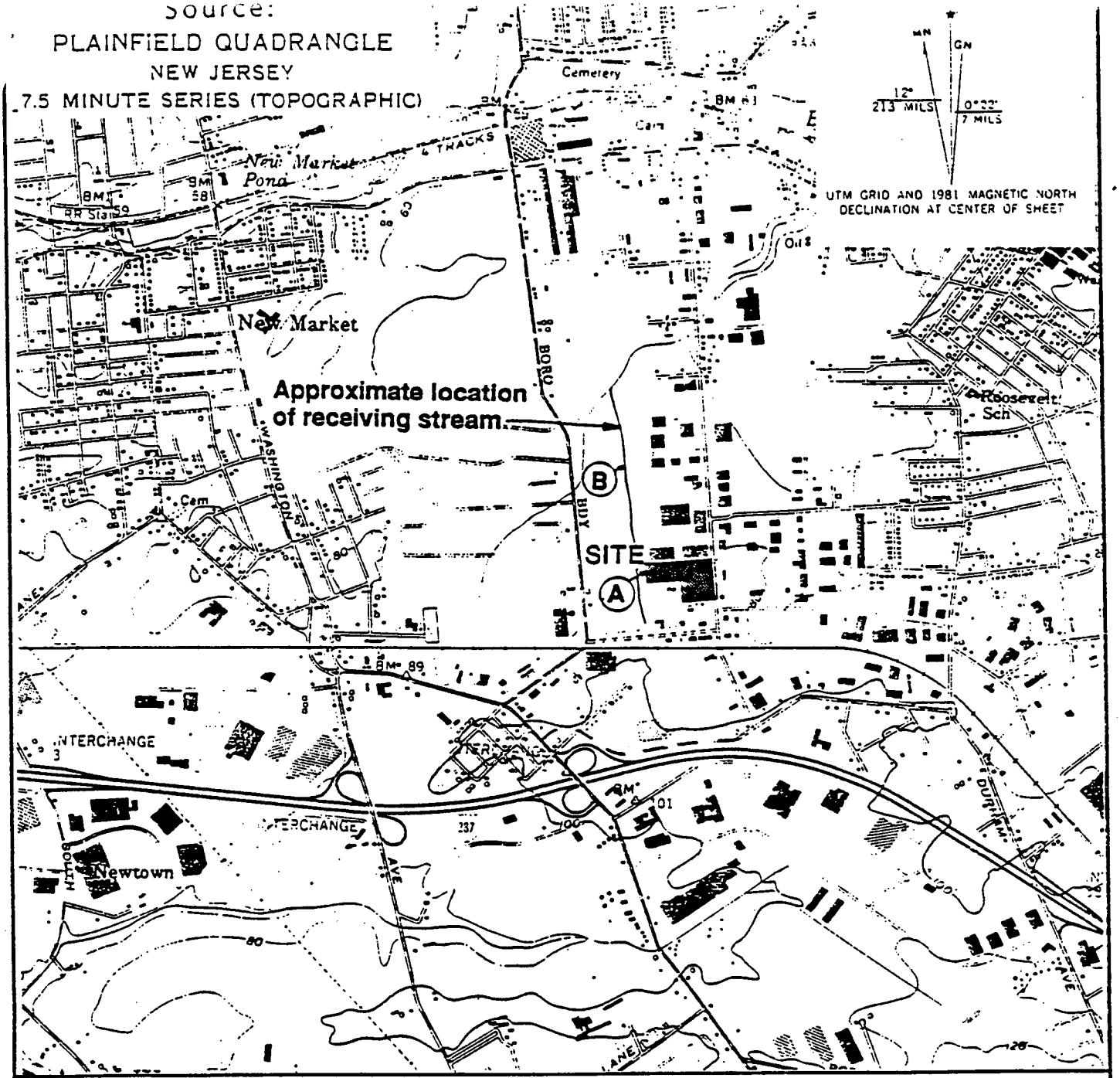
As an additional preventive measure, Metz is planning to construct a detention/retention basin to receive all the non-contact cooling water and storm water run-off from this facility. This tertiary containment will be large enough and will be equipped with sufficient controls to allow the retention of approximately 250,000 gallons of water. This will not only prevent a recurrence of this kind of release, but will also provide a tertiary containment for delivery of bulk liquids from tankwagons.

Scott Eves

SE:jn
SILRE.921

ATTACHMENT F-2

Source:
PLAINFIELD QUADRANGLE
NEW JERSEY
7.5 MINUTE SERIES (TOPOGRAPHIC)



SCALE 1:24000

1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

NEW JERSEY
QUADRANGLE LOCATION

ATTACHMENT T-3

Metz Metallurgical Corp.
3900 South Clinton Ave.
South Plainfield, N.J.

Figure 1
LOCATION MAP

CRM HILL

X
Date of Delivery
DOMESTIC RETURN
865

ATTACHMENT U

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
C.N. 029 Trenton, N.J. 08625

DISCHARGE SURVEILLANCE REPORT

PERMIT #: NJ0034835 NO. OF DISCHARGES: 002-DSW CLASS: Min/Ind

DISCHARGER: Degussa Corporation - Metz Division (formerly Metz Metallurgical Corp.)

OWNER: Degussa Corporation

MUNIC: South Plainfield COUNTY: Middlesex WATERSHED CODE: R

LOCATION: 3900 South Clinton Ave.

RECEIVING WATERS: Bound Brook STREAM CLASS: FW2-NT

LIC. OPERATOR & PLANT CLASS: N/A

TRAINEE/ASST: Scott Eves, Mgr. Env. Control Dept. OTHER INFO: 908-561-1100

Permit expired 5-31-88 Renewal Due 1-3-88 Renewal submitted 4-22-88

Comments/DEFICIENCIES NOTED: (1) The Underground Storage Tanks must be registered. (2) Better attention should be paid to Housekeeping practices. The Sludge presses were washed off onto the floor level below the presses. (3) ECRA cleanup is in process due to sale of corporation. (4) One of the piles of excavated (contaminated) soil was uncovered. (5) Facility will begin using corrosion inhibitors as of 4-1-91

OVERALL RATING: ☐ Acceptable ☑ Conditionally Acceptable ☐ Unacceptable

EVALUATOR: Jay Roberts TITLE: Environmental Specialist

INFORMATION FURNISHED BY: (name) James P. Leahey // Scott Eves

(title) Manager Permits-Administration (organization) Degussa Corp., Metz Div.

* Manager Environmental Controls Dept

ATTACHMENT U-1

DATE OF INSPECTION: March 27, 1991

DISCHARGE SURVEILLANCE REPORT Date: March 27, 1991

INDUSTRIAL TREATMENT PROCESS EVALUATION

RATING CODES: S = Satisfactory M = Marginal U = Unsatisfactory NA = Not Applicable

	RATING	COMMENTS
DISCHARGE #	---	001 / 002
WASTEWATER SOURCE(S)	---	Non contact cooling - Boiler Blowdown / Storm water
CONTINUITY OF OPERATION	---	10 Hr/day 5/wk / intermittent
BYPASSES/OVERFLOWS	S	
S.P.C.C. PLAN	S	Emergency plan on site - is being updated
ALARM SYSTEMS	S	pH, conductivity - will shut off flow + sound alarm
ALTERNATE POWER SUPPLY	S	None if power fails, N_2 cylinders will activate valve
Discharge 001	S	non contact cooling water from cooling jackets on reactors and crystallizers (25 Hem coil vessels) water is supplied by 12 on site wells.
Boiler Blowdown	S	Boiler water is filtered (Filtrite - 15 μm) Filters are backwashed to the pretreatment system - corrosion inhibitors used occasionally
Discharge 002	S	storm water from roof drains
Process water	S	goes to pretreatment plant and is then discharged to MCUA (permit #24055) ~ 33,634 gpd (inst.)
Retention basin	S	Groundwater permit not required at this time.
Sludge from pretreatment system	S	Consists of Base metal impurities removed in process.
Sludge removal	S	Hauled by Disposal Sys. Inc NJD 156163438 or S+W Waste Inc NJD 991291105
DISPOSAL SITE	S	Chemical Management Inc. Farmingdale N.Y. NYD000691949
FLOW METER & RECORDER		Discharges have no flow meters
RECORDS	S	
SAMPLING PROCEDURES	S	as per permit requirements
ANALYSES PERFORMED BY	S	CFM, Somerville lab #18367
ECRA	S	clean up in process - 9 wells on site
Excavated Soil	M	from ECRA Proceedings. 2 piles of soil (contaminated) only (1) was covered.
Underground Storage Tanks	U	Tanks used in processing Hazardous waste Reg. Cert exp. 2-28-91, Not Renewed Reg # 0099525
General Housekeeping	M	Handling of waste materials was improper as indicated by open containers and sludge press cleaning procedures
FINAL EFFLUENT APPEARANCE	S	Clear
REC. WATERS APPEARANCE	S	

ATTACHMENT U-2

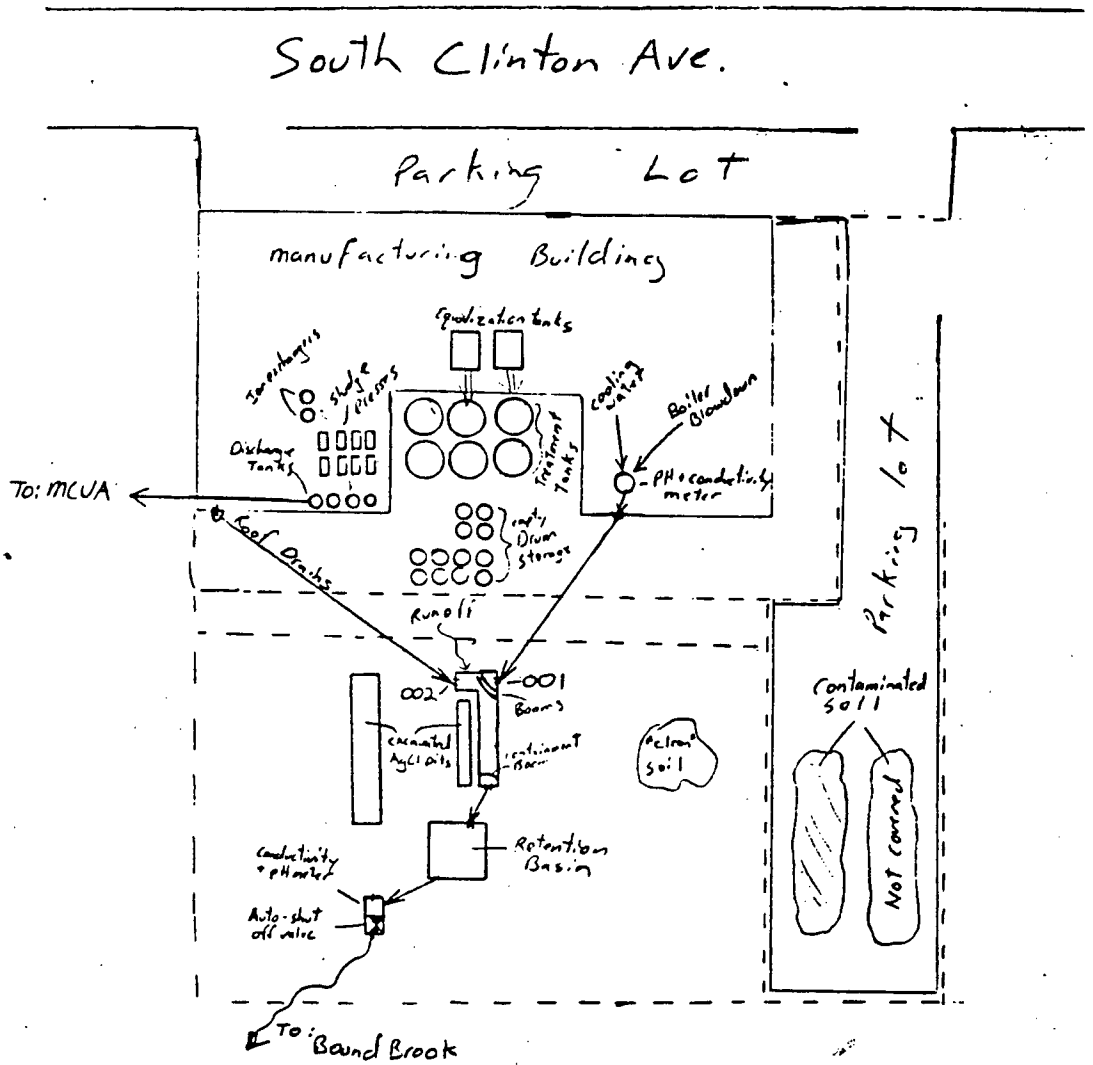
N.J.D.E.P.
D.W.R.
DISCHARGE SURVEILLANCE REPORT

Permit #: NJ0034835
Date: march 27, 1991

PLANT DIAGRAM AND FLOW SEQUENCE:

Degussa Corp,
Metz Division

NJPDES No.
NJ0034835



SAMPLING PERIOD: 3/90 → 11/90 Source: DMRs

No effluent violations noted

DISCHG	PARA	SAMPLE TYPE	PERMIT LIMITS	SAMPLE RESULT	DISCHG	PARA	SAMPLE TYPE	PERMIT LIMITS	SAMPLE RESULT

ATTACHMENT U-5

ATTACHMENT V

DEP-090
91

New Jersey Department of Environmental Protection

COMMUNICATIONS CENTER NOTIFICATION REPORT

Received 5/31/91 TD Log# 7714

Operator ROB Reviewed By RM Case# 91-5-31-0719-21

Notification Type Facility

Reported By: SCOTT EVES
Affiliation: DEGUSSA CORP
Phone: 908-561-1100
Street Address: 3900 SOUTH CLINTON
Municipality: SOUTH PLAINFIELD
State: NJ

Incident Location: Facility
Site: DEGUSSA CORP
Phone 908-561-1100
Street Address: 3900 SOUTH CLINTON
Municipality: SOUTH PLAINFIELD
County: MIDDLESEX
State: NJ

Location Type Industrial Incident Date 5/31/91 Time 0702

Substance Released WATER, WASTE
Amount Released (Estimate): 13000 GAL
ID Known State Liquid CAS# Release Is Terminated
Additional Substances WASTE WATER CONTAINING COPPER
Substance Contained? N Hazardous Material? U TCPA? N A310 Letter? Y
COMU Code 1222 Referral Code 001

Incident Description Spill

Injuries? N Public Evac? N Facility Evac? N Public Exposure? N
Police On Scene? N Firemen On Scene? N DEP Requested? N Wind Sp/Dir

Contamination Of Land,WATER Receiving Water TRIB TO BOUNDBROOK

Status at Scene
RUPTURED FILTER IS SUSPECTED CAUSE OF SPILL. RP WILL CONTACT CONTRACTOR.
WATER HAS PH OF 9.

Responsible Party Known
Party DEGUSSA CORP
Contact SCOTT EVES
Phone 908-561-1100
Title SUPV
Street Address: 3900 SOUTH CLINTON
Municipality: SOUTH PLAINFIELD
County: MIDDLESEX
State: NJ

OFFICIALS NOTIFIED

	Name	Affiliation	Phone	Date	Time
NJSP	OEM		609-882-2000	5/31/91	
MUNIC	SOUTH PLAINFIELD B	BDG 1477	908-755-0700	5/31/91	0728
OTHER					

	Name	Affiliation		Method	Date	Time	T/M
1	L. JONES	DEQ	ER1	Home,Faxed	5/31/91	0725	T
2		DFG	HQ	FAXED	5/31/91		T
3							

COMMENTS

ATTACHMENT V-1

DEP-090
3/91

New Jersey Department of Environmental Protection

COMMUNICATIONS CENTER NOTIFICATION REPORT

Received 6/21/91 | TD Log # 8988

Operator JIMH | Reviewed By YS | Case # 91-6-21-1003-09

Notification Type Facility

Reported By	Affiliation	Phone
SCOTT EVES	DEGUSSA	908-561-1100
Street Address	**Municipality**	**State**
3900 S. CLINTON	SOUTH PLAINFIELD	NJ

Incident Location: Facility

Site: DEGUSSA | Phone 908-561-1100

Street Address	Municipality	County	State
3900 S. CLINTON	SOUTH PLAINFIELD	MIDDLESEX	NJ

Location Type Industrial | Incident Date 5/28/91 | Time 1200

Substance Released SULFURIC ACID

Amount Released (Estimate): 3-5 GALLON

ID Known | State Liquid | CAS# 7664939 | Release Is Terminated

Additional Substances

Substance Contained? Y | Hazardous Material? Y | TCPA? N | A310 Letter? Y

COMU Code 1222 | Referral Code 002

Incident Description Spill

Injuries? N | Public Evac? N | Facility Evac? N | Public Exposure? N

Police On Scene? N | Firemen On Scene? N | DEP Requested? N | Wind Sp/Dir

Contamination Of Land | Receiving Water

Status at Scene

HAND TRUCK PUNCHED HOLE IN DRUM CAUSING SPILL. COMPANY DID CLEANUP.

Responsible Party Known

Party DEGUSSA | Phone 908-561-1100

Contact SCOTT EVES | Title ENV. CONT. MG

Street Address	Municipality	County	State
3900 S. CLINTON	SOUTH PLAINFIELD	MIDDLESEX	NJ

OFFICIALS NOTIFIED

	Name	Affiliation	Phone	Date	Time
NJSP	OEM		609-882-2000	6/21/91	
MUNIC	SOUTH PLAINFIELD B	OPER 6323	908-755-0700	6/21/91	1006
OTHER					

	Name	Affiliation	Method	Date	Time	T/M
	P.DIGANGI	DEQ ER2	Office	6/21/91	1005	T
2						
3						

COMMENTS

ATTACHMENT V-2

ATTACHMENT W

ATTACHMENT W-1

STATE OF NEW JERSEY
STATE WATER POLICY COMMISSION
HOWARD T. CRITCHLOW, ENGINEER IN CHARGE

The Ground-Water Supplies of Middlesex County New Jersey

With Special Reference to the Part of the Coastal Plain Northeast of Jamesburg

By

HENRY C. BARKSDALE

MEREDITH E. JOHNSON ROGER C. BAKER

EDWARD J. SCHAEFER GEORGE D. DEBUCHANANNE

Prepared in cooperation with the United States Department of the Interior, Geological Survey

ATTACHMENT W-2

ABSTRACT

Ground-water investigations have been carried on in parts of Middlesex County since 1923. This report is based upon detailed observations of ground-water conditions in that part of the coastal plain between Jamesburg and Perth Amboy, and upon a generalized survey of ground-water conditions in the remainder of the county. It deals primarily with the factors affecting the safe yield of the more important aquifers in the county.

Roughly the northwestern third of the county is underlain by rocks of the Newark group of Triassic age and the southeastern two-thirds by sands and clays of the coastal plain, which are of Cretaceous age and are largely unconsolidated. The rocks of the Newark group dip toward the northwest, but they are so badly fractured that the dip is of very little significance from a hydrologic standpoint. Intruded into the rocks of the Newark group is a diabase dike, that is of no importance as a water-bearing formation, but stood as a ridge on the surface upon which the Cretaceous deposits were laid down. Hence the lowest of the Cretaceous sands (the Farrington sand member of the Raritan formation) is almost divided into two parts by it. To a considerable extent this ridge has been effective in retarding the advance of salt water into this sand from the estuary of the Raritan River. The beds of the coastal plain formations dip to the southeast, and alternating layers of permeable sands and relatively impermeable clays provide a setting under which water supplies are frequently encountered under artesian conditions. Both the Cretaceous formations and the older rocks of the Newark group are overlain throughout much of the county by various Quaternary deposits. These latter deposits are relatively unimportant as water-bearing formations. Their principal importance lies in their ability to absorb water and transmit it to the underlying materials, or in a few places to prevent the absorption of water by the underlying bed.

Early developments of ground water in the county were primarily in the form of relatively shallow dug wells, and in the improvement of existing springs. Drilled wells similar to those [illegible] not developed to any considerable extent until the end of the last century. The development of large supplies of ground water has depended to a considerable extent upon the development of well drilling methods and upon the improvement of well pumping machinery. In 1941 more than 37 million gallons of water a day was pumped from wells for industrial and municipal water supplies in Middlesex County. Of this amount about 22 million gallons a day was used exclusively for industrial purposes and the remainder for public water supplies.

The quality of water obtained from wells in Middlesex County is generally satisfactory for all ordinary purposes. It sometimes requires treatment for the removal of iron or for the reduction of hardness. In some areas the ground waters have been contaminated by sea water that has been drawn into the aquifers by heavy pumping. Where this contamination has been severe, the waters are of little value except for cooling.

In the course of these investigations records of water levels have been obtained in a great many wells. Some of these records now cover a period of more than twenty years. Included in this group are some wells not affected by pumping that have been used as a standard for comparison with the fluctuations in the other observation wells. They have also proved valuable as indices of the amount of water naturally stored in the ground at various times. As such they are useful outside the scope of this report for the prediction of minimum stream flow and for similar purposes. At the Perth Amboy Water Works, at Runyon, a record of precipitation, temperature and evaporation has been obtained for approximately 20 years.

Of the various aquifers within the county three are of major importance. The rocks of the Newark group are the principal source of ground water in the northwestern part of the county. The Old Bridge and Farrington sands, both members of the Raritan formation, are the principal sources of water supply in the southeastern two-thirds of the county. The other aquifers are of relatively little importance either because of the limited area in which they are available or because they are not capable of yielding substantial supplies.

The Old Bridge sand is the most important aquifer within the county. It supplies more than half the total water used for industrial and public water supplies. In 1941 a total of more than 19 million gallons a day was withdrawn from this sand in Middlesex County and 2 or 3 million gallons a day was taken from wells tapping this sand outside the county, bringing the total yield to 21 or 22 million gallons daily. In 1942 the total pumpage had increased to 25 or 26 million gallons daily. Studies made of this sand indicate that natural recharge probably could not supply this large yield of water. Fortunately, however, at least two major developments include works for artificially recharging this sand. Even so, it is believed that the safe yield of this sand has been reached. The pumpage from this sand should not be increased except in instances where it is possible and desirable to recharge the sand with surface water in an amount essentially equivalent to the additional water to be taken from wells.

The Farrington sand yielded about 8.5 million gallons daily to municipal and industrial wells during 1941. The safe yield of this sand appears to have been exceeded for a considerable period in the past. Its capacity is limited not by the amount of natural recharge or by its ability to transmit water but rather by the fact that it is exposed in numerous localities to the intrusion of salt water from surface sources. A considerable part of this sand now contains water that is contaminated by salt water. In at least three areas the water in this sand is severely contaminated. There is substantial evidence supporting the belief that the areas of contamination will expand with continued pumping from the wells tapping this sand. A few wells that drew from this sand have already been abandoned because of salt-water contamination, and it seems probable that a considerable number of others will have to be abandoned at some time in the future. After this has occurred and the total pumpage from the sand has thereby been reduced materially, it may be possible to develop some new water supplies from this sand in areas near its intake area and remote from bodies of surface water containing salt.

The rocks of the Newark group yield water to a large number of wells in the county. In localities where they are covered by permeable material they yield substantial quantities. In areas where they are not covered by such deposits

or where they are covered by impermeable materials, the yield is very low. The water that these rocks yield comes almost entirely from cracks which form a small part of their total volume so that their storage capacity is low. Substantial yields are safely obtained only in areas where the overlying material is capable of absorbing and storing considerable amounts of water and of transmitting it freely to the underlying rock.

It seems probable that no more large ground-water developments can be made within Middlesex County. Possibly some additional water may be obtained from the Newark group, but this should not be attempted without a careful study of conditions in the vicinity of any proposed development, because draft on these rocks is already heavy. Some additional water can be developed from the Englishtown sand in the southeastern corner of the county, but care should be exercised not to injure water supplies derived from this sand down the dip in Monmouth County. On the whole it seems probable that any large additional supplies of water for Middlesex County will have to come from surface water, and very possibly from sources outside the county. The appraisal of sources of surface water is, however, outside the scope of this report.

Future studies of the Old Bridge sand should be directed primarily toward ways of increasing its intake capacity by artificial recharge. Those of the Farrington sand should be concerned primarily with the salt-water instrusion in this sand. Intensive quantitative studies should be made of the Newark group in order to estimate more accurately its safe yield in different localities. Measurements should be continued at the evaporation station at Runyon and in the Morrell and other water-table wells. A few additional observation wells should be established in parts of the county where there is no effect of pumping.

ATTACHMENT W-1

details of the investigation since that time and on the preparation of the report as well. John N. Brooks, assistant division engineer of the State Water Policy Commission, has also given valuable advice and assistance on numerous phases of the work. W. D. Collins, chemist in charge of the Quality of Water Division, and O. W. Hartwell, District Engineer of the Surface Water Division, both of the Geological Survey, have been helpful in many ways. Jerome M. Ludlow, assistant engineering aid of the Geological Survey, drew most of the diagrams for the report. H. L. Dieker, chief engineer at the Perth Amboy Water Works, and his son, E. V. Dieker, have assisted greatly in the investigation that preceded this report, and have given the authors much information about the ground-water conditions in the county and about the history of the early ground-water developments therein. Gordon E. Linn, of the E. I. duPont de Nemours & Co. at Parlin, now in charge of the Duhernal water supply, furnished much information and assistance during the course of the investigation. The authors are also indebted to George R. Shanklin, senior hydraulic engineer and J. C. Merrill, senior engineering draftsman, both of the State Water Policy Commission; John J. Reager, superintendent of the Perth Amboy Water Department; E. L. Thoenges, of the Hercules Powder Company; A. L. Burke, of the duPont Company; George B. Coale, of the National Lead Company; Robert C. Austin; John H. Poulsen; John Lemke; and to many other individuals for advice and assistance.

Area described.—Middlesex County lies in the east-central part of New Jersey between latitudes 40°15′ and 40°37′ and longitudes 74°13′ and 74°38′. The easternmost part of the county lies along the south shore of Raritan Bay. It lies on both sides of the Raritan River as far west as New Brunswick and on the north side of the river almost to Bound Brook. The area of the county is 312 square miles.

The population of Middlesex County according to the census of 1940 was 217,077. Of the 21 counties in the State, Middlesex is the 7th in population and the 12th in area. Its density of population is approximately 695 persons per square mile. About nine-tenths of the population of the county is concentrated along the Raritan River or north of it. In this area the density of population is more than twice that of the county as a whole, and it is here that the problems of additional water supplies, both municipal and industrial, are most acute.

The favorable location of the northern half of the county with respect to tide-water and its proximity to the metropolitan area surrounding New York City, has produced a steady growth of population and

ATTACHMENT W-4

industry there. This growth was most rapid during the period from 1900 to 1920 when the population of the county more than doubled. There are now four cities and two townships in the county with populations of more than 10,000 and six other cities and one township having more than 5,000 inhabitants. All of these are in the northern part of the county. The largest cities are Perth Amboy with a population of 41,242 and New Brunswick with 33,180 inhabitants in 1940.

The county is the seat of many industries, most of which are concentrated near the Raritan River or north of it. This is due in large part to the exceptional transportation facilities available, which include three of the main railroad lines converging upon the New York City area and many miles of sheltered coast line accessible to ocean-going vessels. Many of the industries concentrated along the waterfront have developed their own water supplies from wells, and heavy pumping combined with repeated deepening and maintenance of the waterways has produced serious contamination of some of the aquifers by salt water. A wide variety of products are manufactured within the county. Some of the more important industries are the smelting and refining of copper, the manufacture of chemicals and of brick, tile and terra cotta, and the refining of petroleum. In the case of the ceramic industries the principal raw material, clay, is mined within the county.

The southern half of the county is devoted largely to agriculture. Favorable soil and climatic conditions and easily accessible markets have encouraged truck gardening, dairy farming and poultry raising. There are many highly specialized farms, some of which have been commercialized and are very large. One such is devoted entirely to the production of certified raw milk. Others combine dairying with general or truck farming. The very large farms are, however, the exception and most of the area is occupied by ordinary farms some of which are specialized although the majority are used for general farming. Almost without exception the farmers draw their water supplies from underground sources. On a few farms ground water is pumped for the irrigation of special crops, but this practice is exceptional and the total withdrawal of ground water for this purpose is not large.

The township and municipal boundaries within the county are shown on the map in Figure 2. This map also shows the names of the various places mentioned in the text and the principal water courses. The locations of some of the more important wells and well fields are also shown, especially the ones that are not shown on any of the more detailed maps.

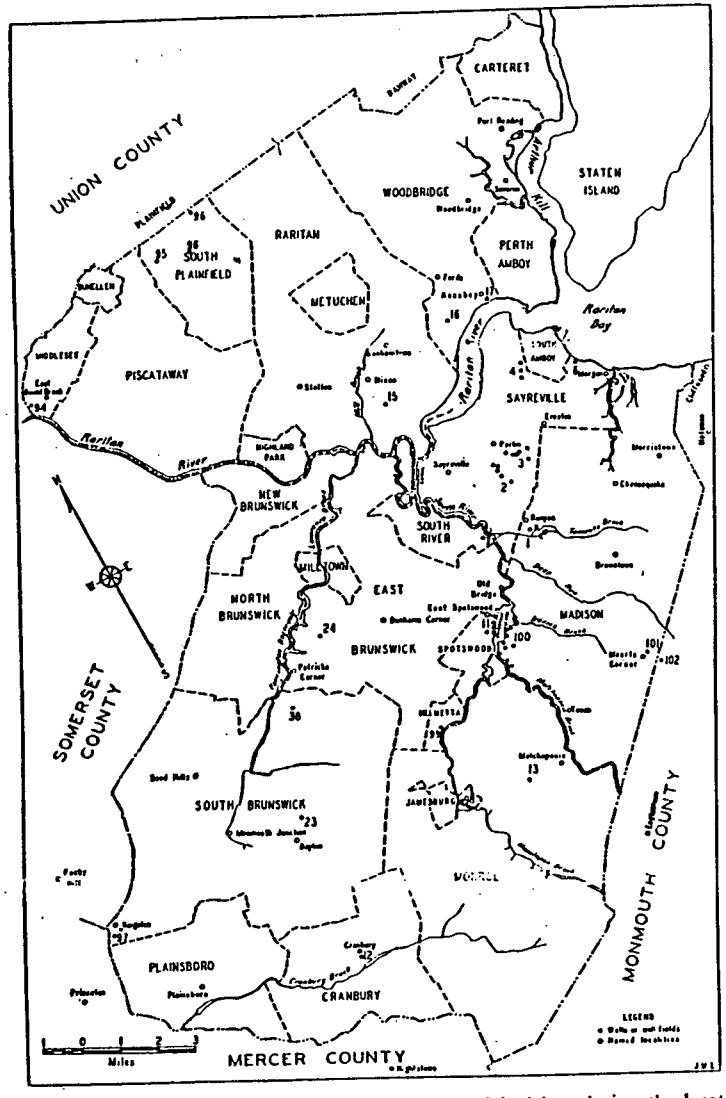


FIGURE 2.—Map of Middlesex County, showing municipal boundaries, the location of important wells or well fields, and places referred to in the text.

KEY TO WELL NUMBERS (Figure 2)

1. Perth Amboy Water Department
2. Hercules Powder Company
3. E. I. duPont deNemours & Co.
4. National Lead Company
6. South Amboy Water Department
7. South River Water Department
11. Peter J. Schweitzer Company
12. Cranbury Water Company
13. State Home for Boys
23. Kufka test well
24. Fischer test well
38. Beecher test well
94. Elizabethtown Water Company, Piscataway well field
95. Plainfield-Union Water Company, Clinton Avenue wells
96. Middlesex Water Company well fields
97. Kingston Water Company
98. Jamesburg Water Company
99. Helmetta Water Company
100. Duhernal water supply
101. Morrell well
102. Hulsart well

Scope of report.—This report is based upon detailed observations of ground-water conditions which were begun at the Perth Amboy Water Works at Runyon in 1923, and have been gradually expanded to cover much of the industrial area along the estuary of the Raritan River, and upon a more generalized survey of ground-water conditions in the remainder of the county which has been carried out mainly during 1941 and 1942. Detailed field studies have been made of the geology and hydrology of the part of the county that lies in the coastal plain northeast of Jamesburg. It is in this area that most of the ground-water development in the county has taken place, and the major part of the report deals with the conditions there. For the remainder of the county, the report is more generalized.

The quality of the ground water of the area is discussed briefly in a section of the report devoted to that topic. Samples of water have been collected from representative wells tapping each of the more important aquifers and have been analyzed for their mineral content in the Water Resources Laboratory of the Geological Survey. The results of these analyses are included in tabular form. No attempt is made to determine the sanitary or bacteriological quality of the water as these features are usually not due to conditions inherent in the aquifer but to extraneous causes or to the treatment of the water after it has been pumped to the surface.

During the investigation on which this report is based much information on water levels and artesian pressure was collected. Many thousands of individual measurements of water level or artesian pressure were made and continuous records of water levels were obtained by means of automatic water-stage recorders at one time or another in about thirty wells. Most of these records have been published by the Geological Survey in its annual reports on water levels and artesian pressure.[1] The remaining records will be published in forthcoming

[1] Meinzer, O. E., Wenzel, L. K., and others, Water levels and artesian pressure in observation wells in the United States: U. S. Geol. Survey Water-Supply Papers 777, 817, 840, 845, 886, 906, 936, etc. (Annual volumes since 1935.)

ATTACHMENT W-5

adjacent counties. Effective control should therefore be State-wide and the regulation of inter-state aquifers may require inter-state cooperation. Effective control should also be broadly inclusive. Restrictions applied to one class of water users and not to another would be futile as well as unfair. No diversion of ground water should be made without the prior approval of some unbiased agency empowered to safeguard this valuable natural resource against injurious overdevelopment.

OUTLINE OF GEOLOGY

Physical Divisions

Middlesex County lies within two major physiographic provinces, the Coastal Plain Province and the Piedmont Province. This division is based largely on rocks and structure projected from nearby regions, for in Middlesex County the topography would not warrant this subdivision, mainly because it has been modified by Quaternary deposits. The part of the county which is in the Coastal Plain Province is, roughly, that which lies southeast of a line from Plainsboro to Carteret. In this area the bed rock consists of unconsolidated or poorly consolidated sands and clays of Cretaceous age (see Stratigraphic Table, page 18, for geologic time-table) which dip at low angles to the southeast.

The Piedmont Province includes the area to the north and west of the Coastal Plain Province. It is underlain by relatively hard Triassic rocks, which in most regions stand up as rounded hills above the flat coastal plain. The prominences at Sand Hills are capped by outliers of the formerly more extensive Cretaceous sediments which have been protected from erosion by the numerous consolidated layers of "ironstone" (ferruginous sandstone) and the resistant Triassic diabase to the south. Farther north and east the Triassic shales have been eroded nearly as low as the Cretaceous sediments. This feature, together with the blanket of Quaternary deposits, has left little difference in the topography of the two provinces.

Geologic History

The geologic history of Middlesex County as observed from the rocks within its borders is necessarily far from complete. Much of it, however, can be read from rocks in nearby areas although other events are forever lost. References to the length of time which has elapsed since the deposition of some of the formations are of necessity approximate. They are based on age determinations from radio-active minerals and are given to indicate the slowness with which geologic processes operate, the vastness of the intervals in which there are no geologic records within the county and, to some extent, the relative age of the existing formations.

The gneiss of the Wissahickon formation, known only from well logs in Middlesex County, gives us the first chapter in the geologic history of the county. In pre-Paleozoic time, at least 600 million years ago, muddy sediments were deposited, which later were folded and metamorphosed (altered) and then intruded by highly heated molten rock. This igneous activity further metamorphosed and recrystallized the sediments so that they little resembled the original deposits.

A long period of erosion followed, during which the existing mountains and hills were reduced to a fairly level plain. This was followed by the development of a depression which extended from the Gulf of Mexico northeastward through the Appalachian belt and Canada, and which was occupied by an arm of the sea for many millions of years. The record of those years is read in the sediments which were deposited in the depression and in which we find today the fossils, or preserved remains of animals which lived and developed during that period (the Paleozoic era). Since these sediments are today found only northwest of Middlesex County, the presumption is that either this area was above sea-level during that entire period, or that such sediments as were deposited have since been entirely removed by erosion. Whichever assumption is right, the second oldest rocks which we find in Middlesex County today are the generally red-colored rocks of Triassic age, which are believed to be at least 400 million years younger than the Wissahickon formation.

The Triassic sediments in Middlesex County are believed to have been deposited in an intermontane valley in the latter part of that geologic period. During this same time there was considerable igneous activity, the most important of which was the intrusion of the thick sill of diabase known along the Hudson River as the Palisades. This sill is continuous in the Triassic rocks in Middlesex County from Carteret to Rocky Hill, but is found at the surface only from Deans to Rocky Hill. The Triassic rocks were later tilted, faulted and eroded during an interval of about 100 million years. This interval spanned all of the Jurassic period and more than half of the Cretaceous period.

In early Upper Cretaceous times the land surface in Middlesex County consisted of a plain of moderate relief sloping to the southeast at about 60 feet to the mile. The bed rock in the southern third of the

ATTACHMENT W-6

area consisted of the Wissahickon formation and the rest consisted of Triassic rocks, above which the resistant diabase sill stood as a ridge. Then the land was submerged and Upper Cretaceous sands and clays were deposited on it in alternating layers dipping to the southeast. These sediments tended to thicken oceanward so that the older sediments dipped parallel to the underlying plain while the higher formations were more nearly horizontal. During this period there were fluctuations in the depth of water, as indicated by the alternation of shallow and deep water fossils in the Cretaceous formations. The general relationship of the various rocks in the county is shown on the geologic section in figure 3.

In the Tertiary period which followed, there were intervals of deposition and of erosion, but any sediments which may have been deposited in Middlesex County have since been removed by erosion, together with much of the older Cretaceous deposits.

In the Quaternary period, which dates from the beginning of the Ice Age and in which we are now living—a period of some 2 million years—there were four advances of great ice sheets moving from centers in Canada into the northern part of the United States, interspaced with times of partial submergence and deposition. In Middlesex County there is evidence of only the last ice sheet. This consists of the Wisconsin drift which blankets the northern third of the county. The oldest non-glacial Quaternary deposits have been entirely removed from the county. The Pensauken formation, which is much older than the Wisconsin drift, is found capping the hills and higher divides but has been removed from the larger stream valleys. The Cape May formation, which is probably slightly older than the Wisconsin drift, is found mainly in stream valleys. Since the retreat of the Wisconsin ice sheet there have been only relatively slight physiographic changes in the county.

Outline of the Stratigraphy

The areal geology of Middlesex County is shown on figures 4, 5 and 6 on pages 19, 20, and 21. The geologic formations shown thereon range from soft, unconsolidated alluvial deposits formed within the last few thousand years, to compacted rocks whose origin dates back many millions of years. The following stratigraphic table, arranged in normal sequence (i. e. youngest formation at the top) includes a still older formation (the Wissahickon) which has been penetrated by a number of deep wells within the county. Detailed descriptions of the formations are given in the section on hydrology and geology of the rock formations beginning on page 52.

ATTACHMENT W-7

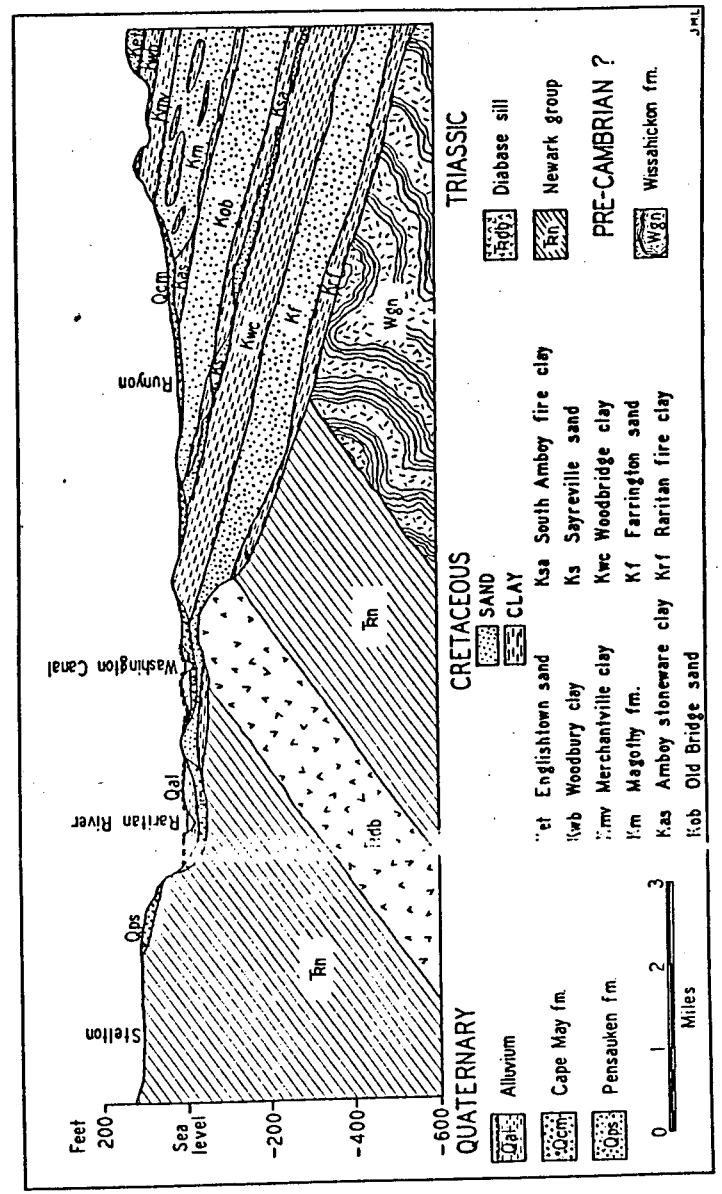


FIGURE 3.—Generalized geologic section from Stelton through Runyon to the county line.

STRATIGRAPHIC TABLE FOR MIDDLESEX COUNTY, N. J.

Cenozoic sequence
- Quaternary system
  - Recent series
    - Alluvium
    - Eolian deposits
  - Pleistocene series
    - Wisconsin drift
    - Cape May formation
    - Pensauken formation

UNCONFORMITY

Mesozoic sequence.
- Cretaceous system
  - Upper Cretaceous series
    - Mount Laurel and Wenonah sands
    - Marshalltown formation
    - Englishtown sand
    - Woodbury clay
    - Merchantville clay
    - Magothy formation
    - Raritan formation
      - Amboy stoneware clay
      - Old Bridge sand member
      - South Amboy fire-clay
      - Sayreville sand member
      - Woodbridge clay
      - Farrington sand member
      - Raritan fire-clay

UNCONFORMITY

- Triassic system
  - Upper Triassic series (Newark group)
    - Brunswick shale
    - Lockatong formation
    - Stockton formation

UNCONFORMITY

Proterozoic sequence (?)
- Pre-Cambrian (?)
  - Wissahickon formation

ATTACHMENT W D

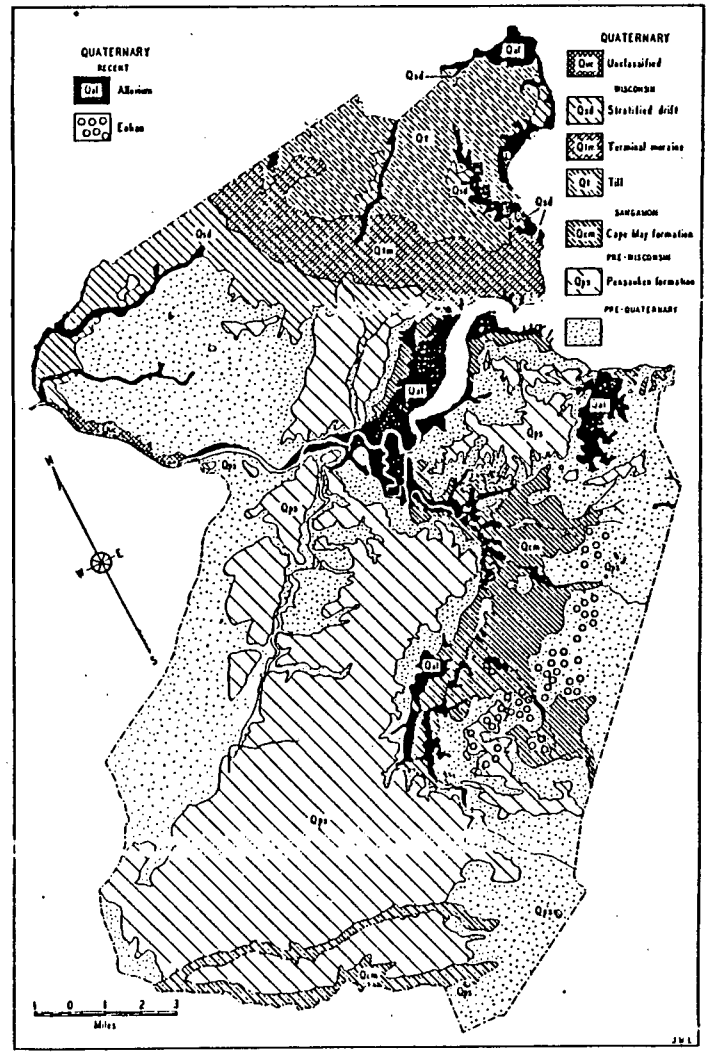


FIGURE 4.—Map of Middlesex County showing the areal distribution of the rocks of the Quaternary system. Small quantities of good water are obtained from the eolian deposits, the stratified drift, the Cape May and Pensauken formations, and the unclassified deposits.

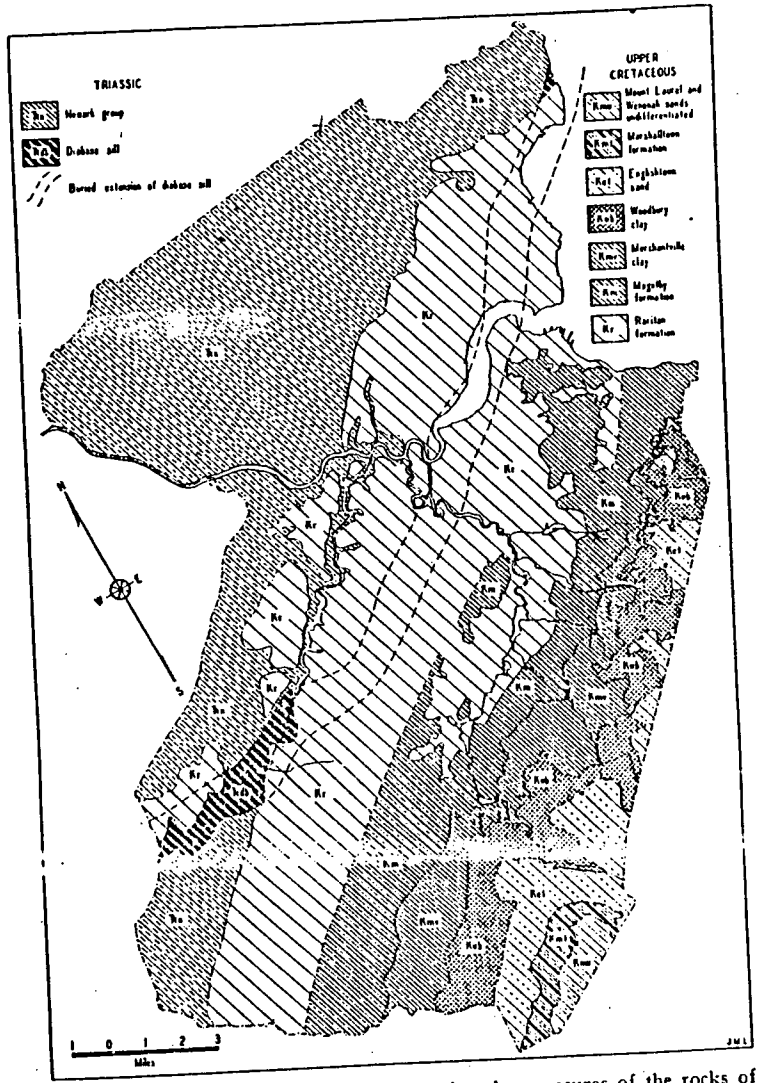


FIGURE 5.—Map of Middlesex County showing the exposures of the rocks of the Triassic and Cretaceous systems. Small quantities of good water are obtained from the Mount Laurel and Wenonah sands, the Englishtown sand and the Magothy formation within the county. Substantial quantities are derived from the Raritan formation and the rocks of the Newark group.

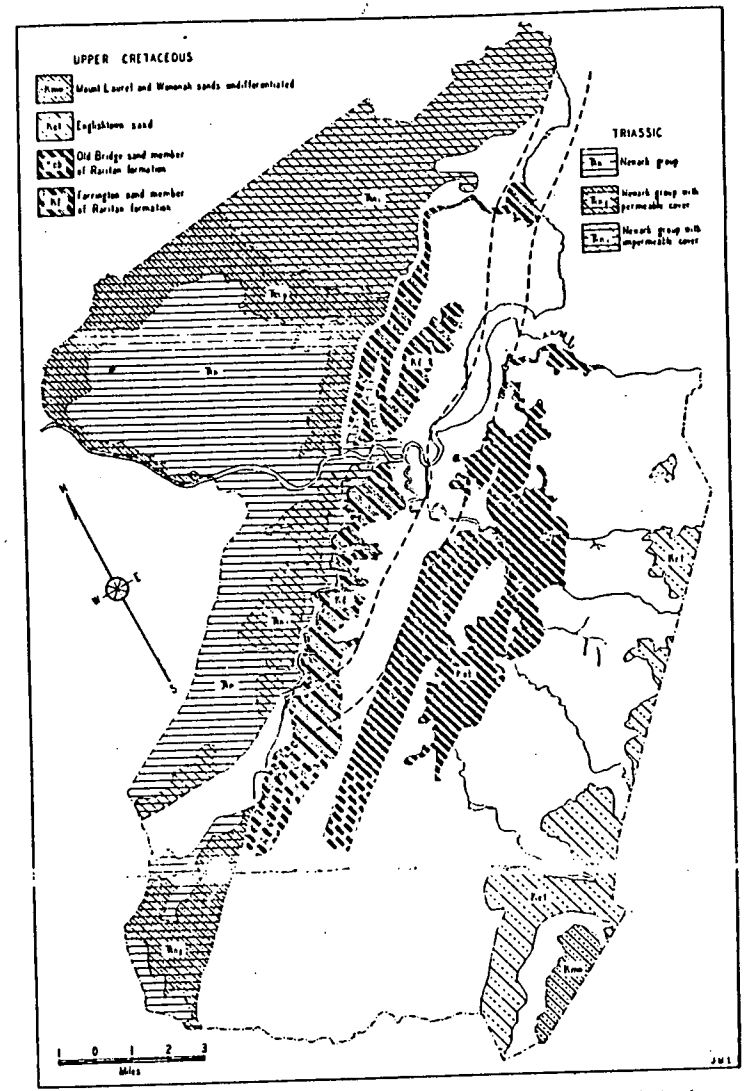


FIGURE 6.—Map of Middlesex County showing the intake areas of the important aquifers. Large quantities of good water are obtained from the Old Bridge and Farrington sand members of the Raritan formation. Small quantities are obtained from the Englishtown sand and the Mount Laurel and Wenonah sands. The rocks of the Newark group yield moderately large supplies where overlain by permeable materials, but elsewhere their yield is small.

ATTACHMENT W-9

yielding about 30 million gallons daily. The destruction of existing and potential ground-water supplies outside the county might be at least as great.

Another plan for the proposed canal contemplates a sea-level canal. In this case, there would be no locks to even retard the movement of salt water along the canal. The destruction of the ground-water supplies by a sea-level canal would be more rapid and possibly more complete than by the lock canal discussed above.

RARITAN FIRE-CLAY

The Raritan fire-clay, the lowest of the Cretaceous beds, includes the "Raritan potter's clay" of early reports and is an inconstant, variable member which, at its outcrop near Nixon, Bonhampton, Fords, Keasbey and Milltown, has a thickness ranging from zero to 35 feet. The average thickness probably increases to the southeast as wells at East Spotswood, Old Bridge, Runyon, Parlin and South Amboy have encountered from 27 to 86 feet of blue, brown, gray or red clay at this stratigraphic horizon. Typically, the basal part of the clay has a brick-red color identical in shade with the underlying Triassic red shale from which it was derived. It has this same appearance where exposed in a recent roadcut northwest of Patricks Corner; but there the red clay is only a foot thick and is overlain by gray clay. Near the mouth of Mill Brook, southwest of Nixon, the clay is mixed with sand and gravel, but half a mile to the northeast it is a relatively pure light-gray clay with a reddish tinge and is a little over six feet thick. The same clay is exposed in a pit half a mile south of the point where Lawrence Brook empties into the Raritan River. There its base is concealed, but the exposed portion (7 feet thick) is a gray, "fat" clay of good quality.

TRIASSIC SYSTEM

Newark Group

In the investigations upon which this report is based, the study of the water-bearing properties of the rocks of the Newark group has been less detailed than those of the Old Bridge and Farrington sands. However, the rocks of the Newark group form one of the three most important aquifers in Middlesex County. This is true both because of the large amounts of water developed from them and because of their relatively wide extent. In much of that part of the county underlain by the coastal plain formations, two or more aquifers can be tapped at any given point by increasing the depth of drilling. In the area covered

ATTACHMENT W-10

by the Newark group, however, this is not true, because these rocks are very thick and essentially homogeneous, and because they are underlain by no other rocks that are capable of yielding any appreciable quantity of water.

GEOLOGY

As shown on the map on page 20, nearly all of the bed rock in Middlesex County northwest of a line roughly from Plainsboro through Monmouth Junction, Milltown and Woodbridge to Carteret is of Triassic age. The younger Quarternary formations form a relatively thin veneer on portions of the Triassic, particularly in the northern part of the county. South of the line mentioned the Triassic is overlain by Cretaceous deposits, but it has been penetrated by wells at Dunhams Corner, Parlin and South Amboy, and probably by the deep well near the Runyon pumping station.

The Triassic rocks in New Jersey belong to the Newark group which is divided into three formations, all of which are found in Middlesex County. The oldest is the *Stockton formation* which consists of conglomerate and sandstone interbedded with red shale. Next above is the *Lockatong formation* and this consists of hard shale and argillite of various hues. These two formations are found only in a small area between Milltown and Kingston near the southwestern border of the county. To the east they are covered by the younger Cretaceous rocks. The Stockton and Lockatong formations cannot be well seen or studied in the county, and they are not differentiated on the geologic maps.

The *Brunswick formation* is the youngest of the three formations of the Newark group, and within Middlesex County it crops out in a much greater area than the other two Triassic formations combined. It is a dull red shale interbedded with siltstones and occasional layers of sandstone. When dry it is a dense compact rock but it quickly softens and disintegrates when exposed to weathering.

In Middlesex County all the sedimentary rocks of the Newark group dip to the northwest at angles of 5° to 15°. The formations are rather impermeable except along the numerous cracks which everywhere traverse the beds at high angles to the bedding. Some water may also follow along the bedding planes, although such movement must be very restricted judging from actual experience with wells.

Molten rock was intruded into the Newark group in late Triassic time and in this region it solidified beneath the surface of the ground in the form of steeply dipping dikes and relatively flat sills. The largest of these is a diabase sill which is now exposed to the north in

Bergen Hill and the Palisades, to the east on Staten Island, and to the west in Rocky Hill. Between these latter two exposures it is buried beneath a mantle of Cretaceous and Pleistocene sediments, but its position has been determined by the many wells which have encountered it and by geophysical exploration. Since it has an important bearing on the water supply of the region, its location has been shown on the geologic maps. The diabase sill stood as a ridge on the pre-Cretaceous surface and was continuous from Rocky Hill to Bayonne. Between Staten Island and Rocky Hill the surface was downfaulted prior to the deposition of the Cretaceous sediments. The first Cretaceous sediments were deposited on each side of the ridge but not on top of it. With continued deposition sandy material covered the higher slopes and then was deposited across it without a break as shown in figure 3. The Farrington sand is very thin or lacking on top of the buried trap ridge between Perth Amboy and South Amboy, but near the Borough of South River it is continuous across a lower segment of the ridge. Because of these geologic factors water cannot move easily from the intake area of the Farrington sand north of the ridge and near Perth Amboy directly south to the center of pumpage from the sand near Parlin; but near the Borough of South River it probably can and does readily move across the trap ridge to the wells in that area.

The intrusion of this thick diabase sill profoundly affected the adjacent beds of shale, those nearest being altered to a tough, dark, spotted rock as hard as slate but lacking its cleavability. With increasing distance from the contacts the alteration is less and less pronounced, the rock becoming progressively softer and changing in color from dark gray, brown and greenish gray to light gray, purplish red, and finally the typical brick red of the unaltered shale. North of Middlesex County where the sill and adjacent beds are exposed the latter are altered for a thickness of 500 feet or more from the contacts. In this region similar altered beds may be seen in a gully west of Patricks Corner, which is more than half a mile distant from the nearest outcrop of diabase but which is unquestionably underlain by that rock at a depth of a few hundred feet; and near the mouth of Mill Brook, two miles northwest of Sayreville, where the nearest exposure of diabase is a small dike more than a mile distant. Metamorphosed or altered shale has also been encountered by wells drilled in Milltown, Keasbey, Perth Amboy and Woodbridge, and by two boreholes respectively two miles east-southeast of Plainsboro and two miles east-northeast of Dayton.

ATTACHMENT W-11

PHYSICAL PROPERTIES

The facts that the materials composing the rocks of the Newark group are usually fine-grained and relatively impermeable and that the formations are water-bearing by virtue of the cracks and crevices in the rocks, introduce special problems in any attempt to appraise their water-bearing capacity. Laboratory tests of ordinary samples of material collected in the field would be of no particular value, because they must of necessity deal with fragments of the rock and cannot indicate the capacity of the cracks between the undisturbed fragments as found in nature. Pumping tests provide the best means of studying the capacity of the group to yield water but very few have been made.

The permeability and the specific yield of the Newark group depend upon the degree of cracking. Since the degree of cracking decreases with the depth, the permeability and specific yield of the rocks also decrease with the depth. An advantage of pumping tests is that their results represent a composite of the conditions from top to bottom of the water-bearing part of the formation. The results of a pumping test may be directly expressed as a coefficient of transmissibility and a coefficient of storage. The coefficient of transmissibility is a measure of the ability of the formation to transmit water. It is the product of the average coefficient of permeability and the depth of the saturated portion of the aquifer. Under water-table conditions the coefficient of storage as determined in a pumping test is essentially the same as the average specific yield of the material. The cracks in the rocks of the Newark group intersect one another at many different angles with the result that the water in the rocks can generally move in any direction and is essentially under water-table conditions. Thus, without actually determining the effective depth of cracking of the aquifer or its characteristics at any given depth, it is possible by pumping tests to determine coefficients that are accurate indices of its capacity to store and transmit water.

Early in 1943 an opportunity arose to conduct a pumping test on some wells drawing from the rocks of the Newark group at Kenilworth, New Jersey, which is in Union County, about four or five miles north of the Middlesex County line at Rahway. At the site of the test the rocks of the Newark group were covered by a relatively permeable phase of the glacial till to a thickness of perhaps 30 or 40 feet. The results of the pumping test no doubt combine the characteristics of both the rock and the overlying materials to some extent. However, they are probably more representative of conditions in the shale than of those

in the overlying till. The results of the pumping tests at Kenilworth indicate that the coefficient of transmissibility of the rocks at that location is about 25,000 and that the coefficient of storage is about 0.0044.

The results of a single test cannot be considered representative of the whole Newark group. Nevertheless, they furnish a basis for an interesting comparison of the group with the aquifers of the coastal plain formations. The Farrington sand, for example, is about 80 feet thick and has an average coefficient of permeability of at least 1,200. Its coefficient of transmissibility would be the product of its thickness and its coefficient of permeability or at least 96,000. This means that the Farrington sand could transmit four or five times as much water as the rocks of the Newark group under a given head and through a given width of section.

The difference in the capacity of the two aquifers to store water is even more striking. It was estimated that a block of the Farrington sand one square mile in area and one foot thick could store about 67 million gallons of available water. If the sand is 80 feet thick, one square mile of it would store about 5,360 million gallons. If the thickness of the water-bearing part of the Newark group is assumed to be 300 feet and its specific yield 0.0044, one square mile of this aquifer could store only about 275 million gallons. Of course where there are overlying permeable sandy deposits, substantial additional quantities of water stored in these deposits, may be available to wells tapping the rocks. The low storage capacity of the rocks helps to explain the high rate of runoff and low ground-water flows observed on streams draining areas underlain by the Newark group where there is no permeable covering.

QUALITY OF WATER

With the exception of the waters that are contaminated by the intrusion of sea water, the water from the Triassic shales and sandstones of the Newark group is more highly mineralized than any other ground water obtained in Middlesex County. A majority of the wells tapping these rocks yield good water containing less than 200 or 300 parts per million of total solids, but it is not unusual to find several hundred parts per million of dissolved solids. The water is high in calcium and magnesium and the hardness is therefore high. The sulphates are high as compared with the carbonates and bicarbonates and much of the hardness is therefore noncarbonate or "permanent" hardness. In the water from one industrial well used for cooling, the total hardness expressed as calcium carbonate was reported to be 900 parts

ATTACHMENT W-12

per million. Very often the waters from these formations also contain objectionable quantities of iron. The chlorides are usually fairly low.

The quality of the water from the Newark group varies from place to place and from one bed to another. The Stockton formation usually yields very good water. Water from the Brunswick shale, on the other hand, is sometimes more highly mineralized. In general, it may be said that where the beds yield water most freely its quality is likely to be better than in those localities where the crevices in the rock are small and the yield is low. Perhaps the greater circulation of meteoric waters through the more permeable beds has removed some of the objectionable soluble materials that have been retained in the less permeable rocks. The fact that better water is generally encountered near the surface than at greater depths tends to confirm this idea.

DEVELOPMENT AND PUMPAGE

A great many wells have been drilled into the Newark group in Middlesex County. The vast majority of them have produced some water. In fact, one reason for the importance of this group of rocks as an aquifer is that they will generally yield at least a small quantity of water to a well in almost any locality where they are encountered. Numerous small wells have been drilled in these rocks for domestic and farmstead water supplies, and most of them have been satisfactory for this purpose. The yield of these wells ranges from a few gallons per minute to 100 gallons per minute or more.

A considerable number of wells have also been drilled into these rocks for municipal or industrial water supplies. Where conditions are most favorable such wells may yield from 100 to 500 gallons per minute, or even more, but very high yields are exceptional. With one or two exceptions the larger developments tapping this aquifer within Middlesex County yield less than 500,000 gallons daily, but there are several well fields yielding water supplies ranging from 100,000 to 500,000 gallons daily or more, and a considerable number that produce 25,000 to 100,000 gallons daily.

A total of approximately 9.6 million gallons a day was withdrawn from the aquifers of the Newark group in Middlesex County in 1941 for municipal and industrial use. About 8.5 million gallons a day or 89 percent of the total was withdrawn from wells in the municipalities north of the Raritan River. Nearly 6.5 million gallons a day or 68 percent of the total was pumped from wells in the Borough of South Plainfield, practically all from wells owned by the Middlesex Water

Company. This is the only public water supply deriving large amounts of water from the Newark group in Middlesex County.

A considerable amount of water is withdrawn from the Newark group by industries scattered throughout the municipalities north of the Raritan River, particularly those municipalities bordering the county line. Amounts exceeding 500,000 gallons a day were withdrawn from industrial wells in Middlesex Borough and Piscataway Township in 1941. Smaller amounts varying from 35,000 to 259,000 gallons a day were withdrawn in the Boroughs of Carteret, Dunellen and Metuchen, and from Raritan and Woodbridge Townships in 1941.

South of the Raritan River the largest withdrawals from the Newark group in 1941 were in the city of New Brunswick where approximately 535,000 gallons a day was withdrawn from industrial wells. Approximately 322,000 gallons a day was withdrawn from these rocks in Plainsboro Township and about 109,000 gallons a day from wells in Milltown Borough in the same year.

FACTORS AFFECTING YIELD

The following discussion of the yield of these rocks is necessarily generalized to a considerable extent. There are, nevertheless, certain factors that control their capacity to yield water in any given area. The nature of the overlying soil or other material affects their intake capacity and their recharge. The degree to which the rocks are cracked affects their storage capacity and their transmissibility. The presence of surface streams or ponds may supply continuous recharge. The water in these rocks is essentially under water-table conditions, and a well tapping them usually cannot be benefited by favorable conditions that occur more than a mile or so from it.

Nature of the overlying material. The rocks of the Newark group weather to a relatively tight and impervious, clayey soil, which is usually thin and therefore incapable of storing much water. Where this soil occurs at the surface the infiltration capacity is relatively low, and the rate of runoff is high. This results in relatively small quantities of water percolating through the soil and reaching the water table. Not only is the infiltration and hence the recharge and the safe yield of the aquifers in these areas low, but the average yield of wells tends to be low also. This is possibly due to the filling of some of the cracks in the rock by the fine materials derived from its decomposition. At any rate, wells of large capacity are seldom found in areas where the rocks of this group have been exposed directly to weathering and are

ATTACHMENT W-13

covered by a residual soil derived from the rocks themselves. The areas in which the Newark group is exposed without any cover except its residual soil are shown on the map on page 21. The total area thus exposed both north and south of the Raritan River is about 49 square miles.

Where the rocks of the Newark group are covered by relatively impermeable beds, the yields are generally about the same as in the areas where the rock is covered only by its residual soil. In the northern part of the county there is a considerable area covered by the Wisconsin till. In a few places the till is fairly permeable and conducts substantial quantities of water into the rock beneath it. In Middlesex County, however, the till, which was derived largely from the underlying rocks of the Newark group, has weathered to a soil that is about as impermeable as the residual soil that overlies the rocks where they have not been covered by any later deposits. South of the Raritan River there are several small areas where the rocks of the Newark group are covered by isolated patches of the Raritan fire-clay that have been separated from the main body of the Raritan formation by erosion. This clay is probably even more impermeable than the residual soil, and in the larger areas thus covered where recharge from outside the area is difficult, the chances of obtaining good yields from the rocks of the Newark group are very poor. In Middlesex County the total area in which the rocks of the Newark group are covered by relatively impermeable younger materials is about 35 square miles.

In marked contrast to the areas just described, a considerable number of very satisfactory wells have been developed in the rocks of the Newark group where they are covered by the permeable stratified drift or by the Cape May or Pensauken formations. The infiltration capacity of these materials is generally high and they absorb substantial quantities of water from precipitation and hold it in contact with the underlying rocks until it can be absorbed by them. Because of the higher rate of recharge and because of the added storage capacity of the overlying sandy materials, the safe yield of the rocks is much higher in these areas. The average yield of individual wells tapping the rocks of the Newark group where they are covered by these sandy deposits is perhaps five times as great as that from the same rocks where they are covered by soil derived from their own decomposition. The greater circulation of fresh water from the overlying sandy materials has removed much of the objectionable soluble matter from the rocks, and they therefore generally yield water of better quality and also larger quantity than in areas where less water circulates through them. As

shown on the map on page —, there are two principal areas in which the Newark group is covered by permeable materials. The largest and most important of these covers about 17 square miles and lies between the Raritan River and the terminal moraine. This area is overlain by stratified drift and other permeable materials. An area of about 7 square miles occurs in the southwestern corner of the county, where the overlying material is largely Pensauken.

Degree of Cracking. The degree and depth to which the rocks have been cracked obviously has an important effect on the water-bearing capacity of the Newark group. The rocks have been warped and faulted and intruded by masses of igneous rock, so that they are often intensely fractured. Since the rocks are generally covered by soil or by later formations, the yield of wells is, perhaps, the best way to judge the degree to which they are cracked. Major fault zones in these rocks are generally good water-bearing areas. In Middlesex County no such zones are recognized, but there are no doubt numerous minor zones of faulting. The condition of the cracks is also important. It has already been pointed out that some of the cracks may have been filled by material from the residual soil. Elsewhere filling may not have occurred or the cracks may have been enlarged. In the areas now covered by the stratified drift, for example, the yield of individual wells suggests that the cracks are more numerous or more open. In the absence of any obvious reason for more numerous cracks, it is suggested that the cracks may have been enlarged by the more continuous circulation of water made possible by the supply of water in the overlying sandy material.

Recharge from surface water. The presence of bodies of surface water provides a ready and continuous source of water for recharging these rocks, just as in the case of the other aquifers discussed in this report. The Raritan River and some of its tributaries, notably Lawrence Brook, have cut channels into these rocks. In various localities there are small lakes or ponds on these formations. Other things being equal, the safe yield of the aquifer in the vicinity of these bodies of surface water is higher than it would otherwise be. The constant recharge from the surface supplements the limited storage in the cracks of the rock.

ESTIMATE OF SAFE YIELD

When all the above factors have been considered there still exists the uncertainty of yield common to most wells tapping rocks in which the water is carried mainly in cracks and crevices. At any given spot a

well may or may not encounter adequate water-bearing cracks. Usually a well drilled into the rocks of the Newark group will encounter at least a few water-bearing cracks and yield at least a small supply of water. The yield of an individual well tapping these formations can probably never be predicted with any degree of certainty, but with more detailed and prolonged study the safe yield of the aquifer in the various areas may be determined with a fair degree of accuracy. Such studies are recommended, especially in the area north of the Raritan River and in the vicinity of Plainsboro because in these areas the rocks appear to be most productive.

The comparison, based on the Kenilworth test, of the Newark group and the Farrington sand member of the Raritan formation seems to indicate that the storage capacity of the rocks of the Newark group is the factor most likely to limit their safe yield. Because of the very small storage capacity of the Newark group, any sustained yield must depend upon frequent replenishment of the stored water. The intake capacity of the aquifer and its opportunity for recharge as affected by the overlying materials are therefore of primary importance. Readily and constantly available recharge, such as that provided by the water in the stratified drift and other permeable overlying materials would seem essential to any sustained large yield from these rocks.

The best that can be said at the present time is that where these rocks are well fractured and are overlain by thick layers of permeable sands, their safe yield is probably in the order of half a million gallons daily per square mile. Where they are covered by tight, residual soils the safe yield is probably only a fraction of this amount. In these latter areas the low yield of individual wells makes the cost of large developments prohibitive, and consequently the danger of exceeding the safe yield of the aquifer is not very great.

Proterozoic Sequence?

Pre-Cambrian?

Wissahickon Formation. The Wissahickon formation is an ancient, intruded and regionally metamorphosed rock of early Paleozoic or pre-Cambrian age. In its type locality, bordering Wissahickon Creek in Philadelphia, it is a gray, foliated rock characterized by an abundance of biotite. Included within the same formation however are schistose belts in which chlorite is the predominating mineral, and other belts in which the rock has a gneissoid character with quartz, feldspar and mica (either biotite or muscovite) the dominant minerals. This formation

ATTACHMENT W-14

ATTACHMENT X

MEMO - NJDEP/DWR

TO: Emad Abdelsayed, BEERA DATE: 7/28/90

FROM: Rob Lux, BGWQC RLL REFERRED: 8/6/90

FACILITY: Metz Metallurgy, S. Plainfield, Middlesex Co. #56105

No contamination exists in the facilities upgradient well. In my previous memo of 3/31/89 I was unable to close the ground water concerns for this case until they submitted additional information

At this time there is no further action is needed for ground water. The information generated and submitted to date seems to indicate that the facility has not impacted ground water.

The monitoring wells onsite should be sealed by a licensed New Jersey Well driller Certified to seal wells.

C: File (x F)
Fred Cornell, BEERA

ATTACHMENT X

ATTACHMENT Y

Form DWR-143
7/81

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
ENFORCEMENT & REGULATORY SERVICES

COMPLIANCE EVALUATION INSPECTION
PUBLIC COMMUNITY WATER SUPPLY

DATE 6/7/89

GENERAL INFORMATION

PURVEYOR/ FACILITY: MIDDLESEX WATER COMPANY

FILE LOCATION: FAIRVIEW AVE EDISON — PW-ID # 1225001

MAILING ADDRESS: PO BOX 1500 ISELIN NJ 08830

ADMIN.

REQUIRED LICENSES: T -4, W -4

BUSINESS TELEPHONE # Admin. (201) 634-1500 Licensed Operators: JOSEPH RITTER T-4, DONALD McCAGE W-4

FACILITY DESCRIPTION

SOURCES: descriptions, locations, capacities(mgd): D&R CANAL & MILLSTONE RIVER 24.0 MGD FAIRVIEW AVE. EDISON, 15 WELLS 9.8 MGD PARK AVE, EDI 9 WELLS 5.6 MGD TINGLEY LN-EDISON, 2 WELLS 1.83 MGD SPRAGUE AVE SO. PL 1 WELL .86 MGD MAPLE AVE SO. PLAINS, 4 WELLS SPRING AVE SO. PLAINS. NOT IN USE Est Tot Eff Cap: 42. MGD

TREATMENT: source, type, capacities(mgd): pH ADJ. TASTE & ODOR CONTROL W/GAC FLOC/SED CHLORINATION/DECHLORINATION & POLY CORROSION CONTROL GROUNDWATER SOURCES HAVE GAS CL2 DISINFECTION.

Est Tot Eff Cap: 42 MGD

FINISHED WATER STORAGE: descriptions, locations, capacities(mg): STANDPIPES - 2 MG AND 5 MG EDISON STORAGE - 5 MG CARTERET AND A NEW *10 MGD AT FAIRVIEW AVE PLANT, EDISON - DUE TO GO ON LINE IN JULY Est Tot Cap: 12. MG ~ *22

EMERGENCY INTERCONNECTIONS: descriptions, available gallonage(mgd): ELIZABETHTOWN WATER CO 6" 8" 16" AND 20" CONNECTIONS

Est Tot Avail: ~ 4 MGD

AUXILIARY POWER: location, type, capabilities: TWO POWER FEEDS AT MAIN PLANT GENERATOR AT 5 MG STORAGE TANK CARTERET

ATTACHMENT V-1

JUN 23 19

NJDEP - DIVISION OF WATER RESOURCES
PUBLIC COMMUNITY WATER SUPPLY INSPECTION

Not accurate

DELIVERY INFORMATION

PLANT DELIVERED WATER (mgd,month,year) EST. June 88 Peak Day (88) FEB 88 Annual 88 (88)
Max 57 MG 50.0 mg Min 29 MG Average 43 MG 30.0

BULK PURCHASES (provider,mgd) ELIZABETHTOWN WATER CO 4 MGD

BULK SALES (customer, mgd) PERTH AMBOY, HIGHLAND OK E BRUNSWICK EDISON 6 MGD

NUMBER OF SERVICES 51,396 % METERED 100

MUNICIPALITIES SERVED (est. services in each) SO. PLAINFIELD, EDISON METUCHEN WOODBRIDGE CARTERET

TOTAL ESTIMATED POPULATION SERVICED 204,000

CURRENT/RECENT WATER RESTRICTIONS SELF IMPOSED

NEW CONSTRUCTION (Project Numbers) 10 MG STORAGE & PUMPSTATION W0888-3900

DISTRIBUTION MAINS: Sizing 4 (min) to 48 (max)
Pressures 30 (min) to 115 (max)
Hydrants/Flushing Program 1 x YR

MONITORING & REPORTING

PARAMETER(S)	FREQUENCY REQUIRED	FREQUENCY PERFORMED	LOCATION
A-280	2/YR	2/YR 1/89 1ST AND	DIST. SYSTEM
Coliform	140/MO	164/MO MAY 89	DIST. SYSTEM
Inorganics	1/YR	1/YR 1/9/89	DIST. SYSTEM
Nitrate	"	"	"
Trihalomethanes	QUARTERLY	2ND QTR 89 COMPLETE	DIST SYSTEM
Organics	1/YR	1/YR 1/9/89	DIST. SYSTEM
Turbidity	1/DY	DAILY	SOURCE
2° REG	1/YR	1/YR 1/9/89	DIST. SYSTEM
RADI	QUARTERLY/4 YRS	86/87 COMPLETE	SOURCE
VOC	QUARTERLY	QTRLY 2ND QTR COMPLETE	SOURCE

NAME OF LABORATORY GARDEN STATE LABS CERTIFICATION # 13135

ADDRESS ACCUTEST LABS 12129 AND MIDDLESEX WATER LAB 12113

COMPLIANCE EVALUATION

SOURCE DEFICIENCIES NONE

*NOTE: VO SAMPLING OF PARK AVE WELL FIELD WATER DISTRIBUTED TO THE SYSTEM PERIODICALLY INDICATES HIGH LEVELS OF TETRA CHLORO ETHENE AND TRICHLORO ETHYLENE

TREATMENT DEFICIENCIES NONE

ATTACHMENT V-2

JUN 23 1989

Form DWR-143
7/81

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
ENFORCEMENT & REGULATORY SERVICES

COMPLIANCE EVALUATION INSPECTION
PUBLIC COMMUNITY WATER SUPPLY

DATE December 7, 1989

New
P.O. Box 788
Westfield, NJ 07091

GENERAL INFORMATION

PURVEYOR/ FACILITY: Elizabethtown Water Co.

FILE LOCATION: Elizabeth / Union County — PW-ID # 2004002

MAILING ADDRESS: ~~600 South Ave~~, Westfield, NJ

ADMIN.: Mr. Frederick Yoerg, Jr. — REQUIRED LICENSES: T 2, W 4

BUSINESS TELEPHONE # Admin.: 654-1234 ext. 437 — Licensed Operators: T 2 W 4

FACILITY DESCRIPTION

SOURCES: descriptions, locations, capacities(mgd): See attached list "A" & attached list "E"

Est Tot Eff Cap: —

TREATMENT: source, type, capacities(mgd): See attached list "A"

Est Tot Eff Cap: —

FINISHED WATER STORAGE: descriptions, locations, capacities(mg): See attached list "B"

Est Tot Cap: 25.45 MG

EMERGENCY INTERCONNECTIONS: descriptions, available gallonage(mgd): See attached list "C"

Est Tot Avail: 67 MGD

AUXILIARY POWER: location, type, capabilities: Booster stations in Metro Region: Roselle East 3 pumps (union), Roselle west - 4 pumps (union), Netherwood - 3 pumps (union), Glenside - 3 pumps (union), Jerusalem Rd - 4 pumps (union), Mountainside - 2 pumps (union) - Lockheed - 2 pumps (union), Springfield - 2 pumps (union), Hummocks - 5 pumps (union) use only 4

ATTACHMENT 1-3

RECEIVED
DIVISION OF
ENFORCEMENT
MAR 15 10 49 AM '89

ELIZABETHTOWN WATER COMPANY

WELLS LOCATED IN ESSEX AND UNION COUNTIES

STATUS AS OF 12/1/88

Town	Well	Status	Chlorination
Clark	Elks Well	In Service	Sodium Hypochlorite
Kenilworth	Quinton Ave.	Out of Service	Sodium Hypochlorite
	Richfield Ave.	In Service	Sodium Hypochlorite
Mountainside	Bristol Road	In Service	Gas
	Central Ave.	Out of Service	Sodium Hypochlorite
	Charles St. #1	In Service	Gas
	Charles St. #2	In Service	Gas
Plainfield	Netherwood #1	In Service	Sodium Hypochlorite
	Netherwood #2	In Service	Sodium Hypochlorite
	Netherwood #3	In Service	Sodium Hypochlorite
	Netherwood #4	In Service	Sodium Hypochlorite
	Netherwood #4G	In Service	Sodium Hypochlorite
	Netherwood #4R	In Service	Sodium Hypochlorite
	Netherwood #5	In Service	Sodium Hypochlorite
	Netherwood #6	In Service	Sodium Hypochlorite
	Netherwood #7	In Service	Sodium Hypochlorite
	Netherwood #8	In Service	Sodium Hypochlorite
	Netherwood #9	In Service	Sodium Hypochlorite
	Netherwood #10	In Service	Sodium Hypochlorite
	Netherwood #11	In Service	Sodium Hypochlorite
	City of Plfd.	In Service	Sodium Hypochlorite
	Fifth St.	In Service	Sodium Hypochlorite
	George St.	In Service	Sodium Hypochlorite
	Prospect Ave.	In Service	Sodium Hypochlorite
	Watchung Ave.	Out of Service	Sodium Hypochlorite
Roselle	St. Walburga #1	Out of Service	Sodium Hypochlorite
	St. Walburga #2	Out of Service	Sodium Hypochlorite
	St. Walburga #3	Out of Service	Sodium Hypochlorite
	St. Walburga #4	Out of Service	Sodium Hypochlorite
	Chandler Ave.	Out of Service	Sodium Hypochlorite
	First Ave.	Out of Service	Gas
Scotch Plains	Aberdeen Rd.	In Service	Sodium Hypochlorite
	Glenside Ave.	In Service	Gas
	Jerusalem Rd.	In Service	Sodium Hypochlorite
	Jerusalem Rd. #1	In Service	Sodium Hypochlorite
	Jerusalem Rd. #2	In Service	Sodium Hypochlorite
	Jerusalem Rd. #3	In Service	Sodium Hypochlorite
	Morse Ave.	In Service	Sodium Hypochlorite

ATTACHMENT 1-4

Elizabethtown Water Company

Netherwood Operations Center: 1341 North Avenue, Plainfield, NJ 07062 (201) 654-1234
Mailing address: P.O. Box 111, Plainfield, NJ 07061-0001

RECEIVED
DIVISION OF
WATER RESOURCES
ENFORCEMENT
MAR 15 10 49 AM '89

March 10, 1989

Mr. John Brennan
New Jersey Dept. of Environmental Protection
Division of Water Resources
Bureau of Regional Enforcement
2 Babcock Place
West Orange, NJ 07052

Dear John:

As per your request, please find enclosed the facility information for Essex and Union Counties. My apologies for the delay in sending you this information.

Should you have any questions, kindly give me a call.

Very truly yours,

Richard A. Sadowski
Assistant Superintendent
Wells and Stations

RAS:mas
Enclosure

ATTACHMENT V-5

653

Town	Well	Status	Chlorination
Scotch Plains	Springfield #1	Out of Service	Sodium Hypochlorite
	Springfield #1A	Out of Service	Sodium Hypochlorite
	Springfield #2A	In Service	Sodium Hypochlorite
	Springfield #5A	Out of Service	Sodium Hypochlorite
	Springfield #6A	Out of Service	Sodium Hypochlorite
	Springfield #7A	Out of Service	Sodium Hypochlorite
	Springfield #8R	In Service	Sodium Hypochlorite
	Springfield #9R	Out of Service	Sodium Hypohclorite
	Springfield #11	Out of Service	Sodium Hypochlorite
	Springfield #12R	In Service	Sodium Hypochlorite
	Springfield #21R	In Service	Sodium Hypochlorite
	Springfield #23	In Service	Sodium Hypochlorite
	Springfield #24	Out of Service	Sodium Hypochlorite
	Springfield #36	In Service	Sodium Hypochlorite
	Springfield #41	Out of Service	Sodium Hypochlorite
	Springfield #42	Out of Service	Sodium Hypochlorite
	Springfield #47	In Service	Sodium Hypochlorite
	Springfield #48	Out of Service	Sodium Hypochlorite
	Springfield #53	Out of Service	Sodium Hypochlorite
	Springfield #54	Out of Service	Sodium Hypochlorite
	Springfield #55	Out of Service	Sodium Hypochlorite
Union	Hummocks #1	Out of Service	Gas Cl_2 After Raw Water Storage Reservoir (1 MG)
	Hummocks #1A	Out of Service	
	Hummocks #2A	Out of Service	
	Hummocks #3	Out of Service	
	Hummocks #3A	Out of Service	
	Hummocks #4A	In Service	
	Hummocks #5	In Service	
	Hummocks #5A	Out of Service	
	Hummocks #6AR	In Service	
	Hummocks #7	In Service	
	Hummocks #8A	Out of Service	
	Hummocks #9A	Out of Service	
	Hummocks #10	Out of Service	
	Hummocks #10A	Out of Service	
	Hummocks #11A	In Service	
	Hummocks #12A	In Service	
	Hummocks #17	Out of Service	
	Hummocks #19	Out of Service	
	Hummocks #23	In Service	
	Hummocks #26	In Service	
	Hummocks #28	Out of Service	
	Hummocks #41	In Service	
	Hummocks #H2	In Service	
	Hummocks #H5	Out of Service	
	Hummocks #TB2	Out of Service	
	Hummocks #TB2A	Out of Service	

ATTACHMENT V-6

ATTACHMENT [illegible]

Town	Well	Status	Chlorination
Westfield	Elm St.	Out of Service	Sodium Hypochlorite
	Prospect St.	In Service	Sodium Hypochlorite
	Wstfld Office #1	Out of Service	Sodium Hypochlorite
	Wstfld Office #2	Out of Service	Sodium Hypochlorite
	Wittke #1	In Service	Sodium Hypochlorite
	Wittke #2	Out of Service	Sodium Hypochlorite

ATTACHMENT 4-7

ATTACHMENT D

FINISHED WATER STORAGE

ESSEX AND UNION COUNTIES

Michigan Avenue	Kenilworth	Standpipe	2.0	MG
Coles Avenue	Mountainside	Standpipe	2	MG
Prospect Street	Mountainside	Standpipe	5	MG
Netherwood	Plainfield	Reservoir	5	MG
Netherwood	Plainfield	Reservoir	1.0	MG
Jerusalem Road	Scotch Plains	Reservoir	12.50	MG
Jerusalem Road	Scotch Plains	Standpipe	1.5	MG
Springfield	Springfield	Reservoir	1.0	MG
Hummocks	Union	Reservoir	1.0	MG Raw Water
Hummocks	Union	Tank	5.0	MG
Hummocks	Union	Watersphere	25	MG

TOTAL 25.45 MG

ATTACHMENT V-8

Attachment C

ELIZABETHTOWN WATER COMPANY

INTERCONNECTIONS IN METRO REGION

ESSEX AND UNION COUNTIES

System	Location	Size (Inches)	Capacity (MGD) TO	Capacity (MGD) FROM
Newark	Linden Avenue Linden	48	30	15
Newark	Summit Avenue	12	--	0.5
Elizabeth	Salem Avenue	12	4	--
Elizabeth	Morris Avenue	20	4	--
Elizabeth	Westfield Avenue	16	4	--
Elizabeth	Waterfront	10	2	--
Elizabeth	Clay Avenue	6	1.5	--
Elizabeth	Lidgerwood Avenue	24	4	--
Elizabeth	Palisades Road	6	0.7	--
Commonwealth	Coit Street Irvington	20	8	--
Commonwealth	Summit Road Springfield	6	--	small
Commonwealth	Carnegie Road Maplewood	12	--	small
Commonwealth	Burnett Avenue Union	12	--	small
Rahway	Merck	36	2	--
Rahway	Woodbridge Avenue	48	1.5	--
Rahway	Leesville Avenue	48	2.3	--
Rahway	Madison Hill Road	36	1.5	--
Winfield Park	Stiles Street	12	0.3	
Winfield Park	Raritan Road (Turbo)	12	0.2	

ATTACHMENT 1-9

Attachment "D"

Potable Water Purchased

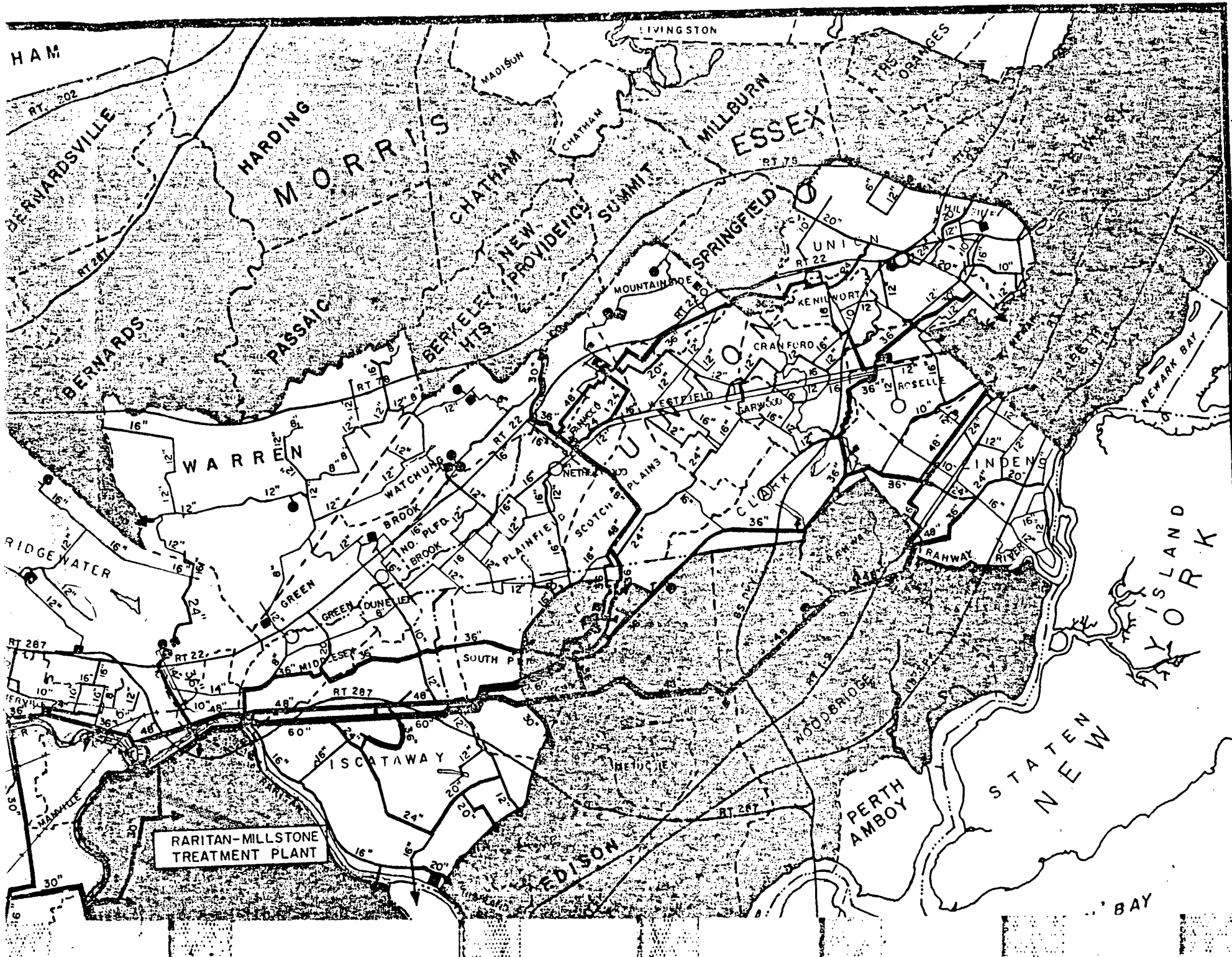
Commonwealth Water Company

City of Elizabeth

City of Newark

Municipalities Served	Connections	Population
1. Clark	4888	19552
2. Cranford	7570	30280
3. Fanwood	2541	10164
4. Garwood	1515	6060
5. Kenilworth	3033	12132
6. Linden	11286	45144
7. Mountainside	2516	10064
8. Plainfield	10537	42148
9. Roselle	5338	21352
10. Roselle Park	3447	13788
11. Scotch Plains	6846	27384
12. Union	16305	65220
13. Westfield	9688	38752
14. Elizabeth	0	0
15. Hillside	5964	23856
16. Rahway	0	0
17. Springfield	0	0

ATTACHMENT 4-10



ATTACHMENT 1-1

Attachment "E"

1988 WELL PRODUCTION
ESSEX AND UNION COUNTIES

Facility	Max Day June 21	Min Day March 5	Avg Day November 15
Elks Well	0.325	0.325	0.331
Quinton Avenue	0	0	0
Richfield	0.201	0.126	0.126
Bristol Road	0.251	0	0
Central Avenue	0	0	0
Charles St. #1	0.419	0	0.409
Charles St. #2	0.173	0	0.130
Fifth Street	0.165	0	0.683
City of Planfield	0.346	0.346	0.346
Prospect Avenue	0.153	0.123	0.161
Watchung Avenue	0	0	0
Netherwood Wellfield	4.754	2.80	3.752
George Street	0.086	0	0.269
Chandler Avenue	0	0	0
First Avenue	0	0	0
Walburga #1	0	0	0
Walburga #2	0	0	0
Walburga #3	0.214	0	0
Walburga #4	0	0	0
Aberdeen	0.342	0.350	0.339
Glenside	0.135	0	0
Jerusalem #1	0.133	0	0.153
Jerusalem #2	0.136	0	0.125
Jerusalem #3	0.037	0	0.534
Morse	0.150	0	0.217
Springfield Wellfield	2.732	2.037	0.469
Hummocks Wellfield	1.650	0.887	1.688
Elm Street	0	0	0
Prospect Street	0	0	0.200
Westfield #1	0	0	0
Westfield #2	0	0	0
Wittke #1	0	0.320	0.346
Wittke #2	0	0	0
TOTAL	12.402 mgd	7.314 mgd	10.278 mgd

ATTACHMENT V-12

1988 BULK SALES (SERVICE TO OTHER SYSTEMS)
CONNECTIONS LOCATED IN ESSEX AND UNION COUNTIES

Facility	Max Day June 21	Min Day March 5	Avg Day November 15
NJAWC	10.754	9.100	9.100
Elizabeth	7.552	7.801	7.778
Newark	0	4.644	0
Rahway	1.281	1.265	1.271

(SERVICE FROM OTHER SYSTEMS)

Not Available at This Time

ATTACHMENT V-13

MAR 6 1990

Let's protect our earth

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
METRO BUREAU OF REGIONAL ENFORCEMENT
2 BABCOCK PLACE
WEST ORANGE, NEW JERSEY 07052

Jorge H. Berkowitz, Ph.D.
Acting Director

DIRK C. HOFMAN, P.E.
DEPUTY DIRECTOR

July 26, 1989

Mr. Richard Sadowski
Assistant Superintendent Wells and Stations
Elizabethtown Water Company
1341 North Avenue
Plainfield, NJ 07062

Re: Compliance Evaluation Inspection
Elizabethtown Water Company
P.W. ID No.: 2004002
Plainfield/Union County

Dear Mr. Sadowski:

A Compliance Evaluation Inspection of your facility was conducted by a representative of this Division on December 7, 1989. A copy of the completed inspection report form is enclosed for your information.

The portion of your facility that is located within the Metro Enforcement Region only has received a rating of "CONDITIONALLY ACCEPTABLE" due to the following deficiencies:

1) The following wells are not equipped with screened casing vents required by N.J.A.C. 7:10-11.4(L)5: Hummock field well Nos. 4A, 6AR, 7A, and 8A.

2) The wells listed above are not equipped with pressure gages and flow meters as required by N.J.A.C. 7:10-11.4(q)3.

3) Pursuant to N.J.S.A. 58:4A-4 et seq. any well not in operation for three (3) years or more or improperly maintained may be deemed abandoned and shall be sealed in accordance with N.J.A.C. 7:9-9.1 et seq. Attachment A lists 38 wells as "out of service".

ATTACHMENT VI-14

NOTE: Undersized mains may exist within your system. All future replacement of these mains and all new mains must be at least 6 inches in diameter, unless justified by hydraulic analysis and approved by the Department.

Since the deficiencies cited are presently, or could in the future, adversely affect the quantity and/or quality of water you provide to your customers, you are requested to institute measures to correct the deficiencies. A written report concerning specific details of the remedial measures to be instituted, as well as an implementation timetable and an inventory of use since 1986 and intended future disposition for all wells listed as out of service, shall be submitted to this Division within thirty (30) calendar days of the date of this correspondence.

Please be advised that the New Jersey Safe Drinking Water Act provides for substantial penalties for violations of the Act.

Please direct all correspondence and inquiries to John M. Brennan, the Environmental Specialist responsible for this case, who can be reached at (201) 669-3900 or by letter through this Division.

Thank you for your cooperation.

Very truly yours,

Gloria T. Grant

Gloria T. Grant, Supervisor
Ground Water Unit
Metro Bureau of
Regional Enforcement

E15:G25

c: Ms. Maria John, Bureau of Safe Drinking Water
Mr. Robert Williams, USEPA
Ms. Ruby Hodges, H.O.
Mr. Richard Kropp, Bureau of Water Allocation

Enclosure

bc: Zaheer Hussain, Enforcement
Gloria Grant, Enforcement
Central File

ATTACHMENT V-15

2004002 ELIZABETHTOWN WATER COMPANY (4.27.90)

Municipalities Served

1. Clark
2. Cranford
3. Fanwood
4. Garwood
5. Kenilworth
6. Linden
7. Mountainside
8. Plainfield
9. Roselle
10. Roselle Park
11. Scotch Plains
12. Union
13. Westfield
14. Elizabeth
15. Hillside
16. Rahway
17. Springfield
18. Bridgewater
19. Bound Brook
20. Green Brook
21. Kingston
22. Middlesex
23. Montgomery
24. North Plainfield
25. [illegible]
26. Plainsboro
27. Princeton Boro, Township
28. Raritan Boro, Township
29. South Plainfield
30. Tewksbury
31. Watchung
32. West Windsor
33. Hillsboro
34. Lawrence
35. Dunellen
36. Edison
37. Millstone
38. Somerville
39. South Bound Brook
40. Bedminster Township
41. Branchburg Township
42. Franklin Township
43. Peapack-Gladstone
44. Warren Township

ATTACHMENT V-16

ELIZABETHTOWN WATER COMPANY (4/9/90)

Surface water information from Glen Johansen of the EWC by telephone on April 9, 1990, ground water information from Don Robertson of the EWC by telephone on April 9, 1990.

SOURCE:

Ground Water: 157 wells - 20 MGD
Surface Water Treatment Plant Capacity: 183 MGD
Surface Water Treatment Plant Backup Capacity: 173 MGD

SURFACE WATER TREATMENT PLANT BREAK DOWN:

Raw Water Pumps - 3 at 11 MGD
1 at 22 MGD
2 at 24 MGD
3 at 40 MGD

Filters - 6 at 3.5 MGD
12 at 4.0 MGD
12 at 4.5 MGD
6 at 10.0 MGD

Finished Water Pumps - 1 at 6 MGD
1 at 8 MGD
2 at 10 MGD
1 at 15 MGD
1 at 16 MGD
1 at 18 MGD
6 at 20 MGD

DEMAND:

Average Daily Demand: 31.12 MGD
Peak Daily Demand (June 21, 1988): 167.8 MGD

ATTACHMENT VI-17

NJDEP - DIVISION OF WATER RESOURCES
PUBLIC COMMUNITY WATER SUPPLY INSPECTION

DELIVERY INFORMATION

PLANT DELIVERED WATER (mgd,month,year) Max. 31,989 6/88 Min 30.24 3/88 Annual Average 31.12 11/88

BULK PURCHASES (provider,mgd) See attached list "D" (MGD not available)

BULK SALES (customer, mgd) See attached list "D" (MGD not available)

NUMBER OF SERVICES 91,474 % METERED 100

MUNICIPALITIES SERVED (est. services in each) 17 municipalities (see attachment "D")

TOTAL ESTIMATED POPULATION SERVICED ~~365,896~~ ~~1,000,000~~ 675,000 (B)

CURRENT/RECENT WATER RESTRICTIONS NONE

NEW CONSTRUCTION (Project Numbers) Hummocks Wellfield installation of Packed Tower & Ranney System

DISTRIBUTION MAINS: Sizing 4" (min) to 30" (max)
Pressures 60 psi (min) to 100 psi (max)
Hydrants/Flushing Program yes / 1 yr.

MONITORING & REPORTING

PARAMETER(S)	FREQUENCY REQUIRED	FREQUENCY PERFORMED
Coliform	240/month	240/month
Inorganics	1/yr	3/26/88
Nitrate	—	—
Trihalomethanes	Quarterly	completed 3 quarters at time of inspection
Organics	once every 3 yrs.	7/88
Turbidity	1/day	1/day
Radionuclides	1/4 yrs	7/87 due in 1991
A280	2x/yr	dates not available

NAME OF LABORATORY Elizabethtown Water Co. CERTIFICATION # 18024

ADDRESS P.O Box 102, Bound Brook, NJ. 08805

COMPLIANCE EVALUATION

SOURCE DEFICIENCIES NONE

TREATMENT DEFICIENCIES NONE

ATTACHMENT V-18

Form DWR-143
7/81

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
ENFORCEMENT & REGULATORY SERVICES

COMPLIANCE EVALUATION INSPECTION
PUBLIC COMMUNITY WATER SUPPLY

DATE 11-28-8

GENERAL INFORMATION

PURVEYOR/ FACILITY: Edison Township Division of Water

FILE LOCATION: Edison Twp. / Middlesex County | PW-ID #: 1205001

MAILING ADDRESS: 7 Langstaff Ave, Edison N.J. 08817

ADMIN.: Mathew Bolger | REQUIRED LICENSES: T - 1, W - 3

BUSINESS TELEPHONE # 201 Admin.: 287-0900 | Licensed Operators: T - 3 M. BOLGER, W - 4 M. BOLGER

FACILITY DESCRIPTION

SOURCES: descriptions, locations, capacities(mgd): Main source 30" line from Elizabethtown Water Comp on Talmadge Ave. Standby Wells, #1 Lexington Ave (.3 Well #3 Plainfield Ave Library (0.20), Well #4 Erie st (0.39), well #7 Langstaff Ave. (0.43), Well #8 Cornell Ave (0.16) Est Tot Eff Cap: 1.55 (Wells o

TREATMENT: source, type, capacities(mgd): Hypochlorination at each well
* storage waiver approved on 3-15-90

Est Tot Eff Cap: 1.55

FINISHED WATER STORAGE: descriptions, locations, capacities(mg): Underground concrete reservoir with booster pumps at Middlesex County College

Est Tot Cap: ≈ 1.0 MG

EMERGENCY INTERCONNECTIONS: descriptions, available gallonage(mgd): (2) with Highland Park, 1-6" at Hamlin Road, 1-12" at Exeter St. / (1) 4" with Middlesex Water Comp at Main St and Woodbridge Ave. The operato suggests this could be a 10" line.

Est Tot Avail:

AUXILIARY POWER: location, type, capabilities: One main booster at Talmadge Road Standby diesel is being rebuilt and rated at (7.560+ Middlesex County College Pumping Station (2) diesel generators at (0.22) each.

ATTACHMENT
1-19

NJDEP - DIVISION OF WATER RESOURCES
PUBLIC COMMUNITY WATER SUPPLY INSPECTION

DELIVERY INFORMATION

PLANT DELIVERED WATER (mgd.month.year) Max August 88 7.865 Min April 88 5.795 Annual Average 6.65

BULK PURCHASES (provider.mgd) Elizabethtown Water Comp 6.0 MGD / Middlesex Water Comp

BULK SALES (customer, mgd) None

NUMBER OF SERVICES 9,400 % METERED 100 %

MUNICIPALITIES SERVED (est. services in each) Southern and Western Sections of Edison Township

TOTAL ESTIMATED POPULATION SERVICED 35,000

CURRENT/RECENT WATER RESTRICTIONS None

NEW CONSTRUCTION (Project Numbers) New 20" main along west and south of town

DISTRIBUTION MAINS: Sizing 4" (min) to 30" (max)
Pressures 35 psi (min) to 100 (max)
Hydrants/Flushing Program 500 / Twice a year

MONITORING & REPORTING

PARAMETER(S)	FREQUENCY REQUIRED	FREQUENCY PERFORMED		
A-280	1 / year	1/yr	6-13-89	SOURCE
Coliform	40 / month	40/month		DISTRIBUT.
Inorganics	1 / year	1/yr	8-1-89	SOURCE
Nitrate	1 / year	1/yr	8-1-89	SOURCE
Trihalomethanes	1 / year	1/yr		DISTRIBUT.
Organics	1 / 3 years	1/3 yrs	8-17-89	SOURCE
Turbidity				
Secondaries	1 / year	1/yr	8-1-89	SOURCE
Radionuclides	4 quarters 1/4 yrs	1/4 yrs	6/86	SOURCE

NAME OF LABORATORY New Jersey Labs CERTIFICATION # 12128

ADDRESS Easton Ave, New Jersey

COMPLIANCE EVALUATION

SOURCE DEFICIENCIES

(1) Lexington Ave. well is down for repairs.

TREATMENT DEFICIENCIES None

ATTACHMENT 20

Form DWR-143
7/81

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
ENFORCEMENT & REGULATORY SERVICES

COMPLIANCE EVALUATION INSPECTION
PUBLIC COMMUNITY WATER SUPPLY

DATE 12/18/89

GENERAL INFORMATION

PURVEYOR/ FACILITY: HIGHLAND PARK WATER DEPARTMENT

PW-ID #: 1207001

FILE LOCATION: HIGHLAND PARK / MIDDLESEX

MAILING ADDRESS: BOROUGH HALL 221 SOUTH FIFTH ST.

REQUIRED LICENSES: T — W-2

ADMIN: Dr JOEL WIESENFELD

BUSINESS TELEPHONE # Admin: (201) 572-3400

Licensed Operators: T [illegible] W-4 Dr WIESENFELD [illegible]

FACILITY DESCRIPTION

SOURCES: descriptions, locations, capacities(mgd): BULK PURCHASES FROM MIDDLESEX WATER CO (0.2 MG) AND ELIZABETHTOWN WATER CO. (1.0 MG)

Est Tot Eff Cap: ~ 1.2 MG

TREATMENT: source, type, capacities(mgd): NONE

Est Tot Eff Cap:

FINISHED WATER STORAGE: descriptions, locations, capacities(mg): STORAGE WAIVER GRANTED 10/28/88

Est Tot Cap: Ø

EMERGENCY INTERCONNECTIONS: descriptions, available gallonage(mgd):
NEW BRUNSWICK WATER DEPT.
EDISON WATER DEPT.

Est Tot Avail:

AUXILIARY POWER: location, type, capabilities: NONE

ATTACHMENT 4-21

NJDEP - DIVISION OF WATER RESOURCES
PUBLIC COMMUNITY WATER SUPPLY INSPECTION

DELIVERY INFORMATION

PLANT DELIVERED WATER (mgd,month,year) Max — Min — Annual Average 1.2

BULK PURCHASES (provider,mgd) ELIZABETHTOWN 1.0 mgd MIDDLESEX WATER CO 0.2 MGD

BULK SALES (customer, mgd) NONE

NUMBER OF SERVICES 3100 % METERED 100%

MUNICIPALITIES SERVED (est. services in each)

TOTAL ESTIMATED POPULATION SERVICED 14000

CURRENT/RECENT WATER RESTRICTIONS N/A

NEW CONSTRUCTION (Project Numbers) N/A

DISTRIBUTION MAINS: Sizing 4 (min) to 20 (max)
Pressures 30 (min) to 80 (max)
Hydrants/Flushing Program 1/YR

MONITORING & REPORTING

DATA UNAVAILABLE FOR INSPECTION

PARAMETER(S)	FREQUENCY REQUIRED	FREQUENCY PERFORMED
Coliform		
Inorganics		
Nitrate		
Trihalomethanes		
Organics		
Turbidity		

NAME OF LABORATORY _____ CERTIFICATION # _____

ADDRESS _____

COMPLIANCE EVALUATION

SOURCE DEFICIENCIES NONE

TREATMENT DEFICIENCIES NONE ~~ATTACHMENT~~ V-22

ATTACHMENT Z

Let's protect our earth

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
CENTRAL BUREAU OF REGIONAL ENFORCEMENT
TWIN RIVERS OFFICE PLAZA
STATE HIGHWAY 33
HIGHTSTOWN, NEW JERSEY 08520

JUN 22 1989

Mr. Joseph Ritter
Middlesex Water Company
P.O. Box 1500
Iselin, NJ 08830

RE: Compliance Evaluation Inspection
Middlesex Water Company
P.W. - ID No. 1225001
Munic/County: Edison/Middlesex

Dear Mr. Ritter:

A Compliance Evaluation Inspection of your facility was conducted by a representative of this Division on June 7, 1989.

Your facility received a rating of "ACCEPTABLE". A copy of the completed inspection report form is enclosed for your information. Please address any minor deficiencies noted therein.

NOTE

A review of your sampling records at the time of the inspection showed periodic exceedences in volatile organic MCLs. Specifically, tetrachloroethylene and trichloroethane were detected at a number of locations in the Park Ave. distribution system in South Plainfield. The source of water for this part of your system is the Park Ave. well field comprising of 15 wells. This office strongly urges the Middlesex Water Company to begin additional testing of these wells for volatile organic contaminants. A sampling plan should be developed that provides for quality assurance/quality control documentation that includes the use of field and trip blanks, proper EPA approved analytical procedures and sample collection, preservation, shipment and chain of custody logs.

You are also requested to contact Bria Keune of the Bureau of Safe Drinking Water at (609) 292-5550 ithin 30 days and advise him on your proposed testing schedule Mr. Keune will be able to answer any questions you may have arding the extent of sampling needed at the Park Ave. well eld.

JUN 23 1989

ATTACHMENT

This Division anticipates your continued cooperation in operating your facilities in a responsible and efficient manner.

Very truly yours,

J. Mark Walters
Compliance Investigation
Ground Water Section

JMW/mf

c: Robert Williams, USEPA, Region II
Brian Keune NJDEP, Bureau of Safe Drinking Water

Enclosure

Z-2

ATTACHMENT 2

ATTACHMENT AA

Community Water Supply - Surface Water Intakes

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER
April 1990

COUNTY	PWS-ID	MUNICIPALITY	PURVEYOR	PHONE NUMBERS	LONG./LAT.	SOURCE
Passaic	1603001	Borough of Haledon	Haledon Water Dept.		74 11'43"/40 58'30"	Molly Ann's Br. Reser.
Passaic	1605002	Little Falls	Passaic Valley Water	(201) 256-1566	74 13'47"/40 52'54"	Passaic River (Totowa)
Passaic	1613001	Pompton Lakes	N.J.D.W.S.C.	(201) 575-0225	74 16'44"/40 59'33"	Ramapo River
Passaic	1613001	Wanaque Borough	N.J.D.W.S.C.	(201) 575-0225	74 17'43"/41 02'30"	Wanaque Reser.
Passaic	1613001	Wanaque Borough	N.J.D.W.S.C.	(201) 575-0225	74 16'47"/40 59'20"	Ramapo River
Salem		Pennsville Twp.	E.I. Dupont DeNemours & Co. ✓	(609) 299-5000	75 30'17"/39 39'13"	Salem Canal (non-comm)
Salem	1712001	City of Salem	Salem Water Department	(201) 935-0350	74 22'26"/39 33'17"	Laurel Lake
Sussex	1903001	Brachville Borough	Branchville Water Dept.	(201) 948-9919	74 43'51"/41 12'17"	Dry Brook Reservoir
Sussex		Franklin Borough	Franklin Water Commission		74 35'21"/41 06'40"	Wallkill River (Franklin Pnd.)
Sussex	1915001	Newton	Newton Water Department	(201) 383-3521	74 36'30"/41 02'34"	Lake Morris
Sussex	1921001	Sussex	Sussex Water Department	(201) 875-4831	74 40'08"/41 16'54"	Lake Rutherford
Sussex	1922017	Vernon Township	Highland Lakes Improvement Company (Summer)		74 28'21"/41 11'10"	Reservoir's, Pochuck Creek
Sussex		Vernon Township	Lake Wallkill Club, Inc. (Summer) ✓		74 31'51"/41 14'20"	Lake Wallkill
Union	2004002	Elizabeth	Elizabethtown Water Co.	(201) 354-4444	74 34'06"/40 32'43"	Raritan River NO
Union	2004002	Elizabeth	Elizabethtown Water Co.	(201) 354-4444	74 34'08"/40 32'33"	Millstone River
Union	2004002	Elizabeth	Elizabethtown Water Co.	(201) 354-4444	74 34'05"/40 32'36"	Confluent of the Raritan & Millstone Rvrs.
Union	2013001	City of Rahwah	Rahway Water Department	(201) 388-0086	74 12'26"/40 36'51"	Rahway River
Warren	2103001	Town of Belvidere	Buckhorn Springs Water Co.	(201) 475-2531	74 03'16"/40 48'04"	Impounded reservoir on Buckhorn Creek
Warren	2108001	Hackettstown	Hackettstown M.U.A.	(201) 852-3622	74 48'04"/40 50'34"	Lower Mine Hill Reservoir
Warren	2108001	Hackettstown	Hackettstown M.U.A.	(201) 852-3622	74 47'47"/40 51'18"	Burd Reservoir

ATTACHMENT A

Community Water Supply - Surface Water Intakes

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF SAFE DRINKING WATER

APRIL 1990

COUNTY	PWS-ID	MUNICIPALITY	PURVEYOR	PHONE NUMBERS	LONG./LAT.	SOURCE
Middlesex	1225001	Woodbridge	Middlesex Water Co.	(201) 634-1500	74 26'43"/40 30'03"	Delaware-Raritan Canal Yes
Middlesex	1219001	Sayreville	Sayreville Water Dept.	(201) 390-7000	74 21'35"/40 24'56"	South River (Recharge) "
Monmouth	1326004	Manalapan Twp.	Matchaponix Water Supply Co.		74 21'54"/40 19'04"	Matchaponix Brook
Monmouth	1345001	Shrewsbury	Monmouth Consolidated Water Company	(201) 842-6900	74 06'43"/40 19'09"	Swimming River Reservoir
Monmouth		Howell Twp.	N.J. Water Supply Authority		74 11'24"/40 10'41"	Manasquan Riv. (Proposed)
Monmouth	1345001	Long Branch	Monmouth Consolidated Water Company	(201) 842-6900	74 04'15"/40 11'54"	Shark River
Monmouth	1345001	Long Branch	Monmouth Consolidated Water Company	(201) 842-6900	74 03'56"/40 12'13"	Jumping Brook
Monmouth	1345001	Wall Township	Monmouth Consolidated Water Company	(201) 842-6900	74 07'08"/40 11'54"	Manasquan Riv. Glendola Reser.
Morris	1401001	Town of Boonton	Town of Boonton	(201) 299-7740	74 23'04"/40 57'06"	Taylortown Reservoir
Morris	1403001	Butler	Butler Water Dept.	(201) 838-7200	74 21'52"/40 59'14"	Kakeout Reservoir
Morris	1424001	Town of Morristown	Southeast Morris County	(201) 538-5600	74 34'47"/40 48'20"	Clyde Potts Reservoir
Ocean	1506001	Brick Township	Brick Twp. M.U.A.	(201) 458-7000	74 11'43"/40 04'37"	Metedeconk River
Passaic	1613001	Two Bridges	N.J.D.W.S.C.	(201) 575-0225	74 16'23"/40 53'40"	Pompton River

(*) - EMERGENCY USE

ATTACHMENT A-2

ATTACHMENT BB

CH2M HILL Engineers Planners Economists Scientists

RECEIVED
AUG 22 11 37 AM '89
INDUSTRIAL
E EVALUATION
ELEMENT

August 18, 1989

NJ026404.A0

Sent to D. Cuaro
8/23

Mr. Stephen E. Maybury, Case Manager
Bureau of Environmental Evaluation and
Cleanup Responsibility Assessment
NJDEP/Division of Waste Management
401 East State Street
CN028
Trenton, New Jersey 08625

Dear Mr. Maybury:

Subject: Metz Metallurgical Corporation
Well Record Search
ECRA Case #86108

In accordance with Mr. DeFina's letter dated June 20, 1989, a well record search was conducted in response to Part B, Item 8. The search was performed by the Bureau of Water Allocation for all wells within a one-half miles radius from the facility. Copies of the well records were sent to CH2M HILL. Wells that were located within the radius were plotted.

In addition, CH2M HILL met with the South Plainfield Health Department. All wells within the radius were identified, however no well records existed at the department.

Attached is a summary table and map of wells within a one-half mile radius of the Metz Metallurgical Corporation. We hope that this information will satisfy your requirements for groundwater information around the site.

If you have any questions concerning this data, please feel free to call me at (201) 316-9300.

Sincerely,

CH2M HILL

Paul B Dahlgren

Paul Dahlgren
Project Manager

ATTACHMENT BB-1

NJC4/003WP
Attachments

ESC X 1 240

METZ-METALLURGICAL STATE AND SOUTH PLAINFIELD HEALTH DEPARTMENT WELL SEARCH

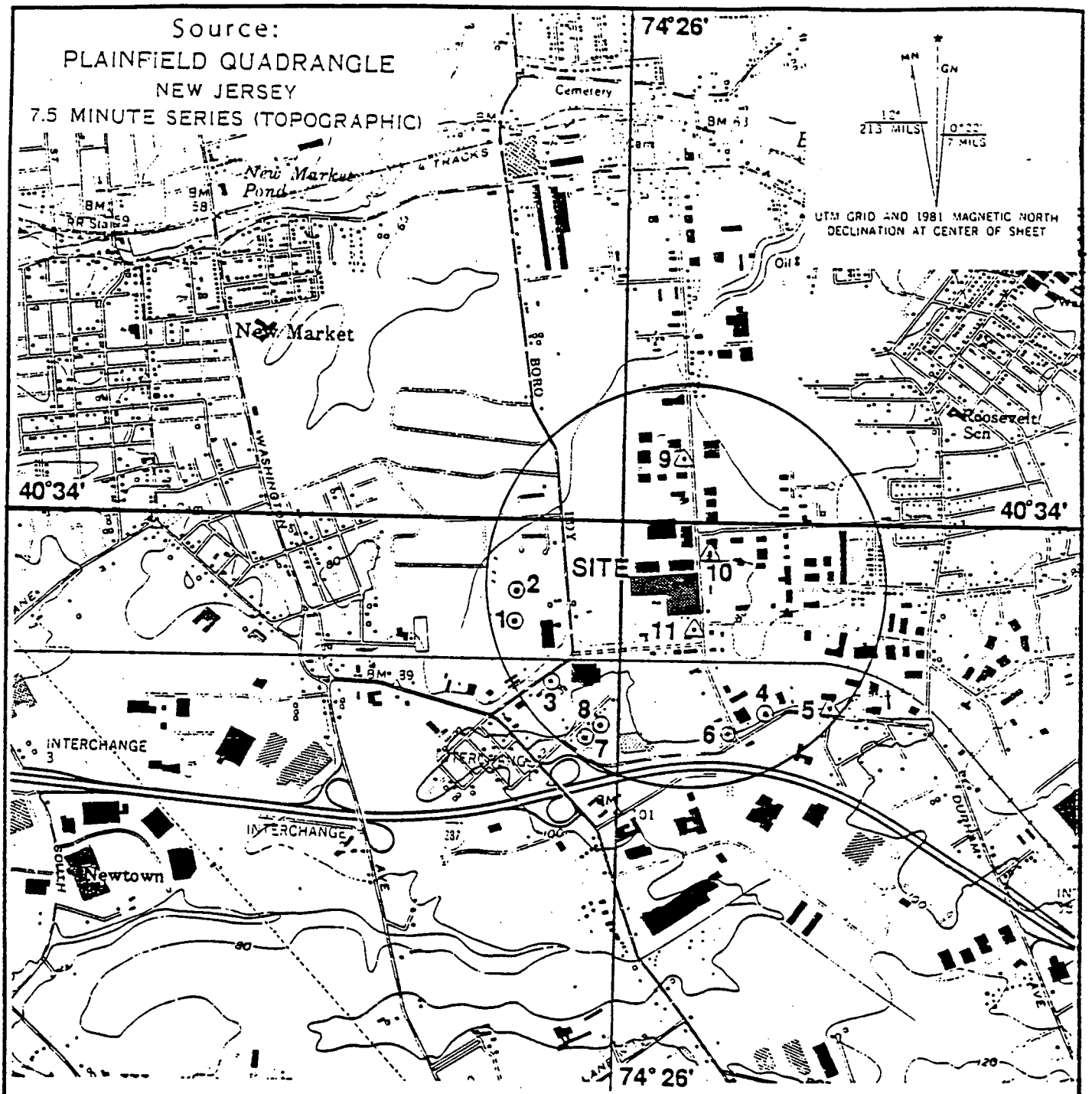
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION WELL RECORD SEARCH

PLOT #	WELL OWNER	WELL #	GRID REF. #	USE	GROUND ELEV.	STATIC W.L.	DEPTH	DIAMETER	CASING	YIELD (GPM
1	CLARENCE ROBERTSON 125 WALNUT ST. DUNELLEN, NJ		25-34-732	DOMESTIC	100 FT.	-54/46 FT.	152 FT.	6"	STEEL 0-23'	7
2	EARL CRAWFORD R.F.D. NEW MARKET, NJ	2	25-34-732	DOMESTIC	100 FT.	-46/54 FT.	145 FT.	TOP- 10" BOTTOM- 6"	STEEL 0-22'	12
3	BRUCE JJ SAUNDERS RANDOLPHVILLE RD PISCATAWAY TWP.		25-34-736	DOMESTIC		-20 FT.	100 FT.	6"	STEEL 0-23'	10
4	JAMES BOSTOS HAMILTON BLVD MIDDLESEX, NJ		25-34-815	DOMESTIC		-46 FT.	140 FT.	6"	STEEL 0-22'	3-5
5	ICE PALACE CO., INC. HAMILTON BLVD. SO. PLAINFIELD, NJ	1	25-34-816	INDUSTRIAL	80 FT.	-75/5 FT.	310 FT.	TOP- 9" BOTTOM- 6"	STEEL 0-41 FT.	75
6	PATRICK COVELLESIA SO. PLAINFIELD, NJ		25-34-818	DOMESTIC	100 FT.	-45/55 FT.	197 FT.	6"	STEEL 0-23 FT.	5

SOUTH PLAINFIELD HEALTH DEPARTMENT RECORD OF WELLS

PLOT #	WELL OWNER	WELL #	GRID REF. #	USE	GROUND ELEV.	STATIC W.L.	DEPTH	DIAMETER	CASING	YIELD (GPM
7	NORMAN BJORNSEN 306 SHEVCHENKO AVE SO. PLAINFIELD, NJ	LOT 13 BL. 472	25-34-739	DOMESTIC	UNKNOWN- NO WELL RECORD EXISTS					
8	FRANK BOROWSKI 314 SHEVCHENKO AVE SO.PLAINFIELD, NJ	LOT 15 BL.472	25-34-739	DOMESTIC	UNKNOWN- NO WELL RECORD EXISTS					
9	SO.PLAINFIELD FIDELCO 3474 SO. CLINTON AVE SO. PLAINFIELD, NJ	1	25-34-577	INDUSTRIAL	UNKNOWN- NO WELL RECORD EXISTS					
10	L.R. METAL TREATING CO. 3651 SO. CLINTON AVE SO. PLAINFIELD, NJ	1	25-34-812	INDUSTRIAL	UNKNOWN- NO WELL RECORD EXISTS					
11	SO.PLAINFIELD FIDELCO 4216 SO. CLINTON AVE SO. PLAINFIELD, NJ	1	25-34-814	INDUSTRIAL	UNKNOWN- NO WELL RECORD EXISTS					

ATTACHMENT B-2



SCALE 1:24000

1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 KILOMETER

QUADRANGLE LOCATION

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

ATTACHMENT BB-3

METZ METALLURGICAL CORP.

3900 South Clinton Ave.

South Plainfield N.J.

Legend
- △ Industrial Wells
- ⊙ Domestic Wells

Figure
WELLS LOCATED IN RECORD SEARCH

CH2M HILL

MEMO
TO: FILE
FROM: ANDREW CYR NJDEP/BSA
SUBJECT: PRIVATE WELLS.

ON JULY 9, 1991 I HAD A CONVERSATION WITH A MR. BONK OF THE SOUTH PLAINFIELD HEALTH DEPARTMENT CONCERNING PRIVATE WELLS IN THE BORO. HE STATED THAT THERE ARE APPROX. 300 HOMES STILL ON PRIVATE WELLS SCATTERED ABOUT THE BORO.

IN AN AUGUST 20, 1991 CONVERSATION WITH A REPRESENTATIVE OF THE EDISON TWP. SEWER DEPT. STATED THAT APPROX. 200 RESIDENTS STILL DERIVE POTABLE WATER FROM PRIVATE WELLS. ALSO IN AN AUGUST 20, 1991 CONVERSATION WITH MR. UDENTAL OF THE PLAINFIELD HEALTH DEPARTMENT ONLY APPROX. 25 HOMES WITHIN PLAINFIELD ARE STILL ON PRIVATE WELLS. HOWEVER, HE ONLY NEW OF ONE WELL LOCATED ALONG PLAINFIELD AVE. NEAR THE SOUTH PLAINFIELD BOARDER.

IN A CONVERSATION WITH A REPRESENTATIVE OF THE DUNELLEN HEALTH DEPARTMENT CONCERNING PRIVATE WELLS WITHIN THE BORO THE REP. STATED THAT THERE ARE APPROXIMATELY 25 HOMES THROUGOUT THE BORO USING PRIVATE WELLS.

ATTACHMENT B B-4

ATTACHMENT CC

MEMO
TO: FILE
FROM: ANDREW CYR NJDEPE/DRPSR/BSA
SUBJECT: AREA WATER SUPPLIES

ON JULY 5, 1991 I SPOKE WITH BILL SIEBEN OF THE SOUTH PLAINFIELD HEALTH DEPARTMENT. HE STATED THAT APPROXIMATELY 300 HOMES WITHIN THE BOROUGH ARE STILL USING PRIVATE WELLS TO OBTAIN POTABLE WATER. THE BOROUGH IS SERVICED BY BOTH THE MIDDLESEX WATER COMPANY AND THE ELIZABETHTOWN WATER COMPANY.

ON AUGUST 15, 1991 I SPOKE WITH A REPRESENTATIVE OF THE MIDDLESEX COUNTY HEALTH DEPARTMENT ABOUT THE MUNICIPALITY OF DUNNELLEN. THE REPRESENTATIVE STATED THAT DUNNELLEN HAS APPROXIMATELY 25 HOMES STILL USING PRIVATE WELLS LOCATED THROUGHUOT THE BOROUGH. SOME OF THE WELLS HAVE SHOWN VO CONTAMINATION.

ATTACHMENT CC

ATTACHMENT DD

BOROUGH OF MIDDLESEX

OFFICE OF

BOARD OF HEALTH

1200 MOUNTAIN AVENUE
MIDDLESEX, N. J. 08846

356-8090

August 21, 1991

Mr. Andrew Cyr
New Jersey State
Department of Environmental Protection
Bureau of Site Assessment
300 Horizon Center
CN 407
Trenton, N.J. 08625-0407

Ref: Middlesex Wells

Dear Mr. Cyr:

As per your request I am enclosing a list of wells in Middlesex Borough. As I stated to you, this is by no means a complete list, only a list of those our department is aware of.

If I can be of any more assistance do not hesitate to call me.

Healthfully,

Kevin G. Sumner

Kevin G. Sumner
Sanitarian/Environmental
Health Official

KGS:J
Enc.

ATTACHMENT DD.1

address	street	USE	DEPTH	AG
E CONTAMINATION				
2	ANNE ST.		0	
0				
31	ANNE ST.	DRINKING	0	
0				
281	ANTHONY AVE.		0	
0				
312	ANTHONY AVE.		0	
0				
320	ANTHONY AVE.		0	
0 N				
217	APPIAN AVE.		0	
0 N				
225	APPIAN AVE.		0	
0 N				
1008	BEECHWOOD AVE.	EVERYTHING	0	
0				
1010	BEECHWOOD AVE.	EVERYTHING	125	2
7 N				
1020	BEECHWOOD AVE.	EVERYTHING	0	3
5				
1021	BEECHWOOD AVE.	EVERYTHING	0	
0				
1023	BEECHWOOD AVE.	EVERYTHING	0	
0				
1025	BEECHWOOD AVE.		0	
0				
1027	BEECHWOOD AVE.	EVERYTHING	0	
0				
1124	BEECHWOOD AVE.	EVERYTHING	0	1
0 N				
1128	BEECHWOOD AVE.	EVERYTHING	0	1
0				
1131	BEECHWOOD AVE.	EVERYTHING	0	
0 Y				
1132	BEECHWOOD AVE.	EVERYTHING	0	
0 N				
351	BEECHWOOD AVE.		0	
0 N				
708	BEECHWOOD AVE.	EVERYTHING	0	
0 N				
800	BEECHWOOD AVE.	EVERYTHING	0	
0				
805	BEECHWOOD AVE.	EVERYTHING	90	3
2				
808	BEECHWOOD AVE.		0	
0				
809	BEECHWOOD AVE.	EVERYTHING	0	
0				
887	BEECHWOOD AVE.	EVERYTHING	0	2
9 N				
909	BEECHWOOD AVE.		0	
0				
540	BOUND BROOK RD.		0	
0				
206	CEDAR AVE.		0	
0				
30	CEDAR AVE.	EVERYTHING	125	3
0 N				
			0	

ATTACHMENT DD 2

700	CEDAR AVE.	DOMESTIC	173	1
7				
86	CEDAR AVE.		0	
0				
536	CHESTNUT ST.	DOMESTIC	0	
0 Y				
537	CHESTNUT ST.	DOMESTIC	110	
0				
540	CHESTNUT ST.		0	
0				
544	CHESTNUT ST.		0	
0				
	CLAY AVE.	INDUSTRIAL	213	1
6				
92	CONOVER PL.		0	
0				
124	COOK AVE.		0	
0				
125	COOK AVE.		0	
0				
126	COOK AVE.		0	
0				
131	COOK AVE.		0	
0 Y				
215	COOK AVE.		0	
0				
218	COOK AVE.		0	
0				
408	COOK AVE.		0	
0				
562	COOK AVE.		0	
0				
29	DAYTON AVE.	CAR WASH, WATER GRASS	36	3
5				
600	DENTON PL.	GARDENING	0	
0				
347	DRAKE AVE.		0	
0				
349	DRAKE AVE.		0	
0				
351	DRAKE AVE.	EVERYTHING	135	2
5 N				
719	DRAKE AVE.		0	
0				
809	DRAKE AVE.		0	
0 N				
815	DRAKE AVE.		0	
0				
820	DRAKE AVE.		0	
0 N				
212	E.GREENLAWN AVE.		0	
0 N				
7	E.WILSON ST.	NOTHING	0	
0				
621	EDGEWORTH ST.		0	
0				
107	EGEL AVE.		0	
0				
	FACTORY LN.	MONITORING WELLS	0	
0				
	FACTORY LN.	MONITORING WELLS	0	
0				
125	FACTORY LN.	MONITORING WELLS	0	
0				

ATTACHMENT DD-3

0 Y				
216	FAIRFIELD AVE.	DOMESTIC	110	2
6				
219	FAIRFIELD AVE.		0	
0				
229	FAIRFIELD AVE.		0	
0				
235	FAIRFIELD AVE.		0	
0				
236	FAIRFIELD AVE.	?	0	
0				
247	FAIRFIELD AVE.		0	
0				
507	FAIRVIEW AVE.		0	
0				
522	FAIRVIEW AVE.		0	
0				
100	FARRAGUT AVE.	EVERYTHING	129	2
0 N				
104	FARRAGUT AVE.	EVERYTHING	200	
2 N				
105	FARRAGUT AVE.	EVERYTHING	75	2
7 N				
106	FARRAGUT AVE.	DOMESTIC	50	1
0				
150	FARRAGUT AVE.	EVERYTHING	120	1
5				
202	FARRAGUT AVE.		0	
0 Y				
330	FIRST ST.		0	
0				
3	FITZSIMMONS AVE.		0	
0				
125	FOURTH ST.	DOMESTIC	0	
0 N				
431	FULTON ST.		0	
0				
11	GARDEN PL.	DOMESTIC	98	2
6				
12	GARDEN PL.		0	
0				
5	GARDEN PL.	DOMESTIC	100	2
6				
9	GARDEN PL.	DOMESTIC	96	2
6				
232	GILES AVE.		0	
0				
233	GILES AVE.		0	
0				
443	GILES AVE.		0	
0				
101	GRANDVIEW ST.		0	
0				
342	GRANT AVE.	DOMESTIC	150	1
1				
41	GREENBROOK RD.		0	
0				
48	GREENBROOK RD.	DOMESTIC	102	2
6				
51	GREENBROOK RD.		0	
0 N				
68	GREENBROOK RD.		0	
0				
211	GROVE ST.	NO LONGER USED	0	

ATTACHMENT DD-4

511	HANCOCK ST.		0	
0				
125	HARRIS AVE.	CLOSED	250	3
0				
145	HARRIS AVE.	EVERYTHING	0	
0				
472	HARRIS AVE.		0	
0				
1017	HAZELWOOD AVE.	NORMAL	0	
0 N				
1100	HAZELWOOD AVE.		0	
0				
1101	HAZELWOOD AVE.		0	
0				
1108	HAZELWOOD AVE.	EVERYTHING	0	
0				
1111	HAZELWOOD AVE.	NORMAL	0	
0 N				
1112	HAZELWOOD AVE.	EVERYTHING	0	
0				
1116	HAZELWOOD AVE.		0	
0				
232	HAZELWOOD AVE.		0	
0				
345	HAZELWOOD AVE.		0	
0				
504	HAZELWOOD AVE.	EVERYTHING	0	
0 N				
508	HAZELWOOD AVE.		0	
0				
513	HAZELWOOD AVE.	NORMAL	0	
0 N				
516	HAZELWOOD AVE.	EVERYTHING	0	
0				
517	HAZELWOOD AVE.	NORMAL	0	
0				
600	HAZELWOOD AVE.	EVERYTHING	0	
0				
601	HAZELWOOD AVE.		0	
0				
604	HAZELWOOD AVE.	EVERYTHING	0	1
0				
609	HAZELWOOD AVE.	DOMESTIC	90	
0				
617	HAZELWOOD AVE.	EVERYTHING	0	
0				
703	HAZELWOOD AVE.	EVERYTHING	0	
0 N				
717	HAZELWOOD AVE.	EVERYTHING	0	
0				
805	HAZELWOOD AVE.	EVERYTHING	0	
0 N				
323	HIGH ST.		0	
0				
351	HIGH ST.		0	
0 N				
409	HIGH ST.		0	
0				
413	HIGH ST.		0	
0				
420	HIGH ST.		0	
0				
436	HIGH ST.		0	

ATTACHMENT DD-5

0 N			
304	JOHN ST.	ALL PURPOSE	25
0			
312	JOHN ST.		0
0			
105	LEE DR.		0
0			
393	LINCOLN BLVD.		0
0			
820	LINCOLN BLVD.		0
0 Y			
428	LORRAINE AVE.		0
0			
629	LORRAINE AVE.	NOT IN USE - 07-00-89	0
0			
638	LORRAINE AVE.	DOMESTIC - EVERYTHING - 07-00-89	95
0 N			
641	LORRAINE AVE.		0
0			
642	LORRAINE AVE.		0
0			
644	LORRAINE AVE.		0
0			
645	LORRAINE AVE.		0
0			
650	LORRAINE AVE.		0
0			
659	LORRAINE AVE.		0
0			
206	LUCIA ST.		0
0			
211	LUCIA ST.		0
0			
212	LUCIA ST.		0
0			
1	LYDECKER PL.		0
0			
5	LYDECKER PL.	EVERYTHING	150
3 N			
107	MAIN ST.		0
0			
341	MAIN ST.		0
0			
343	MAIN ST.		0
0			
344	MAIN ST.		0
0 N			
345	MAIN ST.		0
0			
347	MAIN ST.		0
0			
400	MAIN ST.		0
0			
404	MAIN ST.		0
0			
412	MAIN ST.		0
0			
413	MAIN ST.		0
0			
423	MAIN ST.	ALL PURPOSE	35
0			
250	MARKET ST.	DOMESTIC	0
0 N			
408	MARKET ST.		0

ATTACHMENT DD-6

0					
12	MARLBOROUGH AVE.	EVERYTHING		100	7
0					
16	MARLBOROUGH AVE.			0	
0					
52	MARLBOROUGH AVE.			0	
0					
53	MARLBOROUGH AVE.			0	
0					
58	MARLBOROUGH AVE.			0	
0					
60	MARLBOROUGH AVE.			0	
0					
225	MELROSE AVE.			0	
0					
1200	MOUNTAIN AVE.			0	
0					
1190	MOUNTAIN AVE.	ALL PURPOSE		0	
0 N					
233	MOUNTAIN AVE.			0	
0					
606	MOUNTAIN AVE.	DOMESTIC		0	
0					
142	MULBERRY LA.			0	
0					
22	ORCHARD RD.			0	
0					
34	ORCHARD RD.	EVERYTHING		130	
2 N					
38	ORCHARD RD.	EVERYTHING		150	4
0					
41	ORCHARD RD.	EVERYTHING		120	
7 N					
44	ORCHARD RD.			0	
0					
45	ORCHARD RD.	EVERYTHING		100	3
2 N					
55	ORCHARD RD.	EVERYTHING		0	
0					
56	ORCHARD RD.	EVERYTHING		0	3
5					
59	ORCHARD RD.	EVERYTHING		0	
0					
65	ORCHARD RD.	EVERYTHING		0	
0					
68	ORCHARD RD.	EVERYTHING		100	3
8					
70	ORCHARD RD.			0	
0 N					
71	ORCHARD RD.	EVERYTHING		0	3
5					
72	ORCHARD RD.	DOMESTIC		0	
0					
74	ORCHARD RD.	EVERYTHING		160	3
5					
76	ORCHARD RD.	EVERYTHING		100	
0 N					
78	ORCHARD RD.	EVERYTHING		0	3
3 N					
82	ORCHARD RD.	DO NOT KNOW	ATTACHMENT DD-7	110	3
0					
12	PARK PL.			0	
0					
13	PARK PL.			0	

0				
27	PRINCETON DR.		0	
0				
101	RAMSEY RD.	EVERYTHING	110	4
0 N				
51	RAMSEY RD.	EVERYTHING	60	2
0 N				
57	RAMSEY RD.		0	
0 N				
73	RAMSEY RD.		0	
0				
79	RAMSEY RD.	EVERYTHING	0	3
0				
87	RAMSEY RD.	EVERYTHING	160	3
0 N				
95	RAMSEY RD.	DOMESTIC	130	1
0				
812	RAPHAEL AVE.		0	
0				
124	RIVER RD.		0	
0				
127	ROCK LN.		0	
0 N				
205	RUNYON AVE.	EVERYTHING	0	
0				
218	RUNYON AVE.	DOMESTIC	100	1
7				
230	RUNYON AVE.	EVERYTHING	0	
0 N				
234	RUNYON AVE.	EVERYTHING	35	3
0 N				
236	RUNYON AVE.	EVERYTHING	0	
0 N				
448	RUNYON AVE.	WATER GARDEN	0	
0 Y				
184	S.LINCOLN AVE.		0	
0 N				
113	S.WOODLAND AVE.		0	
0				
308	SALVATORE AVE.		0	
0 N				
411	SECOND ST.		0	
0				
425	SECOND ST.		0	
0				
372	SENECA AVE.	EVERYTHING	60	1
2				
380	SENECA AVE.	EVERYTHING	150	2
5 N				
387	SENECA AVE.		0	
0				
389	SENECA AVE.		0	
0 N				
396	SENECA AVE.		0	
0				
404	SENECA AVE.	EVERYTHING	0	2
5 N				
408	SENECA AVE.	EVERYTHING	127	3
2				
411	SENECA AVE.		0	
0				
421	SENECA AVE.		0	
0				
425	SENECA AVE.	EVERYTHING	90	3

ATTACHMENT DD-8

3 N 300 0	SHEPHERD AVE.		0	
306 0	SHEPHERD AVE.		0	
800 0	SHERIDAN AVE.		0	
135 0	SMALLEY AVE.		0	
900 0	SOUTH AVE.		0	
14 4	STARLIT DR.	DOMESTIC	150	2
155 0	STOUT AVE.		0	
209 0	THIRD ST.		0	
324 0	UNION AVE.		0	
331 0	UNION AVE.		0	
411 0	UNION AVE.		0	
455 0	UNION AVE.		0	
601 5	UNION AVE.	DOMESTIC	110	3
631 0	UNION AVE.		0	
208 0	VESPER AVE.	DOMESTIC	0	
212 0 N	VESPER AVE.		0	
213 8 N	VESPER AVE.	EVERYTHING	0	3
214 0	VESPER AVE.	EVERYTHING	0	
308 0 N	VESPER AVE.	DOMESTIC	0	
320 0	VESPER AVE.		0	
130 0	VOGEL PL.	GARDENING	0	
149 0	VOGEL PL.		0	
758 0	VOORHEES AVE.		0	
817 0 Y	VOORHEES AVE.		0	
821 0 N	VOORHEES AVE.		0	
865 0	VOORHEES AVE.		0	
568 0	W.PERSHING AVE.		0	
45 0 Y	WARRENVILLE RD.		0	
64 0	WARRENVILLE RD.		0	
73 0	WARRENVILLE RD.		0	
28 0	WASHINGTON AVE.		0	
114	WELLINGTON ST.		0	

ATTACHMENT DD-9

501	WELLINGTON ST.	MLL PURPOSE	
0			
510	WELLINGTON ST.		0
0			
512	WELLINGTON ST.		0
0			
514	WELLINGTON ST.		0
0			
518	WELLINGTON ST.		0
0 N			
520	WELLINGTON ST.		0
0			
15	WOODLAND AVE.		0
0 N			
107	ZOAR PL.		0
0			
109	ZOAR PL.		0
0			
3	PARK PLACE		0
0			

ATTACHMENT DD-10

ATTACHMENT EE

Let's protect our earth

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
CN 029
Trenton, N.J. 08625-0029

Office of
the Director

(609) 292-1637
Fax # (609) 984-7938

JUL 11 1991

M E M O R A N D U M

TO: Distribution List

FROM: Senior Environmental Specialist Lisa Oberholtzer
Bureau of Water Supply

THROUGH: Section Chief Rocky Richards
Bureau of Water Supply

SUBJECT: Franklin Avenue Area, Piscataway Township, Middlesex County
Ground Water Impact Area Block and Lot List

In Piscataway Township (Township), Middlesex County there are thirteen homes whose potable wells contain volatile organic compounds (VOCs) exceeding the Maximum Contaminant Levels (MCLs), with the highest concentration of total VOCs at 1410 parts per billion (ppb). In all, 49 different potable wells have been sampled in the Franklin Avenue Area, with twenty seven percent of the wells yielding contamination above the recommended MCLs. The attached map delineates the Ground Water Impact Area (GWIA), all block and lot numbers are listed (see Attachment). However, it should be noted that Block 490 Lots 4A,6,13, 14C, due to their size and potential for subdivision, may need to be reevaluated for their inclusion in the GWIA on a case-by-case basis before a well permit is issued.

Attachment

c: Sindy Pinchuk, ECA
Joseph Marchesani, BGWPAb
Steve Spayd, BGWPAs
Paul Harvey, BFCM
Rick Kropp, BWA
Charles Maack, CBRE
Project File

ATTACHMENT EE-1

New Jersey is an Equal Opportunity Employer
Recycled Paper

FRANKLIN AVENUE AREA
PISCATAWAY TOWNSHIP
MIDDLESEX COUNTY

Blocks and Lots Included
Within the GWIA

BLOCK:	481	LOTS:	1-11
BLOCK:	482	LOTS:	1-18
BLOCK:	483	LOTS:	1-36
BLOCK:	484	LOTS:	1-31, 32B, 32C, 33,34
BLOCK:	485	LOTS:	1-36
BLOCK:	486	LOTS:	1-36
BLOCK:	487	LOTS:	1A,2A,1-12, 13A,17-26, 27A
BLOCK:	488	LOTS:	1-32
BLOCK:	490	LOTS:	4A,6,8-11,13,14C,18-23
BLOCK:	494	LOTS:	6,6B-6H,6J,12A,13

ATTACHMENT EE-2

DELINEATION OF AN INTERIM GROUND WATER IMPACT AREA AT THE NOVA UKRAINE AREA, PISCATAWAY TOWNSHIP, MIDDLESEX COUNTY

April 1991

Joseph Marchesani
Hydrogeologist

Bureau of Ground Water Pollution Abatement
Ground Water Quality Management Element
Division Water Resources
New Jersey Department of Environmental Protection
401 East State Street
Trenton, New Jersey 08625

ATTACHMENT EE-3

Table of Contents

Introduction ---------- 1
- Background ---------- 1
- History of Ground Water Contamination ------ 2

Geology ---------- 2
- Hydrogeology ---------- 3
- Aquifer Testing ---------- 4
- Ground Water Flow Velocity ---------- 5
- Most Probable Pollutant Transport Rate ----- 5

Description of Ground Water Contamination ------- 6
- Tetrachloroethylene ---------- 6
- Trichloroethylene ---------- 6
- 1,1-Dichloroethylene ---------- 7
- 1,2-Dichloroethylene(total) ---------- 7
- Summary of above Compounds ---------- 7
- Methyl-tertiary-butyl-ether, toluene, Trichloroflouromethane ---------- 8

Interim Most Probable Ground Water Pollution Migration Area ---------- 8

Interim- Most Probable Ground Water Pollution Migration Area/ Interim Ground Water Impact Area Delineation ---------- 9

Conclusions ---------- 9

REFERENCES ---------- 10

List of Attachments

Attachment I - Locations of Potential Ground Water Contamination Sources

Attachment II - Names, Locations, and Sampling Dates of Home Wells

Attachment III - Available Local Home Well and Local Deep Well Logs

Attachment IV - Standard Symbols for Mapping Water Quality

* Attachment V - Laboratory QA/QC Data

* Available upon request

ATTACHMENT EE-4

INTRODUCTION

The purpose of this report is to delineate an Interim Ground Water Impact Area for the Franklin Street Area; Nova Ukraine Section in southern Piscataway Township, Middlesex County. A Ground Water Impact Area (GWIA) is the area consisting of the currently known extent of ground water pollution combined with the interim- most probable ground water pollution migration area.

The currently known extent of ground water pollution is the extent of area where pollutant concentrations in ground water exceed maximum contaminant levels (MCL's), or in the absence of MCL's other appropriate health based criteria or guidelines. The GWIA is delineated within this report as "interim" because multiple sources of ground water contamination potentially exist and a source area(s) needs to be determined to more accurately and precisely delineate a final GWIA, thus assessing any additional home wells which may potentially be at risk. Potential source areas are given in attachment I.

Based on source area(s) delineation and further hydrogeologic analysis, this interim GWIA may have to be modified in the future. Any modification will be an expansion of the interim GWIA delineated within this report. Additional justification for delineating the GWIA as "interim" includes:

1. the source or sources of ground water contamination have not been determined,

2. no ground water remediation system is presently in operation to control the flow of contaminated ground water,

3. local domestic and industrial supply wells have recently discontinued pumping and obtained hook-ups to Elizibethtown Water Company due to the massive extent and concentration of local ground water contamination, thus, they no longer exert any constraints on contaminant flow velocities and direction,

4. fracture fabric analysis (see definition on page 4), and potential preferential flow direction determined from pumping tests were not used in this interpretation of ground water flow rate and direction,

5. it is most probable that not yet located pockets of highly contaminated ground water exist trapped in the fractured bedrock.

BACKGROUND

The Nova Ukraine area is a suburban residential neighborhood located in southern Piscataway Township along the South Plainfield Township border (see figure 1). Both townships are located in Middlesex County. The site consists of a community composed of approximately 60 homes, all being permanent places of

residence. The community is "triangle- shaped" and is bound on the east by Stelton Road, on the west by New Brunswick Avenue, and along the south by interstate route 287.

HISTORY OF GROUND WATER CONTAMINATION: NOVA UKRAINE SITE

The currently known extent of ground water contamination, as of April, 1990 is shown on figure 2. Ground water contamination was first identified in the home well of the Robertson residence (see figure 2) in 1982 at 44.4 ug/l Tetrachloroethylene (PCE). Point of use control was implemented at this time through the installation of a carbon tap filter. The Robertson residence home well was then sampled several times during the 1980's verifying the contamination.

Recent sampling during early 1990 of the Robertson residence well indicated elevated levels of 1400 ug/l PCE contamination, along with Trichloroethylene (TCE), 1,1-Dichloroethylene (1,1-DCE), Total 1,2-Dichloroethylene (1,2-DCE), Methyl-Tertiary-Butyl-Ether (MTBE), Toluene, and Trichloroflouromethane (see description of contamination on page 6). Sample results of residences around the Robertson home reveal that PCE and above contaminants have impacted other residences.

Residences whose homes are impacted with ground water contamination and the results of recent sampling events are included as Attachment II.

During the fall of 1990, a limited number of residences within the Nova Ukraine Site were hooked- up to the Elizabethtown Public Water Supply system. Eight inch water supply lines were run along the following streets; Franklin St., Michael St., Carpathia St., Bohdan St., and Olga Place.

GEOLOGY

The Nova Ukraine site lies within the Newark Supergroup and is underlain by the late Triassic/early Jurassic Passaic formation (see figure 3), (Olsen, 1980). The Passaic formation consists of hematite- cemented coarse silt to very fine sand (siltstone and sandstone), and conglomerate in places; however, the conglomerate is not found local to the Nova Ukraine area. These clastic sediments are interbedded to a maximum thickness estimated at over 10,000 feet. Well logs of nearby 350- foot deep wells verify this lithology (HLA, 1990). The sediments which underlie the site strike about N45E and dip 10° northwest. Fractures or joints may make up a significant part of the Passaic formation, but have not been documented in local well logs (NJGS 1986, HLA 1990). These joints or fracture planes, where existent, are high- angle, nearly normal to bedding plane dip, and strike northeast- southwest. Therefore, both the bedding plane and joint/fractures strike northeast- southwest.

ATTACHMENT EB-6

Depth to weathered bedrock (aka. regolith or overburden) is 0-5 feet. Weathered bedrock continues until an approximate depth of 20 feet beneath ground surface, where bedrock becomes competent (ie. not weathered).

HYDROGEOLOGY

Based on a review of available well logs within the Bureau of Water Allocation (BWA), Division Water Resources, NJDEP (see Attachment I), the depths of local domestic wells range from 113 to 200 feet below grade. Average well depth is 158.5 feet. Casing depths range from 22 to 50 feet below grade. Average casing depth is 33.6 feet. Well yields range from 10 to 40 gallons per minute (gpm). Average domestic well yield is approximately 14.9 gpm or 21,456 gpd. The well logs available within the BWA are not a complete record of wells in the Nova Ukraine Area. Based on field observations, there are many more domestic wells in the Nova Ukraine area.

Two aquifers potentially exist beneath the site, an overburden aquifer and a bedrock aquifer. The bedrock aquifer is the aquifer of concern and is the aquifer utilized as a potable water supply; therefore, this report is prepared for the bedrock aquifer.

If an overburden aquifer is present, ground water would occur between 3 - 5 feet beneath ground surface (HLA, 1990). The overburden aquifer, consisting of the weathered upper part of the Passaic formation, exists mainly where surface drainage pathways (ie. streams) are present. Since no streams exist within the Nova Ukraine area, an overburden aquifer may not exist. The hydraulic interconnectivity between overburden and competent bedrock is not known. Ground water flow direction within an overburden aquifer would be towards an existing stream.

Depth to water table within the bedrock (Passaic) aquifer is approximately 20 feet. Ground water flow within the bedrock aquifer appears to be southward, although a westward component may exist. Figure 4 depicts the locations of three nearby sites which were used in the interpretation of ground water flow direction within the Nova Ukraine area. Site 17 is one- quarter mile north of the Nova Ukraine area, site 16 is one- quarter mile east of the Nova Ukraine area, and site 15 is approximately one and one- quarter mile west of the Nova Ukraine area (the site numbers refer to Attachment III- Potential Source Areas). Insets A through H to figure 4 depict ground water flow direction within the bedrock aquifer at different elevations for each of the three sites.

Sites 16 and 17 depict ground water flow direction within the bedrock aquifer as southerly, whereas site 15 depicts general ground water flow direction as westward and ground water flow within a specific unit (see Michalski, 1990) as westward. Based on a review of ground water flow direction for these three sites, the writer has concluded that a southerly ground water flow

direction exists at the Nova Ukraine area, and that a potentially significant, unknown westward component of ground water flow is probable and, therefore, should be taken into consideration for delineation of the interim GWIA.

As previously mentioned, bedding plane dip is to the northwest; therefore, ground water appears to flow against dip or "up-dip". Ground water flow also appears to be normal to strike of the near vertical fractures oriented parallel to the strike of bedding plane. Fractures have been thought to control ground water flow in the Passaic formation; however, Michalski (1990) has proposed that ground water flow in the Passaic formation is primarily influenced by partings along bedding plane, and by the contrast of the degree of fracturing between bedding planes.

Other influences on local ground water flow direction include local industrial supply wells and domestic supply wells. Within the Nova Ukraine area, approximately 60 home wells exist, each capable of yielding 21,456 gallons per day, or altogether capable of withdrawing 1,287,360 gallons per day (gpd). Within 1000- feet north of the Nova Ukraine area, two industrial supply wells rated at 100,000 gpd exist on the Parkway Plastics property. As of December 31, 1990, the two industrial wells at Parkway plastics have been shut down and water supplied as- needed by the Elizabethtown Water Authority. In addition, as of mid- December, 1990, impacted homes within the Nova Ukraine area have been utilizing the public water supply rather than domestic home wells. Ground water flow direction may differ slightly now that these outside influences have ceased.

In order to further verify ground water flow direction, pump tests should be conducted to determine if there is a preferential flow direction in the bedrock aquifer. Bedrock core samples should also be obtained and analyzed. Hoag (1985) has shown that ground water flow direction and hence, potential contaminant migration pathways is more representative of the true flow direction in the aquifer when interpreted from pumping test results and fracture fabric analysis. Fracture fabric refers to the total sum of fracture shape, fracture size, and fracture configuration within the Passaic formation.

Additional investigation is warranted to more decisively interpret bedrock aquifer ground water flow direction within the Nova Ukraine area. However, based on existing information and for the purposes of this interim GWIA, ground water flow direction is concluded as southward with a westward component.

AQUIFER TESTING

Local aquifer tests (AGES 1987, HLA 1990) have estimated aquifer properties. The bedrock aquifer responds as a leaky confined system, with vertical recharge occurring from the overburden aquifer and surface water bodies where present, or precipitation infiltration and percolation. Local transmissivity (T) values

ATTACHMENT EE-8

range from 150 ft^2/day (1122 gal/day-ft) to 313 ft^2/day (2341 gal/day-ft). Hydraulic conductivity (K) values range from 0.793 ft/day to 1.83 ft/day with an average of 1.31 ft/day. Horizontal hydraulic gradient ($dh_h/dl_h = I_h$) averages 0.005 ft/ft to the south. Vertical hydraulic gradient ($dh_v/dl_v = I_v$) ranges from 0.002 to 0.043 ft/ft **downward**, with an average downward I_v of 0.0185 ft/ft (Ages, 1988). Storativity values (s) (developed because aquifer modeled as "confined") ranged from 5.0E-05 to 1.0E-3, with a mean value of 2.0E-04.

For the purposes of ground water flow velocity computations, this mean storativity value could not be used since the bedrock aquifer is probably not confined at the Nova Ukraine area. Therefore, an effective porosity (n_e) within the aquifer rock matrix was used and the Nova Ukraine area was modeled as unconfined. Driscoll (1989), and Fetter (1988) show n_e values indicative of the bedrock aquifer range from 0.05 to 0.005. An average value of 0.02 was assumed for purposes of interim GWIA delineation. This value does not consider the existence of joint/fracture apertures or partings along bedding plane. If these variables were considered, effective porosity may be as low as 0.005. The local aquifer tests conducted by AGES and HLA did not calculate aquifer properties along strike; hence, aquifer properties used in this analysis may be an estimation of actual values.

GROUND WATER FLOW VELOCITY

The horizontal ground water flow velocity (V) can be determined using the following equation:

$$v = (Kdh_h/dl_h)/n_e \qquad \text{(Fetter, 1980)}$$

where n_e is the effective porosity (the porosity available for fluid flow). Considering an n_e of 0.02, and the average of K and dh_h/dl_h given above, the ground water flow velocity averages 0.327 ft/day or 119 ft/year. Because fracture fabric analysis, potential preferential ground water flow direction interpreted from pumping test results and the effects of local supply wells have not been considered in the interpretation of ground water flow rate **and** direction, the calculated ground water flow velocity is an average for the aquifer. In theory, ground water flow velocities are greater in fractures than within the rock matrix. Since flow velocities may be much greater along fractures or joints then within the rock matrix, ground water flow velocities in the joints or fractures may be much greater than 119 ft/year.

MOST PROBABLE POLLUTANT TRANSPORT RATE

The most probable pollutant transport rate (v_{pt}) in ground water can be estimated by using the following equation:

$$v_{pt} = (Kdh/dl)/(n_e R_d)$$ (BGWPA, 1980)

Since no retardation factors (R_d) have been developed for any compound of concern within the project area, a retardation factor value of one was assumed for all compounds. This assumption would generate the greatest most probable pollutant transport rate and provide a "worst case scenario". As a result of this assumption, the most probable pollutant transport rate longitudinal to ground water flow direction is equal to ground water flow velocity, which is 119 ft/year. This value is applicable to all compounds.

Because of the potential westward component of ground water flow, it is important to obtain a pollutant transport rate based on a westward ground water flow direction. Also, potential source area locations were reviewed (see attachment I) using this flow assumption. As a result of this review and assumption, the most probable pollutant transport rate in the westward direction would be 119 ft/year. This value is applicable to all compounds.

DESCRIPTION OF GROUND WATER CONTAMINATION: NOVA UKRAINE AREA

Ground water samples collected from the 49 domestic wells between 25 August 1989 and 26 April 1990 disclosed ground water contamination within the Nova Ukraine area. Attachment II depicts domestic well sampling locations, dates, and contaminant concentrations. Figures 5 through 9 depict the currently known extent of ground water pollution (above MCL's or Department guidelines) for each contaminant mentioned below. The bedrock aquifer at the Nova Ukraine area has been classified as GW-2 (drinking water aquifer) and Department guidelines were developed accordingly.

TETRACHLOROETHYLENE (PCE)

PCE was detected in fourteen wells at concentrations ranging from 0.7 to 1400 ppb. Twelve of the fourteen wells were above promulgated state MCL's (see figure 5). The MCL for PCE is 1.0 ppb. Resampling ten of the fourteen domestic wells verified the PCE contamination.

PCE has a specific density of 1.62, and is termed a dense, non-aqueous phase liquid (DNAPL). PCE is a colorless liquid with a solubility in water limited to 150 mg/l @ 20-25°C . PCE degrades both chemically and biologically sequentially to TCE, 1,2-DCE, and vinyl chloride (Montgomery and Welkom, 1990).

TRICHLOROETHYLENE (TCE)

TCE was detected in seven wells at concentrations ranging from 0.5 to 10.0ppb. Four of the seven wells were above promulgated state MCL's (see figure 6). The MCL for TCE is 1.0 ppb. Resampling of six wells verified TCE contamination in three of the seven wells.

ATTACHMENT EE-10

TCE has a specific density of 1.46, and is termed a DNAPL. TCE is a clear, colorless, watery- liquid with a solubility in water of 1,100 mg/l @ 20-25°C . TCE degrades sequentially into 1,2-DCE and vinyl chloride (Montgomery and Welkom, 1990).

1,1- DICHLOROETHYLENE (1,1-DCE)

1,1-DCE was detected in five wells at concentrations ranging from 0.5 to 3.9 ppb. One of the five wells was above Department guidelines (see figure 7). The Department guideline for 1,1-DCE is 2.0 ppb. Resampling of three wells verified 1,1-DCE contamination in one of the five wells.

1,1-DCE has a specific density of 1.22, and is termed a DNAPL. 1,1-DCE is a colorless liquid with a solubility in water limited to 400 mg/l @ 20°C and 273 mg/l @ 25°C. 1,1-DCE biodegrades into vinyl chloride (Montgomery and Welkom, 1990).

TOTAL 1,2- DICHLOROETHYLENE (1,2-DCE)

1,2-DCE was detected in five wells at concentrations ranging from 0.5 to 19 ppb. Two of the five wells were above Department guidelines (see figure 8). The Department guideline for 1,2-DCE is 10 ppb. Resampling of four wells verified 1,2-DCE contamination in two of the five wells.

1,2-DCE has a specific density of 1.27, and is termed a DNAPL. 1,2-DCE is commonly a mixture of cis- and trans- isomers (hence "total"), forming a colorless liquid with a solubility in water limited to 600 mg/l @ 20°C; however, becomes substantially more soluble to 6,300 mg/l @ 25°C. It both chemically and biologically degrades to vinyl chloride (Montgomery and Welkom, 1990).

SUMMARY OF ABOVE MENTIONED COMPOUNDS

1,1- DCE along with total 1,2- DCE appear to have no logical source since they are either not actually produced or are not as commonly used as PCE or TCE. Therefore, it is assumed that 1,1-DCE and total 1,2- DCE are the result of anaerobic biodegradation of PCE and/or TCE. The degradation sequence is as follows:

```
                                   Cl
     Cl        Cl                  |
      |         |   cis-1,2-DCE    |
PCE--> TCE--> trans-1,2-DCE--> Vinyl Chloride      (Wood &
                1,1-DCE                            others, 1981)
```

Thus, it appears that all of the above mentioned compounds are related to the same source area(s). As degradation occurs, a chlorine is lost until vinyl chloride is formed. Vinyl chloride is not found within the Nova Ukraine area; therefore, one can predict its ultimate formation from the above degradation sequence. The breakdown of vinyl chloride to carbon dioxide would eventually occur.

ATTACHMENT EE-11

METHYL-TERTIARY-BUTYL-ETHER (MTBE), TOLUENE, TRICHLOROFLOURO-METHANE (Freon)

These compounds were detected in six wells at total combined concentrations ranging from 1.8 to 58 ppb. One of the six wells was above the Department guideline of 50.0 ppb for these compounds (see figure 9). Resampling of five wells verified MTBE contamination in three of the six wells.

MTBE has been used as an octane enhancer in premium grade gasolines since 1979, thus is associated with gasoline related contamination. It is commonly referred to as 2-methoxy 2-methyl propane. MTBE has a high solubility in water of 43,000 mg/l (4.3%) @ 25° and is not a DNAPL (Garret and others, 1986). When it is found in ground water, it is typically found at the leading edge of a gasoline plume. Since MTBE is a gasoline additive, it is not likely related to the PCE and related degradation product contaminant source area(s).

Toluene is a colorless liquid with a solubility in water of 515 mg/l @ 20°C and 524 mg/l @ 25°. Toluene has been known to degrade completely to carbon dioxide within an aquifer (Montgomery and Welkom, 1990). Toluene has a specific density of 0.86 and is therefore not a DNAPL. Toluene is a component of gasoline at varying concentrations; however, is also utilized as a commercial solvent.

Freon is a colorless, odorless liquid (a gas above 23.63°C) with a solubility in water of 1100 mg/L @ 20°C to 1240 mg/L @ 25°. Freon has a specific density of 1.48 and is therefore a DNAPL. Freon is commonly used as an aerosol propellant, a refrigerant and in fire extinguishing (Montgomery and Welkom, 1990).

Toluene and trichloroflouromethane may be related to the source area(s) of PCE and related degradation product contamination.

INTERIM MOST PROBABLE GROUND WATER POLLUTION MIGRATION AREA

The interim most probable ground water pollution migration area has been determined for each compound described above based upon the most probable ground water flow direction (southward) and the most probable pollutant transport rate (V_{pt}) which is 119 ft/year. The horizontal migration distance (D_{hm}) for each compound is calculated by multiplying V_{pt} by a time factor (T_f). The T_f used in this situation is five years (1825 days). Interim most probable ground water pollution migration area maps (figures 10 - 14) have been developed by adding D_{hm} in the direction of ground water flow, to the currently known extent of ground water pollution delineated for each individual compound. Additionally, these maps have been modified in the northerly (upgradient) and easterly (potentially upgradient to the assumed westward component of ground water flow direction) directions since nearby potential source areas exist in these directions (see attachment

ATTACHMENT EE-12

I). Since a westward component of ground water flow has been assumed, but not identified due to lack of data, a worst- case ground water pollutant transport rate of 119 ft/year is estimated westward and the maps have been modified westward to reflect this potential westward component.

Each interim most probable pollution migration area has been given a vertical component equal to the thickness of the Passaic aquifer at the Nova Ukraine Site. This vertical component is based on; 1)the lack of identified confining units (aquitards) within the Passaic aquifer, 2)the presence of local deep industrial supply wells, 3)the potential presence of near vertical joint or fracture patterns, 4)the chemical and physical properties of the compounds within the pollution migration area, and 5)an average downward I_v value calculated at 0.0185 ft/ft.

INTERIM- MOST PROBABLE GROUND WATER POLLUTION MIGRATION AREA/ INTERIM GROUND WATER IMPACT AREA DELINEATION

The Interim Ground Water Impact Area defined in this report is the area consisting of all interim most probable ground water pollution migration areas for each compound combined.

The Interim Ground Water Impact Area is shown in figure 15. The interim GWIA is based on the present extent of contamination (April 1990), a southerly ground water flow direction and the ground water flow velocity (same as pollutant transport rate), unknown source area(s), and a westward component of ground water flow equal to the southerly flow rate. The downgradient extent of the GWIA corresponds to interstate route 287. This downgradient extent will be reached in approximately five years.

CONCLUSIONS

This report delineates an interim GWIA which includes existing pollution and the most likely migration pathway in the next five years. This is considered an interim area because of limited information and the lack of hydraulic control of the plume as described in the introduction. During the determination of ground water flow rate and direction, detailed information on the structural texture and fabric of the Passaic formation in the local area was not available. In addition, the aquifer properties determined from the pump tests were not determined along strike of the formation, which would provide for a greater understanding of aquifer properties.

Based on the results of additional investigations and/or the implementation of remedial action in the area, this interim GWIA may need to be expanded in the future.

ATTACHMENT EE-13

REFERENCES

AGES Corporation, "Phase I Ground Water Investigation Report Prepared for the Tang Realty Site", Piscataway, New Jersey. October 1987.

BGWPA, "Draft Standard Methodology for Ground Water Impact Area Determinations". Bureau of Ground Water Pollution Assessment, Ground Water Quality Management Element, Division Water Resources, New Jersey Department of Environmental Protection. 21pp., May 1990.

Driscoll, Fletcher G., Ph.D., Ground Water and Wells, Second Edition. Johnson Filtration Systems Inc., St. Paul, Minnesota. 1089 pp. 1989.

Fetter, C.W., Applied Hydrogeology, Second Edition. Merrill Publishing Company, Columbus, Ohio. 592 pp. 1988.

Harding Lawson Associates, "Ground Water Characterization Report Prepared for the Tang Realty Site", Piscataway, New Jersey. September 1987.

----------, "Partial Listing of Commercial/ Industrial Properties and Partial Listing of Underground Storage Tank Locations and CERCLIS List Sites in Piscataway and South Plainfield Township", Middlesex County, December 1989.

Hoag, Roland B., Jr., Ph.D. "An Innovative Technique for Determining Contaminant Pathways in Fractured Bedrock", BCI Geonics, Inc., Laconia, New Hampshire, Proc. The Sixth National Conference on Management of Uncontrolled Hazardous Waste Sites, Washington, DC. November 1985.

Michalski, Andrew. "Hydrogeology of the Brunswick (Passaic) Formation and Implications for Ground Water Monitoring Practice", Ground Water Monitoring Review. Fall 1990.

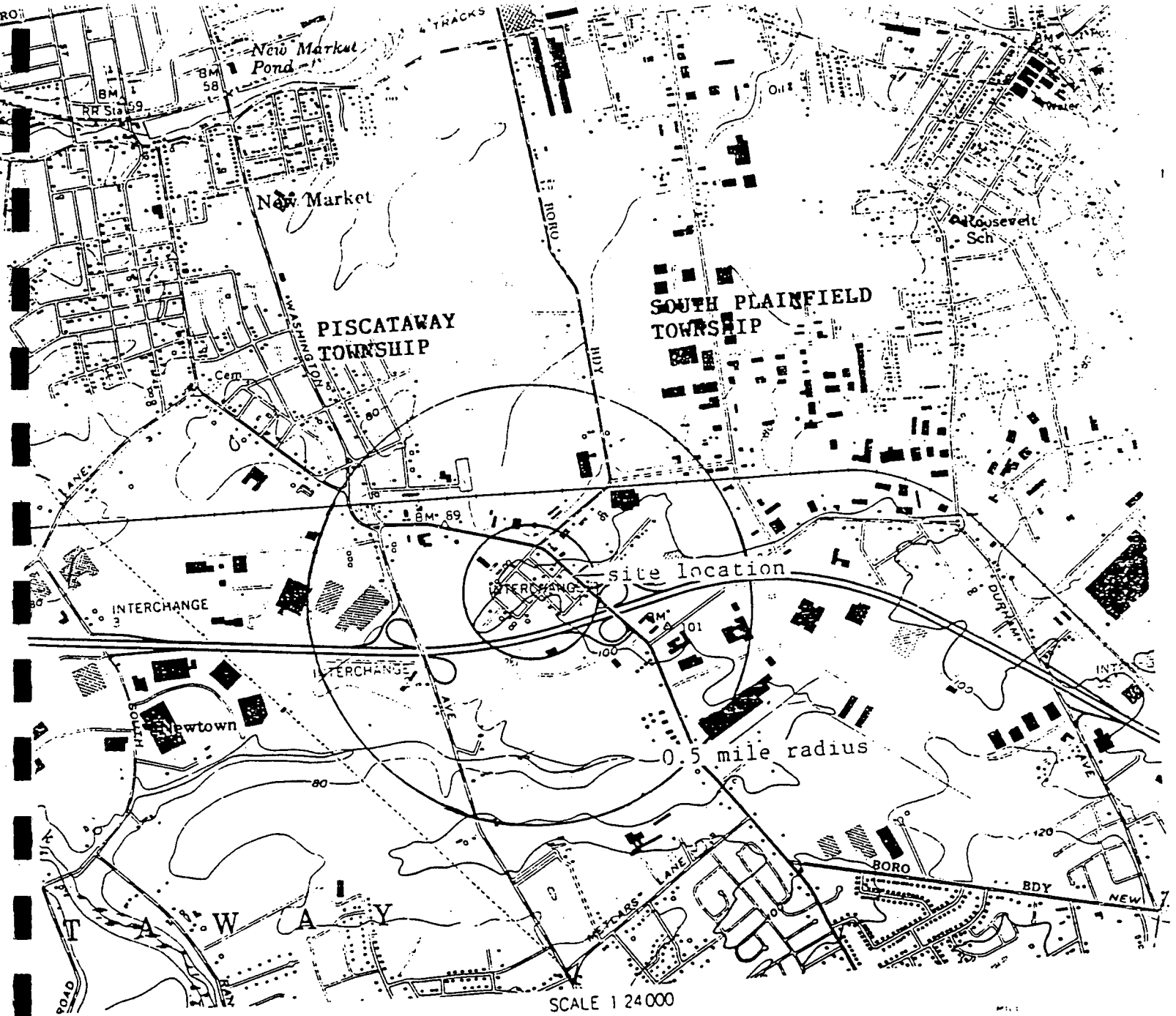
Montgomery, John H. and Welkom, Linda M. Ground Water Chemicals Desk Reference. Lewis Publishers, Inc., Chelsea, Michigan. 640 pp. 1990.

Olsen, Paul E., Triassic and Jurassic Formations of the Newark Basin. Bingham Laboratories, Department of Biology, Yale University, New Haven, Connecticut. 1980.

Piscataway Township Official Tax Map, Sheet #41A.

Wood, P.R., Lang, R.F., and Payan, I.L., Anaerobic Transformation, Transport, and Removal of Volatile Chlorinated Organics in Ground Water. Drinking Water Research Center, School of Technology, Florida International University, Tamiami Campus, Miami, Fl, 1981.

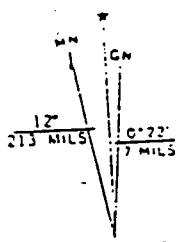
ATTACHMENT EE-14



CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

PLAINFIELD, N. J.
N4030—W7422.5/7.5

1955
PHOTOREVISED 1981
DMA 6165 III SW-SERIES V822



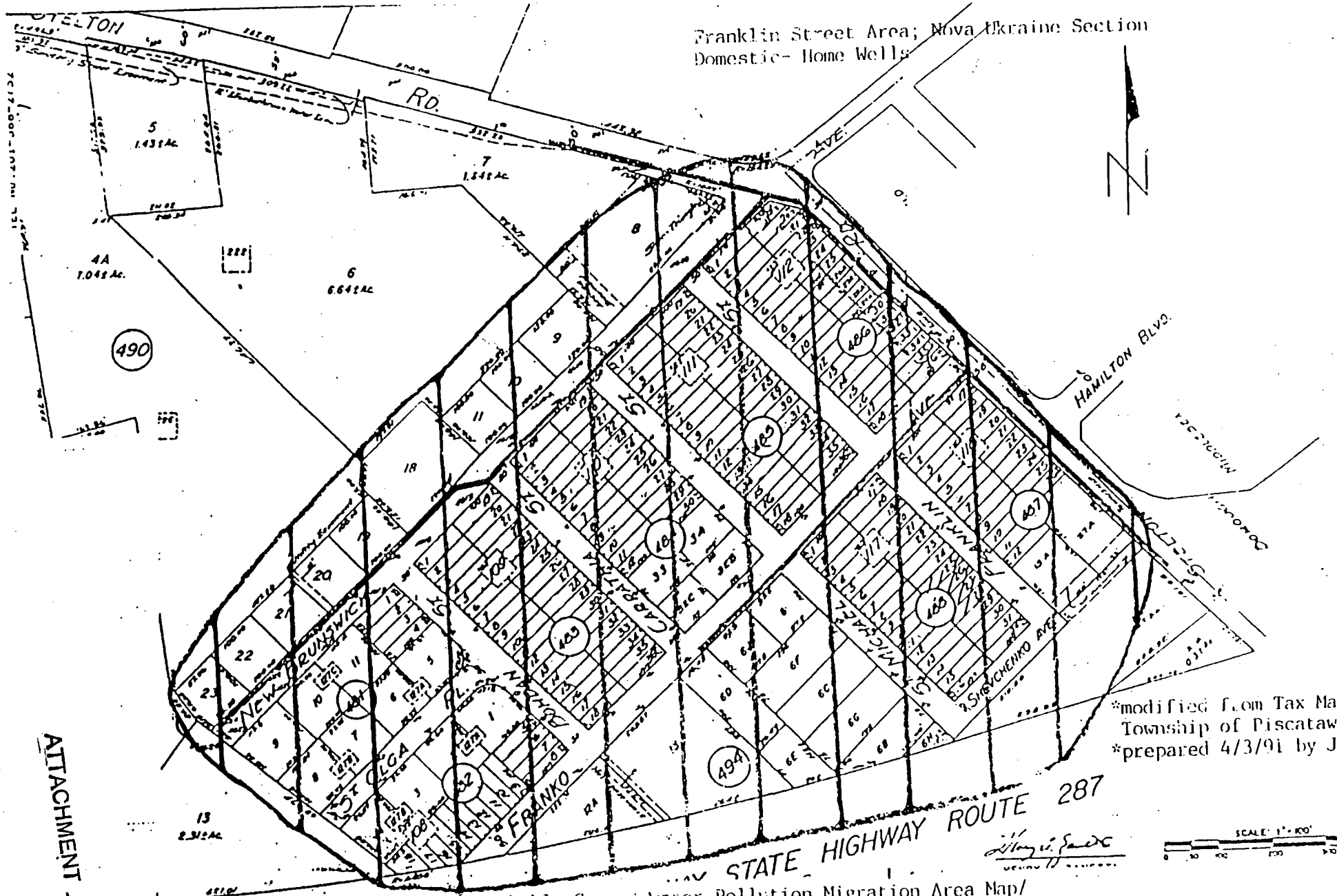
UTM GRID AND 1981 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

QUADRANGLE LOCATION

FIGURE 1

ATTACHMENT EE-15

Franklin Street Area; Nova Ukraine Section
Domestic- Home Wells



*modified from Tax Map
Township of Piscataway
*prepared 4/3/91 by J.M.

Interim-Final most Probable Ground Water Pollution Migration Area Map/
Interim Ground Water Impact Area

ATTACHMENT III-16

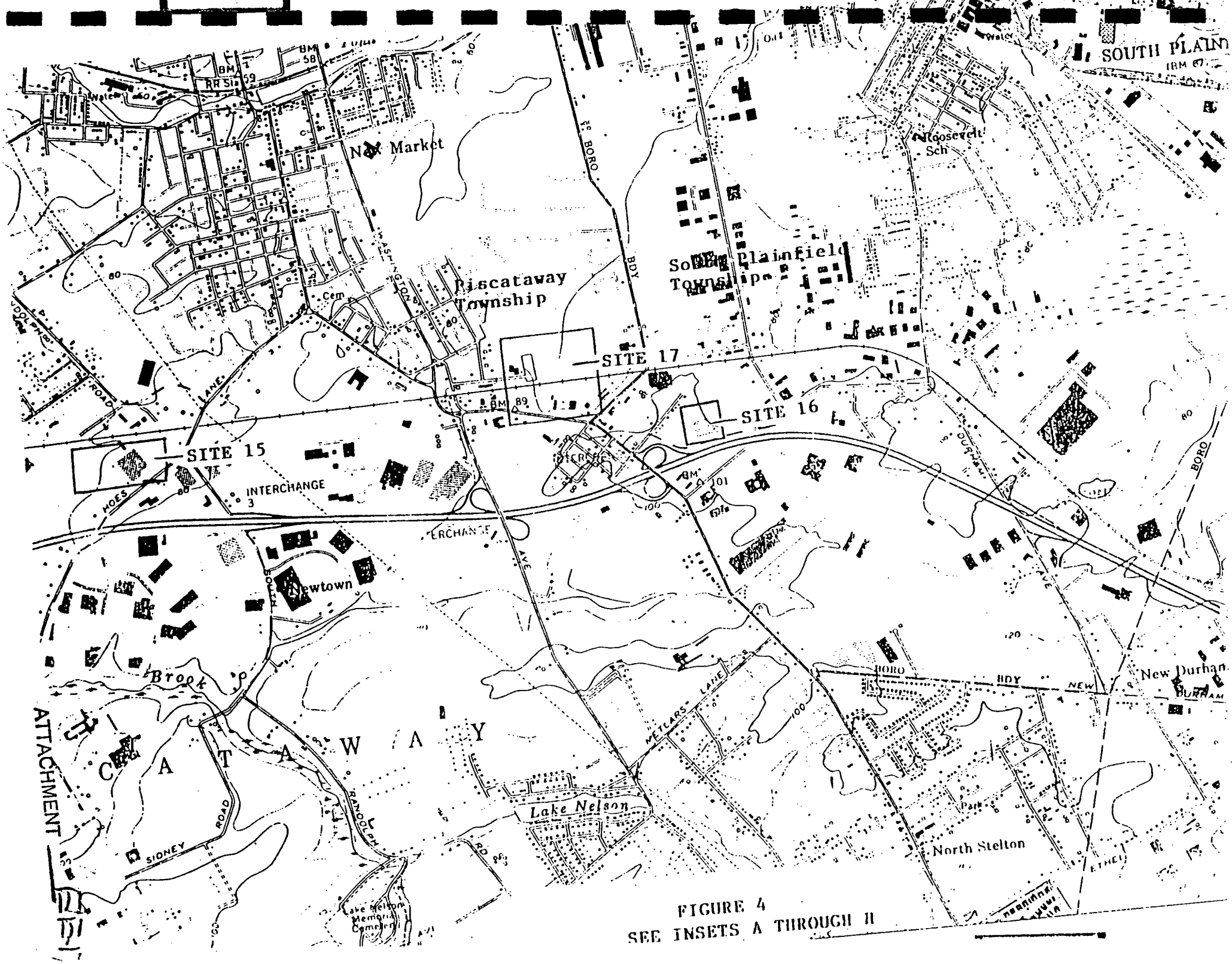


FIGURE 4
SEE INSETS A THROUGH H

ATTACHMENT FF

New Jersey 1988 State Water Quality Inventory Report

A Report on the Status of Water Quality in New Jersey Pursuant to the New Jersey Water Pollution Control Act and Section 305(b) of the Federal Clean Water Act

State of New Jersey
Department of Environmental Protection
Division of Water Resources
Bureau of Water Quality Planning
Trenton, New Jersey

Thomas H. Kean, *Governor*
Richard Dewling, P.E., Ph.D., *Commissioner*
George G. McCann, P.E., *Director*

May, 1988

ATTACHMENT EE1

28. RARITAN RIVER

Watershed Description

The Raritan River, its tributaries, and branches drain an area totalling over 1100 square miles. The Raritan River basin is the largest river basin located entirely within New Jersey. The mainstem, 31 miles long, drains parts of Somerset, Union, Middlesex, and Monmouth Counties before emptying into the Raritan Bay. Tides affect this waterway to the Fieldsville Dam upstream of New Brunswick. The Delaware and Raritan Canal flows alongside the Raritan River from the confluence of the Millstone River to New Brunswick. Major tributaries to the Raritan are the North and South Branches, Millstone River, South River, Green Brook, and Lawrence Brook. The section of the Raritan basin reviewed here is the mainstem of the Raritan River from the confluence of the North and South Branches to Raritan Bay, and small tributaries. For the most part, this drainage area is densely populated, with the centers of population being Plainfield, New Brunswick, Perth Amboy, Edison, South Amboy, Sayreville, Bound Brook, Somerville, Manville, Piscataway, Metuchen, and Bridgewater. There are two low dams in the river, Fieldsville Dam and Calco Dam. Among the many small recreational lakes and ponds in this area are Watchung Lake, Suprise Lake, Spring Lake, and Green Brook Pond (all manmade).

The land use in this watershed is primarily urban/suburban, with industrial and commercial centers throughout. There are 73 NJPDES permitted discharges here, 12 of which are municipal and the remainder industrial/commercial. Fifteen discharges go to Raritan Bay and tributaries. Classifications of waters in the Lower Raritan River watershed are FW-2 Trout Maintenance, FW-2 Nontrout, and SE-1.

Water Quality Assessment

The Raritan River is currently monitored at three locations in the river. These locations are at Raritan, Manville, and from the Queens Bridge at South Bound Bridge.

The Raritan River at Raritan and Manville contains generally good water quality. At Manville conditions worsen to fair quality during the late spring-early summer period. The similar conditions at the two locations is exemplified in the water quality data collected between 1983 and 1987. Total phosphorus and fecal coliform often appear in elevated levels. Total phosphorus averaged .1 mg/l at both Raritan and Manville. Approximately 50 percent of all phosphorus values from the two stations were in excess of the recommended State criterion. Total inorganic nitrogen was greater than 2.0 mg/l in 15 percent of the samples from Raritan and 10 percent from Manville. Fecal coliform had geometric means of 132 and 158 MPN/100ml at Raritan and Manville, respectively. Fecal coliform violated State criterion in less than one-half of all samples collected at the two stations. Dissolved oxygen was above 4.0 mg/l in all samples from 1983 to 1987, while biochemical oxygen demand was generally under 3.0 mg/l.

Downstream at South Bound Brook ambient monitoring has detected fair water quality with conditions worsening in the summer period. The river here has experienced major changes in water quality within the past decade. In 1981 the Raritan River experienced very poor conditions during low flow periods. Extremely high nutrient concentrations and low dissolved oxygen saturation indicated a severely stressed stream. However, between 1981 to 1985 conditions improved in the river. While nutrients (phosphorus and nitrogen containing compounds) are still elevated, concentrations are one-third to one-half of those recorded in 1981. Total phosphorus values averaged .22 mg/l from 1983 to 1987, compared to .64 mg/l in 1981. Fecal coliform continues to be found at problematic levels, having a geometric mean of 752 MPN/100ml from 1983 to

ATTACHMENT FE-2

1987. Dissolved oxygen appears to be adequate in this section of the river, but large diurnal fluctuations during warm weather are still expected. The significant improvements in the Raritan River at South Bound Brook can be attributed to the gradual reduction in discharge flows from the American Cyanamid facility. In 1985 the company's discharge was eliminated with flows transferred to the Somerset Raritan Valley SA treatment plant.

The NJDEP's Division of Science and Research has performed extensive work in the Raritan River to study the fate and transport of toxic substances in 1982 and 1983. The results of this study was throughly described in the 1982 and 1986 305(b) reports, but are summarized here. Water samples were analyzed for priority pollutants. Sediments were analyzed for priority pollutants as well as grain size. The water analyses showed that the volatile organics were the most frequently occurring organic compounds. Chloroform, toluene, ethylbenzene, and 1, 1, 2, 2-tetrachloroethylene were found at levels up to 50 ug/l in almost every sample. Copper, zinc, arsenic, and silver were the most frequently occurring metals.

The sediment analyses detected organic compounds rather infrequently. Metals were detected in every sample. Copper and zinc were detected at the highest levels, most likely due to their geologic abundance. Lead was also detected at elevated levels. Fine grain sediments were positively correlated to the metal concentrations; metals were also strongly intercorrelated meaning that when one was high others were also elevated.

The Raritan River, from the confluence of the North and South Branches downstream to the confluence with the Millstone River, is assessed as supporting a healthy warm water fish community. Below the confluence with the Millstone down to the Landing Lane Bridge in New Brunswick, the river's fishery is judged to be moderately degraded.

Problem and Goal Assessment

Point Source Assessment

The Raritan River appears to be heavily influenced by both point and nonpoint sources. The elimination of the American Cyanamid discharge, as noted above, has resulted in improvements in river water quality. However, a number of DWR enforcement actions are now underway. Facilities that are under such action which are having known impacts on surface water quality include: Somerset Raritan Valley Sewerage Authority's discharge to Cuckels Brook, the Manville STP discharge to the Raritan River, the Stavola Construction Materials discharge to Middle Brook, the Conrail Tile Drain discharge to the Raritan River, the Raritan River Steel discharge to the Raritan River, and a Middlesex County UA discharge to the Raritan River. A number of hazardous waste sites are located in the Raritan River watershed, many of which are on the National Priority List. Sites that are impacting surface waters include: Blue Spruce International (Raritan River), Chemical Insecticide Corporation (Mill Creek), Horseshoe Road Dump (Raritan River), Kin-Buc Inc. (Edmonds Creek and Raritan River), Renora Inc. (Mill Creek), and Rhone-Poulene/Reagent Chemical (Raritan River).

Nonpoint Source Assessment

The Raritan River is impacted by nonpoint source pollution from urban/suburban development throughout its length. Additional nonpoint source pollution from landfill leachate is suspected in the lower portions of the river. Runoff from urban surfaces, storm sewers and roadways are all believed to be an increasing problem in the watershed. Additional contamination sources are suspected from the land disposal of wastewater and from local chemical spills.

Construction activities are noted to be active in the Peters Brook area of the Upper Raritan sub-watershed, and in Franklin and Warren Townships in the Lower Raritan

ATTACHMENT FR3

sub-watershed. The result of this urbanization is an increase in the nutrient and sediment loads which the river must absorb, as well as an increase in local flooding.

Designated Use and Goal Assessment

The Raritan River will only partially meet clean water goals and State designated uses. The entire river is not swimmable, and only the freshwater portions can be considered to be meeting the fish propagation and maintenance use/goal. The fisheries in this part of the river are thought to be threatened by the pollution sources present. In the tidal section of the river a moderately degraded fisheries is present and there is a fishing advisory because of PCBs contamination in certain fishes. The presence of elevated PCBs may indicate possible long-term health effects for fish. As a result the tidal Raritan River is only partially meeting the fish propagation/maintenance use.

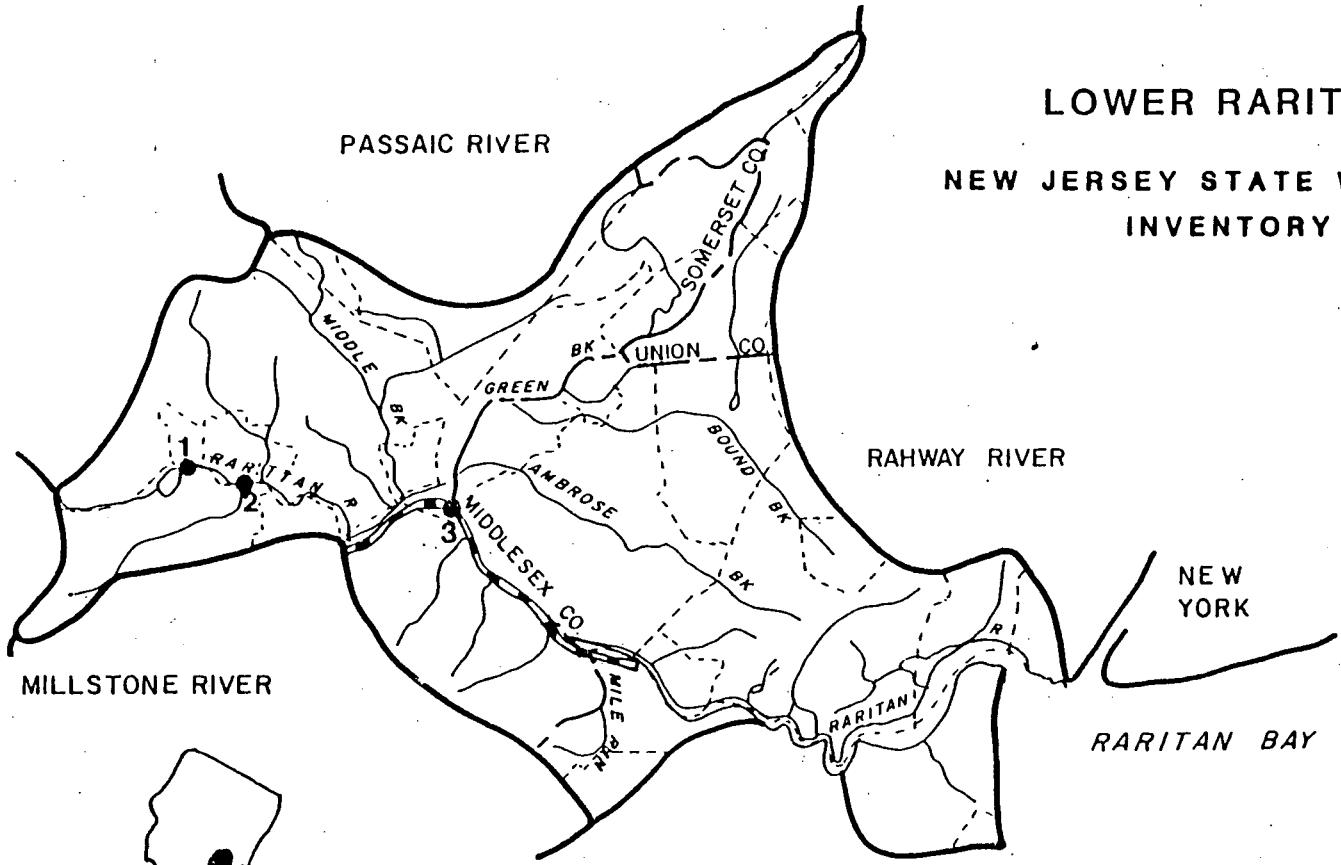
Monitoring Station List

Map Number	Station Name and Classifiction
1	Raritan River at Raritan, FW-2 Nontrout
2	Raritan River at Manville, FW-2 Nontrout
3	Raritan River at Queens Bridge, FW-2. Nontrout

ATTACHMENT FF-4

LOWER RARITAN RIVER

NEW JERSEY STATE WATER QUALITY INVENTORY REPORT



LOCATION OF BASIN

0 1 2 3 4 8

SCALE IN MILES

LEGEND

- STATE BOUNDARY
- STREAM
- COUNTY BOUNDARIES
- MUNICIPAL BOUNDARIES
- WATERSHED BOUNDARIES
- ● WATER SAMPLING STATIONS

ATTACHMENT FF-5

WATER QUALITY INDEX PROFILE 1983-1987

Raritan River

WATER QUALITY INDICATORS

STATION		TEMP	OXYGEN	PH	BACTERIA	NUTRIENTS	SOLIDS	AMMONIA	METALS	OVERALL AVERAGE AND CONDITION
Raritan River at Raritan	AVG WQI	3	6	10	24	18	6	5	ID	16 Good
	WORST3 MONTHS	July-Sept	August-Oct	August-Oct	April-June	July-Sept	Nov-Jan	July-Sept		23 Good April-June
Raritan River at Manville	AVG WQI	4	11	11	22	18	6	6	7	17 Good
	WORST3 MONTHS	July-Sept	March-May	August-Oct	May-July	May-July	Sept-Nov	August-Oct	April-June	30 Fair May-July
Raritan River at Queens Bridge	AVG WQI	3	7	4	39	28	7	5	10	31 Fair
	WORST3 MONTHS	June-August	August-Oct	March-May	July-Sept	August-Oct	August-Oct	May-July	Feb-April	50 Fair July-Sept

LEGEND - Water Quality Index Description

WQI	Condition	Description	WQI	Condition	Description
0-10	Excellent	No or minimal pollution; water uses met throughout the year.	61-80	Poor	Pollution in high amounts; water uses not met.
11-25	Good	Generally low amounts of pollution; water uses periodically not met.	81-100	Very Poor	Pollution occurs at extremely high levels; severe stress to stream life; water uses not met.
26-60	Fair	Pollution amounts vary from moderate to high levels; certain water uses prohibited.	ID	Insufficient Data	

An index of 20 is equivalent to the level of water quality criteria.

ATTACHMENT F

N.J.P.D.E.S. DISCHARGE INVENTORY

WATERSHED: Raritan River

DISCHARGE NAME	# NJPDES	RECIEVING WATERS	MUNICIPALITY/COUNTY	TYPE
St. Bernards Sch. STP	0020991	Lochiel Creek	Brdgwtr. Twp/Somerst	Municipal
Ethicon Inc.	0001139	Peters Brook	Brdgwtr. Twp/Somerst	Ind./Comm.
Crestline Div. of N. Am. Prod	0029921	Gaston Ave. Brook	Raritan Boro/Somerst	Ind./Comm.
Indust. Tube Corp.	0023019	Raritan River Trib.	Smrvil. Boro/Somerst	Ind./Comm.
Valley Rd. Sew. Co. -	0022772	Royce Brook	Hilsboro Twp/Somerst	Municipal
Fieldhedge				
Chemicals Corp.	0021806	Middle Brook	Brdgwtr. Twp/Somerst	Ind./Comm.
Somerset-Raritan Valley S.A.	0024864	Cuckel's Brook	Brdgwtr. Twp/Somerst	Municipal
American Cynamid-Bound Brook	0002313	Raritan River	Brdgwtr. Twp/Somerst	Ind./Comm.
Taylor Oil Co.	0029271	Raritan River	Smrvil. Boro/Somerst	Ind./Comm.
Devro Inc.	0001961	Peters Brook	Smrvil. Boro/Somerst	Ind./Comm.
Warren Twp. SA-Stage 3 STP	0023752	Middle Brook	Warren Twp./Somerset	Municipal
Johns-Manville Sales Corp.	0001678	Raritan River	Manvile Boro/Somerst	Ind./Comm.
Manville Boro STP	0028762	Confluence of Raritan/Millst.	Manvile Boro/Somerst	Municipal
Veterans Admin. Supply Depot	0020036	Roycefield Brook	Smrvil. Boro/Somerst	Municipal
RBH Dispersions	0033545	Ambrose Brook	Midsex Boro/Middlesx	Ind./Comm.
Reagent Chem. + Research In.	0033251	Trib to Raritan Riv.	Midsex Boro/Middlesx	Ind./Comm.
National Starch & Chem. Corp.	0032506	Raritan River	Brdgwtr. Twp/Somerst	Thermal
Gibson Tube, Inc.	0064700	Trib. to Cuckels Brk	Brdgwtr. Twp/Somerst	Ind/Thermal
Zappa Res. & Molding Corp.	0030309	Green Brook River	Green Brook/Somerset	Thermal
Colorguard Corp.	0033111	Woodmere Brook	Raritan/Somerset	Thermal
Tingley Rubber Corp	0020672	Dismal Swamp	South Plainfield	Ind/Thermal
Scott Environmental Tech	0033707	Bound Brook	South Plainfield	Industrial
Metz Metallurgical Corp.	0034835	Middlesex County	South Plainfield	Industrial
Ronnie Packing Co.	0034886	Rain Water Ditch	South Plainfield	Thermal
United Steel Container Corp.	0032034	Mile Run	N. Brusnwick	Thermal
Clayton Block Corp.	0026069	Mill Brook	Metuchen/Midd.	Ind/Strmwtr
Troy Chen-Corp.	0031453	Pierson's Creek	Middlesex Boro/Midd.	Thermal
Webcraft	0052655	Dismal Swamp	Metuchen/Midd.	Thermal
Gulton Industries, Inc.	0028720	Storm Creek Flow	Metuchen/Midd	Industrial
Sayeville Borough of	0050245	Cheesequake Creek		Industrial

ATTACHMENT E

N.J.P.D.E.S. DISCHARGE INVENTORY WATERSHED: Raritan River Cont.

DISCHARGE NAME	# NJPDES	RECIEVING WATERS	MUNICIPALITY/COUNTY	TYPE
National Cam	0036102	Bound Brook	Edison/Midd	Thermal
Academy Die Casting & Plating	0034495	Ambrose Brook	Edison/Mid	Industrial
Union Steel Corp.	0001015	Trib. to Raritan R.	Piscataway Twp/Midsx	Ind./Comm.
Sun Oil Co. of Pennsylvania	0025798	Raritan River	Piscataway Twp/Midsx	Ind./Comm.
Kentile Floors	0030023	Bound Brook	S. Plnfld. Boro/Mid.	Ind./Comm.
LA Dreyfus Co.	0001210	Drainage Ditch to Bound Brook	S. Plnfld. Boro/Mid.	Ind./Comm:
Mobile Chem. Co.	0026255	Bound Brook	Edison Twp./Middlesx	Ind./Comm.
PSE&G - Edison	0003603	Raritan River	Edison Twp./Middlesx	Ind./Comm
Raritan Arsenal	0028835	Raritan River	Edison Twp./Middlesx	Municipal
Ford Motor Co. - Metuchen	0002691	Mill Brook	Edison Twp./Middlesx	Ind./Comm.
Oxford Div. - Hartford	0032557	Mile Run Brook	New Brnswk/Mdsx	Ind./Comm.
Delco Remy Div. of GMC Plant 12	003092	Mile Run Brook	New Brnswk/Mdsx	Ind./Comm.
Nuodex Inc.	0001791	Raritan River	Edison Twp./Middlesx	Ind./Comm.
NJP + Light	0002747	Raritan River	Sayreville Boro/Mdsx	Ind./Comm.
Amerada Hess Corp.	0001376	Raritan River	Perth Amboy Cty/Mdsx	Ind./Comm.
Chese Borough Ponds Corp.	0002381	Raritan River	Perth Amboy Cty/Mdsx	Ind.Comm.
Saytech Inc.	0031470	Trib. To Burt Ditch	New Brnswk. Cty/Mdsx	Ind./Comm.
Middlesex Co. M.U.	0020141	Raritan Bay	Sayreville Boro/Mdsx	Municipal
Sayreville Boro-Melrose STP	0023833	Raritan Bay	Sayreville Boro/Mdsx	Municipal
Bell Labs-Murray Hill	0000442	Trib. to Green Brook	Brkly Hts. Twp/Union	Ind./Comm.
Anchor Glass Container Corp.	0033651	Long Neck Creek	Cliffwood/Monmouth	Industrial
Buhler and Bitter	0062669	Raritan Bay	Hazlet/Monmouth	Industrial
Comdata Systems Incorp	0001775	Ditch to Mahora	Holmdel/Mon	Industrial
Biddle Sawyer Corp	0030872	Lupatcong Creek	Keyport/Mon	Thermal
Aberdeen Twonship MUA	0022535	Whale Creek	Matawan/Mon	Municipal
Engineered Precision Castings	0033294	Wrackaack Creek	Middletown Twp./S.A.	Thermal
Aberdeen Township WTP	0034142	Wilkson Creek	Monmouth County	Ind
Imperial Oil Comp Inc	0035874	Lake Lefferts	Morganwille/Mon	Ind
Stavola Constructions Mat	0002895	Middle Brook	Red Bank/Mon	Ind/Storm
National Starch & Chemical	0001333	Coreen Brook	Plainfield/Union	Ther/Storm
Olivetti Corp of America	0032581	Raritan River	Somerville/Union	Ind

ATTACHMENT FF2

N.J.P.D.E.S. DISCHARGE INVENTORY

WATERSHED: Raritan River

DISCHARGE NAME	# NJPDES	RECIEVING WATERS	MUNICIPALITY/COUNTY	TYPE
Septembers On The Hill	0026727	Raritan River	Watchung/Union	Mun
Valvoline Oil Comp	0030503	Raritan River	Edison/Middlesex	Ind
Nuodex Inc	0000116	Raritan River	Fords/Midd	Therm/Ind
Weldon Concrete	0000345	Raritan River	Keasbey/Midd	Ind
Sohio-Carborundum	0002950	Raritan River	Keasbey/Midd	Ind
Woodbridge, Twp	0020401	Raritan River	Keasbey/Midd	Mun
New Brunswick	0033219	Raritan River	N. Brunswick/Midd	Mun
Old Bridge, Twp	0022471	Raritan Bay	Old Bridge/Midd	Mun
Old Bridge MUA Browntown	0033065	Raritan Bay	Old Bridge/Midd	Mun
Reserve Terminal Corp	0001392	Raritan Bay	Perth Amboy/Midd	Ind
Perth Amboy	0023213	Raritan Bay	Perth Amboy/Midd	Mun
Raritan River Steel Comp	0031178	Storm Sewer to Rar	Perth Amboy/Midd	Ind
Union Carbide	0000256	Raritan River	Piscataway/Midd	Ind/Therm
Beecham Laboratories Inc	0035491	Raritan River	Piscataway/Midd	Ind
EH Werner Generating Station	0002755	Raritan River	South Amboy/Midd	Ind/Therm
Silvatrim Corp of American	0030881	Raritan River	South Plainfield/Mid	Ind
Design & Molding Services	0029629	Bound Brook	Piscataway/Midd	Ind
Captive Plastics	0030571	Ambrose Brook	Piscataway/Midd	Ind
Parkway Plastics	0032042	Bound Brook	Piscataway/Midd	Thermal
Evans Partnership	0033723	Ambrose Brook	Piscataway/Midd	Ind
Eastern Steel Barrel Corp	0034797	Bound Brook	Piscataway/Midd	Ind
Bound Brook Operation	0061794	Bound Brook	Piscataway/Midd	Ind
Exxon Service Station	0063967	Raritan River	Matawan/Mon	Ind
North American Philips Lgt.	0064939	Ambrose Brook	South Plainfield/Mid	Ind

ATTACHMENT FF9

ATTACHMENT GG

STATE AND FEDERAL THREATENED AND ENDANGERED SPECIES, BY QUAD

List provided by Computerized Fish and Wildlife Information System
New Jersey Division of Fish, Game and Wildlife
20 JUN 1990

117	Bound Brook	Shad, American Turtle, bog Turtle, wood Sparrow, vesper
119	Plainfield	Shad, American Salamander, longtail Turtle, bog Harrier, northern Sparrow, Henslow's
121	Perth Amboy	Shad, American Falcon, peregrine
123	Arthur Kill	Falcon, peregrine
125	The Narrows	
127	Coney Island	
129	Lumberville	Shad, American Salamander, longtail Turtle, wood Swallow, cliff Bobolink
131	Stockton	Shad, American Salamander, longtail Turtle, wood Swallow, cliff Bobolink Sparrow, vesper
133	Hopewell	Turtle, wood Harrier, northern Sandpiper, upland Owl, barred Bobolink Sparrow, Savannah Sparrow, grasshopper Sparrow, vesper
135	Rocky Hill	Sandpiper, upland Owl, barred Owl, short-eared Bobolink Sparrow, Savannah Sparrow, grasshopper Sparrow, vesper
137	Monmouth Junction	Turtle, wood Sandpiper, upland Bobolink Sparrow, grasshopper Sparrow, vesper
139	New Brunswick	Treefrog, pine barrens Shad, American Turtle, wood Harrier, northern Sparrow, Henslow's

ATTACHMENT G6-1

Common Name: Shad, American
Scientific Name: Alosa sapidissima

NJ.HABITAT

Freshwater aquatic

Fresh and Salt water

LAND.USE

Water

Streams and Canals

Bays and Estuaries

Atlantic Ocean Coastal Waters

COMMENTS ON HABITAT ASSOCIATIONS

Dissolved oxygen levels < 3 ppm strongly reduce or eliminate spawning migration and may cause mortality *01*. Shad spawn in a current less than 0.3 to greater than 0.9 m/sec *1257*. The minimum spawning temperature for American Shad is 12 degrees C *10,12,2517*, although most spawning takes place at between 13-20 degrees C *12,10,4205*. Shad spawn in fresh or slightly brackish water *2517*, over shallow flats and riffles *4205*. They show a preference for channel areas *2522,2530*. The adults are highly tolerant of varying salinity levels, but require 2-3 days to adapt to fresh water *12*. Adults surviving the spawning run return promptly to the sea *12*.

Eggs are absent at dissolved oxygen levels less than 5 ppm *2533*. The eggs hatch more successfully in slightly brackish water (7.5 ppm, at 12 degrees C and 15 ppm at 17 degrees C). The eggs are broadcast loosely in open water *2521,10*. In Virginia , the eggs become abundant when the water reaches 12 degrees C *4205*. Hatching and survival of Shad are greatest between 15.5-26.5 C. *12*.

ATTACHMENT GG-2

Common Name: Salamander, longtail
Scientific Name: Eurycea longicauda

NJ.HABITAT

Freshwater aquatic

Deciduous Forest

LAND.USE

Water

Streams and Canals

Wetland

Forested Wetland

Nonforested Wetland

Forest Land

Deciduous Forest Land

COMMENTS ON HABITAT ASSOCIATIONS

Habitat requisites for Long-tailed Salamanders apparently include 1) access to underground water for reproductive purposes (primarily egg deposition) *851,853,858*; 2) aquatic habitat for larvae (sometimes underground), and with which the adults usually associate while above ground *851,857,856,853,858,859*; and 3) terrestrial habitat for adults and immatures *851,859,856,858*. The species appears to be rather catholic in its habitat use given the presence of these three components. There may be considerable variation in Long-tailed Salamander habitats (and perhaps life history), both between geographically separate populations of E.l. longicauda and between the three subspecies.

Locations and subspecies studied in the literature referenced below are as follows:

Anderson and Martino, 1966 *851* studied New Jersey E.l. longicauda;
Bruce, 1970 and 1982 *853,857* studied North Carolina E.l. guttolineata;
Franz, 1964, cited in *853*, studied E.l. longicauda in Maryland;
Mohr, 1943,1944,and 1945, cited in *851* and *858*, studied E.l. longicauda in Maryland;
Rudolph, 1958 *856* studied Oklahoma E.l. melanopleura;
Sciascia, 1989 *859* refers to New Jersey E.l. longicauda;
Zappalorti and Reap, 1983 *858* considered New Jersey E.l. longicauda.

UNDERGROUND WATER: Anderson and Martino *851*, examining concentrations of larvae in ponds, did not find breeding adults or eggs, but theorized that adults mated and eggs were deposited in fissures in the limestone underlying

ATTACHMENT G-3

the ponds in winter; eggs would hatch in early spring and larvae either emerge from the fissures to the ponds directly or undergo some development in the fissures before emergence. Mohr, cited in *851,858* found Long-tailed Salamander eggs in an abandoned mine, deposited on old planks. Bruce *853* found eggs and larvae in a 2.5' X 2' brick cistern covered by a concrete slab; the site had recently been disturbed so it was impossible to ascertain for certain where the eggs had been deposited. Franz, cited in *851*, found a partial clutch of eggs attended by a female in a limestone cave. Zappalorti and Reap *858* stated that Long-tailed Salamander eggs had never been found in New Jersey.

AQUATIC HABITAT: The Long-tailed Salamander has generally been associated with lotic environments, e.g. streams and springs, and, especially in earlier literature, undersurface situations such as mines and caves. Anderson and Martino *851* reported numerous larvae in, and adults on the fringes of, ponds. The ponds were mostly sinkholes in Kittatiny limestone, but varied widely in size, permanence, substrate, vegetation and fauna; all had "rich" amphibian fauna. Larvae in these ponds were found mostly in a foot or less of water (the ponds had areas deeper than this), and hid buried in the substrate or among aquatic vegetation. Late in the larval periods the ponds became stagnant and clogged with vegetation, a situation termed "most unlike that expected for Eurycea" *851,p. 261*. Anderson and Martino also found lesser concentrations of the species in springs and along streams running through basalt, shale and sandstone, and in a large spring in sedimentary and crystalline metamorphic rocks; vegetation and fauna in these locations were typical of cold springs of north Jersey. Bruce *857* found E.l. guttolineata larvae in a spring-fed marshy area in an open pasture, with individual pools < 10 sq.meters and less than .5m max. depth, and in a small, permanent pond in deciduous woods. Rudolph *856* found E.l. melanopleura in and around caves with springs and spring-fed streams; he noted *856,p. 158* that the optimum habitat for salamanders, including E.l. melanopleura, would appear to be the areas nearest spring sources because o greater environmental stability. Zappalorti and Reap *858* found E.l. longicauda in habitats much the same as reported by Anderson and Martino *851*.

TERRESTRIAL HABITAT: This is variable. Anderson and Martino *851,p. 271* reported that, at the first appearance of terrestrial stages (in April), "They appear under logs, bark and rocks well under the forest canopy, frequently as much as 100 ft from the water. By late May, however they have moved to the water's edge, the greatest number being found 0-20 from shore . . . they have never been observed in the ponds." Anderson a Martino *851*found salamanders under logs, the bark of logs, and rocks during daylight, and at night on the ground or the old pond bottom (in temporary ponds), on the sides and tops of logs or rocks, on the trunks c large trees, and on blades of grass. At almost all times they were clos associated with the pond margins. Anderson and Martino *852* found E.l longicauda in an abandoned iron mine in Sussex County, NJ. Sciascia *859 states that adults are ". . . usually found under logs, rocks, crevices vertical rock faces in the vicinity of water." He further notes that ". forest parameters (i.e. open/closed, overstory, etc.) [are] not limitin Rudolph *856* noted mouths of caves and blufflines as adult habitats.

ATTACHMENT GG-4

Common Name: Turtle, bog
Scientific Name: Clemmys muhlenbergii

NJ.HABITAT

Freshwater marsh

Bog/swamp

LAND.USE

Agricultural Land

Cropland and Pasture

Rangeland

Shrub and Brush Rangeland

Mixed Rangeland

Water

Streams and Canals

Wetland

COMMENTS ON HABITAT ASSOCIATIONS

In Pennsylvania, Bog Turtles found primarily in sphagnum bogs or wet sedge meadows in or near slow moving streams with a muddy bottom, above 610 meters elevation. The highest populations occur in shrub stage of forest succession. *3073*

In Maryland, Bog Turtles were associated with spring-fed pockets of shallow water, a bottom substrate of soft mud and rock, dominant vegetation of low grasses and sedges, and interspersed wet and dry pockets. Turtles were never encountered beyond the wet meadow transitional edge. This habitat was used for all activities, including mating, foraging, egg-laying, basking, resting, and over-wintering. *17*

ATTACHMENT G6-5

Common Name: Harrier, northern
Scientific Name: Circus cyaneus

NJ.HABITAT

Saltwater marsh

Freshwater marsh

Bog/swamp

Agricultural

LAND.USE

Herbaceous Rangeland

Shrub and Brush Rangeland

Agricultural Land

Cropland and Pasture

Rangeland

Mixed Rangeland

Wetland

Nonforested Wetland

Other Agricultural Land

Bays and Estuaries

COMMENTS ON HABITAT ASSOCIATIONS

Harriers inhabit non-forested land for nesting and foraging--marshes, prairies and grasslands *434,449,12*.Y

ATTACHMENT GG-6

Common Name: Sparrow, Henslow's
Scientific Name: Ammodramus henslowii

NJ.HABITAT

Saltwater marsh

Freshwater marsh

Agricultural

Old field

LAND.USE

Agricultural Land

Cropland and Pasture

Rangeland

Herbaceous Rangeland

Mixed Rangeland

Wetland

Nonforested Wetland

COMMENTS ON HABITAT ASSOCIATIONS

Henslow's Sparrow's habitat requirements have been related to: 1) moisture range; 2) Herbaceous vegetation; 3) presence of litter; 4) singing perches; 5) Standing dead vegetation. Pertinent reference include *4506,4504,4507,02,05,01,03,07*.

1) Moisture range - Robins *4506* states that the species prefers an intermediate moisture range, avoiding wet or dry areas. Several other sources *4503,4504,03,05* note that the species prefers moist conditions such as "wet or damp" weedy fields or swales *4503*; "low-lying, damp situations" *4504*; "damp meadows" *03*; etc. Most sources also note, however, that species may also occur in drier situations, e.g. Bull *03*.

2) Herbaceous vegetation - Robins *4506* states that correct vegetation is "dominated by herbaceous plants, particularly grasses and sedges, which is dense, or at least with frequent dense patches."*4506, p.39* At his study site in Michigan, the tallest and densest vegetation was most densely populated by Henslow's Sparrows. Similar conclusions about height and density of vegetation were reached by Zimmerman *02* in Kansas, although

ATTACHMENT GG-7

Zimmerman suggested that tall dead vegetation (and litter; see #3 and #5 below) suppressed new grass growth and provided a more open substrate for the species at ground level.

Others describe the species' habitat as "Weedy prairies and meadows, and neglected grassy fields and pasturelands. . . unmowed timothy-clover hayfields" *4504*; "old weedy fields and swales" *4503*. Graber *4504* noted that breeding habitat may be irregular or uniform in height, with ground cover dense and "at least a foot or two" high.

Several sources *4504,05,01,03* note scattered shrubs may be present breeding areas. Robins *4507* found that breeding Henslow's Sparrows enter thickets only when pursued. The species uses hedgerows and shrubby areas in migration *4504*. Zimmerman *02* found that Henslow's Sparrows in Kans held territories containing less woody vegetation than found at random points outside of territories.

3)Presence of litter - Robins *4506* listed the presence of litter among t habitat requirements of Henslow's Sparrow. Zimmerman *02* noted that spri burning in Michigan precluded the species' presence, and that burned areas have no litter or dead vegetation.

4)Singing perches - Robins *4506* listed singing perches as "possibly" required by Henslow's Sparrows, although he notes that available perches provided by stakes or woody vegetation were used infrequently. Clumps of dead vegetation standing above the new grass were often used early in the breeding season.

5) Standing dead vegetation - In unburned watersheds in Michigan, Zimmerma *02* found that Henslow's Sparrows established territories in areas containing more and taller dead vegetation compared to sites outside territories. Zimmerman offered several management recommendations regardi controlled burning based on his observations. (See C.MANAGEMENT).

ATTACHMENT G-8

ATTACHMENT HH

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
P.O. BOX CN 029
TRENTON, NEW JERSEY 08625

JOHN W. GASTON JR., P.E.
DIRECTOR

CERTIFIED MAIL
RETURNED RECEIPT REQUESTED

Metz Metallurgical Corporation
3900 S. Clinton Avenue
S. Plainfield, New Jersey 07080
ATTN: Mr. Mazar

APR 21 1983

Re: NJPDES/DSW Permit No. NJ0034835
Effective Date: 6-1-83

Dear Mr. Mazar:

Enclosed is the final NJPDES/DSW Permit and Notice of Authorization to discharge pollutants to the tributary to Bound Brook, classified as FW-2 Nontrout waters, issued in accordance with the New Jersey Pollutant Discharge Elimination System Regulations, N.J.A.C. 7:14A- et seq. Violation of any condition of this permit may subject you to significant penalties.

Within 30 calendar days following your receipt of this permit, under N.J.A.C. 7:14A-8.6 you may submit a request to the Adminstrator for an adjudicatory hearing to reconsider or contest the conditions of this permit. Regulations regarding the format an requirements for requesting for an adjudicatory hearing may be four in N.J.A.C. 7:14A-8.9 through 8.13. The request should be made to:

Administrator
Water Quality Management Element
Division of Water Resources
CN-029
Trenton, New Jersey 08625

If you have any questions on this action, please contact Mr. William S. Beggs, Section Chief, Best Management Practices Section at (609) 292-4860.

Very truly yours,

Paul C. Kurisko, P.E., Chief
Industrial Waste Management Bureau
Water Quality Management Element

ATTACHMENT HH-1

WQM7-B/fl:fmm

New Jersey Is An Equal Opportunity Employer

Let's protect our earth

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

NOTICE OF AUTHORIZATION

PERMIT NO.	ISSUANCE DATE	EFFECTIVE DATE	EXPIRATION DATE
NJ0034835	4-8-83	6-1-83	5-31-88

ISSUED TO
Metz Metallurgical Corporation
3900 S. Clinton Avenue
S. Plainfield, NJ 07080

FOR ACTIVITY/FACILITY AT
3900 S. Clinton Avenue
S. Plainfield, Middlesex Co.,
New Jersey

OWNER
Metz Metallurgical Corporation
3900 S. Clinton Avenue
S. Plainfield, NJ 07080

ISSUING DIVISION
- [x] Water Resources
- [ ] Coastal Resources
- [ ] Environmental Quality

TYPE OF PERMIT
NJPDES/DSW

STATUTE(S)
N.J.S.A.
58:10A-1 et seq.

APPLICATION N
NJ0034835

A PERMIT TO Metz Metallurgical Corporation to:

discharge into surface waters named Tributary to Bound Brook, classified as FW-2 Nontrout waters, in accordance with the effluent limitations, monitoring requirements, and other conditions set forth in Parts I, II, III, and IV hereof.

DEP AUTHORIZATION

Form DEP-008
7/80

THIS NOTICE MUST BE CONSPICUOUSLY DISPLAYED AT THE ACTIVITY/FACILITY SITE.

ATTACHMENT HH-2

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
CN 402
Trenton, N. J. 08625

PERMIT *

The New Jersey Department of Environmental Protection grants this permit in accordance with your application, attachmen accompanying same application, and applicable laws and regulations. This permit is also subject to the further conditior and stipulations enumerated in the supporting documents which are agreed to by the permittee upon acceptance of the permi

Permit No.	Issuance Date	Effective Date	Expiration Date
NJ0034835	4-8-83	6-1-83	5-31-88

Name and Address of Applicant	Location of Activity/Facility	Name and Address of Owner
Metz Metallurgical Corporation 3900 S. Clinton Avenue S. Plainfield, NJ 07080	3900 S. Clinton Avenue S. Plainfield, Middlesex Co., New Jersey	Metz Metallurgical Corporation 3900 S. Clinton Avenue S. Plainfield, NJ 07080

Issuing Division	Type of Permit	Statute(s)	Application No.
☒ Water Resources ☐ Coastal Resources ☐ Environmental Quality ☐ Other	NJPDES/DSW	N.J.S.A. 58:10A-1 et seq.	NJ0034835

This permit grants permission to: Metz Metallurgical Corporation to:

discharge into surface waters named Tributary to Bound Brook, classified as FW-2 Nontrout waters, in accordance with the effluent limitations, monitoring requirements, and other conditions set forth in Parts I, II, III, and IV hereof.

ATTACHMENT III-3

Approved by the Department of Environmental Protection

Arnold Schiffman
Administrator
Water Quality Management

4/8/83
DATE

* *The word permit means "approval, certification, registration, etc."*

(GENERAL CONDITIONS ARE ON THE REVERS

Form DEP-007

ATTACHMENT II

DRAFT COPY

PERMIT NO. 24055

MIDDLESEX COUNTY UTILITIES AUTHORITY
SAYREVILLE, NEW JERSEY

NON-DOMESTIC WASTEWATER DISCHARGE PERMIT

In accordance with the provisions of the Federal Water Pollution Control Act (hereinafter referred to as "the Act"), its Amendments, and the Middlesex County Utilities Authority (MCUA) Rules and Regulations,

METZ METALLURGICAL CORPORATION

(hereinafter referred to as the "Permittee") identified by facility DUNS No.: NJD002195303

is authorized to discharge from a facility located at:

3900 South Clinton Avenue
South Plainfield, NJ 07080

to the Middlesex County Utilities Authority Treatment Works which includes the treatment plant, trunk sewers, pumping stations and meter chambers, either directly or indirectly through one of the Authority's Participants or Customers collection systems, in accordance with discharge limitations, monitoring requirements and other conditions set forth herein.

Effective Date: August 1, 1990

Expiration Date: July 31, 1995

Middlesex County Utilities Authority

By: _____
Executive Director

ATTACHMENT II-1

IIA. DISCHARGE LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning August 1, 1990 and lasting through July 31, 1995 the permittee is authorized to discharge from point(s) designated as Tank A/B (as indicated on the "Application for Non-Domestic Wastewater Discharge", dated May 28, 1986).
The rate of discharge shall not exceed an average daily flow of 50,000 gallons per day nor a maximum daily flow of 75,000 gallons per day.
Such discharge shall be limited and monitored by the permittee as specified below;

WASTE CHARACTERISTICS *	DISCHARGE LIMITATION		MINIMUM MONITORING REQUIREMENTS **		
	Daily Maximum	Maximum Monthly Avg.	MEASUREMENT FREQUENCY	SAMPLE TYPE	REPORTING DATES
Flow (MGD)	N/A	N/A	Quarterly	N/A	June, Dec.
BOD5	N/A	N/A	Quarterly	Composite	June, Dec.
COD	N/A	N/A	Quarterly	Composite	June, Dec.
Total Suspended Solids	N/A	N/A	Quarterly	Composite	June, Dec.
Petroleum Hydrocarbons	100	N/A	Quarterly	Grab	June, Dec.
Ammonia (Total)	4987.982	2214.581	Monthly	Composite	June, Dec.
Cadmium (Total)	0.725	0.285	Monthly	Composite	June, Dec.
Chromium (Total)	2.578	1.592	Monthly	Composite	June, Dec.
Copper (Total)	45.837	21.930	Monthly	Composite	June, Dec.
Cyanide (Total)	9.368	3.812	Monthly	Grab	June, Dec.
Combined Metals (Total) ***	35.838	N/A	Monthly	Composite	June, Dec.
Lead (Total)	0.654	0.408	Monthly	Composite	June, Dec.
Nickel (Total)	3.780	2.260	Monthly	Composite	June, Dec.
Silver (Total)	0.699	0.350	Monthly	Composite	June, Dec.
Zinc (Total)	37.667	15.559	Monthly	Composite	June, Dec.
Total Toxic Organics ****	1.649	N/A	Quarterly	Grab/Composite	June, Dec.
pH (Standard Units)	5.0 < pH < 10.0		Weekly	Grab	June, Dec.

* All units are in mg/L, unless otherwise specified.

** Certification of non-use for any regulated metal or cyanide is acceptable in lieu of sampling, provided Baseline Monitoring Report data and knowledge of process support this statement. Certification of implementation of an approved Total Toxic Organic Management Plan is acceptable in lieu of organics monitoring.

*** Combined Metals include Gold, Palladium, and Platinum.

**** Total Toxic Organics are defined in Section IIB.

Note: Production and Flow data shall be reported with each Self-Monitoring Report. Any Significant changes in the plant's processes including production rate or flow, must be reported to the MCUA.

ATTACHMENT 1-12

ATTACHMENT JJ

Degussa
Metz Metallurgical
Corporation

R.S.

November 2, 1989

Certified# P 122 477 916

Mr. Matthew Precinski
New Jersey Department of Environmental Protection
Division of Water Resources
Permits Administration
CN-029
Trenton, NJ 08625

RECEIVED
NOV 08 1989
DEPT. OF ENVIRON. PROTECTION
Division Water Resources
Bureau of Information Systems

RE: NJPDES Permit #NJ0034835

Dear Mr. Precinski:

As a continuing measure of pollution prevention at Metz Metallurgical Corporation, and to prevent further releases to the NJPDES permitted outfall, we have come to the decision that the installation of a retention/detention basin will allow us to achieve these goals. The basin will be installed at the west edge of our property, and will receive the current discharge from D001 (Non-contact cooling and storm water run-off), D002 (Storm water run-off only). No additions or deletions to the sources for these discharges will be made nor will we raise the resulting discharge above the stream bed. Herewith is a sketch of the basin showing the locations for the input and the outfall and the sampling points. You will notice that the sampling points for the quarterly DMR's will remain the same (i.e: before the water enters the basin). Because of the recent spate of releases to the NJPDES outfall and to prevent any off site contamination, we feel it is imperative to start this project immediately.

Please let me know if this letter is sufficient notification of this change in the physical layout of our discharge, or, if we need to file for a new NJPDES permit.

Cordially,

C. Scott Eves
Environmental Control Manager
Degussa Corp. - Metal Group

CSE:jn
NJDEP.1102

RECEIVED
NOV 08 1989

RECEIVED
NOV 08 1989

ATTACHMENT JJ

3900 South Clinton Ave. South Plainfield, NJ 07080 (201) 561-1100 TWX 710-997-9524

PLANT ID	COUNTY	MUNICIPALITY	BUSINESS NAME	PLANT NAME	PLANT CONTACT
15404	MID	SO.PLAINFIELD	CLARK COLORS INC.		
15405	MID	SO PLAINFIELD	DEGUSSA CORPORATION	METAL & CATALYST DIV/SO PLAINFIELD PLANT	
15406	MID	PERTH AMBOY	HARBOR TERRACE APARTMENT	T/A HARBOR TERRACE APARTMENTS	
15407	MID	HIGHLAND PARK	HIGHLANDER TRUST,THE	T/A HIGHLANDER APTS.	

STACK	CERT	COND	STATUS	EXP. DAT	COMPANY DESIGNATION	LAST INS	BY
001	062720		PERM	09/30/92	BOILER,	07/20/88	624
002	062721		PERM	12/23/93	MIX TANK VENT	07/20/88	624
003	062722		PERM	09/30/92	DRYER (LYDON TRAY)	07/20/88	624
004	062723		PERM	09/30/92	DUST COLL. MIKROPUL #495-8-20	07/20/88	624
005	062817		PERM	12/23/93	WINDOW 10' AWAY	07/20/88	624
006	065680		PERM	08/29/93	DRYER (NATIONAL)	07/20/88	624
007	068777		PERM	10/10/93	NATIONAL DRYER #3	07/20/88	624
008	087282	X	TEMP	06/18/90	MIX TANK/SEWER TANK		
009	087941		TEMP	07/15/90	DUST COLLECTOR		

STACK	CERT	COND	STATUS	EXP. DAT	COMPANY DESIGNATION	LAST INS	BY
000			ZERO		MISCELLANEOUS INSPECTIONS	04/14/89	200
001	090075	X	TEMP	06/01/90	001	04/14/89	200
002	062725		DELETE	04/20/89	2	04/14/89	200
003	062726		PERM	10/29/92	3		
004	087943	X	TEMP	08/03/90	KF STACK		

STACK	CERT	COND	STATUS	EXP. DAT	COMPANY DESIGNATION	LAST INS	BY
000			ZERO		MISCELLANEOUS INSPECTIONS	11/17/88	614
001	004954		PERM	04/06/92	INCINERATOR, BLDG. 10	11/17/88	614
002	004955		PERM	04/06/92	INCINERATOR, BLDG. 12	11/17/88	614
003	004956		PERM	04/06/92	INCINERATOR, 14	11/17/88	614
004	004957		PERM	04/06/92	INCINERATOR, BLDG. 16		
005	004958		EXPD	04/06/87	INCINERATOR, BLDG. 18		

STACK	CERT	COND	STATUS	EXP. DAT	COMPANY DESIGNATION	LAST INS	BY
000			ZERO		MISCELLANEOUS INSPECTIONS		

**** DENOTES UNDEFINED STATUS

ATTACHMENT F5

PLANT ID	COUNTY	MUNICIPALITY	BUSINESS NAME	PLANT NAME	PLANT CONTACT
15407	MID	HIGHLAND PARK	HIGHLANDER TRUST,THE	T/A HIGHLANDER APTS.	

STACK	CERT	COND	STATUS	EXP. DAT	COMPANY DESIGNATION	LAST INS	BY

ATTACHMENT KK

PLANT ID	COUNTY	MUNICIPALITY	BUSINESS NAME	PLANT NAME	PLANT CONTACT
15404	MID	SO.PLAINFIELD	CLARK COLORS INC.		
15405	MID	SO PLAINFIELD	DEGUSSA CORPORATION	METAL & CATALYST DIV/SO PLAINFIELD PLANT	
15406	MID	PERTH AMBOY	HARBOR TERRACE APARTMENT	T/A HARBOR TERRACE APARTMENTS	
15407	MID	HIGHLAND PARK	HIGHLANDER TRUST,THE	T/A HIGHLANDER APTS.	

STACK	CERT	COND	STATUS	EXP. DAT	COMPANY DESIGNATION	LAST INS	BY
001	062720		PERM	09/30/92	BOILER	07/20/88	624
002	062721		PERM	12/23/93	MIX TANK VENT	07/20/88	624
003	062722		PERM	09/30/92	DRYER (LYDON TRAY)	07/20/88	624
004	062723		PERM	09/30/92	DUST COLL. MIKROPUL #495-8-20	07/20/88	624
005	062817		PERM	12/23/93	WINDOW 10' AWAY	07/20/88	624
006	065680		PERM	08/29/93	DRYER (NATIONAL)	07/20/88	624
007	068777		PERM	10/10/93	NATIONAL DRYER #3	07/20/88	624
008	087282	X	TEMP	06/18/90	MIX TANK/SEWER TANK		
009	087941		TEMP	07/15/90	DUST COLLECTOR		

STACK	CERT	COND	STATUS	EXP. DAT	COMPANY DESIGNATION	LAST INS	BY
000			ZERO		MISCELLANEOUS INSPECTIONS	04/14/89	200
001	090075	X	TEMP	06/01/90	001	04/14/89	200
002	062725		DELETE	04/20/89	2	04/14/89	200
003	062726		PERM	10/29/92	3		
004	087943	X	TEMP	08/03/90	KF STACK		

STACK	CERT	COND	STATUS	EXP. DAT	COMPANY DESIGNATION	LAST INS	BY
000			ZERO		MISCELLANEOUS INSPECTIONS		
001	004954		PERM	04/06/92	INCINERATOR, BLDG. 10	11/17/88	614
002	004955		PERM	04/06/92	INCINERATOR, BLDG. 12	11/17/88	614
003	004956		PERM	04/06/92	INCINERATOR, 14	11/17/88	614
004	004957		PERM	04/06/92	INCINERATOR, BLDG. 16	11/17/88	614
005	004958		EXPD	04/06/87	INCINERATOR, BLDG. 18		

STACK	CERT	COND	STATUS	EXP. DAT	COMPANY DESIGNATION	LAST INS	BY
000			ZERO		MISCELLANEOUS INSPECTIONS		

**** DENOTES UNDEFINED STATUS

ATTACHMENT 5A

PLANT ID	COUNTY	MUNICIPALITY	BUSINESS NAME	PLANT NAME	PLANT CONTACT
15407	MID	HIGHLAND PARK	HIGHLANDER TRUST,THE	T/A HIGHLANDER APTS.	

STACK	CERT	COND	STATUS	EXP. DAT	COMPANY DESIGNATION	LAST INS	BY

ATTACHMENT LL

VEM-045
7/88

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF ENVIRONMENTAL QUALITY
AIR POLLUTION CONTROL PERMIT PROGRAM
BUREAU OF NEW SOURCE REVIEW
CN 027
TRENTON, NEW JERSEY 08625

Date: 4/ 3/91

DEGUSSA CORPORATION
JAMES LEAHEY
3000 SO. CLINTON AVE
SO. PLAINFIELD , NJ, 07080-0000

Plant Location: SO. PLAINFIELD
County: MIDDLESEX
Applicant's Designation of Stack: AMMONIA SCRUBBER
Application Log #: 01911030
Approval Date: 3/28/91
Approval Status Code: 51

PERMIT TO CONSTRUCT, INSTALL OR ALTER CONTROL APPARATUS OR EQUIPMENT

This permit is being issued under the authority of chapter 106, P.L. 1967 (N.J.S.A. 26:2C-9.2). You may construct, install, or alter the control apparatus or equipment as indicated on the application referenced above.

The Status of this approval is referenced above. Please see page 2 of this letter for the explanation the status code.

You will be sent Form VEM-017 at a later date. Form VEM-017 will include your New Jersey Plant ID Number, New Jersey Stack Number, and Certificate Number.

If you have any questions regarding this document, please write to the Bureau of New Source Review at the above address. Questions regarding Certificates to Operate should be directed to the Regional Office.

Approved by: _____
Chief

C: BNSR File
Regional Office

ATTACHMENT LL-1

Form VEM-003
9/85

Side 1

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF AIR POLLUTION CONTROL

APPLICATION FOR
PERMIT TO CONSTRUCT, INSTALL OR ALTER CONTROL APPARATUS OR EQUIPMENT
AND
CERTIFICATE TO OPERATE CONTROL APPARATUS OR EQUIPMENT

TO: New Jersey Department of Environmental Protection
Bureau of Air Pollution Control
CN 027, Trenton, NJ 08625

Read Instructions Before Completing Application

SECTION A

1. Full Business Name: DEGUSSA CORPORATION - METZ DIVISION
2. Mailing Address: 3900 SOUTH CLINTON AVENUE SOUTH PLAINFIELD N.J. 07080 (No. / Street / City / State / Zip Code)
3. Division and/or Plant Name: SAME
4. Plant Location: MIDDLESEX (No. / Street / City / State / Zip Code / County)
5. Location of Equipment on Premises (bldg., dept., area, etc.): BLDG. A - EAD COPPER DEPT.
6. Nature of Business: PRECIOUS METALS MANUFACTURE
7. Estimated Starting Date of Construction: EXISTING
8. Date Equipment to be put in use: EXISTING
9. Plant Contact: C. SCOTT EVES (Name (print or type)) ENVIRONMENTAL CONTROL MANAGER (Title) (201) 561-1100 (Telephone No.)

SECTION B

REASON FOR APPLICATION *(Check One)*

- ☐ New Equipment without Control Apparatus
- ☐ New Equipment with Control Apparatus
- ☐ New Control Apparatus on Existing Equipment
- ☐ Five Year Renewal of Certificate No.(s)
- ☐ Other *(Explain)*
- ☒ Modification to Existing Equipment
- ☐ Modification to Existing Control Apparatus
- ~~☐ Painting Tank White~~

SECTION C

STACK INFORMATION (EQUIVALENT STACK INFORMATION)

1. Company Designation of Stack(s): AMMONIA SCRUBBER
2. Previous Certificate Numbers (if any): 098824
3. a. Number of Sources Venting to this Stack: 67 (Complete a separate VEM-004 for each source)
   b. Number of Stacks Venting Source Operation(s): 1
4. Distance to the nearest Property Line (ft.): 30
5. Stack Diameter (inches): 21
6. Discharge Height Above Ground (ft.): 50
7. Exit Temperature of Stack Gases (°F): AMBIENT
8. Volume of Gas Discharged at Stack Conditions (A.C.F.M.): 6900
9. Discharge Directions ☐ Horizontal ☒ Up ☐ Down

The information supplied on applications VEM-003 and VEM-004, including the data in supplements, is to the best of my knowledge true and correct.

Signature: [signature] Date: MARCH 6, 1991

Name (print or type): JAMES D. LEAHY Title: MGR. PERMITS ADMINISTRATION

This application will not be processed unless proper fee is submitted. FOR ASSISTANCE CALL (609) 292-6716

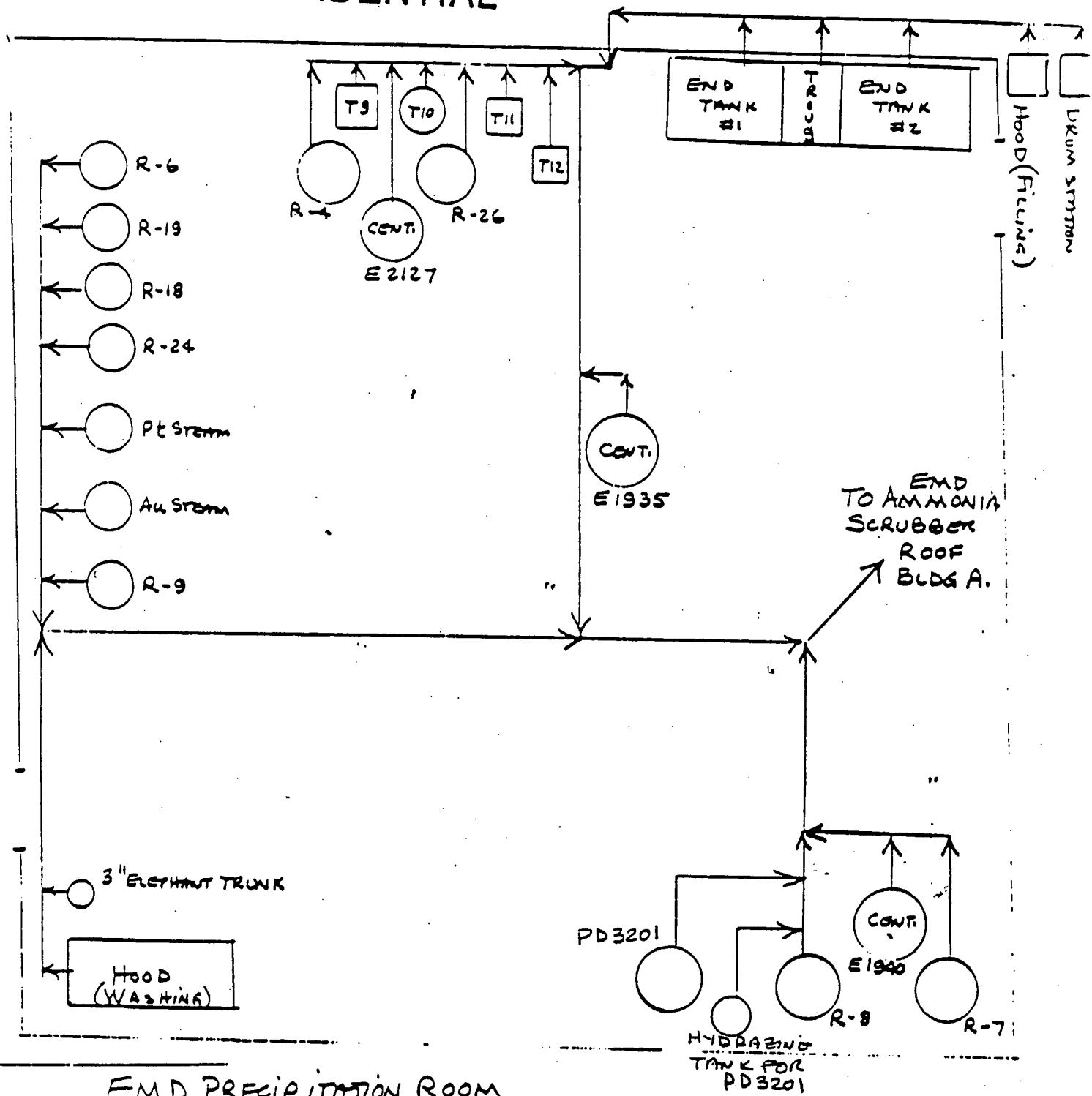
FOR DEPARTMENT USE ONLY

N.J.I.D. ☐☐☐☐☐ – STACK ☐☐☐ – 0 0 0 ☐ – LOG NO. ☐☐ – ☐☐☐☐ CT. NO. ☐☐☐☐☐☐

01-91-1030

PAID - BNSR
DATE: 3/13/91
AMOUNT 250.00
FEE _____ EVAL. JHG

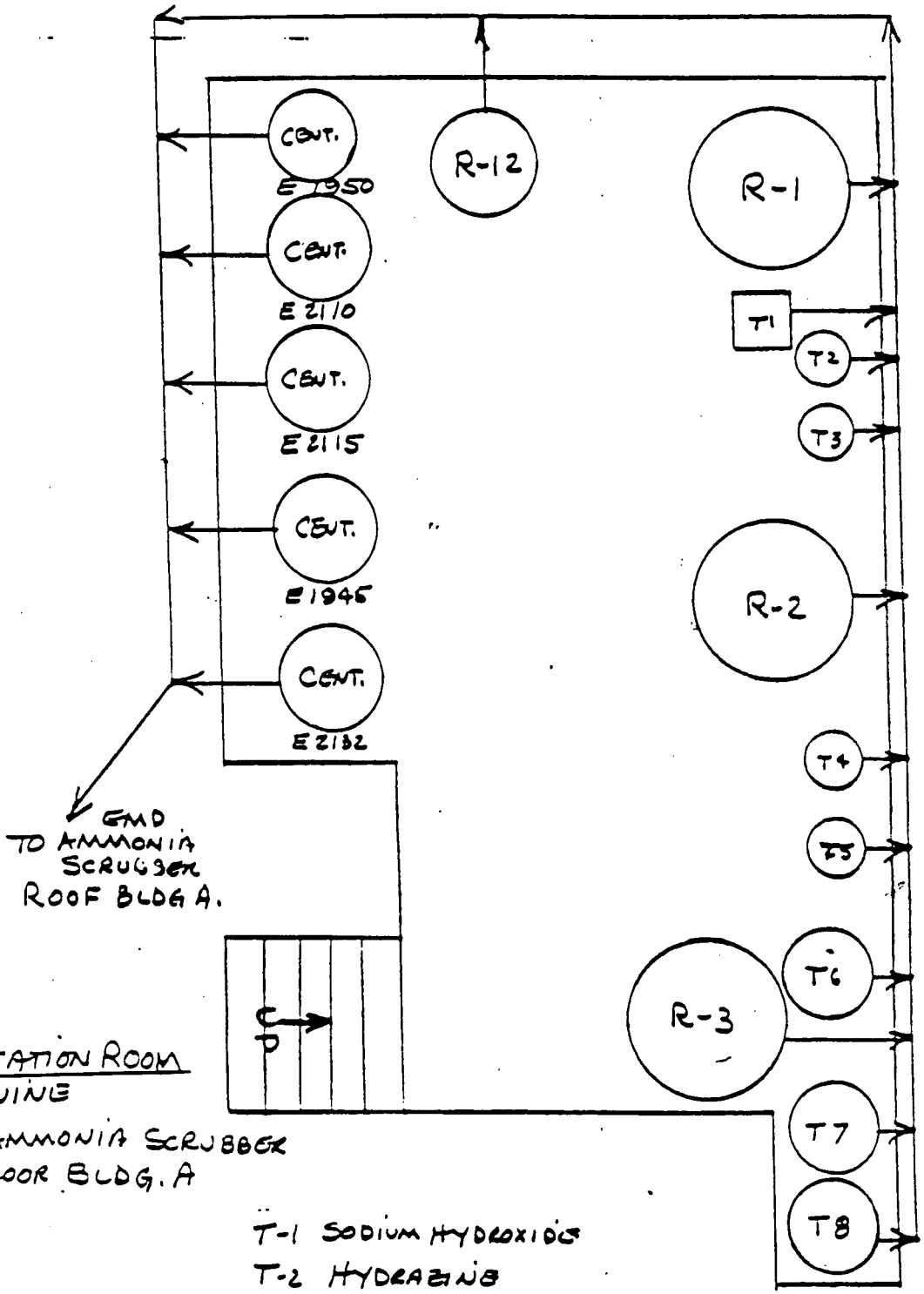
ATTACHMENT LL-2



EMD PRECIPITATION ROOM
SOURCES TO AMMONIA SCRUBBER
GROUND FLOOR BLDG. A

T9 = HYDRAZINE
T10 = AMMONIUM HYDROXIDE
T11 = FORMALDEHYDE
T12 = SODIUM HYDROXIDE

ATTACHMENT LL-3

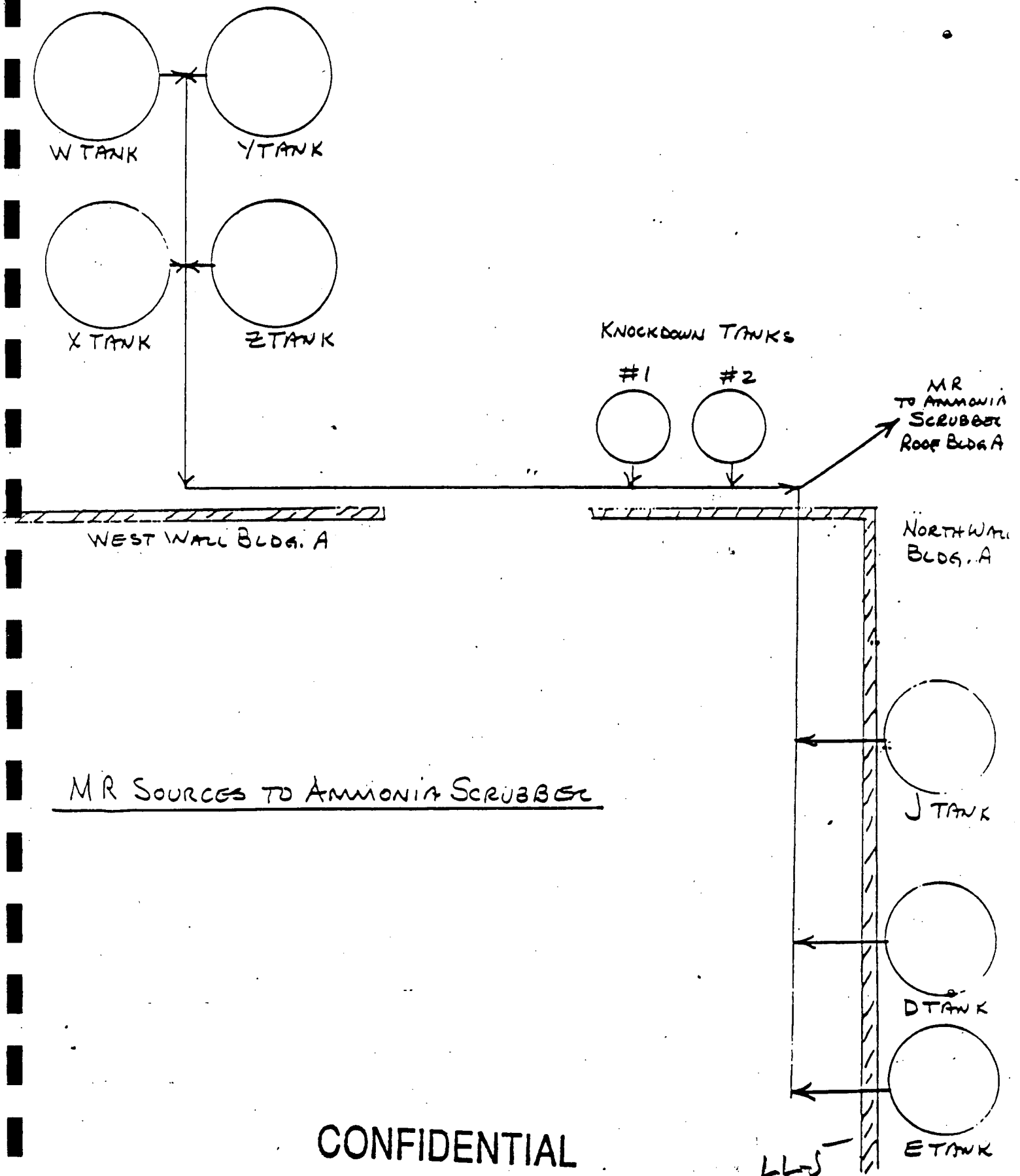


EMD PRECIPITATION ROOM
MEZZANINE

SOURCES TO AMMONIA SCRUBBER
GROUND FLOOR BLDG. A

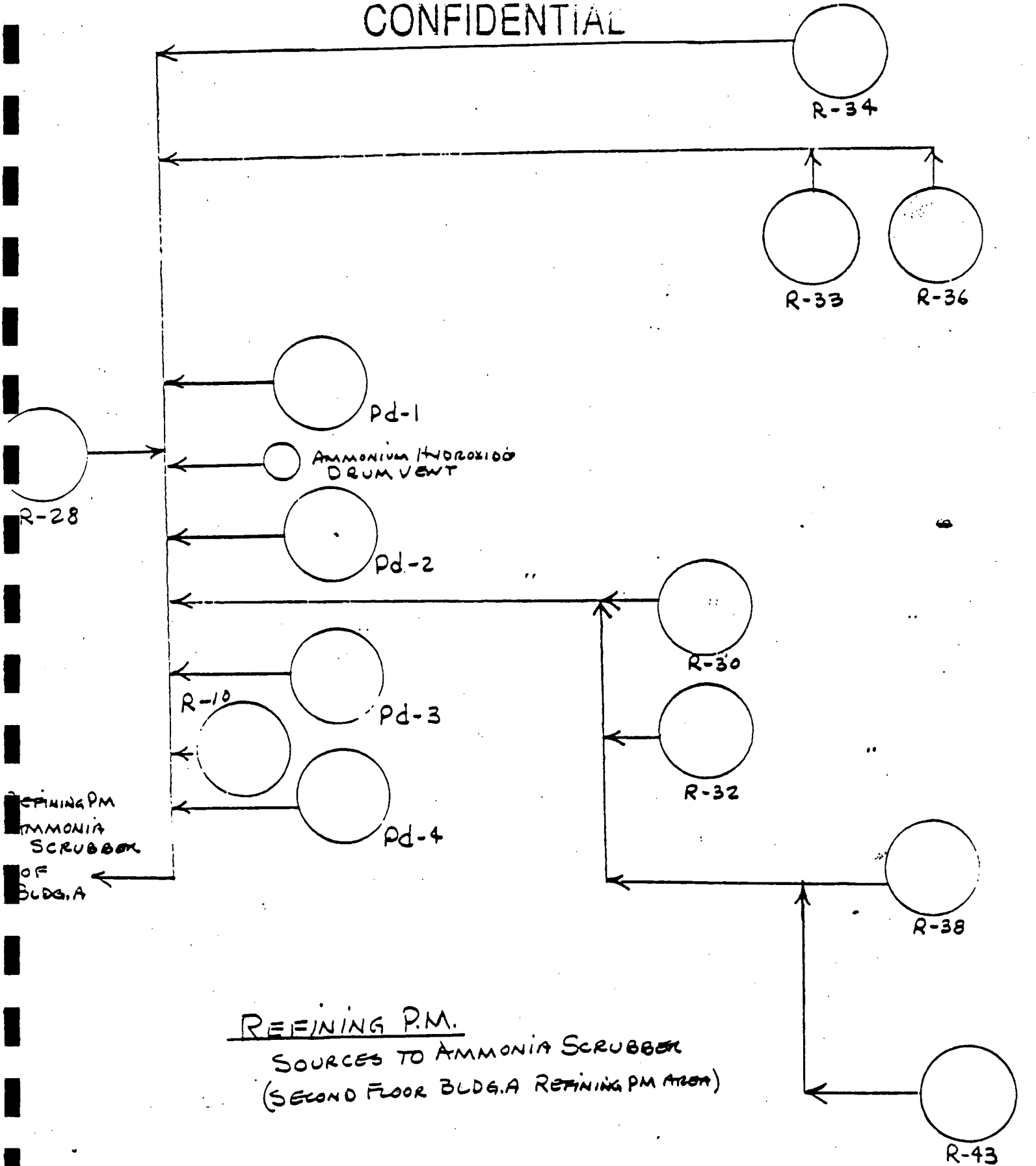
T-1 SODIUM HYDROXIDE
T-2 HYDRAZINE
T-3 AMMONIUM HYDROXIDE
T-4 HYDRAZINE
T-5 AMMONIUM HYDROXIDE
T-6 HYDRAZINE
T-7 AMMONIUM HYDROXIDE
T-8 HYDRAZINE

ATTACHMENT LL-4



MR SOURCES TO AMMONIA SCRUBBER

ATTACHMENT LLJ



REFINING P.M.
SOURCES TO AMMONIA SCRUBBER
(SECOND FLOOR BLDG. A REFINING PM AREA)

ATTACHMENT LL-6

VEM-045
7/88

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF ENVIRONMENTAL QUALITY
AIR POLLUTION CONTROL PERMIT PROGRAM
BUREAU OF NEW SOURCE REVIEW
CN 027
TRENTON, NEW JERSEY 08625

Date: 2/20/91

DEGUSSA CORPORATION
JAMES D. LEAHEY
3900 SO. CLINTON AVE
SOUTH PLAINFIELD , NJ, 07080-0000

Plant Location: SOUTH PLAINFIELD
County: MIDDLESEX
Applicant's Designation of Stack:FLAKE BAGHOUSE
Application Log #: 01910071
Approval Date: 2/15/91
Approval Status Code:51

PERMIT TO CONSTRUCT, INSTALL OR ALTER CONTROL APPARATUS OR EQUIPMENT

This permit is being issued under the authority of chapter 106, P.L. 1967 (N.J.S.A. 26:2C-9.2). You may construct, install, or alter the control apparatus or equipment as indicated on the application referenced above.

The Status of this approval is referenced above.
Please see page 2 of this letter for the explanation the status code.

You will be sent Form VEM-017 at a later date. Form VEM-017 will include your New Jersey Plant ID Number, New Jersey Stack Number, and Certificate Number.

If you have any questions regarding this document, please write to the Bureau of New Source Review at the above address. Questions regarding Certificates to Operate should be directed to the Regional Office.

Approved by: _____
Chief

C: BNSR File
Regional Office

ATTACHMENT LL-7

Form VEM-003
1/79

Side 1

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF AIR POLLUTION CONTROL

APPLICATION FOR PERMIT TO CONSTRUCT, INSTALL OR ALTER CONTROL APPARATUS OR EQUIPMENT AND CERTIFICATE TO OPERATE CONTROL APPARATUS OR EQUIPMENT

TO: New Jersey Department of Environmental Protection
Bureau of Air Pollution Control
CN-027
Trenton, New Jersey 08625

Read Instructions Before Completing Application

SECTION A

1. Full Business Name: DEGUSSA CORPORATION - METZ DIVISION
2. Mailing Address: 3900 SOUTH CLINTON AVENUE (No.) SOUTH PLAINFIELD (Street) (City) N.J. (State) 07080 (Zip Code)
3. Division and/or Plant Name: SAME
4. Plant Location: (No.) (Street) (Municipality) MIDDLESEX (County)
5. Location of equipment on premises((Bldg., Dept., area, etc.): BLDG. A - FLAKE DEPT.
6. Nature of business: PRECIOUS METALS MANUFACTURE
7. Estimated starting date of construction: DECEMBER 1990
8. Date equipment to be put in use: JANUARY 1991
9. Plant Contact: C. SCOTT EVES (Name (Print or type)) ENVIRONMENTAL CONTROL MANAGER (Title) (201) 561-1100 (Telephone No.)

SECTION B

REASON FOR APPLICATION (CHECK ONE)

- ☐ New Equipment without Control Apparatus
- ☐ New Equipment with Control Apparatus
- ☒ New Control Apparatus on Existing Equipment
- ☐ Five Year Renewal of Certificate No. (s)
- ☐ Other (Explain)
- ☐ Modification to Existing Equipment
- ☐ Modification to Existing Control Apparatus
- ☐ Painting Tank White

SECTION C

STACK INFORMATION (EQUIVALENT STACK INFORMATION)

1. Company Designation of Stack (s): FLAKE BAGHOUSE
2. Previous Certificate Numbers (if any): N/A
3. a. Number of Sources Venting to this Stack: 42 (Complete a separate VEM-004 for each source)
   b. Number of Stacks Venting Source Operation (s): 1
4. Distance to the nearest Property Line (ft.): 200
5. Stack Diameter (inches): 20
6. Discharge Height Above Ground (ft.): 50
7. Exit Temperature of Stack Gases (°F): AMBIENT
8. Volume of Gas Discharged at Stack Conditions (A.C.F.M.): 7500
9. Discharge Direction ☐ Horizontal ☒ Up ☐ Down

The information supplied on applications VEM-003 and VEM-004, including the data in supplements, is to the best of my knowledge true and correct.

Signature: James D. Leahey — Date: 1/9/91

Name (Print or type): JAMES D. LEAHEY — Title: MGR. PERMITS ADMINISTRATION

This application will not be processed unless proper fee is submitted.

FOR ASSISTANCE CALL (609) 292-6716

FOR DEPARTMENT USE ONLY

☐☐☐☐☐ - ☐☐☐ - 000 ☐☐☐☐☐☐

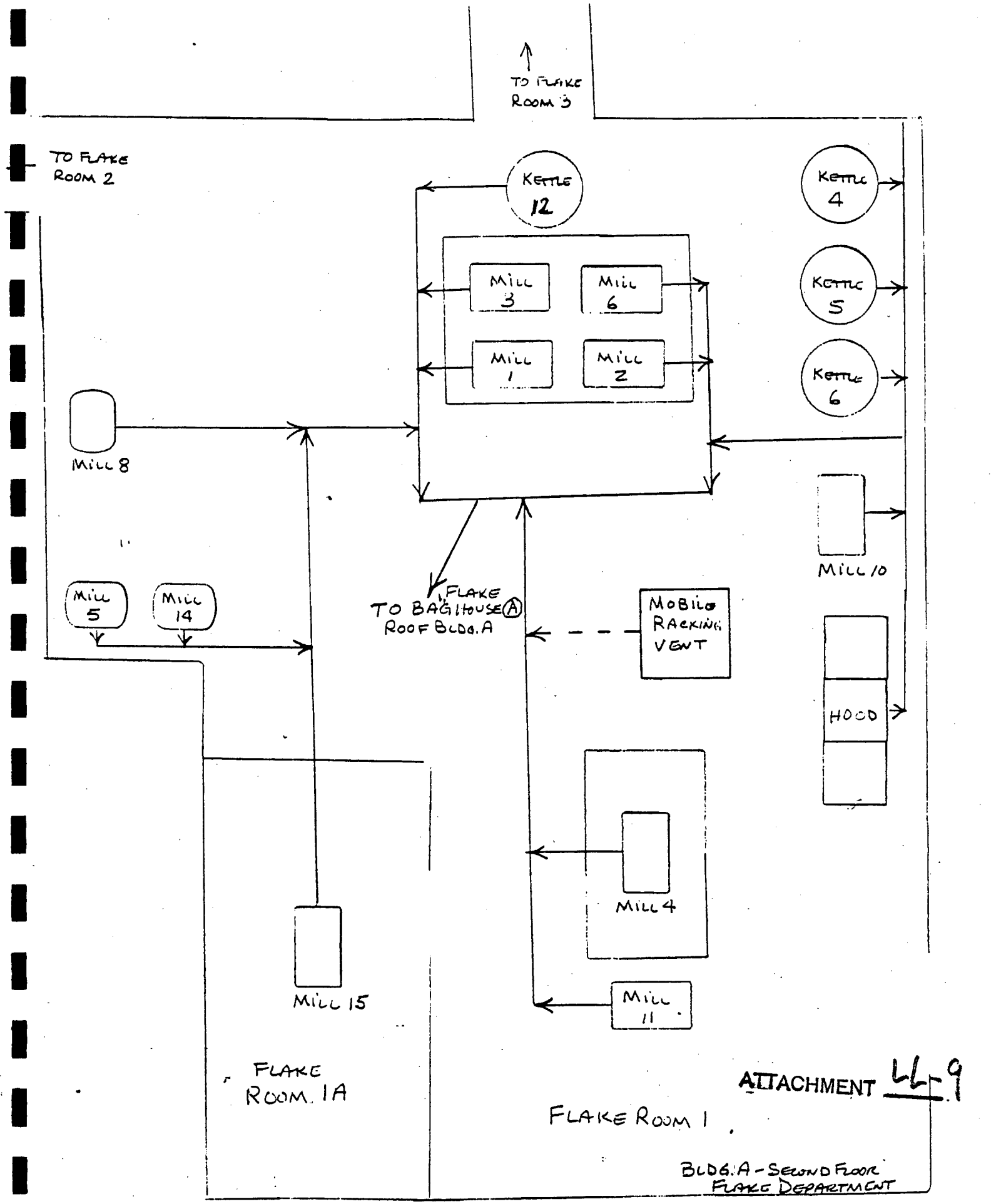
ATTACHMENT LL-8

01-91-0071

PAID - BNSR JACK

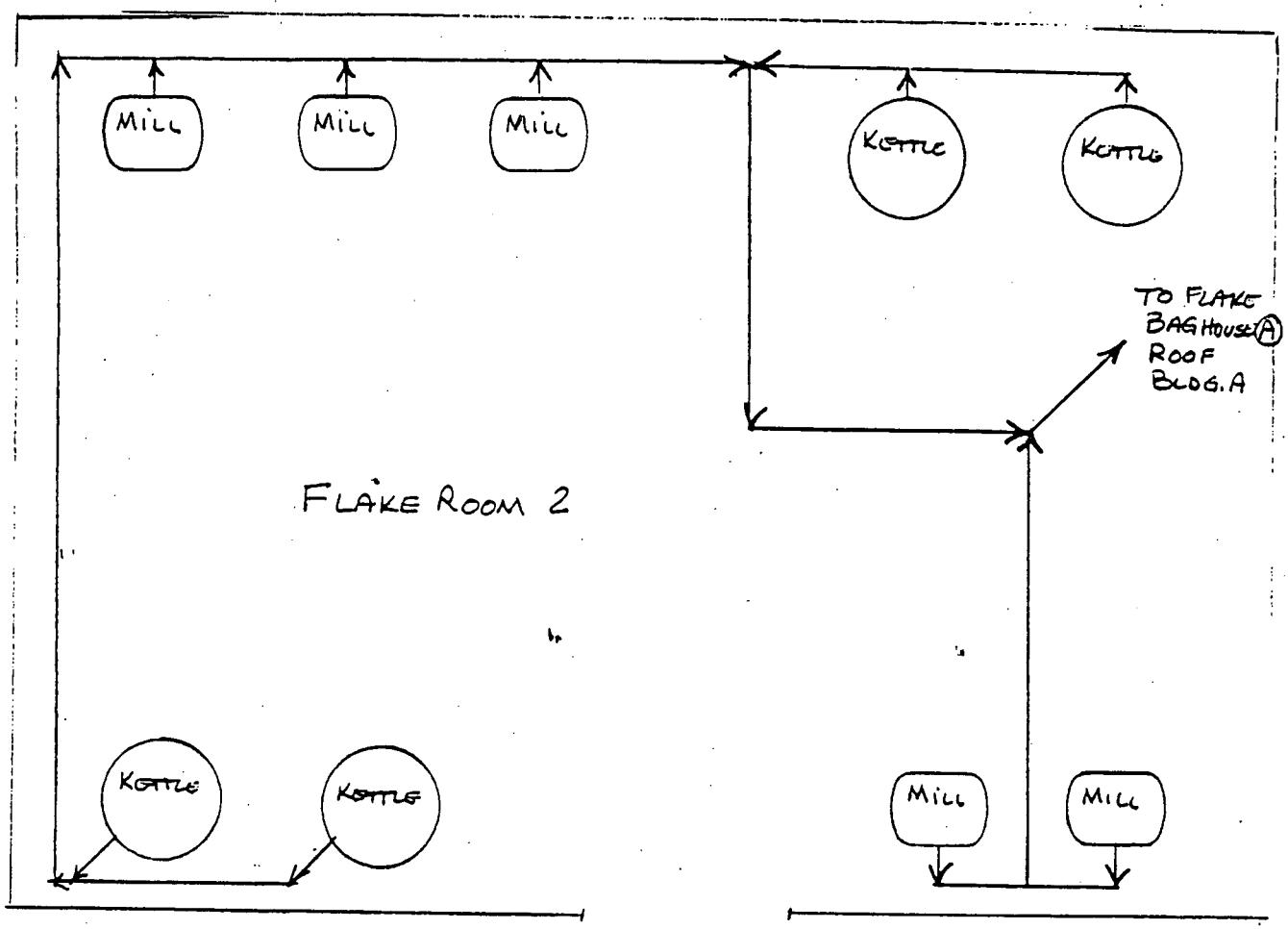
DATE: 1/9/91

AMOUNT (over) 250.-



ATTACHMENT LL-9

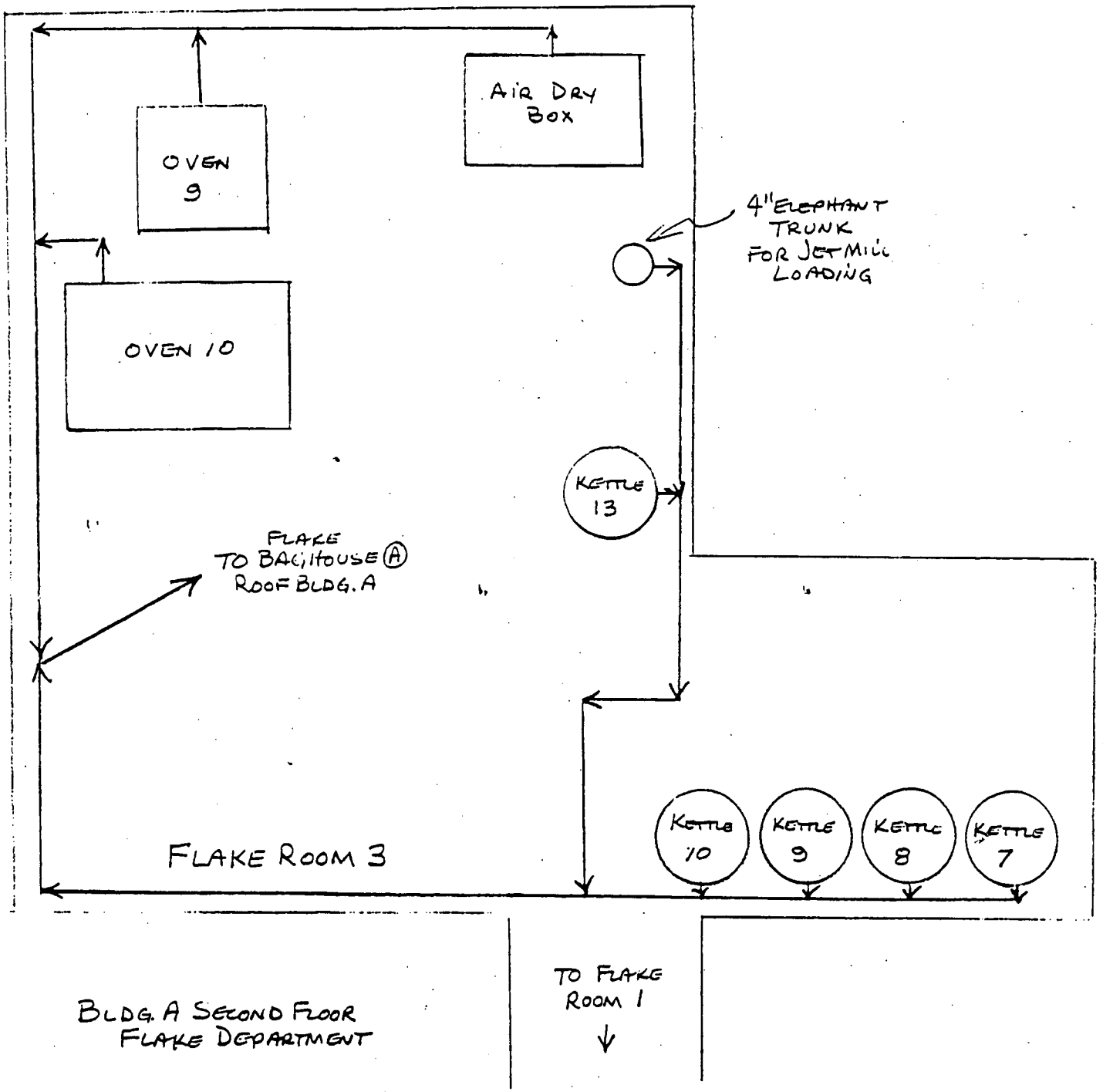
SOURCES FROM FLAKE ROOM 1 AND ROOM 1A TO FLAKE BAGHOUSE



BLDG. A - SECOND FLOOR
FLAKE DEPARTMENT

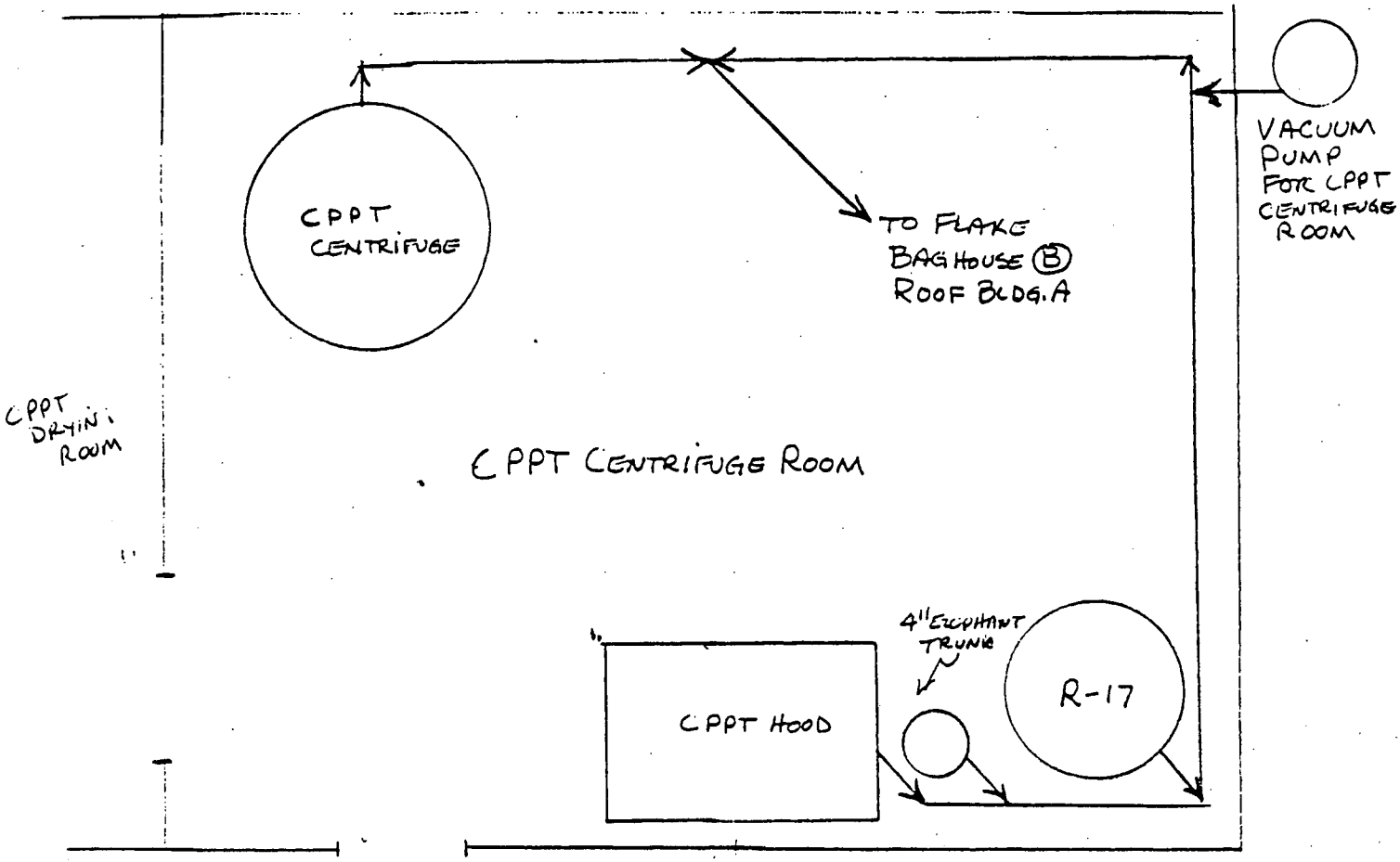
ATTACHMENT LL-10

SOURCES FROM FLAKE ROOM 2
TO FLAKE BAGHOUSE



SOURCES FROM FLAKE ROOM 3 TO FLAKE BAGHOUSE

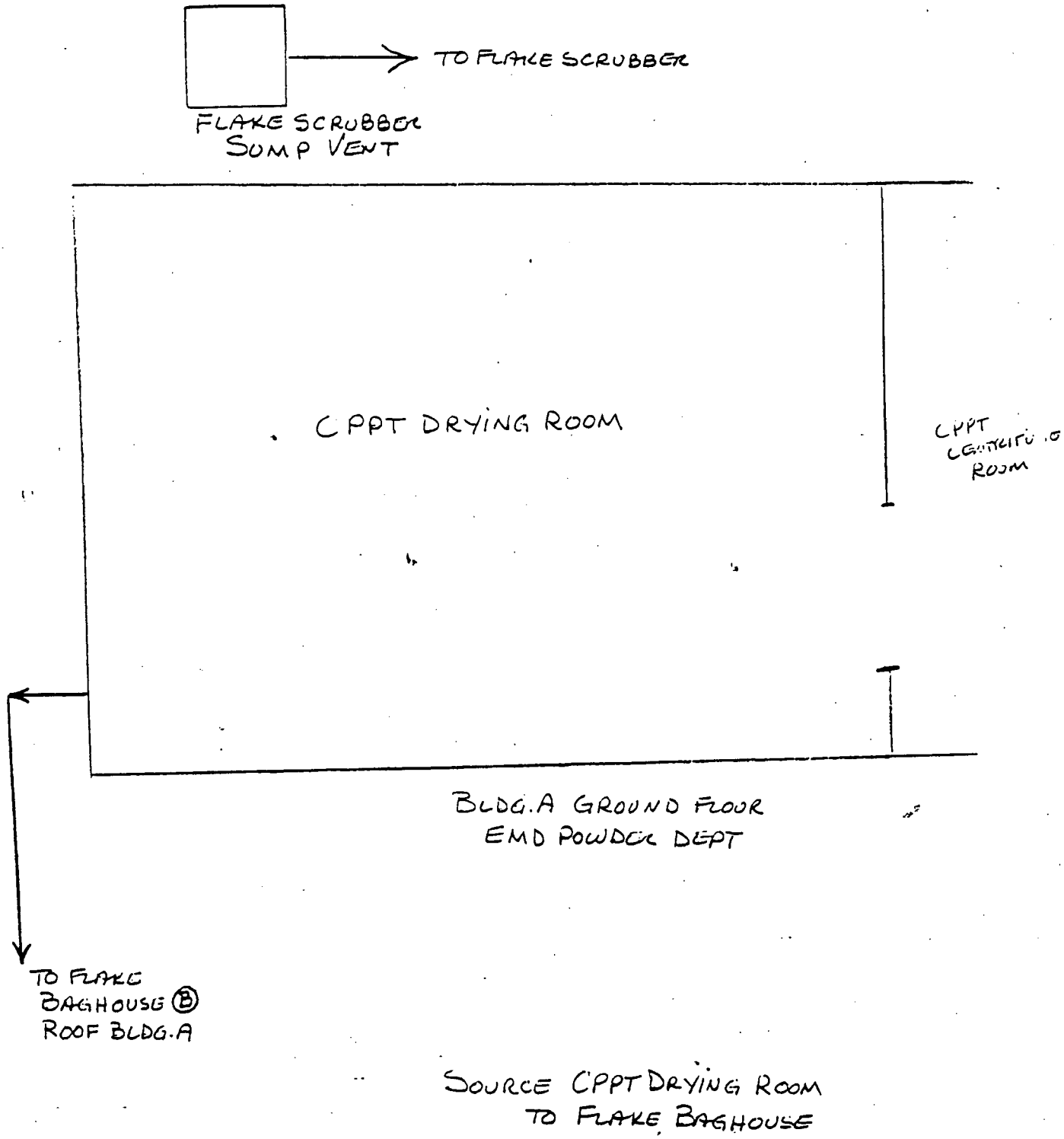
ATTACHMENT LL-11



BLDG. A - GROUND FLOOR
EMD POWDER DEPT.

ATTACHMENT 66-12

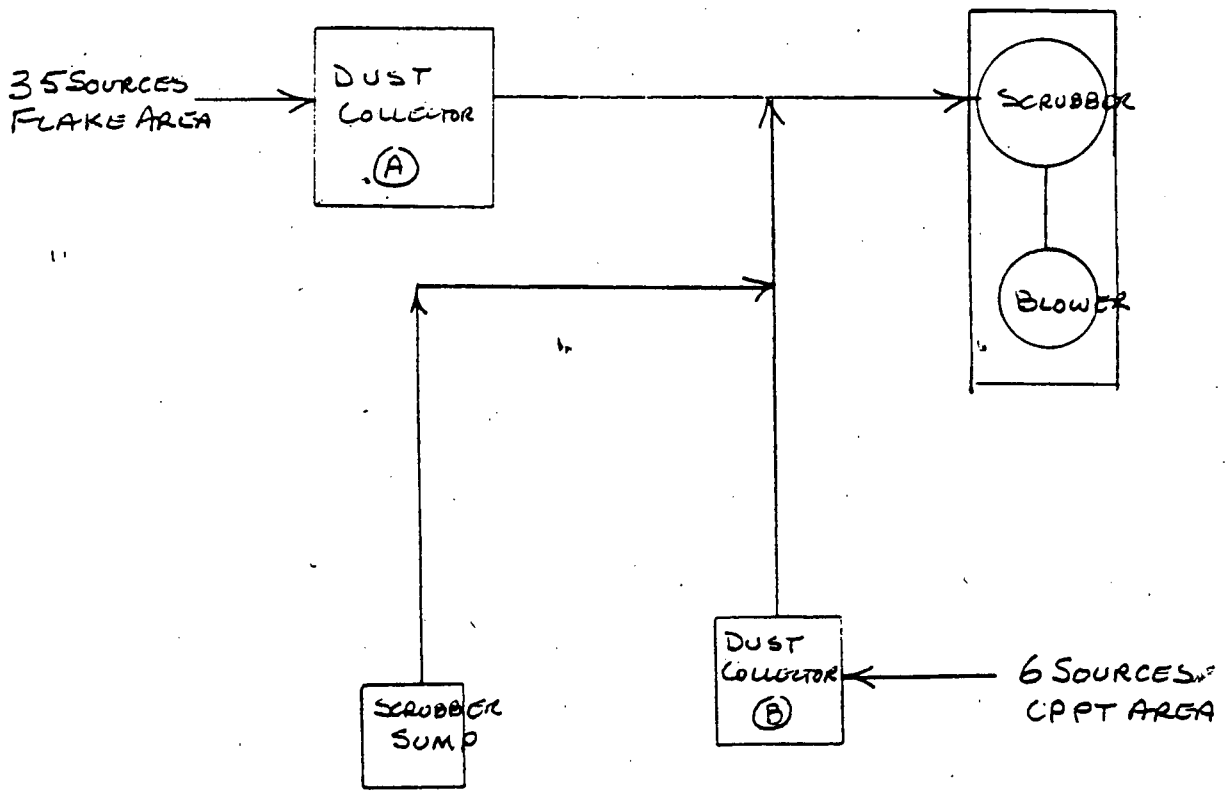
SOURCES FROM CPPT CENTRIFUGE ROOM
TO FLAKE BAGHOUSE



SOURCE CPPT DRYING ROOM TO FLAKE BAGHOUSE

ATTACHMENT LL-13

ROOF LAYOUT OF FLAKE BAGHOUSE SYSTEM
DEGUSSA CORP. - METE DIVISION



ATTACHMENT LL-14

ATTACHMENT MM

DEQ-062
1/88

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
BUREAU OF ENFORCEMENT OPERATIONS

FIELD INVESTIGATION ASSIGNMENT REPORT

PLANT ID #	INSPECTOR ASSIGNED
15465	MCHD

DATE ASSIGNED	DATE DUE
12-28-88	1-28-89
DATE COMPLETED	COUNTY
4-14-89	Mid

COMPANY NAME Degussa Corp
LOCATION Metal + Catalyst Div. So. Plainfield
CDS CLASS: A1 ___ A2 ___ B X NSPS ___ NESHAPS ___ PSD ___
AIR GRANT (105): ☐ Yes ☒ No PLLT: PT ___ S2 ___ CO ___ N2 ___ VO ___ Other ___

TYPE OF ASSIGNMENT
☐ Complaint ☒ APEDS
☐ Order Followup
☐ Other (by code) ___

CYCLE: 5

COMPLAINANT NAME ___ PHONE # ___
COMPLAINANT ADDRESS ___
DATE RECEIVED ___ TIME RECEIVED ___ RECORDED BY ___

ASSIGNMENT ___

PLANT CONTACT Hans Kuehn
TITLE Production Director - Catalyst Div.
ARRIVAL TIME AT PLANT 1345
TOTAL ASSIGNMENT TIME 36 units
STACKS INSPECTED 3 TEMPS 1
TOTAL SOURCES INSPECTED 23
DEQ-012 COMPLETED FOR SUBCHAPTERS —

SUBCHAPTER	# INSP
3	1
5	1
6	1
8	4
OTHER	

COMPLAINT	TYPE	NUMBER

Time/Date at Complainant ___ / ___
Verified: ☐ Yes ☐ No
Give details below

VIOLATION FOLLOWUP INSPECTION
Violation Log # ___
Order Dated ___
Subchapter Violated ___
Compliance Achieved ☐ Yes ☐ No
Give details below

TYPE SAMPLE COLLECTED —
OF SAMPLES COLLECTED —
COMMENTS (by code) 001 005 all 008 existing

DETAILS OF INSPECTION Inspected seventeen sources which exhaust through stack #001 (formerly plct. temp./conditional # 076110, now temp./conditional Log # 0188390, - approved 3/9/89 for the addition of fifteen sources.
Of these seventeen sources, only three were in operation, venting out the stack: the catalysts centrifuge and two platinum nitrate 100 liter glass dissolvers - emitting reddish NO_x gases through the glass venturi countercurrent scrubber. No odors or visible emissions downwind of stack. Four potassium gold cyanide sources are in process of removal which vent to stack #001. Unable to obtain delete letter from company for these PGC sources at this time. No additional sources added which require permitting. In compliance with subchapter 8. Six more sources plus a scrubber to stack #001 are expected to be installed by July 1989. All are approved for installation, based on copies of VEM 003, 004 obtained from company.
Inspected 3,347,000 BTU/hr. Cleaver Brooks gas boiler stk #003 plct # 062726 - in compliance with subchapters 3 and 8. No visibles.
Inspected analytical lab exhaust sources - not in use. - covered by stack #002 plct # 062725. In compliance with 8.

INSPECTOR'S SIGNATURE Steven Rose
TITLE: Env. Spec.
SUPERVISOR'S REVIEW
INITIALS: ___ DATE: 4-26-89

SEE ATTACHED FOR ADDITIONAL INFORMATION: ☐ YES ☒ NO

Inspected stackless 1200°C Degussa platinum powder oven which bakes 150 Troy ounces of platinum powder / hour. No permit required, < 50 lbs./hr.

ATTACHMENT MM-1

Investigation Summary

SOURCE Degussa Corporation

LOCATION 104 New Era Drive South Plainfield
No. Street Municipality

MAILING ADDRESS 07080

PERSON(S) INTERVIEWED Hans Kuehn Prod. Dir. - Catalyst Div.
Title
Ray Smith Asst. Plant Mgr.
Title

☑ PREMISES ENTERED / TIME IN 1:45 a.m. p.m. OUT 3:40 a.m. p.m.
☑ N.C.A. ☐ V.N.# _____ SPECIFIC permits APEDs

COMPLAINT # _____ FI # 061-89

DATE 4-14-89 TIME 1:45 a.m. p.m.

CHAPTER REF. (8) (5) (6)

☐ SINGLE _____ ☐ MULTIPLE _____

CLIMATIC CONDITION:
☐ Clear ☒ Cloudy ☐ Fog
☐ Rain ☐ Snow

WIND: Vel. 10 TEMP. 58°F
Dir. S-SW

OBSERVATIONS Company at this location since 1982. Manufactures precious metal salts & catalysts. No underground storage tanks, no incinerators, no visible emissions from boiler stack while in operation (plct. # 062726).

No visible emissions or odors of property downwind of processes stack (stack #001, formerly plct. # 076110, now approved 3-9-89 Log # 01883901 for the addition of 15 sources requiring permit/certificate inclusion). Obtained copies of all updated VEM 004's and VEM 003 for stack #001. Inspected seventeen of a total of 23 listed sources currently existing/installed which vent through stack #001. Construction on six pilot plant sources plus dedicated scrubber in newly built addition has not yet begun. Installation expected July - August 1989. Of the seventeen sources inspected, only 3 were currently in operation venting thru stack #001. These included the (1) catalysts centrifuge, which is connected to stack #001 ductwork only during certain phases of centrifugal process to precipitate metal catalyst out of solution, and (2) & (3) two - 100 liter glass platinum nitrate dissolvers, observed emitting reddish NO_x emissions to a countercurrent venturi packed tower glass scrubber. Scrubber has automatic sensor probe electrodes which automatically

RECOMENDATIONS NCA. All equipment installed/operating is in compliance with subchapter (8). No legal action required. Equipment appears very well maintained & operated. Company is environmentally conscious - even has permit on QC lab ven

INVESTIGATED BY: Steven Rose Env. Spec.
signed title

ASSISTED BY: _____ _____
signed title

PROCESSED FOR FURTHER ACTION [signature]
Super.
[signature] 4-26-89
Specific Date

APPROVED BY: [signature] 4/17/89

ATTACHMENT MM-2

activates metering pumps to increase NaOH or hydrogen peroxide concentration to scrubbing solution as required.

Plant operates six chloride units (3 w/ stirrers, 3 w/o stirrers) plus these two nitrate dissolvers 24 hours/day 5 days/wk. with shutdown occuring Friday afternoons (now). These 8 sources vent thru the glass dedicated scrubber to stack #001 and are pressurized reflux reactions.

All other sources installed in accordance to permit/certificate application forms VEM 003.

Observed four PGC (platinum gold cyanide) sources partially disconnected and/or removed. Company awaiting sale prior to requesting deletion of these four sources from stack #001 Log# 01883901.

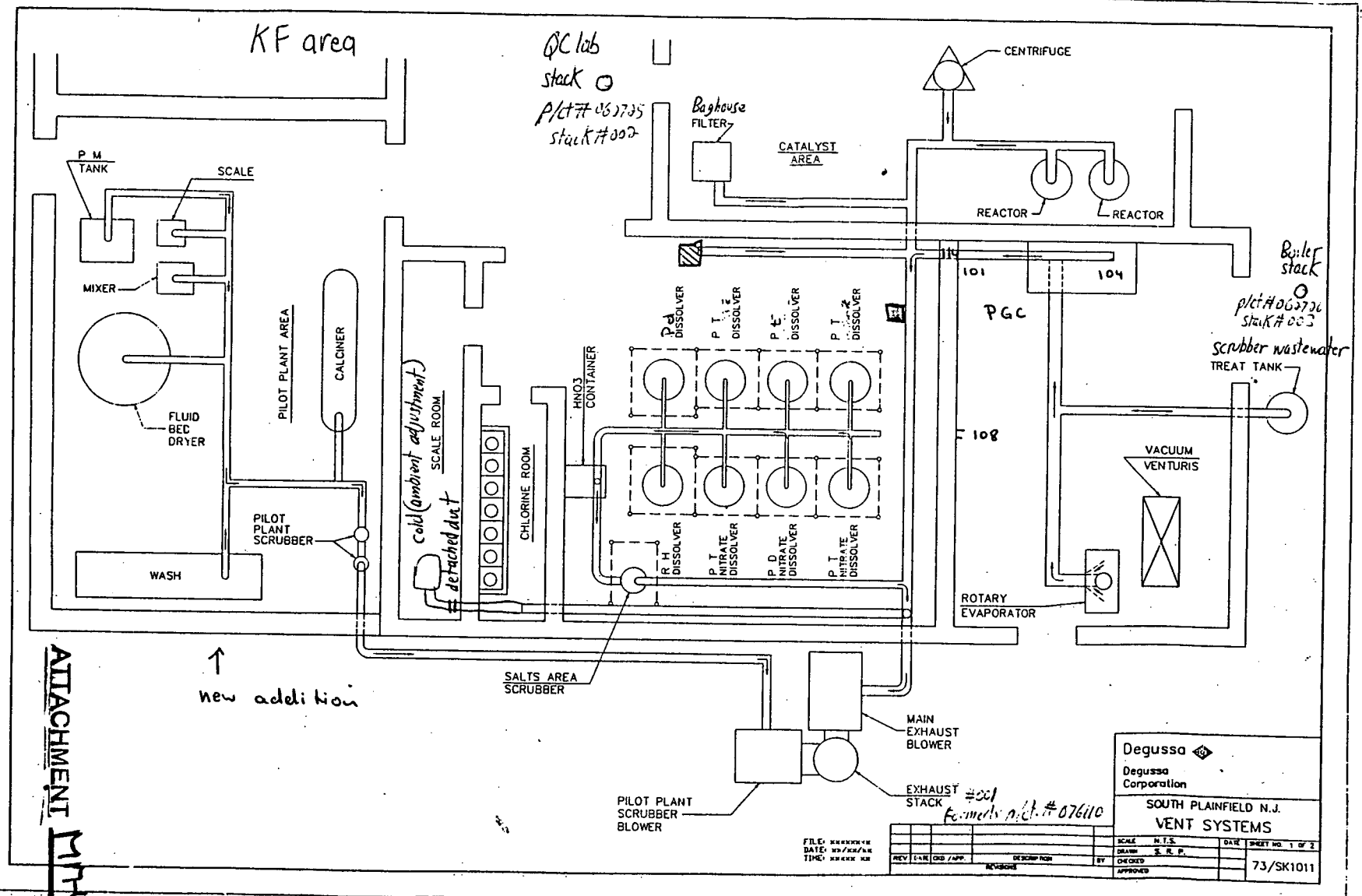
Observed three other connected sources to stack #001 not permitted. They include a duct from the chlorine tank storage room, a duct from the Nitric acid drum storage booth, and a duct from an emergency walk in hood. None are manufacturing processes and do not vent under normal circumstances. No permit inclusion required for these sources.

Also observed a disconnected source duct from the scale room, where cold products are weighed and concentrations of solutions are adjusted prior to sale. No permit req'd. Not a manufacturing process. Ductwork not connected to "equipment".

Also inspected an unconnected Degussa 2'x2' platinum powder electric 1200°C oven. Here 150 ounces of platinum powder is baked in a quartz tray lined with "filter paper to keep the platinum from adhering to the tray. "Burnt soot" marks on wall in back of oven from burning of the filter paper. No permit required; < 50 lbs./hr. No stack. Number of sources matches those listed in applications, all accounted for, amounts and types of raw materials used in batches for each source consitant with #'s listed on permit. In compliance with Sub-8

ATTACHMENT MM-3

Degussa [illegible] Metz Metallurgical since 1987



stackless Degussa platinum powder oven

Emergency walk in fume hood

FI#061-89

= equipment in use

ATTACHMENT

ATTACHMENT NN

DEPARTMENT OF HEALTH
COUNTY OF MIDDLESEX, NEW JERSEY
417 DENNISON STREET
HIGHLAND PARK, N.J. 08904
(201) 828-8100

LASZLO SZABO, M.P.H., M.P.A
DIRECTOR

No. 3665

NOTICE OF VIOLATION

Jan. 24, 1985

TO: Mr. C. Scott Eves
Engineering Assistant
Metz Metallurgical Corp.
3900 S. Clinton Avenue
South Plainfield, N.J. 07080

RE: AIR POLLUTION CODE OF
THE Middle-Brook Regional Health Commission
& Boro of South Plainfield Ordinance #78-1M
VIOLATION EXISTS AT THE PREMISES
KNOWN AS: Metz Metallurgical Corp.
3900 S. Clinton Ave.
South Plainfield, N.J.
NJ Plant ID# 15305

DEAR SIR:

An investigation or inspection by Agency personnel was conducted at the premises noted above on 12/26/84 . The investigation or inspection disclosed that a violation of Section 8:2 (see below) of the Air Pollution Control Code Ordinance of the Boro of South Plainfield did exist at Bldg. A, Incinerator, NJBAPC P/CT# 041538, Stack #020, between 11:00 A.M. and 11:30 A.M.

This violation makes you liable to prosecution under the ordinance cited. This notice should not be construed as to relieve you from liability under the aforementioned ordinance. A separate offense shall be deemed committed on each day during, or on which, a violation occurs or continues. You are therefore requested to take those necessary steps to correct this condition.

SECTION 8:2 : The investigation or inspection discloses no person shall cause, suffer, allow or permit smoke from any incinerator the shade or appearance of which is darker than No. 1 of the Ringelmann Smoke Chart to be emitted into the open air; or emissions of such opacity within a stack or chimney, or exclusive of water vapor, of such opacity leaving a stack or chimney to a degree greater than the emission designated as No. 1 of the Ringelmann Smoke Chart.

Specifically: Excessive Black Smoke Emissions

- [x] This notice shall be regarded as a warning notice provided that the violation does not continue or recur.
- [ ] This violation is being processed for legal action in Municipal Court.
- [ ] This violation is being forwarded to the New Jersey Bureau of Air Pollution Control for a violation of N.J.A.C. 7:27 _____ et. seq. section _____.
- [ ] Other:

RICHARD J. HILLS
Program Coordinator

C# 1137-84, Inspector DiGangi

ATTACHMENT NN-1

CC: N.J. Bureau of Air Pollution Control

MAILGRAM SERVICE CENTER
MIDDLETOWN, VA. 22645
07AM

Western Union Mailgram

4-002643S280002 10/07/85 ICS IPMMTZZ CSP NWKB
1 2015611100 MGM TDMT SOUTH PLAINFIELD NJ 10-07 0809A EST

METZ METALLURGICAL C EVES
3900 SOUTH CLINTON AVE
SOUTH PLAINFIELD NJ 07080

THIS IS A CONFIRMATION COPY OF THE FOLLOWING MESSAGE:

2015611100 MGMB TDMT SOUTH PLAINFIELD NJ 137 10-07 0809A EST
ZIP
BYRON SULLIVAN
NEW JERSEY DEPT OF ENVIRONMENTAL PROTECTION
BUREAU OF AIR POLLUTION CONTROL
TWIN RIVERS PROFESSIONAL BLDG
EAST WINDSOR NJ 08520
THIS IS A CONFIRMATION OF THE TELEPHONE CONVERSATION WE HAD ON
10-4-85. FRIDAY 10-4-85 WE HAD AN AIR POLLUTION INCIDENT THAT LASTED
14 MINUTES FROM 1108AM UNTIL 1122AM. NOX WAS DISCHARGED FROM OUR
VESSEL R-20 (P/CT #68233, NJ STACK #033). THE AMOUNT DISCHARGED WAS
APPROXIMATELY 2.04 POUNDS. AT THIS TIME IT APPEARS AS IF 3 FACTORS
WERE INVOLVED: 1) THE AMOUNT OF MATERIAL PROCESSED WAS TOO GREAT, 2)
THE PH WAS NOT HIGH ENOUGH, AND 3) THE REACTION WAS RUN TOO RAPIDLY.
THE QUANTITY OF NOX GENERATED OVERWHELMED THE AIR POLLUTION CONTROL
DEVICE CONNECTED TO THIS SOURCE. MORE STRINGENT ADMINISTRATIVE
CONTROLS HAVE BEEN IMPLEMENTED TO ASSURE THAT THIS WILL NOT OCCUR
AGAIN.

CORDIALLY
C SCOTT EVES

08:08 EST

MGMCOMP

ATTACHMENT NN-2

METZ METALLURGICAL CORP.
3900 SO. CLINTON RD.
SO. PLAINFIELD, NJ 07080

Western Union Mailgram

4-0082251019 01/19/87 TWX METZ SOPD NWKB
1611915 SO. PLAINFIELD, NJ 1/19/87

MS. DONNA OSTMANN
SOUTH PLAINFIELD BOARD OF HEALTH
2480 PLAINFIELD AVE.
SOUTH PLAINFIELD, NJ 07080

JANUARY 19,1987
MESSAGE NO. - 1611915

TODAY, 1-19-87, WE HAD AN EMISSION OF SMOKE FROM OUR SENACA BAGHOUSE (P/CT #073949, NJ STACK #056). THE EMISSION LASTED 24 MINUTES FROM 12:01 PM UNTIL 12:25 PM. THE MATERIAL EMITTED WAS SMOKE FROM THE BAGHOUSE. THE CARTRIDGES INSIDE THE BAGHOUSE IGNITED AND BURNED. AN UNKNOWN AMOUNT OF SMOKE WAS RELEASED. ALL PROCESSES THAT REQUIRE THIS BAGHOUSE WILL BE HALTED UNTIL REPAIRS CAN BE MADE.

CORDIALLY,
C. SCOTT EVES
MANAGER ENVIRONMENTAL CONTROL DEPT.
METZ METALLURGICAL CORP.

16:30 EST

MGMCOMP

RECEIVED
JAN 20 1987
BOARD OF HEALTH
So. Plainfield,
N. J.

ATTACHMENT NN-3

5241 (R 7/82)

TO REPLY BY MAILGRAM MESSAGE, SEE REVERSE SIDE FOR WESTERN UNION'S TOLL - FREE PHONE NUMBERS

TD LOG # L12468

New Jersey Department of Environmental Protection
Div. of Environmental Quality — Bur. of Communications & Support Services
Phone: (609) 292-7172

COMMUNICATIONS CENTER NOTIFICATION REPORT

CASE NO. 89-10-30-113514 (Yr) (Mo) (Day) (Time)

DATE 10-30-89 (Mo) (Day) (Yr) REC'D BY VAZQUEZ / (Initials) REVIEWED BY R. Mah

NATURE OF INCIDENT: ___Citizen Notification ___Munic. Notification ✓Facil. Notification ___Other Notification

INCIDENT REPORT BY:
Name LINDA BRENNON Phone 201 561-1100
Street
Municipality State
Affiliation/Title METZ-METALLURGICAL / ENVIRONMENTAL CO. MANAGER

INCIDENT LOCATION: ___Transportation ✓Facility ___Other
Name (Site) METZ-METALLURGICAL Phone 201 561-1100
Street 3900 S CLINTON
Municipality SOUTH PLAINFIELD County MIDDLESEX State N.J. Zip Code
Location Type: ___Residential ✓Industrial ___Rural ___Sensitive Population (Hospital, School, Nursing Home)
Date of Incident: 10-30-89 (Mo) (Day) (Yr) Time: 1345

IDENTITY OF SUBSTANCE(S) SPILLED, RELEASE, ETC.: ✓Known ___Suspected ___Unknown ___None
Name of Substance(s): (Gas, Liquid, Solid) NOx
TCPA Chemical (Y/N/U) CAS Number N/A
Amount Released/Spilled UNKNOWN ___Actual ___Potential ___Estimated
Substance Contained (Y/N/U) ✓
Type of Release/Spill: ✓Terminated ___Continuous ___Intermittent
Hazardous Material (Y/N/U) A310 Letter (Y/N) COMU CODE 1222 REF CODE 02

INCIDENT DESCRIPTION: ✓
___Fire ___Explosion ✓Air Rel ___Spill ___Abandoned Containers ___Illegal Dumping
___MVA ___Odors ___Smoke/Dust ___Sewage ___NJPDES ___L.U.S.T. ___Wildlife
___Equip. Startup/Shutdown, Equip. Fail/Upset, etc.
___Other (Derailment, Ocean Dumping, Noise, etc.)

Injuries (Y/N/U) Public Exposure (Y/N/U)
Facility Evacuation (Y/N/U) Police at Scene (Y/N/U)
Public Evacuation (Y/N/U) Firemen at Scene (Y/N/U)
Contamination of ✓Air ___Land ___Water Assistance Requested (Y/N/U)
Receiving Water N/A Wind Direction/Speed UNK / N/A

STATUS AT INCIDENT SCENE RELEASE OF MATERIAL NOx CONTAINED IN FACILITY. CAUSE UNKNOWN. COMPANY WILL HANDLE CLEAN-UP ACTION.

RESPONSIBLE PARTY: ___Known ___Suspected ___Unknown
Company Name METZ METALLURGICALL Phone
Contact SCOTT EVES Title ENV. CONTROL MANAGER
Street 3900 S CLINTON
Municipality SOUTH PLAINFIELD County MIDDLESEX State N.J. Zip Code

OFFICIALS NOTIFIED (Name/Title):
NJSP Lt. HANSON / CEM Phone OFFICE Date/Time 10/30 / 1405 (T/M)
Local Health / Phone Date/Time / (T/M)
Local Munic. CUMISKY / PLAINFIELD Phone 755-0700 Date/Time 10/30 / 1406 (T/M)
Other / Phone Date/Time / (T/M)

INCIDENT REFERRED TO:
✓DEQ ___DWR ___DSWM ___DHSM ___DOH ___DFG ___DPF ✓DCJ ___DCR
Region: ___Northern ___Metro ___Central ___Southern ___ER1 ✓ER2
1. Name/Affil SCHRADER / ER-2 Phone OFFICE Date/Time 10/30 / 1406 (T/M)
2. Name/Affil / Phone Date/Time / (T/M)
3. Name/Affil / Phone Date/Time / (T/M)

COMMENTS
ATTACHMENT VV-1

COPIES: White - Comm. Center Yellow - Lead Agency Pink - A310

MIDDLESEX COUNTY HEALTH DEPARTMENT
AIR POLLUTION CONTROL PROGRAM
COUNTY ANNEX BUILDING
841 GEORGES ROAD
NORTH BRUNSWICK, NJ 08902
(201) 745-4350
FAX # (201) 745-2410

BERNARD G. MIHALKO
DIRECTOR

RICHARD J. HILLS
PROGRAM COORDINATOR

NOTICE OF VIOLATION

No. 5269

Oct. 2, 1990

TO: Mr. C. Scott Eves
Environmental Control Manager
Metz Metallurgical Corp.
3900 South Clinton Ave.
South Plainfield, NJ 07080

RE: AIR POLLUTION ACT/CODE/ORDINANCE OF THE
State of NJ Air Pollution Control Act
26:2C-1 et. seq.
VIOLATION EXISTS AT THE PREMISES KNOWN AS:
Metz Metallurgical Corp.
3900 South Clinton Ave.
South Plainfield, NJ

DEAR Mr. Eves:

N.J. PLANT ID# 13305

An investigation or inspection by Program personnel was conducted at the premises noted above on 9/14/90. The investigation or inspection disclosed that a violation of the regulation cited below contained in the referenced Air Pollution Code of the State of New Jersey did exist at Dayco #2 Oven (NJDEP stack # 074, permit/certificate #094060)

Regulation 26:2C-19(e): Any person who causes a release of air contaminants in a quantity or concentration which poses a potential threat to public health, welfare or the environment or which might reasonable result in citizen complaints shall immediately notify the Dept.

Specifically: Failure to immediately notify NJDEP of a release of metal particulates of a concentration which resulted in citizen complaint and posed a potential threat to public health and the environment.

This violation makes you liable to prosecution under the referenced code. This notice should not be construed as to relieve you from liability under the aforementioned Code. A separate offense shall be deemed committed on each day during, or on which, a violation occurs or continues. You are therefore requested to take those necessary steps to correct this condition.

☐ This notice shall be regarded as a warning notice provided that the violation does not continue or recur.

☐ This violation is being processed for legal action in Municipal Court.

☐ This violation is being forwarded to the New Jersey Department of Environmental Protection Division of Environmental Quality for a violation of:
N.J.A.C. 7:27 _____ et. seq. Section _____ and/or
N.J.S.A. [illegible] et. seq. Section [illegible].

☐ Other:

for RICHARD J. HILLS
Program Coordinator

Reference # [illegible]
CC: N.J. Bureau of Air Pollution Control, M.F.O./C.F.O.
Sent Regular Mail

ATTACHMENT NN-5

Bureau of Communications & Support Services
Phone: (609) 292-7172

COMMUNICATIONS CENTER NOTIFICATION REPORT

CASE NO. 90-12-17-1405 (Yr) (Mo) (Day) (Time)

DATE 12.17.90 (Mo) (Day) (Yr) REC'D BY CASEY (Initials) REVIEWED BY [illegible]

NATURE OF INCIDENT: ___Citizen Notification ___Munic. Notification X Facil. Notification ___Other Notification

INCIDENT REPORT BY:
Name SCOTT EVES Phone 201-561-1100
Street 3900 South Clinton Ave.
Municipality South Plainfield State NJ
Affiliation/Title DEGUSSA CORP/METZ DIV. / ENVIRON MGR

INCIDENT LOCATION: ___Transportation X Facility ___Other
Name (Site) DEGUSSA CORP/METZ. DIV. Phone 201-561-1000
Street 3900 S. CLINTON AVE.
Municipality South Plainfield County Middlesex State NJ Zip Code
Location Type: ___Residential X Industrial ___Rural ___Sensitive Population (Hospital, School, Nursing Home)
Date of Incident: 12-11-90 (Mo) (Day) (Yr) Time: 0830

IDENTITY OF SUBSTANCE(S) SPILLED, RELEASE, ETC.: X Known ___Suspected ___Unknown ___None
Name of Substance(s): (Gas, Liquid, Solid) Silver Powder & Silver Flake
TCPA Chemical (Y/N/U) CAS Number [illegible]
Amount Released/~~Spilled~~ UP TO 15 LBS ___Actual X Potential ___Estimated
Substance Contained (Y/N/U)
Type of Release/Spill: X Terminated ___Continuous ___Intermittent
Hazardous Material (Y/N/U) A310 Letter (Y/N) 1222 COMU CODE 05 REF CODE

INCIDENT DESCRIPTION:
___Fire ___Explosion X Air Rel ___Spill ___Abandoned Containers ___Illegal Dumping
___MVA ___Odors ___Smoke/Dust ___Sewage ___NJPDES ___L.U.S.T. ___Wildlife
X Equip. Startup/Shutdown, Equip. Fail/Upset, etc.
___Other (Derailment, Ocean Dumping, Noise, etc.)

Injuries (Y/N/U)
Facility Evacuation (Y/N/U)
Public Evacuation (Y/N/U)
Contamination of X Air ___Land ___Water
Receiving Water None

Public Exposure (Y/N/U)
Police at Scene (Y/N/U)
Firemen at Scene (Y/N/U)
Assistance Requested (Y/N/U)
Wind Direction/Speed ___/___

STATUS AT INCIDENT SCENE AIR RELEASE CAUSED BY EQUIPMENT FAILURE.

RESPONSIBLE PARTY: X Known ___Suspected ___Unknown
Company Name DEGUSSA CORP/METZ DIV Phone 201-561-1100
Contact SCOTT EVANS Title ENVIRON MGR.
Street 3900 SOUTH CLINTON
Municipality South Plainfield County Middlesex State NJ Zip Code

OFFICIALS NOTIFIED (Name/Title):
NJSP ___/___ Phone ___ Date/Time ___/___(T/M)
Local Health ___/___ Phone ___ Date/Time ___/___(T/M)
Local Munic. ___/___ Phone ___ Date/Time ___/___(T/M)
Other ___/___ Phone ___ Date/Time ___/___(T/M)

INCIDENT REFERRED TO:
X DEQ ___DWR ___DSWM ___DHSM ___DOH ___DFG ___DPF ___DCJ ___DCR
Region: ___Northern ___Metro X Central ___Southern ___ER1 ___ER2
1. Name/Affil ___/ AIR-C Phone ___ Date/Time 12-17-90 / ___(T/M)
2. Name/Affil ___/___ Phone ___ Date/Time ___/___(T/M)
3. Name/Affil ___/___ Phone ___ Date/Time ___/___(T/M)

COMMENTS

ATTACHMENT NN-6

COPIES: White - Comm. Center Yellow - Lead Agency Pink - A310

Degussa

Degussa
Corporation

Metz Division

RECEIVED

JAN 24 1 00 PM '90

DEPT. OF ENVIRONMENTAL PROTECTION
DIV. OF ENVIRONMENTAL QUALITY
CENTRAL REGIONAL
ENFORCEMENT OFFICE

January 18, 1991

Certified# P 122 478 066

NJDEP
Division of Environmental Quality
Bureau of Enforcement Operations
CN-407
Trenton, NJ 08625-0407

ATTN: Mr. Joseph DePierro

In response to your letter of December 18, 1990:

1) Cause of the incident:

An operating piece of equipment, a jet mill, malfunctioned causing the silver being processed to become airborne. The malfunction was caused by a foreign object plugging the feed stream.

2) Material and quantity released:

From a mass balance on the batch being processed - 15 pounds of silver powder/flake.

3) Off site impacts:

Air release only. No water body, no police, no Fire Department, and no assistance requested by Degussa.

4) New Jersey Stack # and Certification # for equipment involved:

Although the jet mill itself has no exit to atmosphere, the airborne silver exited through the silver flake air dry box which is Stack #040 and Certification #061261.

Very truly yours,

James D. Leahey
Manager
Permits Administration
Environmental Control Dept.

ATTACHMENT NN-7

JDL:jn
NJDEP.122

3900 South Clinton Avenue South Plainfield, NJ 07080 908-561-1100 FAX 908-769-9456 TWX 710-997-9524

MIDDLESEX COUNTY HEALTH DEPARTMENT
AIR POLLUTION CONTROL PROGRAM
COUNTY ANNEX BUILDING
841 GEORGES ROAD
NORTH BRUNSWICK, NJ 08902
(908) 745-4350
FAX # (908) 745-2410

BERNARD G. MIHALKO
DIRECTOR

RICHARD J. HILLS
DIVISION HEAD

NOTICE OF VIOLATION

No. [illegible]

Feb. 5, 1991

TO: Mr. G. Scott Eves
Manager Environmental Control
Degussa Corporation
3900 South Clinton Ave.
South Plainfield, NJ 07080

RE: AIR POLLUTION ACT/CODE/ORDINANCE OF THE
NJ State Dept. of Environmental Protection
NJ Administrative Code, Title 7, Chapter 27
VIOLATION EXISTS AT THE PREMISES KNOWN AS:
Degussa Corporation/Kets Division
3900 South Clinton Ave.
South Plainfield, NJ

DEAR Mr. Eves:

N.J. PLANT ID# 15305

An investigation or inspection by Program personnel was conducted at the premises noted above on 1/17/91. The investigation or inspection disclosed that a violation of the regulation cited below contained in the referenced Air Pollution Code of the State of New Jersey did exist at the waste water scrubber system covered under NJDEP/BAPC p/ct #395010 NJ stack 060 (between 10:40am thru 12:15pm)

Regulation 5.2(a): Notwithstanding compliance with other Subchapters of this Chapter, no person shall cause, suffer, allow or permit to be emitted into the outdoor atmosphere substances in quantities which shall result in air pollution as defined herein.

Specifically: Allowed acid type odors to be transported beyond property lines resulting in verified citizen compliant.

This violation makes you liable to prosecution under the referenced code. This notice should not be construed as to relieve you from liability under the aforementioned Code. A separate offense shall be deemed committed on each day during, or on which, a violation occurs or continues. You are therefore requested to take those necessary steps to correct this condition.

☐ This notice shall be regarded as a warning notice provided that the violation does not continue or recur.

☐ This violation is being processed for legal action in Municipal Court.

☐ This violation is being forwarded to the New Jersey Department of Environmental Protection Division of Environmental Quality for a violation of:
N.J.A.C. 7:27 [illegible] et. seq. Section 5.2(a) and/or
N.J.S.A. _____ et. seq. Section _____.

☐ Other:

RICHARD J. HILLS
Division Head

Reference # [illegible]
CC: N.J. Bureau of Air Pollution Control, M.F.O./C.F.O.
Sent Regular Mail-

ATTACHMENT NN-8

Let's protect our Earth

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
CN 027, TRENTON, NJ 08625

IN THE MATTER OF METZ METALLURGICAL 3900 S. CLINTON AVE. SOUTH PLAINFIELD, N.J. 07080 LOG #A860096 CDS	: : : : :	ADMINISTRATIVE ORDER AND NOTICE OF CIVIL ADMINISTRATIVE PENALTY ASSESSMENT

JAN 23 1986

This ORDER and NOTICE are issued pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (the "Department") by N.J.S.A. 13:1D-1 et seq., and the Air Pollution Control Act, N.J.S.A. 26:2C-1 et seq. (the "Act"), and duly delegated to the Assistant Director for Enforcement of the Division of Environmental Quality pursuant to N.J.S.A. 13:1B-4.

FINDINGS

1. As the result of an investigation conducted on October 7, 1985, the Department has determined that at your facility located at 3900 S. Clinton Avenue, Boro of South Plainfield, Lot(s) 29, Block(s) 467-A, County of Middlesex, State of New Jersey, (ID #15305) you used the equipment and/or control apparatus associated with Permit(s) to Construct, Install or Alter Control Apparatus or Equipment and Certificate(s) to Operate Control Apparatus or Equipment (P & CT(s) see below) without fulfilling all conditions and provisions of the Permit(s) and Certificate(s), in violation of N.J.A.C. 7:27-8.3(e)1 by Operating vessel R-20 (P/CT-68233) while overcharging the vessel, running the reaction too rapidly and operating the scrubber with low liquor ph, resulting in a release of oxides of nitrogen to the outdoor air.

ORDER

2. NOW, THEREFORE, IT IS HEREBY ORDERED THAT on or before February 11, 1986, you cease operation of the equipment listed in Paragraph 1 above or operate said equipment in accordance with the above Permit(s) and Certificate(s).

3. Based upon the above FINDINGS, and a review of the entire matter, the Department hereby assesses a Civil Administrative Penalty against you in the amount of $800.00. Payment must be submitted to the Department within twenty (20) calendar days of receipt of this Order and Notice unless you request a hearing in accordance with the provisions of Paragraph 4 below. Payment must be made to the Department at the address listed in Paragraph B of Attachment I.

ATTACHMENT NN-9

4. Pursuant to N.J.S.A. 26:2C-14.1 you are entitled to a hearing if aggrieved by this Order and Notice. Application for such a hearing must be made pursuant to N.J.A.C. 1:1-6.1(b) and must be received by the Department within twenty (20) calendar days from receipt of this Order and Notice. In applying for such hearing, you must furnish the Department with the information listed in Paragraph A of Attachment I. If no request for a hearing is received within twenty (20) calendar days, this Order and Notice shall become a final Order and the Penalty will then become due and payable. A hearing request does not stay the terms or effect of this Order.

5. The provisions of this Order and Notice shall be binding on you, your principals, agents, employees, successors, assigns, tenants and any trustee in bankruptcy or receiver appointed pursuant to a proceeding in law or equity.

6. No obligations imposed by this Order and Notice, with the exception of Paragraph 3, are intended to constitute a debt, damage claim, penalty or other civil action which should be limited or discharged in a bankruptcy proceeding. All obligations imposed by this Order shall constitute continuing regulatory obligations imposed pursuant to the police powers of the State of New Jersey, intended to protect the public health, safety and welfare.

7. NOTICE IS GIVEN, that pursuant to N.J.S.A. 26:2C-19(b) and N.J.S.A. 26:2C-19(d), any person who violates the provisions of the Act, or any code, rule regulation or order promulgated or issued pursuant thereto, or who fails to pay a civil administrative penalty in full, shall be liable to a penalty of up to $10,000 for the first offense, $25,000 for the second offense, and $50,000 for the third and each subsequent offense.

Dated: January 21, 1986

Allan T. Edwards
Acting Assistant Director
Enforcement Element

ATTACHMENT NN-10

ATTACHMENT OO

December 3, 1982

Mr. Mazar
Metz Metallurgical
3900 South Clinton Avenue
South Plainfield, N.J. 07080

Dear Mr. Mazar:

Enclosed is our report of the walk-through inspection of your plant conducted on November 19th and 22nd. We have included all points that we felt were relevant to health and safety conditions in the plant. Those points include information gathered both during our inspection, and through interviews with the complainants. If there are any inaccuracies which require clarification, please let us know.

We have included a list of recommendations for hazard reduction. They include work practice changes that we were able to observe during the walk-through, and areas which need further evaluation to allow thorough hazard assessment and appropriate hazard reduction implementation. We also suggest that a more thorough medical evaluation program be instituted, however, the specific form that it should take is yet to be worked out.

We will contact you in January to discuss these recommendations, and to develop the necessary follow-up activities. If you have any questions, please feel free to call.

Sincerely,

Noah Seixas
Industrial Hygienist

Robert J. Kunze
Industrial Hygienist

NS:ms
Enc.

ATTACHMENT 00-1

INSPECTION REPORT

METZ METALLURGICAL
3900 So. Clinton Ave.
South Plainfield, N.J.

GENERAL

This inspection was the result of complaints received from two employees who stated that there were numerous exposures to toxic chemicals throughout the plant, including cadmium, silver, formaldehyde and that there were reports of respiratory difficulties and skin problems from workers in several areas.

We met with Peter Becker and Dave Berry, vice presidents at Metz, on 11/16 and discussed our authority, the complaint and our desire to inspect the plant. We were asked to produce a letter from Dr. Cohen explaining our authority and to return on Friday for the inspection. We were give the plant tour by Noel Mazar, plant engineer on Friday and the following Monday, 11/22.

The plant employs about 200 people, approximately 160 in production work. The plant extracts precious metals from a variety of sources and produce ingots, wire and powders of various materials. The primary metals produced are silver and cadmium although palladium, platinum, gold and a few other metals are processed in smaller quantities.

Dr. Scalera of South Plainfield conducts all company health exams. All employees are given pre-employment physicals and workers in specified areas are given annual exams. These areas include workers regularly exposed to cadmium and all maintenance department personnel; a total of approximately 50 employees. Exams include pulmonary function, X-rays and urine cadmium levels as well as routine blood screening tests. Employees are not directly given the results of exams, but they are available from the company.

According to the company, OSHA visited the plant in February 1982 for a record review inspection. They found that the company had over-estimated their accident rate from the 200 Log. Nevertheless, a plant inspection for both health and safety was conducted. Detector tubes were drawn in several areas and no over exposures were found based on the PELs. On the basis of these findings, OSHA only did 8-hour sampling for silver. The company also stated that OSHA said that their silver standard was too stringent, and that they would not fully enforce it. According to workers interviewed, the plant was not functioning normally during the OSHA inspection and that clean up efforts had been made in preparation for the OSHA inspection. Metz was cited for over-exposure to silver and the first stage of the abatement process is now underway. OSHA has requested plans for re-engineering the silver powder operation by May 26, 1982 and completion of these controls by 12/1/82. However, the company stated that plans were due by 12/1, suggesting that an informal conference had resulted in an extended abatement period. In addition, the company stated that further extensions of the abatement period were going to be requested.

A Personal Protective Equipment program including the use of asbestos gloves, protective clothing, eye protection, air purifying disposable respirators and purifying air-stream helmets was in place.

ATTACHMENT 00-2

However, there appeared to be a general lack of maintenance on most safety equipment throughout the plant. Airstream helmets not in use were seen lying about in areas where there are high concentrations of toxic dusts. Some cracked helmets were noted and one was seen taped onto an operator, thus reducing its effectiveness. Frequency of replacing the filters was not clearly specified. No clear lines of responsibility for maintenance and distribution of the equipment were evident.

PROCESS DESCRIPTION

Metallurgy: Silver powders, bars, and waste materials are melted in a large refractory crucible, and the molten metal is poured into graphite molds to form ingots. Ventilation is provided however it must be adjusted by the operator to capture fumes from the pouring area. Operators wear aluminized clothing, face shields and asbestos gloves during operation. There is some traffic flow through the melting and pouring area creating a safety hazard.

Adjacent to this "foundry" are a series of break-down, roll, and hot mills which are used to draw out silver bars. No health hazards were noted however a safety inspection was not carried out. According to a worker interviewed, these rolls are cleaned periodically with ammonia creating an airborn exposure problem.

The resulting coiled strips are acid-washed in an adjacent room. The operator maneuvers the coil over the sulfuric acid tank with a crane and dips. No protective equipment was worn. The material may also be degreased in a vapor phase degreaser using Freon. The degreasing system utilizes a cooled water jacket and appears well controlled.

Chemical Department: A series of about 8 vessels in this area are used for forming and crystalizing silver oxide, silver carbonate and silver chloride powders. Formaldehyde is piped into the vessels and both hydrazine and 35% hydrogen peroxide are used in the area from drum containers. All the vessels are vented to the back and appear to control exposures from the vessels as long as the reaction is well controlled, there is no splashing, and the ventilation is working.

In an adjacent room, silver nitrate is formed. Silver is dissolved with nitric acid and oxygen and is then treated in a proprietary process. The silver nitrate is then crystalized and the supernatant is centrifuged off. The crystal is then dropped down onto trays and is hand transfered into a tumble dryer. Persons doing the hand transfer operation wear air-stream helmets however other operators in the room do not. During our inspection, dried crystal had been left in trays on the floor and was being hand transfered into the chute below the tumble dryer and a shop vacuum had been placed by the chute to control the dust release. Nevertheless, a strong irritant effect on the eyes and upper respiratory tract was felt in the area.

Silver-Cadmium: Cadmium oxide and silver are co-precipitated in a reaction vessel. The resulting crystal is then centrifuged and calcined and dried on trays. The powder is then screened and dropped into a chute to the floor below. There is potential exposure during the screening operation although the operator wears the air-stream helmet. The cadmium silver powder is then compacted by an operator who enters a small room with a plastic lined drum. He places the

ATTACHMENT 00-3

drum part way under the chute and activates the pouring mechanism. Large quantities of visible dust are generated. There is a small upward draft created by the local ventilation system, but it is clearly inadequate. Although air-stream helmets are clearly called for here, the operator was wearing only a paper dust mask. When the area foreman was questioned about this practice, he stated that the helmets were too restricting for this job.

Silver Powder: This room is used entirely for screening dry silver powders into different grades. The room has been re-engineered, although the present dust control system is still obviously inadequate. A new system using large cyclones, rather than filter bags is being planned.

Small drums of powder are hoisted with a crane to one of the seives and is placed over the hopper. The operator releases the powder into the hopper, creating a cloud of visible silver dust. As the powders sifts through, dust is trapped by a large filter bag. Two of these set-ups have been fitted with additional temporary enclosures with ventilation. Operators wear air-stream helmets while operating seives, but not at other times in the room.

Flake: Silver powder is added to a mill with a solution of ethyl alcohol, ammonium hydroxide, oleic acid, methanol and one of two Exxon products (Isopar E, or Aromatic 100). Both of these products are petroleum hydrocarbon solvents and the company's MSDS did not specify contents. When the mill is finished mixing, more methanol is added and the slurry is pumped into an open-top decanting vessel with limited exhaust ventilation. The mill is repeatedly washed with methanol (or Aromatic 100) and the flake is also washed with the solvents. After each wash, the flake is left to settle, and then the solvent is decanted off the top into open drums. These drums sit open until the liquid is drained to waste treatment. One type of flake is made in a similar manner with the use of hydroquinone. After decanting of the wet flake, it is spread onto trays by hand and placed in drying ovens. During these processes, potentially high exposures to methanol, ethanol, petroleum distillates and hydroquinone may develop.

Catalyst: A spent catalyst containing about 15% silver is unloaded approximately two days per month. The drummed material is dumped into a floor-level grate creating very high dust levels, according to operators in the area. The grating is partially enclosed although the suction ventilation is reportedly inadequate for the dust generated. The material is conveyed in an air stream from this area to a storage silo and brought back into the reaction vessels, as needed. The catalyst is reduced with caustic and formaldehyde. After draining, nitric acid is added to dissolve the silver off of the base material. This liquid is then pumped to the silver chloride area (Disneyland) for crystalization. The remaining catalyst base material is dumped out into drums as waste. This waste may at times still have nitric acid and oxides contained in it, resulting in acid or NOX exposure to persons drumming the waste. The catalyst base is Al_2O_3, alumina.

Silver Chloride: The dissolved silver nitrate from catalyst goes to this area called "Disneyland" where silver metal, or silver chloride is precipitated by the addition of brine, NaOH and formal-

dehyde. Reaction vessels are ventilated to control exposure. The silver chloride precipitate is taken to a special room where silver chloride is melted in a crucible, poured, and then processed through a series of roll mills to form bars of the material.

EMD Lab (Electronic Materials Lab): This is one of the few areas that metals other than silver and cadmium are processed. Upstairs, and in the first room, silver and other metals are dissolved in vessels with muriatic acid. The dissolved materials are then transfered to the crystalizing room where various alloys are co-precipitated. These operations are done over heat, with manual stirring and addition of precipitators such as oxalic acid. Some of these crucibles are within ventilated hoods however the hood face air supply plenum was not working during our inspection. One unvented crucible which was in use during the inspection had a yellow mist rising from the mixture. At one end of this room, hexane is used for final cleaning of the powders. A sign on the wall indicated that operators were to smell inside the vessel as a test to see if residual hexane remained.

Other Operations: Silver crystal is also produced in an electrolytic process in which cast silver anodes are electrolyzed and the crystals collected on the cathode are caught in a tray at the bottom of the bath. Acid exposures are possible in this room.

Copper powder is cyanide coated in one area. The powder is mixed in a decanting vessel with sodium cyanide, and then rinsed with decreasing concentrations of the cyanide. Waste cyanide is drained off and decomposed in a special treatment plant which was not inspected.

Waste materials from the plant are taken to an incinerator room where one man breaks up materials and incinerates them. Ash from the process is recycled through the extraction process to recover lost metals.

A liquid waste treatment plant consists of three large storage tanks into which all liquid waste is drained. The wastes are neutralized, analyzed and drained into the sanitary sewer system.

Nitrogen oxides created by the nitric acid dissolution of metals is scrubbed in an air pollution control system. An orange smoke (presumably NO_2) is visible rising from the stack behind the plant.

EXPOSURES

Silver: Silver fume and dust permeates many areas of the plant. The areas where it is most obviously a problem are the silver powder room, and the flake screening room. There may also be a silver exposure problem during unloading of catalyst which contains about 15% silver. OSHA has monitored silver exposures and cited for over-exposure in the following areas: Silver Nitrate Crystal Packing Room, Silver Powder Screening and Packing Rooms, Silver Oxide Oven and Screening Rooms, Silver Oxide Packing Room, Silver Cadmium Oxide Production Room, Silver Flake Milling and Screening Room, Silver Flake Packing Area, Precious Metals Furnace Melting Areas, both Induction and Gas Fired. The primary problem with silver is that it is absorbed by the body and is not excreted effectively. Therefore, almost all the silver that is absorbed,

remains in the body indefinately. Although there is limited information on health effects, silver does irreversably produce discoloration of the skin and eyes. Skin can become a silvery grey color at the sites of contact, or absorbed silver can be systemically distributed throughout the body and cause discoloration over many parts of the body. It tends to concentrate in the eyes, and may cause some degree of night blindness. There are also some reports that suggest some kidney damage from silver exposure. The OSHA TLV is 0.01 mg/m^3.

Silver Nitrate: There is potentially a very significant exposure to silver nitrate in the crystal area. Operators directly handling the material wear protective clothing and air-stream helmets, however other operators in the area do not.

Silver nitrate may cause argyria, as does silver powder. It also has a severe irritating effect on the nasal mucosa and the conjuctiva. It can cause burns in these areas, and with heavy exposure may cause permanent damage to the nasal passages. It has also been shown to cause chronic bronchitis after long term high exposure. The TLV is the same as for silver.

Cadmium: Cadmium dust is most obviously a problem in the cadmium handling areas, particularly during the screening operation (upstairs) and the post screen collecting area downstairs. Exposures in these two areas are poorly controlled and may lead to exposure to the individual operators, and to contamination of other areas with the cadmium dust. This area requires further exposure evaluation and installation of control technology.

Cadmium is primarily absorbed through the inhalation. It is a respiratory tract irritant and it concentrates in the liver and kidneys. High acute exposures (usually to fume) can cause an acute illness, delayed by a few hours which often leads to pulmonary edema and death.

Chronic exposure, more like the potential exposures at Metz, may cause emphysema, blood abnormalities and most importantly, damage the kidneys. In animals, cadmium has been shown to cause testicular atrophy, birth defects and cancer. Cadmium should be treated as a suspected carcinogen and exposure carefully controlled. The OSHA TLV is 0.2 mg/m^3 however NIOSH recommends 40 micrograms/m^3 with a 200 micrograms/m^3 ceiling concentration.

Other Metals: Gold, platinum, palladium, rutheneum and a few other metals are processed in the EMD Lab. Some of the crystalization crucibles are controlled with hood ventilation, however, operators must stand by the hood and stir the mixtures during crystalization. If the ventilation is working properly, exposures should be fairly minimal. Other crucibles are not ventilated, however, and a visible, unidentified mist was visible above the surface. Exposures in these areas should be further evaluated. Palladium is the only metal processed in large quantities and screened in a process that might be expected to cause a high dust exposure.

Platinum is the only metal in this area with known significant health effects, however it must be in the form of a salt. Platinum salts may cause severe dermal or respiratory sensitization, leading to asthma-like attacks, on contact with very small traces of platinum. Palladium is thought to be non-toxic. The OSHA TLV for platinum salts is 0.002 mg/m^3.

ATTACHMENT 00-6

Formaldehyde: Formaldehyde is used extensively throughout the plant. The system is centralized, with one main storage tank outside the plant, and a pressurized piping system to distribute it to secondary holding tanks. From there it is gravity fed into tertiary tanks, over the reaction vessels. Although the system itself is sealed, the vessels into which it is poured are open, and spills and leaks are reportedly very common.

Chemical operators must monitor the flow of formaldehyde into their reaction vessels. If the vessels' ventilation system is working properly, exposures at this point should be controlled. However, this system should be evaluated for exposure, and adequacy of the ventilation.

When spills, or leaks in the system occur, significant exposure may occur to operating personnel in the area, and particularly to maintenance personnel who are called in to fix the system. Maintenance personnel are given formaldehyde respirators, and operating personnel control exposure by washing down the area with water. Systems to contain spills, and to repair the system while avoiding exposure should be developed.

Formaldehyde is a severe irritant to the eyes and respiratory tract as well as to the skin. Direct contact with concentrated formaldehyde with eyes or skin can cause chemical burns and contact with more dilute solutions can cause a contact dermatitis. In addition, formaldehyde is a sensitizer and may cause allergic response on the skin or in the respiratory tract, bringing on asthma-like attacks. Formaldehyde has been shown in animals and humans to cause cancer and NIOSH has recommended that it be treated as a human carcinogen by minimizing exposure. The OSHA TLV is 3 ppm although since it has been shown to be a carcinogen, NIOSH recommends a 0.8 ppm 10 minute ceiling exposure.

Hydrogen Peroxide: 35% H_2O_2 is used in the chemical department. 20 gallon drums are stored in a high traffic aisle. Workers transfer the peroxide from the drums into open pails and then add to the reaction vessel. Both the storage/dispensing location, and the method of transferring in open pails create significant risk of spilling and splashing. H_2O_2 is a strong oxidizing agent and can bleach, or burn the skin, or respiratory tract on contact. Workers using the material should be adequately protected. The OSHA TLV is 1 ppm.

Hydrazine: Hydrazine is used in the chemical department and in the upper room of the EMD Lab as a reducing agent. Drums of hydrazine are transferred to the vessel where it is needed and a pump is inserted to transfer the liquid into the vessel. Although this operation was not observed, exposure could occur during tapping of the drum, or transferance of the liquid into the vessel. Evaluation of exposure during this process should be evaluated. Safety precautions and personal protective equipment used during handling of drums and transferring of hydrazine into reaction vessels should be reviewed. The OSHA TLV is 1 ppm although ACGIH recommends 0.1 ppm.

Ammonia: Ammonia is used extensively in various departments as a chemical reducing agent. It is stored centrally in an outdoor tank and piped to vessels inside the plant. According to workers interviewed, it is also used for hand cleaning of mills, especially in the metallurgy department. During the cleaning operation a significant skin and airborne exposure may occur if appropriate protection is not provided.

Ammonia is a severe skin and respiratory irritant. A high, acute exposure may lead to pulmonary edema and death. Bronchitis and pneumonia may develop and there have been reports of loss of pulmonary function in individuals exposed over a long period of time. The OSHA TLV is 50 ppm although NIOSH recommends that 50 ppm should be a 10 minute ceiling concentration.

Acids and Caustics: Nitric and hydrachloric acids and sodium hydroxide are used extensively throughout the plant. Spills and splashes of the materials present a significant hazard to operators, other personnel in the areas, and particularly to maintenance personnel who must repair the systems. Acid dip tanks are operated without necessary protective equipment in the metallurgy and wire departments. Large acid tanks are also used in the elctrolytic crystalization room, and exposures should be evaluated during this operation.

Acids and caustics present their most severe hazard in terms of spills and splashes which may cause serious burns to the contacted surface. The hazard is especially great with contact to the eyes. Inhalation of acid mists may also erode teeth, cause damage to the nasal passages and in severe exposures, cause lung damage.

NOX: When nitric acid is used in these chemical processes mists and gases of various nitrogen oxide compounds are given off. These off gases are trapped and scrubbed in a centralized air pollution control system at the back of the plant. An orange smoke, presumably NO_2, are visible rising from the stack. According to workers interviewed, when the wind blows in the right direction, this smoke is drawn back into the plant and causes irritation of the respiratory tract. In addition, workers reported that there is occasionally residual nitric oxides on the spent catalyst after the metals have been dissolved off and the sludge is removed and NOX exposure can occur during the drumming operation.

Exposure to high concentrations of NOX, especially NO_2, may give rise to a delayed pulmonary reaction and the development of pulmonary edema and death. Lower exposures may give rise to lung damage including shortness of breath, wheezing,and decreased vital capacity. NO_2 may also give rise to methemaglobinemia, which in severe untreated cases may lead to death. The OSHA TLV is 5 ppm although NIOSH recommends a 1 ppm ceiling on exposures.

Flake Operation: Operators are potentially exposed to high concentrations of all volatile components of the flake operation mixtures. These include methanol, ethanol, and the Exxon aromatic hydrocarbon mixtures. The aromatics are likely to include toluene and xylene and could include benzene.

Methanol is a central nervous system depressant and may cause dizziness, behavioral changes and headaches at levels around 20 ppm. It also causes an optic neuropathy which may lead to blindness. Toluene, xylene and benzene have similar CNS effects however may also affect the blood forming system. Benzene is suspected to cause leukemia. These mixtures should be evaluated for benzene. The TLV for MeOH is 200 ppm, toluene is 200 (NIOSH recommends 100) and xylene 100 ppm. Benzene's OSHA TLV is 10 ppm although 1 ppm has been recommended.

One particular flake operation also requires the use of hydroquinone. The operators reportedly transfer the flake, by hand, from the mills to drying trays and into the oven. This operation may potentially expose the operator to high concentrations of hydroquinone.

Hydroquinone causes eye irritation with acute exposure. Lower, chronic exposure may lead to a brownish discoloration of the conjunctive (eye lining) and cornea. Corneal opacities may develop with permanent structural damage resulting in loss of visual acuity. The OSHA TLV is 2 mg/m^3.

Catalyst: An analysis of the spent catalyst, after processing, revealed that it is primarily alumina, and contains less than 1% silica, and a number of metals in trace quantities. It is, however, possible that metals are present before extraction to give rise to significant exposure levels during the unloading operation. The operation is reported to be very dusty and an analysis of this dust would be warranted.

Hexane: Hexane is used in one operation in the EMD Lab and operators are required to use their nose to detect residual hexane after drying. Hexane has CNS effects as do most solvents, but is also a peripheral nerve toxin and may cause tingling in arms and legs. Deliberate inhalation of hexane should be strictly avoided. The OSHA TLV is 500 ppm, but NIOSH has recommended 100 ppm.

HEALTH EFFECTS

A number of health effects have been brought to our attention. According to workers interviewed, there has been some non-specific complaints from people in many areas of the plant. These would include tiredness, shortness of breath, and productive coughing. Dermatitis has also been a problem in several areas. Nose bleeds at work, or soon after, have arisen in workers in silver nitrate crystal and silver powder rooms in addition to the cadmium area a few years ago.

Urinary cadmium levels are tested in approximately 50 persons and are reported to the individuals if they exceed 10 micrograms/l. One person reportedly had a level of 15, and was removed from exposure until the level fell below 10.

A review of the OSHA Log of illnesses and injuries for 1982 indicated 3 incidents of inhalation of corrosive or irritant vapors. Formaldehyde once, and acids twice.

An incident in which 4 persons were overcome by unknown fumes was relayed to us by both workers and management. It took place in the waste treatment area. One person was hospitalized over night for observation. HCN was the suspected agent.

This record clearly indicates that a problem exists with acute exposures to irritants and corrosive materials. The chronic health problems, and the possibility that the nose bleeds are work-related will require further evaluation.

ATTACHMENT 029

RECOMMENDATIONS

Several work procedures leading to hazardous conditions have been identified during our walk-through inspection. In addition several exposures which may pose significant health hazards effects were also identified. The work practices should be looked into and appropriate changes made as soon as possible. The exposures which may present hazardous conditions should be further evaluated with appropriate industrial hygiene techniques so that engineering controls can be designed and implemented.

WORK PRACTICE CHANGES

1) Employees in the downstairs cadmium compacting area must be supplied with appropriate personal protective equipment. The paper dust mask presently being used should be replaced with an air stream helmet. If the helmet is found to be too restrictive, as stated during our inspection, then supplied air may be the reasonable alternative.

2) Employees handling acids or caustics must be required to wear proper gloves, face shields and aprons.
The practice of transferring acids, caustic and hydrogen peroxide in open pails is an unnecessarily dangerous one and should be halted. A safer system using closed containers should be instituted.

3) A respirator mainteance and fit testing program should be set up to comply with the OSHA Respiratory Protection Standard. One person should be designated to have responsibility for the program.

4) EMD Lab - In order to detect residual hexane after drying, the operator should not be required to inhale vapors. Instead, a new system should be designed, possibly with the use of vapor detecting tubes.

5) Emergency and Spill Response - Comprehensive procedures should be developed to protect operators, clean-up crews and maintenance personnel during the release of hazardous materials into the work environment. Materials of special concern include acids, caustics, formaldehyde and ammonia. Personnel should not be required to work on cleaning up, or repairing systems when these materials are present in appreciable amounts.

6) Appropriate personal protective equipment should be made available to personnel in the flake operation. The equipment should be designed to eliminate exposure to the solvents, and hydroquinone used in this area, until appropriate exposure assessments and engineering controls can be instituted.

EXPOSURE EVALUATION

1) Exposure assessment using air sampling techniques will be done in the following areas:
   a) methanol, aromatic hydrocarbons and hydroquinone in the flake area
   b) cadmium in all appropriate areas
   c) hydrazine during the transfer operation
   d) dust and metals during the catalyst unloading operation

ATTACHMENT 00-10

2) The release of Nitrogen oxides from the outside stack should be reviewed by DEP. The possibility that these gases are being drawn back into the plant should also be evaluated.

3) Compliance with the OSHA citation abatement plant will be monitored in the silver. silver cadmium and silver nitrate areas.

MEDICAL EVALUATION

An evaluation of the plant has indicated a number of potentially hazardous exposures as detailed in this report. We therefore feel that a comprehensive evaluation of health effects among employees is warranted.

SUMMARY

Workers at Metz Metallurgical are exposed to a number of toxic materials including silver, cadmium, formaldehyde, ammonia, acids, caustics, nitrogen oxides and solvents. Some of these exposures are controlled, however, some do not appear to be sufficiently controlled, leaving the possibility that over-exposures are occurring. In addition, spills and leaks of some of these materials present significant hazards to workers who may be in the area, or who are called in to repair the system and clean up. Handling procedures for some of the corrosive and irritant materials leave room for accidental, high level exposures.

A review of the OSHA Log of accidents and illnesses indicate that these high accidental exposures do occur periodically, and that careful review of handling procedures should be conducted to attempt to prevent further accidents. In addition, health complaints from various areas in the plant indicate the possibility of on-going exposures and related health problems. These complaints cannot be evaluated without further medical investigation.

ATTACHMENT 00-11

ATTACHMENT PP

August 10, 1985 Incident #08-85-96

METZ METALLURGICIAL CORP.
3900 SO. CLINTON AVE
SO. PLAINFIELD - MIDDLESEX CO.

EVENTS LOG:

01:48 hrs. - J. DePierro paged by Trenton Dispatch notifying of a fire at subject facility. Information indicated that Hydrogen Chloride and Formaldehyde were involved and eight persons injured.

J. DePierro requests that Trenton Dispatch notify USEPA, NJDOH, and NJSP of situation. In addition J. Strong be notified to conduct call back procedures since J. DePierro was nowhere near a telephone.

02:25 hrs. - J. DePierro responds to subject incident. Trenton Dispatch (TD) informs that twelve persons have now been injured and that Chief Cotone - So. Plainfield Fire Department is requesting a DEP response.

J. DePierro informs TD to notify the Duty Officers in the Division of Water Resources and Waste Management.

03:00 hrs. - J. DePierro while enroute is informed by Trenton Dispatch that subject fire is under control and nearly extinguished. Injured personnel were restricted to firefighters, no public exposure verified by fire department.

03:35 hrs. - J. DePierro arrives on scene. An interview is conducted with Chief Cotone, Ron Wastowski, and David Berry.

It was determined that subject facility was shut down at 17:30 hrs. on August 9, 1985. For some unknown reason a fire ignited near a packed spray tower - Air Pollution Control device at rear of subject facility. This control device serviced several acid reactors used in precious metals fabrications. The fire quickly spread since the equipment involved was constructed of fiberglass material.

Chief Cotone stated that several firefighters were hospitalized for smoke inhalation and an additional two firefighters were injured falling from a ladder.

A second interview was conducted with plant officials David Berry and Noel Mazar. No explanation as to the cause of the fire or what equipment was actually involved could be given.

An equipment inspection was conducted with Ron Wastowski; however due to fire damage details could not be ascertained.

ATTACHMENT PP-1

A second equipment inspection was conducted with J. Strong and it was found that a large Hydrochloric Acid tank was severly fuming. Since all electrical power was turned off, the control device servicing subject acid tank was inoperative. Examination of this vapor cloud revealed a dissipation point of fifty feet (on subject plant property) however firefighters were given verbal warning to stay clear of the immediate area surrounding this tank.

Plant officials stated that a complete inspection would be made of the plant for damage assessment. In addition an equipment inspection by Middlesex County Health Department would be conducted on the following workday.

04:40 hrs. - A final conference was conducted with Chief Cotone and Middlesex County.

The emissions from subject fire scene had stablized with no emission escaping off subject property line.

Chief Cotone was informed if conditions worsened he could contact TD for assistance.

04:45 hrs. - J. DePierro and J. Strong depart from subject scene.

Recommendations

Follow up plant inspection be made by Central Regional Office and/ or Middlesex County Health Department.

J. DePierro
J. DePierro
Chief, BERC

ATTACHMENT PP-2

Incident: 08-85-96 - Metz Metallurgical Corp.

Responding Officers/Personnel

J. DePierro - NJDEP - DEQ (609-292-0331)

J. Strong - NJDEP - DEQ (609-292-0331)

R. Wastowski - Middlesex County H.D. (201-826-3100)

Chief Cotone - So. Plainfield F.D. (201-756-4701)

D. Berry - Metz Metallurgical (201-561-1100)

N. Mazar - Metz Metallurgical (201-561-1100)

ATTACHMENT PP-3

ATTACHMENT QQ

SFS 00004

State of New Jersey
DEPARTMENT OF THE TREASURY
P O BOX 1829
STATE HOUSE
TRENTON, NEW JERSEY 08625

FEB 14 1983

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

NOTICE OF VIOLATION
AND OFFER OF SETTLEMENT

D.W.M. Case #82-08-25-003

Mr. Peter Metz
Metz Metallurgical Corporation
3900 South Clinton Avenue
South Plainfield, N.J.

Dear Mr. Metz:

On August 25, 1982 as a result of a rupture of a fibergalss storage tank containing a hazardous substance (potassium hydroxide) at the Metz Metallurgical Corporation, 3900 So. Clinton Avenue, South Plainfield, New Jersey, approximately 1100 gallons of potassium hydroxide was allowed to be dischaged onto the ground from which it might flow or drain into the waters of the State.

The incident summarized above was investigated by members of the Division of Waste Management, who determined that the following provisions of the Spill Compensation and Control Act and regulations promulgated thereunder were violated:

N.J.S.A. 58:10-23.11c	Discharging Hazardous Substances
N.J.S.A. 58:10-23.11e/ N.J.S.A. 58:10-23.11u	Failure to Immediately Notify the Department of the Discharge [see N.J.A.C. 7:1E-2.1(a)]

The above cited violations carry maximum statutory civil penalties of $25,000 per day for each violation.

ATTACHMENT QQ-1

In accordance with the recommendations of the Department of Environmental Protection, and pursuant to the authority vested in me as Administrator of the New Jersey Spill Compensation and Control Fund by N.J.S.A. 58:10-23.11q, I am amenable to compromise and settle these claims for penalties for the sum of $875.00.

Should you decide to settle this matter, payment must be made within fifteen (15) days of your receipt of this letter. Payment must be sent to the Administrator, New Jersey Spill Compensation Fund, Department of Treasury, 135 West Hanover Street, Trenton, New Jersey 08625. Only checks or money orders drawn to the order of "New Jersey Spill Compensation and Control Fund" will be accepted. Your cancelled check or money order will serve as your receipt.

Should you decide not to accept this settlement offer or fail to forward payment within 15 days of receipt of this letter, this offer is rescinded, and this matter will be referred to the Office of the Attorney General with instructions to initiate a legal action for the maximum allowable penalty.

Acceptance of this settlement offer will satisfy your liability for civil penalties in connection with the above cited violations but will not relieve you of any other responsibility or obligation under the law, including the responsibility to pay for any damages which may have been caused by the discharge.

If you wish to make any inquiries or discuss this settlement offer, you may contact David Shotwell, Chief, Bureau of Compliance and Enforcement, Division of Waste Management at 120 Route 156, Yardville, N.J. 08620 or at (609) 292-5560.

Very truly yours,

Administrator,
New Jersey Spill Compensation and Control Fund

Recommendation approved by:

Joseph Rogalski, Assistant Director
Division of Waste Management
Department of Environmental Protection

rh

TO WHOM IT MAY CONCERN

Enclosed find copies of waste management enforcement actions that the Department has taken against companies or individuals for violations that have occurred in your area.

These are sent to keep you up to date on the Departments activities, if you have any questions I can be reached at (609) 984-3695.

ATTACHMENT QQ-2

Sincerely,

Matthew Latta

Matthew Latta

Robert J. Kunze
Industrial Hygienist

Metz Metallurgical Corp.
3900 South Clinton Avenue
South Plainfield, NJ 07080
(201)561-1100

August 25, 1982

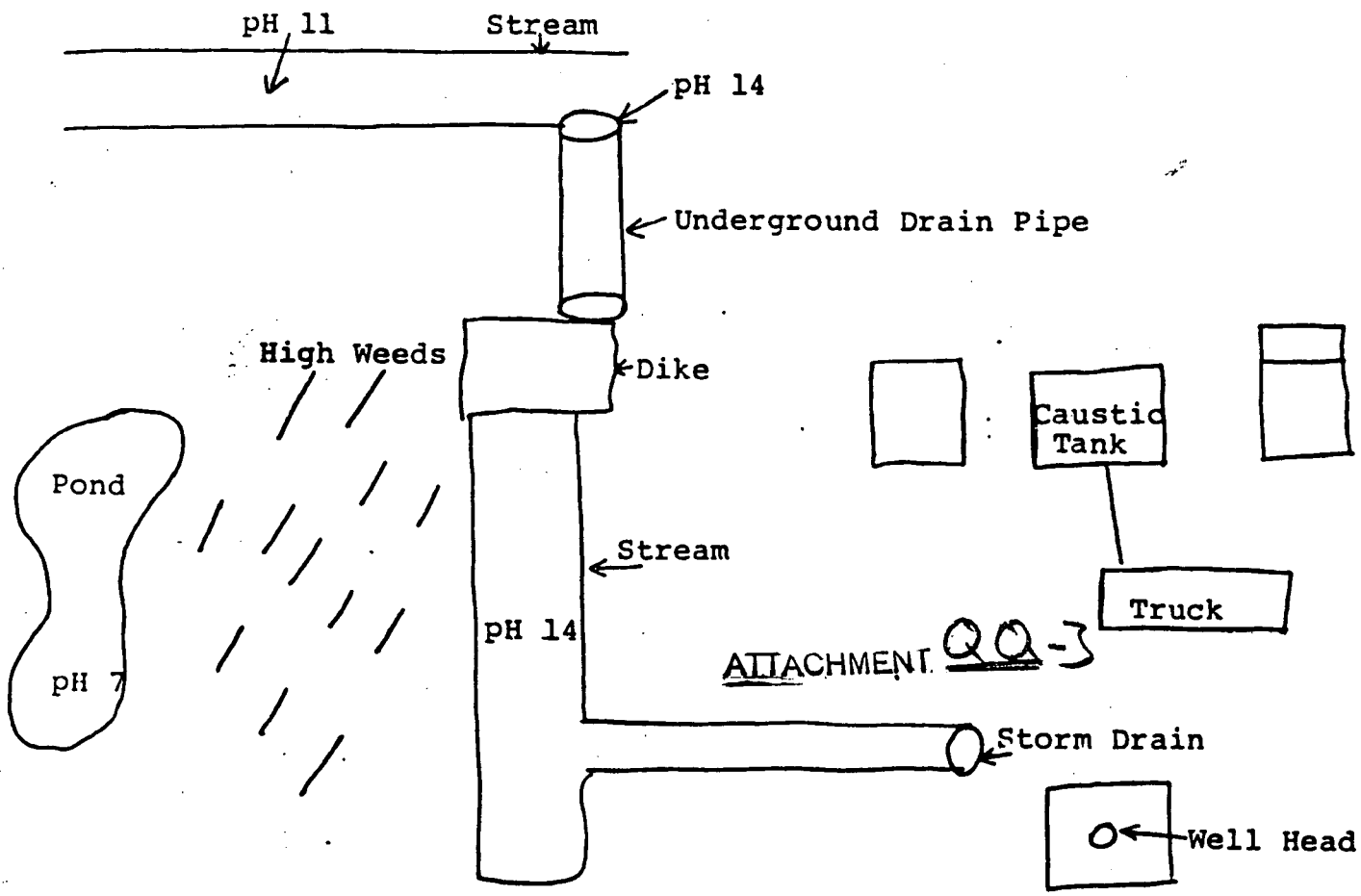
A tank truck was delivering caustic pot ash (sodium hydroxide) into a fiber holding tank. One small area at the side of the tank collapsed. The driver pumped back into the truck from the leaking tank what he could losing approximately 1100 gallons. The loss was determined by the following: truck's tank measured 48" full, after salvaging 31" = 17" loss which converts to 1100 gallons.

The spilled caustic travelled into the area of Metz's well head. After overflowing here, it then travelled through a storm drain and emptied into a small stream. The Fire Department had the stream diked preventing most of the caustic from going any further.

Metz set up pumps at both the streams and the well head. All liquids were to be pumped into holding tanks treated with acid and then put into the sanitary sewer.

Note:

John DeFina and Carl Delaney from New Jersey State DEP were present (609)292-0715
Pete Decker from Metz was also present (201)561-1100



ATTACHMENT RR

HW 00588

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
120 Rt. 156, Yardville, N.J. 08620

DR. MARWAN M. SADAT, P.E.
DIRECTOR

LINO F. PERRIN
DEPUTY DIRECTOR

DEC 12 1984

(IN THE MATTER OF)
(METZ METALLURGICAL CORPORATION)

ADMINISTRATIVE
ORDER

The following FINDINGS are made and ORDER is issued pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (Department) and duly delegated to the Assistant Director for Enforcement and Field Operations, Division of Waste Management, under the Solid Waste Management Act, N.J.S.A. 13:1E et seq.

FINDINGS

1) Metz Metallurgical Corporation (hereinafter "MMC") is operating as a generator of hazardous waste (EPA ID #NJD002195303) and is located at 3900 South Clinton Avenue, Block 467.01, Lot 29.01, in South Plainfield Boro, Middlesex County, New Jersey.

2) Pursuant to N.J.A.C.7:26-9.3(a), a generator may accumulate hazardous waste on-site without a permit for 90 days or less provided that the generator complies with the requirements for owners and operators of N.J.A.C. 7:26-9.6 and 9.7 concerning preparedness and prevention, contingency plans and emergency procedures as well as N.J.A.C. 7:26-9.4(g) concerning personnel training.

3) During the course of a routine Departmental inspection conducted on April 26th and April 27th, 1984 at the above referenced facility, the following violations were noted:

N.J.A.C. 7:26-9.3(a)4 and 9.4(g) - MMC is in non-compliance with the requirements for personnel training.

N.J.A.C. 7:26-9.3(a)4 and 9.6(e) - MMC failed to maintain sufficient aisle space for movement of safety equipment within the hazardous waste storage area.

N.J.A.C. 7:26-9.3(a)4 and 9.6(f)1 - MMC failed to make arrangements to familiarize the police, fire departments, and emergency response teams with the facility.

ATTACHMENT RR-1

N.J.A.C. 7:26-9.3(a)4 and 9.6(f)4 - MMC failed to make arrangements with local hospitals to familiarize them with the properties of the hazardous waste handled at the facility.

N.J.A.C. 7:26-9.3(a)4 and 9.6(f)5 - MMC failed to make arrangements with the local fire department to inspect the facility on a regular basis with at least two (2) inspections annually.

N.J.A.C. 7:26-9.3(a)4 and 9.7 et seq. - MMC failed to maintain a contingency plan at the facility.

ORDER

NOW, THEREFORE, IT IS HEREBY ORDERED that Metz Metallurgical Corporation, its principals, agents, employees, successors, assigns, tenants, and any receiver or trustee in bankruptcy, (should such an entity be appointed to take control of the facility which is the subject of this Order) shall:

4) Immediately comply with N.J.A.C. 7:26-9.3(a)4, specifically comply with generator requirements concerning preparedness and prevention, contingency plans and emergency procedures.

5) Immediately comply with N.J.A.C. 7:26-9.4(g), specifically comply with the requirements for personnel training.

6) Immediately comply with N.J.A.C. 7:26-9.6(e), specifically, maintain sufficient aisle space for movement of safety equipment within the hazardous waste storage area.

7) Immediately comply with N.J.A.C. 7:26-9.6(f)1, specifically make arrangements to familiarize the police, fire departments, and emergency response teams with the facility.

8) Immediately comply with N.J.A.C. 7:26-9.6(f)4, specifically make arrangements with local hospitals to familiarize them with the properties of the hazardous waste handled at the facility.

9) Immediately comply with N.J.A.C. 7:26-9.6(f)5, specifically make arrangements with the local fire department to inspect the facility on a regular basis with at least two (2) inspections annually.

10) Immediately comply with N.J.A.C. 7:26-9.7 et seq., specifically maintain a contingency plan at the facility.

11) Within fifteen (15) calendar days of receipt of this ORDER submit an affidavit of compliance outlining the actions taken to comply with the regulations cited in paragraphs 4 through 10 of this ORDER to:

ATTACHMENT RR-2

NJ Department of Environmental Protection
Division of Waste Management
Bureau of Compliance & Enforcement
120 Route 156
Yardville, NJ 08620
Attention: Barry Frasco

BE ON NOTICE that the maximum civil penalty for violations of the Solid Waste Management Act on an ORDER issued pursuant thereto is $25,000 per day.

Joseph A. Rogalski
Assistant Director

F01:F024:lmc

ATTACHMENT RR-3

ATTACHMENT SS

Let's protect our earth

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS WASTE MANAGEMENT
CN 028, Trenton, N.J. 08625
609 - 292 - 1250

JOHN J. TRELA, Ph.D.
ACTING DIRECTOR

IN THE MATTER OF	:	ADMINISTRATIVE
METZ METALLURGICAL CORPORATION	:	CONSENT ORDER
ECRA CASE #86108	:	

The following FINDINGS are made and ORDER is issued pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (hereinafter "NJDEP") by N.J.S.A. 13:1D-1 et seq. and the Environmental Cleanup Responsibility Act, N.J.S.A. 13:1K-6 et seq., and duly delegated to the Assistant Director for Enforcement and Field Operations within the Division of Hazardous Waste Management pursuant to N.J.S.A. 13:1B-4.

FINDINGS

1. The Environmental Cleanup Responsibility Act, N.J.S.A. 13:1K-6 et seq. ("ECRA" or "the Act"), was signed into New Jersey State Law by Governor Thomas H. Kean on September 2, 1983, and took effect on December 31, 1983.

2. ECRA required the NJDEP to adopt rules and regulations to implement the Act. On March 6, 1984, NJDEP adopted the Interim ECRA Regulations, N.J.A.C. 7:1-3 ("Regulations") in compliance with the Administrative Procedure Act, N.J.S.A. 52:14B-1 et seq., upon acceptance for filing by the Office of Administrative Law pursuant to N.J.A.C. 1:30-4.4(d).

3. ECRA requires that the owner or operator of an industrial establishment planning to sell or transfer operations (a) notify the NJDEP in writing within five (5) days of the execution of an agreement of sale pursuant to N.J.A.C. 7:1-3.7, (b) submit within (60) days prior to transfer of title, a Negative Declaration or Cleanup Plan to the NJDEP for approval, and (c) obtain, upon approval of any necessary Cleanup Plan by the NJDEP, a surety bond or other financial security approved by the NJDEP guaranteeing performance of the Cleanup Plan in an amount equal to the cost estimate for the approved Cleanup Plan.

4. N.J.S.A. 13:1K-13 provides that failure to submit a Negative Declaration or Cleanup Plan pursuant to ECRA is grounds for voiding the sale by NJDEP. Any person who knowingly gives or causes to be given any false information or who fails to comply with the provisions of ECRA is liable for a penalty of not more than $25,000.00 for each occurrence, and each day of a violation of a continuing nature constitutes an additional and separate offense. Furthermore, any officer or management official of an industrial establishment who knowingly directs or authorizes the violation of any provisions of the Act shall be personally liable for the $25,000.00 penalties for each violation described above.

ATTACHMENT SS-1

5. Metz Metallurgical Corporation ("Metz"), a New Jersey corporation, owns and operates a precious metal manufacturing and refining facility located at 3900 South Clinton Avenue, South Plainfield, Middlesex County; said site being further known as Block 467-01, Lots 29.01 and 30 on the tax map of the Borough of South Plainfield ("Plainfield facility" or "subject Industrial Establishment"). Metz has informed NJDEP that the Standard Industrial Classification ("SIC") number which best describes the operations at the Plainfield facility is 3399. Metz has further informed NJDEP that hazardous substances as defined by the Regulations are used in the operations at the Plainfield facility. The Plainfield facility is an Industrial Establishment as defined by ECRA.

6. On January 30, 1986, the shareholders of Metz agreed to sell all outstainding shares of Metz common stock to Degussa AG, a West German corporation (the "Transaction"). NJDEP and Metz expressly agree the Transaction is subject to ECRA and the Regulations.

7. On February 13, 1986, Metz submitted to NJDEP the General Information Submission ("GIS") portion of the ECRA Initial Notice as required by N.J.A.C. 7:1-3.7. NJDEP reviewed the GIS, assigned the Plainfield facility ECRA Case #86108, and in a letter dated February 18, 1986 found the GIS to be incomplete. On March 5, 1986, Metz submitted to NJDEP the Site Evaluation Submission ("SES") portion of the ECRA Initial Notice along with additional information for the GIS. NJDEP reviewed the SES and the additional GIS information, and in a letter dated March 7, 1986 found the Initial Notice to be complete.

8. Metz has informed NJDEP that Transaction must be consummated on or before July 31, 1986 or the Transaction will be terminated. Metz has further informed NJDEP that Metz cannot comply with all of the requirements of ECRA and the Regulations prior to July 31, 1986. Therefore, Metz has requested that NJDEP prepare an Administrative Consent Order which, when effective, will allow the Transaction to be consummated prior to the completion of all administrative requirements.

9. In appropriate cases, NJDEP may allow transactions subject to ECRA to proceed prior to completing the standard ECRA administrative process by execution of an Administrative Consent Order. The Administrative Consent Order specifies a time schedule for completion of ECRA requirements by the industrial establishment and provides for financial assurance in a form and amount acceptable to NJDEP prior to consummation of any transactions subject to ECRA. Failure to fully comply with all the terms and conditions of the Administrative Consent Order shall subject the Ordered Party(ies) to the full range of penalties and remedies prescribed in the Act, the Regulations, and the Administrative Consent Order.

ORDER

NOW, THEREFORE, IT IS ORDERED AND AGREED THAT:

10. ECRA Program Requirements for the Plainfield Facility

    A. Within one hundred (100) days from receipt of NJDEP's written approval of the Sampling Plan prepared pursuant to N.J.A.C. 7:1-3.7(d)14 and N.J.A.C. 7:1-3.9, Metz shall initiate, complete, and submit to NJDEP

ATTACHMENT SS-2

KFS

the results from any NJDEP-approved Sampling Plan including, but not limited to, complete delineation of environmental contamination on-site, and any off-site environmental contamination resulting from discharges of hazardous wastes or substances on or from the subject Industrial Establishment. NJDEP and Metz recognize that additional sampling may be necessary during the various stages of the implementation of this Administrative Consent Order and ECRA, including during the implementation of a Cleanup Plan, at the subject Industrial Establishment to delineate fully the nature and extent of environmental contamination on-site, and any off-site environmental contamination resulting from discharges of hazardous substances or wastes on or from the subject Industrial Establishment. Therefore, Metz agrees to submit any additional sampling plans for NJDEP review and approval required by NJDEP in writing during the various stages of the implementation of this Administrative Consent Order and ECRA, including during the implementation of a Cleanup Plan, to further delineate the nature and extent of environmental contamination on or from the subject Industrial Establishment. NJDEP and Metz mutually agree that Metz shall submit any additional sampling plans required to NJDEP for review and approval within forty-five (45) days of the receipt of said written request. Within one hundred (100) days from receipt of NJDEP's written approval of any additional sampling plans, Metz shall initiate, complete and submit to NJDEP the results from any additional NJDEP-approved sampling plan required pursuant to this paragraph.

B. NJDEP shall notify Metz in writing requiring Metz to submit either a Negative Declaration or Cleanup Plan when sampling results have satisfied NJDEP's requirement to delineate fully the nature and extent of environmental contamination on or from the subject Industrial Establishment. Metz shall submit a Negative Declaration or Cleanup Plan within sixty (60) days from receipt of a written demand from NJDEP for a Negative Declaration or Cleanup Plan. If a Cleanup Plan is required, the Cleanup Plan shall address remediation of any contamination identified on or from the subject Industrial Establishment. Any Negative Declaration or Cleanup Plan submitted shall conform to N.J.A.C. 7:1-3.

C. Metz shall implement any NJDEP-approved Cleanup Plan in accordance with the approved time schedule or defer implementation of all or part of the Cleanup Plan subject to NJDEP approval pursuant to N.J.A.C. 7:1-3.14.

D. Should NJDEP determine that any submittal made as part of the Initial Notice or under Paragraph 10 of this Administrative Consent Order is inadequate or incomplete, then NJDEP shall provide Metz with written notification of the deficiency(ies), and Metz shall revise and resubmit the required information within a reasonable period of time not to exceed thirty (30) days from receipt of such notification.

E. All submissions required pursuant to Paragraph 10 or any other provision of this Administrative Consent Order shall be accompanied by all appropriate fees required pursuant to the Fee Schedule for ECRA, N.J.A.C. 7:1-4.

ATTACHMENT SS-3

PCS

11. Financial Assurance

A. Metz shall obtain and provide to NJDEP financial assurance in the form of a surety bond or letter of credit in the amount of $2,000,000.00 prior to execution of this Administrative Consent Order. The financial assurance must conform with the requirements of N.J.S.A. 13:1K-9(b)3, N.J.A.C. 7:1-3.10, N.J.A.C. 7:1-3.13, and this Administrative Consent Order.

B. Metz shall establish and submit to NJDEP a standby trust fund within seven (7) days from the effective date of this Administrative Consent Order. The financial institution which issues the financial assurance shall agree to promptly and directly deposit all amounts up to the total value of the financial assurance into the standby trust fund upon demand by NJDEP.

C. Upon NJDEP approval of a Cleanup Plan, Metz shall amend the amount of the financial assurance, described in A. above, to equal the estimated cost of implementation of the approved Cleanup Plan, or shall provide such other financial assurance as may be approved by NJDEP in an amount equal to the estimated cost of implementation of the approved Cleanup Plan.

D. In the event that NJDEP determines that Metz has failed to perform any of its obligations under this Administrative Consent Order or ECRA, NJDEP may draw on the financial assurance provided, however, that before any such demand is made, NJDEP shall notify Metz in writing of the obligation(s) with which it has not complied, and Metz shall have reasonable time, not to exceed fourteen (14) days, to perform such obligation(s) to NJDEP's satisfaction. Nothing in this paragraph shall prevent NJDEP from collecting stipulated penalties pursuant to the terms of this Administrative Consent Order for cause.

E. Upon NJDEP's written approval of a Negative Declaration, Metz shall be relieved of any further obligation to maintain in full force and effect the financial assurance required by this Administrative Consent Order for the facility which is the subject of the NJDEP-approved Negative Declaration. Upon NJDEP's written approval of the completion of any cleanup required by this Administrative Consent Order, as verified by final site inspection pursuant to N.J.A.C. 7:1-3.12(e) and upon Metz's satisfaction of all financial obligations in connection therewith, Metz shall be relieved of any further obligation to maintain in full force and effect the financial assurance required by this Administrative Consent Order for the facility at which the approved cleanup has been completed.

12. Additional Conditions of Consent

A. Metz shall allow NJDEP access to the subject Industrial Establishment for the purpose of undertaking all necessary monitoring and environmental cleanup activities. Prior to entry into this Administrative Consent Order, Metz shall provide NJDEP with appropriate documentation that Degussa AG shall allow the NJDEP access required herein.

ATTACHMENT SJ-4

iPS

B. Compliance with the terms of this Administrative Consent Order shall not excuse Metz from obtaining and complying with any applicable federal, state or local permits, statutes, regulations and/or orders while carrying out the obligations imposed by ECRA through this Administrative Consent Order. The execution of this Administrative Consent Order shall not excuse Metz from compliance with all other applicable environmental permits, statutes, regulations and/or orders and shall not preclude NJDEP from requiring that Metz obtain and comply with any permits, and/or orders issued by NJDEP under the authority of the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., and the Spill Compensation and Control Act ("Spill Act") N.J.S.A. 58:10-23.11 et seq., for the matters covered herein. The terms and conditions of any such permit shall not be pre-empted by the terms and conditions of this Administrative Consent Order if the terms and conditions of any such permit are more stringent than the terms and conditions of this Administrative Consent Order. Should any of the measures to be taken by Metz during the remediation of any ground water and surface water pollution result in a new or modified discharge as defined in the NJPDES regulations, N.J.A.C. 7:14A-1 et seq., then Metz shall obtain a NJPDES permit or permit modification from NJDEP prior to commencement of said activity.

C. NJDEP agrees that it will not bring any action, nor will it recommend that the Attorney General's Office bring any action for failure to comply with (a) the time requirements in N.J.S.A. 13:1K-9(b)1 that NJDEP be notified within five (5) days of execution of an agreement of sale, and (b) the time requirement in N.J.S.A. 13:1K-9(b)2 that a Negative Declaration or Cleanup Plan be submitted sixty (60) days prior to transfer of title. NJDEP also agrees that it will not bring any action, nor will it recommend that the Attorney General bring any action seeking monetary penalties for Metz's failure to meet the time requirements specified in (a) and (b) of this paragraph.

D. No obligations imposed by this Administrative Consent Order (other than by paragraph "E" below) are intended to constitute a debt, claim, penalty or other civil action which could be limited or discharged in a bankruptcy proceeding. All obligations imposed by this Administrative Consent Order shall constitute continuing regulatory obligations imposed pursuant to the police power of the State of New Jersey, intended to protect the public health, safety and welfare.

E. In the event that Metz fails to comply with any of the provisions of this Administrative Consent Order, Metz shall pay to NJDEP stipulated penalties in the amount of $5,000.00 for each day on which Metz fails to comply with any obligation under this Administrative Consent Order provided, however, that no such stipulated penalty shall be payable by Metz with respect to such period that said failure to comply results from Force Majeure.

F. The provisions of this Administrative Consent Order shall be binding upon Metz and its successors in interest, assigns, tenants, and any trustee in bankruptcy or receiver appointed pursuant to a proceeding in law or equity. Any officer or management offical of Metz who knowingly

ATTACHMENT SSS

PCS

directs or authorizes the violation of any provision of ECRA or the Regulations shall be personally liable for the penalty established pursuant to N.J.S.A. 13:1K-13 and N.J.A.C. 7:1-3.16(d).

G. Metz's failure to submit an approvable Negative Declaration or Cleanup Plan shall constitute grounds for the NJDEP to void the subject sale or transfer. NJDEP's right to void the subject sale or transfer shall terminate upon NJDEP's written approval of an appropriate Negative Declaration or Cleanup Plan submitted by Metz pursuant to this Administrative Consent Order and ECRA.

H. Any submission to be made to NJDEP in accordance with this Administrative Consent Order shall be directed to:

Lance R. Miller, Chief
Bureau of Industrial Site Evaluation
Division of Waste Management
428 East State Street
Trenton, NJ 08608

13. Force Majeure

If any event occurs which purportedly causes or may cause delays in the achievement of any deadline contained in this Administrative Consent Order, Metz shall notify NJDEP in writing within ten (10) days of the delay or anticipated delay, as appropriate, referencing this paragraph and describing the anticipated length, precise cause or causes, measures taken or to be taken and the time required to minimize the delay. Metz shall adopt all necessary measures to prevent or minimize any delay. If any delay or anticipated delay had been or will be caused by fire, flood, storm, riot, strike or other circumstances determined by NJDEP to be beyond the control of Metz, then the time for performance hereunder shall be extended by NJDEP for a period no longer than the delay resulting from such circumstances, provided that NJDEP may grant additional extensions for good cause. If the events causing such delay are not found by NJDEP to be beyond the control of Metz, failure to comply with the provisions of the Administrative Consent Order shall constitute a breach of the Administrative Consent Order's requirements. The burden of proving that any delay is caused by circumstances beyond Metz's control and the length of such delay attributable to those circumstances shall rest with Metz. Increases in the costs or expenses incurred in fulfilling the requirements contained herein shall not be a basis for an extension of time. Similarly, delay in completing an interim requirement shall not automatically justify or excuse delay in the attainment of subsequent requirements.

14. Reservation of Rights

This Administrative Consent Order shall be fully enforceable in the New Jersey Superior Court having jurisdiction over the subject matter and signatory parties upon the filing of a summary action for compliance pursuant to ECRA. This Administrative Consent Order may be enforced in the same manner as an Administrative Order issued by NJDEP pursuant to other statutory authority and shall not preclude NJDEP from taking whatever action it deems appropriate to enforce the environmental protection laws of the

ATTACHMENT SS-6

VCS

State of New Jersey. It is expressly recognized by NJDEP and Metz that nothing in this Administrative Consent Order shall be construed as a waiver by NJDEP of its rights with respect to enforcement of ECRA on bases other than those set forth in the ECRA Program Requirements section of this Administrative Consent Order or by Metz of its right to seek review of any enforcement action as provided by the Administrative Procedure Act, N.J.S.A. 52:14B-1 et seq. Furthermore, nothing in this Administrative Consent Order shall constitute a waiver of any statutory right of NJDEP to require Metz to implement additional remedial measures should NJDEP determine that such measures are necessary to protect the public health, safety and welfare.

15. Metz hereby consents to entry of this Administrative Consent Order and waives its right to a hearing concerning the terms hereof pursuant to N.J.S.A. 52:14B-1 et seq.

16. This Administrative Consent Order shall take effect upon the signature of all parties. Upon the signature of all parties, Metz may complete the Transaction subject to the Administrative Consent Order.

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Date: July 23, 86

By: Ronald T Corcory

Ronald Corcory, Assistant Director for Enforcement & Field Operations

METZ METALLURGICAL CORPORATION

Date: July 23, 1986

By: W Peter Metz

Name: W. Peter Metz

Title: Chief Executive Officer

ATTACHMENT SS-7

RFS

ATTACHMENT TT

DWR-047
2/88

Let's protect our earth

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
CN 029
TRENTON, NEW JERSEY 08625

GEORGE G. McCANN, P.E.
DIRECTOR

NOTICE OF VIOLATION

DATE March 27, 1991

Central
ENFORCEMENT ELEMENT
BUREAU OF REGIONAL ENFORCEMENT
TELEPHONE NO. 609-584-4200

PCWS # _____ TYPE SUPPLY _____ NJPDES # NJ0034835 TYPE DISCH DSW RCRA# _____
NAME OF FACILITY Degussa Corporation Metal division
LOCATION OF FACILITY [illegible] MUN. [illegible] COUNTY Middlesex
FACILITY REPRESENTATIVE AND TITLE [illegible]

You are hereby NOTIFIED that during an inspection of your facility on the above date, the following violations were noted and remedial actions are required:

DESCRIPTION OF VIOLATION/REMEDIAL ACTION: [illegible]

The above noted violations are in violation of the following N.J. Statutes/Regulation, and will be recorded as part of the permanent enforcement history of your facility:

- [x] New Jersey Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and appropriate Regulations.
- [ ] New Jersey Safe Drinking Water Act (N.J.S.A. 58:12A-1 et seq.) and appropriate Regulations.
- [ ] New Jersey Water Supply Management Act (N.J.S.A. 58:1A-1 et seq.) and appropriate Regulations.
- [ ] New Jersey Solid Waste Management Act (N.J.S.A. 13:1E-1 et seq.) and appropriate Regulations.
- [ ] New Jersey Underground Storage of Hazardous Substance Act (N.J.S.A. 58:10A-21 et seq.) and appropriate Regulations.

Remedial action to correct the violations must be initiated immediately. Within five (5) calendar days of receipt of this Notice of Violation, you shall telephone the investigator issuing this notice at the above number with the corrective measures you have initiated to attain compliance. The issuance of this document serves as notice to you that the Department has determined that a violation has occurred and does not preclude the State of New Jersey or any of its agencies, from initiation of further administrative or judicial enforcement action, or from assessing penalties, with respect to this or other violations. Violations of these regulations are subject to penalties of up to $25,000 per day.

Further enforcement action, which will require a written response, may be issued on these violation(s) and any additional violations found during the inspection.

Investigator, Division of Water Resources, DEP

Violation received by

White - Original Canary - Bureau File Pink - Criminal Justice Goldenrod - Central File

New Jersey Is An Equal Opportunity Employer

ATTACHMENT II-1

ATTACHMENT UU

HYDROGEOLOGIC INVESTIGATION

INTERIM REPORT - JULY 1986

METZ METALLURGICAL CORPORATION
3900 SOUTH CLINTON AVENUE
SOUTH PLAINFIELD, NEW JERSEY

ATTACHMENT UU-1

environics incorporated/environmental consultants

46 JACKSON DRIVE • CRANFORD, NJ 07016-3580 • (201) 272-3770

TABLE OF CONTENTS

			PAGE
1.0		Introduction	1
2.0		Technical Summary	
	2.1	Groundwater Elevations	3
	2.2	Sampling Technique	3
	2.2.1	November 1985 Sampling	3
	2.2.2	March/April 1986 Sampling	3
	2.2.3	May 1986 Sampling	4
3.0		Findings	
	3.1	Analytic Results	6
	3.2	Discussion -Inorganic Analysis	6
	3.3	Discussion - Organic Analysis	7
4.0		Summary and Conclusions	9

ATTACHMENT UU-2

LIST OF TABLES

TABLE NO.	TITLE
2-1	Sample Identification/Groundwater Sampling 3/31/86 - 4/2/86
2-2	Sample Identification/Groundwater Sampling 5/12/86
3-1	Summary of Groundwater Analysis 11/20/85
3-2	Summary of Groundwater Analysis 3/31/86 - 4/2/86 Inorganics
3-3	Summary of Groundwater Analysis 3/31/86 - 4/2/86 Organics
3-4	Summary of Groundwater Analysis 5/12/86 Volatile Organics, Well MW 105
3-5	Summary of Groundwater Analysis 5/12/86 Volatile Organics, Production Well
3-6	Summary of Groundwater Analysis 5/12/86 Base/Neutral Organics Well MW 105

ATTACHMENT UU-3

LIST OF FIGURES

FIGURE NO.	TITLE
2.1	Groundwater Elevations 3/31/86 (13:28 - 13:55)
3.1	Representative VOC Concentrations 3/31/86 - 4/02/86

ATTACHMENT UU-4

APPENDICES

APPENDIX A: Groundwater Analytic Data
3/31/86 - 4/02/86
Princeton Testing Laboratory

APPENDIX B: Groundwater Analytic Data
5/12/86
ETC

APPENDIX C: Groundwater Analytic Data
5/12/86
S R Analytical

ATTACHMENT UU-5

1.0 Introduction

A hydrogeologic investigation was initiated at the Metz Metallurgical Corporation (MMC) as a portion of the Sampling Plan, submitted to the New Jersey Department of Environmental Protection (NJDEP) on March 4, 1986, in partial compliance with N.J.A.C. 7:1-3.

The objective of the hydrogeologic investigation was the determination of the integrity of several underground structures within the MMC Plant, including quench pits, process sumps, safety catchments and underground tanks, as described in the Sampling Plan and in the Site Evaluation Submission (SES).

Initial sampling results, included in the Sampling Plan, indicated that the structures of concern were tight. However, additional sampling was proposed in the Sampling Plan, for verification of the initial findings.

The seven monitor wells and the production well at MMC were sampled between March 31 and April 2, 1986. Samples were analyzed by Princeton Testing Laboratory (PTL) for full USEPA "Priority Pollutants, plus 40". Sampling methods and results are submitted in this report.

The analysis for inorganic materials, confirmed the findings of the initial sampling, submitted with the Sample Plan. Of the inorganic parameters, only zinc and cyanide were detected, both at concentrations below appropriate groundwater standards.

Volatile organic compounds (VOC) were detected in six of the eight wells sampled. The highest concentrations and greatest number of VOC's were found in Monitor Well MW-105 located at the northern property boundary. Total VOC concentration in this well was nearly 44,000 parts per billion (ppb). Most of this total (34,000 ppb) consisted of Carbon Tetrachloride, a common industrial solvent, not used by MMC. This compound was detected in five other wells, including the production well (10 ppb).

Additional sampling was performed, to confirm or disprove the possibility of laboratory error. Details of procedures and results are included in this report. Briefly, wells MW-105 and the production well were sampled on May 12, 1986. From each well, two samples of full strength water and one sample diluted 1:1 with distilled, deionized water were sent to two laboratories, Environmental Testing and Certification (ETC) and SR Analytical (SR). As described in this report, the sampling confirmed the presence of VOC's in groundwater beneath the MMC plant.

ATTACHMENT UU-6

In MW-105, bis (2-ethylhexyl) phthalate was detected during the PP+40 analysis at a concentration of 250 ppb. On May 12, 1986, this well was sampled for a Base/Neutral scan, following the same proceure adopted for VOC's, to verify the initial result. The subsequent results refuted the 250 ppb level reported in the March/April, 1986 sample. It was, therefore, determined that Base/Neutral compounds do not constitute a groundwater problem at this site.

ATTACHMENT UU-7

2.0 Technical Summary

2.1 Groundwater Elevations

Groundwater elevations were measured in the seven monitor wells prior to sampling. These elevations, and groundwater contours are shown on Figure 2.1. All wells were measured with an electric well sounder on March 31, 1986, between the hours of 13:28 and 13:55.

Comparison of Figure 2.1 with results of previous groundwater measurements (Section 5.5 of the Sampling Plan) shows virtually an identical groundwater flow pattern. Elevations suggest that the regional upgradient direction is to the north or northeast of the site. The apparent elongation of the cone of depression trending in a northwest-southwest direction suggests preferential flow in that direction.

2.2 Sampling Technique

2.2.1 November 1985 Sampling

Details of this sample episode are provided in the Sample Plan. Wells were evacuated with a submersible pump and subsequently sampled with a teflon coated bailer.

2.2.2 March/April 1986 Sampling

This Sampling episode was conducted in the manner proposed in Section 6.1 of the Sampling Plan, with the following exceptions: (1) threaded sections of Schedule 80 PVC pipe were used with the submersible pump instead of Polyethylene pipe. This substitution allowed improved cleaning of equipment between wells. Internal and external surfaces of pipe sections were washed with distilled water; (2) reducing couplings were attached to the gate valve (1-1/4 inch) controlled pump discharge, to restrict the flow to an ultimate discharge through 1/4 inch polytehylene tubing. By this method, a laminar flow discharge was produced for VOC samples, to minimize disturbance of the sample.

During evacuation prior to sampling, pump discharge was restricted to approximately six gallons per minute, in an attempt to prevent pumping to dryness. This was successful for

ATTACHMENT UU-8

wells MW-101, 104 and 105, from which three well volumes were removed. However, even at the reduced flow rate, wells MW-102, 103, 106 and 107 pumped dry. The pump was left in place while the wells recovered. A total of one or two well volumes were removed prior to sampling.

Analysis for priority pollutants was performed by Princeton Testing Laboratory. Chain of Custody, laboratory reports and QA/QC data are included in Appendix A. The Base/Neutral fraction of the analysis for well ME-103 was lost in the laboratory. A summary of data is also included in Section 3.0 of this report.

Quality assurance samples for the March/April sampling episode included trip and field blanks for all parameters, and a blind duplicate of Well MW-101, identified to the laboratory as "MW-109". Sample identification is included in Table 2-1. The field blank was transferred into sample containers through the reducing coupling described above at the location of Well MW-106.

2.2.3 May 1986 Sampling

As stated in Section 1.0 of this report, the May 1986 Sampling episode was conducted to confirm or disprove the presence of VOC's in groundwater beneath the MMC plant. In addition, monitor well MW-105 was sampled to confirm or disprove the presence of bis (2-ethylexyl) phthalate.

The following sampling protocol was developed and executed:

(1) Wells MW-105 and the production well were selected for analysis. The production well is regularly used as a supply of non-contact cooling water. Samples for this program were collected from a sample port directly at the well head. At the time of the May sampling, Well MW-105 was equipped with a semi-permanent submersible pump. Three well volumes were discharged prior to sample collection.

ATTACHMENT UU-9

(2) Two laboratories were selected for this program: ETC in Edison, New Jersey and S.R. Analytical, in Cherry Hill, New Jersey. Each laboratory provided glassware to sample six (6) wells for VOC analysis, and three (3) wells for B/N analysis. In addition, each laboratory provided materials for VOC trip and field blanks.

(3) For each laboratory, three samples from each well were collected for VOC analysis. In addition, three samples from Well MW-105 were collected for B/N analysis by each laboratory. For each group of three samples, two were collected at full strength, and one was diluted in the field at a 1:1 ratio with distilled water. Sample identification to the laboratory was by sample number only, as indicated in Table 2-2.

Analytic reports and Chain of Custody docmentation are included in Appendices B and C. One copy of the complete data report is submitted under separate cover. A summary of results and discussion is included in Section 3.0.

ATTACHMENT UU-10

TABLE 2-1

METZ METALLURGICAL CORPORATION

SAMPLE IDENTIFICATION

GROUNDWATER SAMPLING, 3/31/86 - 4/2/86

Sample Number	Date Sampled	Well
E-1240-1	3/31/86	MW - 101
E-1240-2	4/01/86	MW - 102
E-1240-3	4/01/86	MW - 103
E-1240-4	4/01/86	MW - 104
E-1240-5	4/02/86	MW - 105
E-1240-6	4/02/86	MW - 106
E-1240-7	4/01/86	MW - 107
E-1240-8	4/02/86	Production Well
E-1240-9	3/31/86	Duplicate, MW - 101
TRIP	N/A	Trip Blank
FIELD	4/02/86	Field Blank, collected at MW - 106

ATTACHMENT UU-11

TABLE 2-2

METZ METALLURGICAL CORPORATION

SAMPLE IDENTIFICATION

GROUNDWATER SAMPLING, 5/12/86

WELL	ETC SAMPLE #	ETC LAB #	SR ANALYTIC SAMPLE #	SR ANALYTIC LAB #	DILUTION	ANALYSIS
MW 105	M0511	M2835	M0521	SR12828-1	None	VOA
MW 105	M0512	M2836	M0522	SR12828-2	None	VOA
MW 105	M1513	M2837	M1523	SR12828-3	1:1	VOA
MW 105	M0514	M2843	M0524	SR12828-4	None	B/N
MW 105	M0515	M2844	M0525	SR12828-5	None	B/N
MW 105	M1516	M2845	M1526	SR12828-6	1:1	B/N
Production	M0817	M2838	M0827	SR12828-7	None	VOA
Production	M0818	M2839	M0828	SR12828-8	None	VOA
Production	M1819	M2840	M1829	SR12828-9	1:1	VOA
Field Blank	"Field"	M2841	"Field"	SR12828-10	None	VOA
Trip Blank	"Trip"	M2842	"Trip"	SR12828-11	None	VOA

ATTACHMENT UU-12

3.0 Findings

3.1 Analytic Results

Results from the November 1, 1985 Sampling were presented in the Sample Plan. For convenience, a summary of metals detected is provided in Table 3-1.

Inorganic parameters detected in samples collected between March 31 and April 2, 1986 are presented in Table 3-2. The organic parameters detected at that time are presented in Table 3.3.

Results of VOC analysis from May 12, 1986 for Wells MW 105 and the Production Well are presented in Tables 3-4 and 3-5 respectively. The Base/Neutral results for Well MW-105 are presented in Table 3-6.

3.2 Discussion - Inorganic Analysis

As previously stated, metals results from the November 1985 Sampling suggested that no leakage had occurred from the underground structures in the MMC plant. This was confirmed in the subsequent samples.

As shown on Table 3-1, metals detected in the initial analysis included antimony, lead, silver, zinc, cadmium and copper. Of these, silver, zinc, cadmium and copper are used in MMC. Antimony and lead are not. If the underground structures had leaked, significant concentrations of silver would be expected, rather than a trace quantity (at the detection limit) in one well. It was postulated in the Sample Plan, that the source of metals detected in the initial samples could be sediment from the formation.

Of the inorganic parameters included in priority pollutant analysis, trace quantities of zinc (0.02 to 0.03 ppm) were detected in the production well and five of the monitor wells (see Table 3-2). These concentrations are much lower than the potable water standard for zinc (5.0 ppm). Zinc was detected in sample 109 but not 101, which were duplicate samples. However, since all zinc levels detected were near the detection limit, this is not considered significant.

Cyanide was detected in the production well and Well 105, at the detection limit of 0.01 ppm. This is below the groundwater standard (0.2 ppm), and is not of concern.

ATTACHMENT UU-13

There are two possible explanations for the difference in results shown in Table 3-1 and 3-2. (1) improved development of the wells; or (2) different sampling methods. The second samples were collected from the pump discharge. There are fewer chances for contamination of samples from external sources (i.e. airborne dust, etc.) than for samples collected from bailers. In addition, threaded sections of PVC pipe proved easier to handle in the field than semi-rigid polyethylene pipe and therefore less pront to external contamination.

Analysis for metals on both sampling occasions clearly demonstrate that there has been no contamination of groundwater beneath the MMC plant by materials handled in quantity within the underground structures (i.e. silver). This lack of contamination documents integrity of the structures.

3.3 Discussion - Organic analysis

All organic compounds detected in the March/April Sampling are presented in Table 3-3. As mentioned earlier, the Base/Neutral fractions of the analysis for Well MW-103 was lost in the laboratory. The only compound detected in any well other than in the VOC fraction was bis (2-ethylhexyl) phthalate in Well MW-105 at a concentration of 250 ppb. The supplemental analysis for Base/Neutrals from this well (see Table 3-6) show that Base Neutral Compounds are not of concern for this well. Based on these data, it may be concluded that Base/Neutrals are not a problem for the site in general. Therefore, resampling Well 103 for Base/Neutrals will not be necessary.

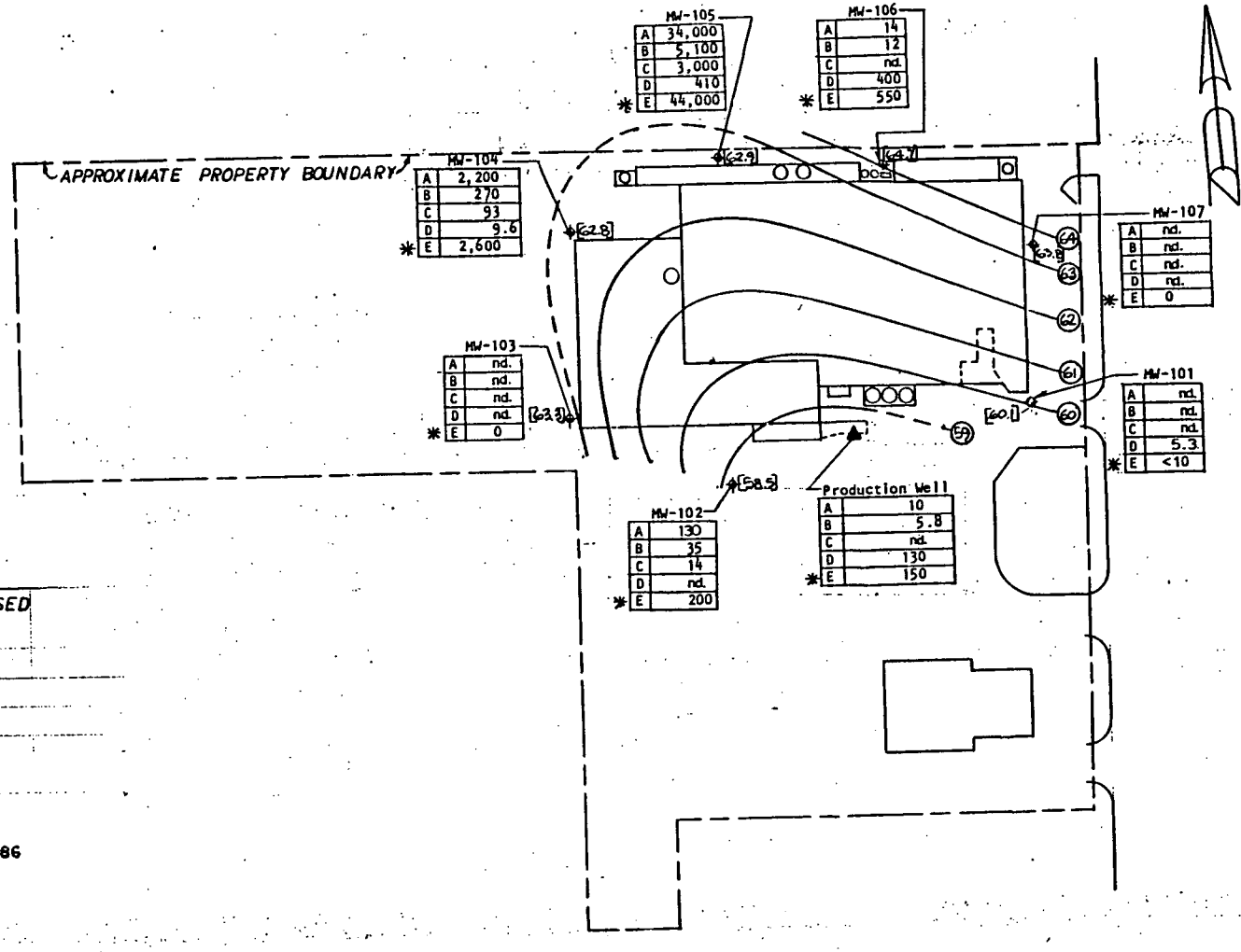
There is no doubt that groundwater beneath the MMC site is contaminated with VOC's. This was suggested in the March/April data, and confirmed in the May 12 data.

Representative compounds, and total VOC concentration are plotted on Figure 3.1. The compounds included in this figure were selected on the basis of concentration and distribution in the wells. The contour lines plotted on this figure are groundwater elevation as measured on March 31, 1986.

The greatest concentration and number of compounds are found in Well MW-105, located at the northern property boundary of MMC, in the upgradient direction. The second and third highest concentrations of compounds are found in Wells MW-104 and MW-106, respectively, which are also upgradient (see Figure 3.1). The only

ATTACHMENT UU-14

ATTACHMENT



EXPLANATION

ALL CONCENTRATIONS EXPRESSED IN µg/ℓ (ppb)

A	CARBON TETRACHLORIDE
B	1,1-DICHLOROETHENE
C	1,1,1-TRICHLOROETHANE
D	TRICHLOROETHENE
* E	TOTAL VOLATILES

n.d. INDICATES NOT DETECTED

[60.1] INDICATES GROUNDWATER ELEVATION MEASURED 3-31-86

DATE	REV NO.	REVISION DESCRIPTION	APPROVED

SCALE 1" = 100'-0"
DRAWN BY RZ
CHECKED BY PD
APPROVED BY PD
DATE 7-2-86
PRINTED

JOB NO. E-1117-85 STATUS

PROJECT TITLE
METZ METALLURGICAL CORP.
3900 SOUTH CLINTON AVENUE
SOUTH PLAINFIELD N.J.
ENVIRONMENTAL AUDIT

ENVIRONICS, INC.
ENVIRONMENTAL CONSULTANTS
46 JACKSON DRIVE CRANFORD, N.J. 07016

DRAWING TITLE
REPRESENTATIVE VOC CONCENTRATIONS
3/31/86 - 4/2/86

DRAWING NO. 3.1

REV.

ATTACHMENT UU-15

other wells in which significant concentrations of VOC's were detected were the production well, and MW-102, near the production well in the center of the cone of depression. No VOC's were detected in Wells MW-103 or MW-107, and less than 10 ppb total VOC's were detected in MW-101.

These data clearly show that the source of the VOC's is located off-site, to the north of MMC. Concentrations of the compounds detected are being drawn toward the Metz Production Well. The apparent elongated shape of the cone of depression suggests anisotropic permeability, with a preferred direction trending northwest to southwest. The concentrations of VOC's suggest that the plume of VOC contamination enters the Metz property from the northwest.

Concentrations of VOC's appears to fluctuate over time, especially in Well MW-105. This is apparent from the May 12 data, as shown on Table 3-4. Samples M0511, M0512, M0521 and M0522 were all collected full strength, while MI513 and MI523 were collected in vials previously half filled with distilled water. All the samples for each well were collected within a period of approximately five minutes. For the production well (Table 3-5) the diluted samples were M1819 and M1829.

The total concentration of each parameter in sample M0511 was nearly four times that detected in sample M0512. However, the diluted sample (M1513) correlates well with sample M0512. In the corresponding samples analyzed by SR Analytical, methylene chloride appears to indicate the dilution effect. However, quality assurance data suggest that this parameter may be a laboratory artifact.

ATTACHMENT UU-16

Table 3-1

METZ METALLURGICAL CORPORATION

SUMMARY OF GROUNDWATER ANALYSIS, 11/20/85

Parameter	Detection Limit	Drinking Water Standard Primary	Drinking Water Standard Secondary	Production Well	Metals detected (mg/l) (ppm) (1) MW 101	MW 102	MW 103	MW 104	MW 105	MW 106	MW 107
Antimony	0.20	—	—		0.21			0.44	1.42	0.33	0.79
Beryllium	0.05	—	—								
Chromium	0.02	0.05	—								
Lead	0.02	0.05	—		0.02			0.03	0.13	0.02	
Nickel	0.05	—	—								
Silver	0.01	0.05	—						0.01		
Zinc	0.01	—	5.0		0.01	0.01			0.01		0.01
Arsenic	0.01	0.05	—								
Cadmium	0.01	0.01	—						0.013		0.033
Copper	0.02	—	1.0						0.03		
Mercury	0.001	0.002	—								
Selenium	0.01	0.01	—								
Thallium	0.10	—	—								

Notes: (1) A blank indicates result less than detection limit

ATTACHMENT UC-17

Table 3-2

METZ METALLURGICAL CORPORATION

SUMMARY OF GROUNDWATER ANALYSIS, 3/31/86 - 4/02/86
INORGANICS

Parameter	Detection Limit	Drinking Water Standard Primary	Drinking Water Standard Secondary	Production Well	Metals detected (mg/l) (ppm) (1) MW 101	MW(2) 109	MW 102	MW 103	MW 104	MW 105	MW 106	MW 107
Antimony	0.10	—	—									
Beryllium	0.05	—	—									
Chromium	0.02	0.05	—									
Lead	0.02	0.05	—									
Nickel	0.04	—	—									
Silver	0.01	0.05	—									
Zinc	0.01	—	5.0	0.02		0.03	0.02	0.02	0.02	0.02	.04	.07
Arsenic	0.01	0.05	—									
Cadmium	0.01	0.01	—									
Copper	0.02	—	1.0									
Mercury	0.001	0.002	—									
Selenium	0.01	0.01	—									
Thallium	0.05	—	—									
Cyanide	0.01	0.2	—	0.015						0.01		

Notes: (1) A blank indicates result less than detection limit
(2) "MW 109" was a duplicate sample for MW 101

ATTACHMENT UU-18

Table 3-3

METZ METALLURGICAL CORPORATION

SUMMARY OF GROUNDWATER ANALYSIS, 3/31/86 - 4/02/86

ORGANICS (1)

PARAMETERS	PRODUCTION WELL	MW 101	MW(2) 109	MW 102	MW 103	MW 104	MW 105	MW 106	MW 107
Volatiles									
Carbon tetrachloride	10			130		2200	34000	14	
Chloroform		2.6	2.6	8.7		53	580	98	
1,1-Dichloroethene	5.8			35		270	5100	12	
Tetrachloroethene							12		
1,1,1-Trichloroethane				14		93	3000		
Trichloroethene	130	5.3	4.6			9.6	410	400	
Trichlorofluoromethane						7.2	590		
Total Xylenes							160		
Base/Neutral Extracts					(3)				
bis(2-ethylhexyl) phthalate							250		

NOTES: (1) Compounds detected, in micrograms/liter (ppb)
(2) "MW 109" was a duplicate sample for MW 101
(3) Base/neutral fraction for Well MW 103 lost in laboratory

ATTACHMENT UU-16

Table 3-4

METZ METALLURGICAL CORPORATION

SUMMARY OF GROUNDWATER ANALYSIS, 5/12/86

VOLATILE ORGANICS (1), WELL MW 105

PARAMETER	ETC M0511	ETC M0512	ETC M1513	SR ANALYTICAL M0521	SR ANALYTICAL M0522	SR ANALYTICAL M1523
Carbon tetrachloride	55000	16200	8690	11000	12000	12000
Chloroform				250(2)	270(2)	210(2)
1,1 Dichloroethene	12200	3360	1880	1800	2200	2100
Methylene Chloride				1500	1600	670
Tetrachloroethene						
Toluene				260(2)	250(2)	140(2)
1,1,1 - Trichloroethane	3590	1660	943	1200	1300	1100
Trichloroethene				240(2)	250(2)	230(2)
Trichlorofluoromethane	<5000	<1000				

NOTES: (1) Compounds detected in micrograms/liter (ppb)
(2) Approximate quantification, below method detection limit

ATTACHMENT UU-20

Table 3-5

METZ METALLURGICAL CORPORATION

SUMMARY OF GROUNDWATER ANALYSIS, 5/12/86

VOLATILE ORGANICS (1), PRODUCTION WELL

PARAMETER	ETC M0817	ETC M0818	ETC M1819	SR ANALYTICAL M0827	SR ANALYTICAL M0828	SR ANALYTICAL M1829
Carbon tetrachloride	9.25	13.5		5.3 (2)	8.6 (2)	5.2 (2)
Chloroform					1.8 (2)	0.8 (2)
1,1 Dichloroethene				17 (3)	2.2 (2,3)	16 (3)
Methylene Chloride	6.55	6.28	<2.8	7.4 (2)	10	5.3 (2)
Tetrachloroethene	10.3	12.8		2.6 (2,3)	3.5 (2,3)	2.7 (2,3)
Toluene				1.4 (2)	1.8 (2)	
1,1,1 - Trichloroethane				120	150	80
Trichloroethene	142	194	83			
Trichlorofluoromethane	<10	<10				

NOTES: (1) Compounds detected in micrograms/liter (ppb)
(2) Approximate quantification, below method detection limit
(3) Result questionable - see laboratory report

ATTACHMENT CC-2

Table 3-6

METZ METALLURGICAL CORPORATION

SUMMARY OF GROUNDWATER ANALYSIS, 5/12/86

BASE/NEUTRAL ORGANICS (1) WELL MW 105

PARAMETER	ETC M0514	ETC M0515	ETC M1516	SR ANALYTICAL M0524	SR ANALYTICAL M0525	SR ANALYTICAL M1526
bis (2-ethylhexyl) Phthalate				1.3 (2)		
Di-n-butyl Phthalate	12.3	<10		0.8 (2,3)	1.0 (2,3)	0.44 (2,3)
Naphthalene					2.6 (2)	3.3 (4)

NOTES:
(1) Compounds detected in micrograms/liter (ppb)
(2) Approximate quantification, below method detection limit
(3) Result questionable - see laboratory report
(4) Result questionable - Sample M1526 was 1:1 dilution with distilled/deionized water

ATTACHMENT LU-22

4.0 Summary and Conclusions

1. Groundwater flow at the Metz site is controlled, in part, by the production well. The general regional gradient appears to be from the north. Local gradient is in the direction of the production well, with an elongated northwest-southwest axis, which suggests a zone of increased permeability in that direction.

2. Analysis of groundwater samples on two occasions (November 1985 and March 31-April 2, 1986) demonstrates that groundwater beneath the MMC site has not been contaminated with metals used in the plant (i.e. silver, cadmium, copper). Monitor Wells MW-101 through MW-107 are all located "up gradient" of the site. However, contamination of the groundwater by volatile organic compounds, unrelated to Metz Metallurgical Corporation, has indicated the hydraulic connection between the portion of the acquifer monitored by the monitor wells (i.e. the upper portion of the saturated zone) and the deeper portion from which the production well draws. Therefore, it is apparent that if there were any leakage from the underground structures, the detection of which was the original objective of the Sampling Plan, if missed by Monitor Wells, it would be detected in the production well. It can be concluded, therefore, that the integrity of the underground structures is satisfactory.

3. Volatile organic compounds were detected in samples collected between March 31, and April 2, 1986. Contamination of groundwater by VOC's was confirmed in samples collected May 12, 1986.

4. The concentration and number of compounds detected is greatest in wells located at and near the northern property boundary. The groundwater flow direction at the area of greatest concentration (MW-105) is southerly, in the direction of the Metz production well.

5. The volatile compounds detected are all common industrial solvents. However, none of the compounds are used at Metz Metallurgical Corporation.

6. The distribution of the VOC's and the hydrogeologic data demonstrate that the source of the VOC contamination is off-site, to the north of the Metz Metallurgical Site. It is recommended that the NJDEP conduct an investigation to determine the source of the contamination.

ATTACHMENT UU-24

ATTACHMENT VV

ANALYTIC RESULTS FOR SOIL SAMPLING PROGRAM

AT

Metz Metallurgical Corporation
3900 South Clinton Avenue
South Plainfield, NJ

ECRA Case #86108

July 31, 1987

prepared by:

ATTACHMENT VV-1

environics incorporated/environmental consultants
46 JACKSON DRIVE • CRANFORD, NJ 07016-3580 • (201) 272-3770

TABLE OF CONTENTS

	Title	Page
1.0	Introduction	1
2.0	Technical Summary	2-4
3.0	Findings	5
3.1	Area A	5-7
3.2	Area B	10-11
3.3	Area C	13
3.4	Area D	15
3.5	Area E	17-18
3.6	Area F	21
3.7	Area G	23
4.0	Conclusions and Recommendations	25
4.1	Conclusions	25-26
4.2	Proposed Action	26

FIGURES

MMC-1117-1004	- Sample Results - Parameters Above Action Level	Pocket
MMC-1117-1005	- Proposed Locations for Limit of Contamination Samples	Pocket

ATTACHMENT VV-2

LIST OF TABLES

3-1	Summary of Analytic Results - Area A	8
3-1-A	Summary of Analytic Results - Area AX Sidewall Samples	9
3-2	Summary of Analytic Results - Area B	12
3-3	Summary of Analytic Results - Area C	14
3-4	Summary of Analytic Results - Area D	16
3-5	Summary of Analytic Results - Area E (Silver)	19
3-5-A	Summary of Analytic Results - Area E (PP + 40)	20
3-6	Summary of Analytic Results - Area F	22
3-7	Summary of Analytic Results - Area G	24

APPENDICIES

Appendix A Laboratory Analytic Data, Quality Assurance and Chain of Custody

ATTACHMENT VV-3

1.0 INTRODUCTION

A Sample Plan for Metz Metallurgical Corporation (Metz), of South Plainfield, New Jersey, was submitted to the New Jersey Department of Environmental Protection (NJDEP) as part of the Site Evaluation Submission (SES). The original plan was designed to investigate four general areas of concern:

1. Underground structures;
2. Spill History;
3. Surface water discharge;
4. Vacant land.

The rationale for the sample plan is included in the SES will not be repeated here.

Additional concerns were identified by the Bureau of Industrial Site Evaluation (BISE) during the site inspection and file review. As requested by BISE, a Revised Sample Plan was submitted to the NJDEP on December 10, 1986. The Revised Plan addressed environmental concerns in six locations on the Metz site, identified as Area A through Area F.

A conditioned approval of the Sample Plan was granted on February 18, 1987. With the exception of two conditions related to groundwater quality, the conditions were relatively minor modifications in sample method, location or parameter.

One of the major conditions required the collection of soil samples for VO analysis, in order to corroborate the conclusion drawn from hydrogeologic data, that the VO compounds detected in groundwater originated off-site. The requested sampling was conducted as described in Section 3.7 (Area G) of this report.

The second major condition of approval required the re-sampling of monitor wells for Priority Pollutant metals. The sampling was conducted concurrently with the soil sampling program. Anomalous results prompted Environics and Metz to resample groundwater again. Problems with the quality control/quality assurance of the groundwater data have been observed, although the exact cause of the problem has not yet been identified. Additional sampling and analysis of the groundwater is required. In order to avoid further delay in submission of the analytic results of the soil sample program, a separate report on the groundwater results will be prepared and submitted after the cause of the QA/QC problem has been identified and corrected.

ATTACHMENT VV-4

2.0 TECHNICAL SUMMARY

The sampling program at Metz was conducted between April 1, 1987 and April 27, 1987. With the exception of minor deviations discussed in this report, all sampling activities were conducted in accordance with the Revised Sample Plan (December 10, 1986), as approved with conditions (February 18, 1987).

The major deviation from the Sample Plan was the substitution of the sample collection method in Areas B, C, and D. The sample collection method for these areas specified in the sample plan was the excavation of test pits, with the collection of sidewall samples for analysis. Instead of test pits, a standard 2 inch O.D. split spoon was driven with a manually powered sliding drop hammer. The sample was transferred to containers with stainless steel scoops in a method acceptable to the NJDEP. Decontamination of the split spoon was performed in accordance with the cleaning protocol included in the Sample Plan as modified by Item 7 of the Conditional Approval. The split spoon bore holes were plugged with impermeable material after completion. Except for possible sample contamination with asphalt fragments in Area B, there is no evidence of any adverse impact on sample quality from the substitution of sample collection methods.

Samples from four required locations were not collected due to field conditions, as discussed in Section 3. These locations included two from Area E, and one each from Areas F and G.

The Area E locations not sampled were within the rip rap adjacent to the outfall. Since contamination exists up and down stream from these locations, a lack of data from these points does not affect the conclusions which are drawn.

In Area F, one sample could not be obtained since refusal was encountered in the borehole (at 1.9 feet) before sample depth (6.0 feet) was reached. The most likely cause of refusal was the sample spoon encountering the footing for the building. A field decision was made not to attempt relocation of the boring, based on the following:

1. No visual or olfactory evidence of hydrocarbon contamination was observed in any of the adjacent borings;

2. The boring at the center of the tank location was less than three feet from the abandoned sample.

ATTACHMENT VV-5

Bedrock was encountered at one sample location in Area G at feet below grade. The NJDEP had requested collection of two sample depths from each boring location, at depths of 1.5 to 2.0 nd 3.5 to 4.0 feet, or above bedrock. A field decision was made collect only one sample from this location, from 1.4 feet to 1.9 feet. Since no VO compounds were detected in any of the Area samples, this decision is considered justified.

Analysis of all samples was performed by Garden State Laboratories, Irvington, New Jersey. Analytic methodologies ceptable to the NJDEP were employed for all analyses. Quality ntrol/quality assurance data is included in the laboratory report in Appendix A. Sample holding times, minimum detection imits and precision and accuracy criteria were within acceptable imits.

Of the seven areas sampled on the Metz site, only one (Area was targeted to evaluate the effects of a known discharge of azardous material. Sample locations in Area E were selected in an attempt to delineate fully the vertical and horizontal extent f contamination in the stream. The stream bed contamination is ot deep. The samples collected from the 0.5 to 1.0 foot increment were not all below the action level (AL) for silver, but ere only slightly above it. It is likely that some contamination of the samples took place in the collection process. When a leanup of the stream bed is conducted, post-cleanup sampling will be adequate to verify completeness of the recovery of silver. Similarly, the lateral samples at the north and south dges of the stream do not delineate the horizontal extent of contamination. However, based on the geometry of the stream bed, the horizontal extent of contamination cannot be more than a few feet outside the present sample locations. Post recovery samples will be used to verify adequacy of cleanup activities.

Other areas were sampled not to target a known spill or discharge, but to search for evidence of any residual contamination in exposed soil areas of the plant. The sample results show that contamination of the exposed soils is wide spread. Silver, cadmium and copper, all processed by Metz, were found in unacceptable concentrations at many locations. Concentrations vary from slightly above the AL to orders of magnitude above. Petroleum hydrocarbon (PHC) was also found above the AL at some locations, although its distribution appears to be less of a problem than metals.

Concentrations of thallium above the AL were found in nearly every sample collected. Concentrations were observed within limits of 1.96 and 10.7 ppm, with a mean of 6.58. Approximately 60 percent of values fall within one standard deviation of the mean. Since Metz does not process thallium, the values observed apparently represent a background condition.

ATTACHMENT VV-6

The contamination by silver, cadmium, and copper in Area A, and of silver and cadmium in Areas C and D was not anticipated. The most likely source of the contamination is the accumulation of residue from the equipment stored outside the plant in these areas. If this is the case, numerous "hot spots" probably exist, with very high concentrations, as found in Area A. Between the "hot spots", there may be areas with no detectable contamination, and zones where moderate contamination exists as a result of mixing by runoff, soil movement during construction, by vehicle movement and other similar processes.

The vertical extent of contamination is undoubtedly limited by the shallow soil. Bedrock is generally encountered at less than a five foot depth. The horizontal extent will need to be determined. A conceptual plan for cleanup and verification of extent of contamination is discussed in Section 4. The appropriate supplemental Sample Plan and remedial action plans will be submitted at a later time.

ATTACHMENT VV-7

3.0 FINDINGS

This section of the report contains a summary of the results of soil sampling conducted as part of the approved Sample Plan. These results are presented for each of the six areas of the site discussed in the Plan (Areas A through F), and a seventh area (Area G) in which a soil sampling was required as a condition of approval.

Each subsection contains: (1) a description of the area; (2) a summary of the environmental concern; (3) a description of the sampling proposed; (4) a discussion of any deviations from Sample Plan dictated by field conditions; (5) a presentation of analytic results.

Sample locations are shown on Drawing 1004, along with concentrations detected of parameters in excess of actions levels.

3.1 Area A

DESCRIPTION - Area A consists of unpaved (gravel) soil adjacent to the western edge of Building A. The southern portion of the area is bounded on the north by a paved ramp which provides vehicle access to the Refining Department, on the east by the wall of Building A, and on the south by a paved driveway south of the security fence. To the west, the gravel extends approximately 150 feet to a security fence, beyond which lies the open area identified as Area D.

The central portion of Area A extends northward from the paved ramp described above, adjacent to the west and north sides of an elevated concrete platform used for storage of raw materials.

The northern segment of Area A includes gravel between the elevated platform and the Patio. This portion of Area A (designated AX in the Sample Plan) has been excavated to bedrock (at a depth of approximately five feet) for a building expansion. All soil excavated has been stockpiled on site.

CONCERN - No record of discharges of hazardous materials exists for Area A. Inclusion of the area in the sample plan was based upon observation of stained and saturated soil made by the Case Manager during his site inspection on June 24, 1986.

ATTACHMENT VV-8

PROPOSED SAMPLING - Sampling of Area A requested by the Case Manager included 11 locations (A-1 through A-11, shown on Drawing 1004. Requested parameters for all locations included volatile organics (VO), petroleum hydrocarbons (PHC), polychlorinated biphenyls (PCB), and priority pollutant metals (PP metals). Three of the sample locations (A-1 through A-3) were sampled for the full parameters in advance of submission of the Sample Plan, so that the proposed construction in Area AX could begin. Results of this sampling were included in the Sample Plan. Based upon those results, parameters for six of the remaining Area A samples were reduced to PHC, VO and 6 of the 13 PP metals. The reduced list of metals included materials produced by Metz (nickel, silver, zinc, cadmium, and copper) and one metal not used by Metz (thallium) which was detected in two of the three AX samples above the NJDEP "action level" (AL). Also included in proposed samples were sidewall samples from the AX excavation at three locations (two depths each) for PHC, cadmium and thallium.

The sample method proposed for Area A samples was collection of sidewall samples from test pits excavated by back hoe.

ACTUAL SAMPLING - Sampling within Area A was conducted in two sampling events. Excavation sidewall samples in Area AX were collected on April 14, 1987. Remaining Area A samples (locations A-4 through A-11) were collected on April 27, 1987. All sampling in Area A was conducted in accordance with the Sample Plan. Test pits were back filled upon completion of sampling.

RESULTS - Summaries of analytic results of the Area A and Area AX sidewall samples are included in Table 3-1 and 3-1-A respectively. The laboratory report for these data is included in Appendix A.

Every sample exceeded the action level (AC) for one or more parameters. The northern portion (locations A-1 through A-3 and AX sidewall samples) is widely contaminated at low levels by PHC. The highest concentration of PHC in this segment was found at location A-2 (1852 ppm). This area has already been excavated to bedrock with the soil stockpiled on site. PHC concentration in the AX sidewall samples exceed the AL at the soil surface (<425 ppm) and in two of the deeper samples (135 and 315 ppm).

With the exception of A-8 (1211 ppm), all samples in the central and southern portions of Area A contained PHC at concentrations less than the AL. No PCB was detected in any sample. Total VO concentrations were less than the AL in all samples.

ATTACHMENT VV-9

With the exception of zinc, concentrations of metals produced by Metz were above the AL throughout Area A. Silver exceeds the AL in 7 of the 11 locations samples with a maximum of 674 ppm in sample A-7. Cadmium exceeds the AL in 8 of 11 locations with a maximum of 178 ppm in A-10. Copper concentrations above the AL were found in six locations which a maximum concentration of 500 ppm. Nickel concentrations were acceptable at all locations except A-10 which had 160 ppm.

Priority Pollutant metals not produced by Metz were all found at or below AL except for thallium and chromium. Chromium was found above the AL only in sample A-10 at a concentration of 141 ppm. Thallium was found above the AL in nearly all samples within limits of approximately 4 and 10 ppm.

ATTACHMENT VU-10

TABLE 3-1

METZ METALLURGICAL CORPORATION

SUMMARY OF ANALYTIC RESULTS - AREA A

PARAMETER	ACTION LEVEL	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	A-10	A-11
Nickel	100	24.2	31.5	38.1	55.6	48.6	49.0	47.2	48.6	48.8	160	58.7
Silver	5	1.5	1.48	1.29	154	11.5	2.56	674	319	78.3	13.2	20
Zinc	350	102	157	190	188	120	148	198	146	100	237	87.6
Cadmium	3	3.40	4.85	2.52	1.89	<0.6	6.2	10.6	22.2	3.8	178	3.51
Copper	170	84.0	126	132	121	192	197	206	184	180	500	132
Thallium	5	4.02	10.1	8.80	7.43	10.3	8.91	7.25	6.58	9.94	5.63	10.7
Arsenic	20	1.82	1.16	0.64	---	---	---	0.903	---	---	0.704	---
Beryllium	---	<1	<1	<1	---	---	---	0.714	---	---	0.962	---
Chromium	100	16.8	18.7	18.2	---	---	---	32.2	---	---	141	---
Lead	100	21.5	17.6	23.0	---	---	---	42.7	---	---	87.6	---
Mercury	1	0.056	0.096	0.078	---	---	---	<0.10	---	---	<0.10	---
Selenium	4	<1	<1	<1	---	---	---	<0.10	---	---	<0.10	---
Antimony	2	<1	<1	<1	---	---	---	<1	---	---	<1	---
PHC	100	270	1852	262	<20	<20	51.9	<20	1211	<20	49.4	<20
PCB	5	<0.01	<0.01	<0.01	---	---	---	<0.01	---	---	<0.01	---
TOTAL VO	1	0.07	<0.01	0.026	0.076	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

NOTES:
(1) Samples collected 4/27/87
(2) Results expressed in mg/kg dry weight basis
(3) All samples collected from 0-0.5 feet EXCEPT VO, from 1.5-2.0 feet
(4) Targeted VO compounds identified are: A-1 - Chlorobenzene; A-3 - Xylene; A-4 - Trichloroethylene
A-5 through A-11 - none

ATTACHMENT VV-11

TABLE 3-1-A

METZ METALLURGICAL CORPORATION

SUMMARY OF ANALYTIC RESUTLS - AREA AX SIDEWALL SAMPLES

DEPTH	PARAMETER	ACTION LEVEL	AXSW1	AXSW2	AXSW3
0 - 0.5	PHC	100	421	417	404
	Cd	3	4.03	5.61	7.15
	Tl	5	6.44	7.38	6.24
1.5 - 2	PHC	100	135	71.1	315
	Cd	3	8.68	5.58	7.21
	Tl	5	4.45	6.56	5.34

NOTES:
(1) Samples collected 4/14/87
(2) Results expressed in mg/kg dry weight basis

ATTACHMENT VV-12

3.2 Area B

DESCRIPTION - Area B includes the western portion of a driveway, oriented parallel to and located south of building A. Dimensions are approximately 180 feet by 8 feet. A fenced storage area is located to the north and open land designated Area C lies to the south. Area B is paved with asphalt. There is no visible evidence of contamination.

CONCERN - There is no record of discharge of hazardous material in Area B. Environmental concern is based upon identification of drum storage in this area from an aerial photograph taken on December 3, 1979, prior to pavement in the area.

PROPOSED SAMPLING - The NJDEP requested sampling of Area B at three locations for PHC, PCB, VO and PP metals. Environics proposed reduced parameters for two of the three locations based on Area AX samples (see Section 3.1). The proposed depth for collection of PHC samples was 1.5 to 2.0 feet below the asphalt pavement to minimize contamination of the sample with pavement fragments. Test pits were proposed as the method of sample collection. Proposed sampling for Area B was approved without condition.

ACTUAL SAMPLING - Samples were collected in Area B on April 14, 1987. The sample collection method was changed from test pits with sidewall sampling to split spoon. This change was made to minimize destruction of pavement.

Pavement was opened in approximately one foot square cuts by Metz personnel using an impact hammer. Pavement thicknesses encountered were:

B-1 - 0.7 feet, with gravel sub base 1.2 feet;
B-2 - 0.6 feet, no sub base
B-3 - 0.8 feet, no sub base

Pavement cutting was performed prior to the day of sampling. On the sampling day rainwater was found in all three pavement cuts. This was bailed out as thoroughly as possible prior to sampling. Finely crumbled asphalt fragments from the bottom of the pavement cut were removed as well as possible. No hydrocarbon odor was observed in the soil samples.

RESULTS - A summary of analytic results is included in Table 3-2. The laboratory data report is included in Appendix A.

ATTACHMENT VV-13

All parameters in Area B were found at or below the Action Level (AL) except thallium in B-2 (7.04 ppm) and PHC in B-3 (169 ppm). The hydrocarbon value probably represents contamination of the sample with asphalt fragments.

ATTACHMENT VV-14

TABLE 3-2

METZ METALLURGICAL CORPORATION

SUMMARY OF ANALYTIC RESULTS - AREA B

PARAMETER	ACTION LEVEL	B-1	B-2	B-3
Nickel	100	36.2	33.1	35.6
Silver	5	1.53	3.19	4.91
Zinc	350	76.1	58.4	95.0
Cadmium	3	<1	1.24	1.51
Copper	170	9.82	87.3	24.1
Thallium	5	4.44	7.04	3.94
Arsenic	20		0.89	
Beryllium	---		<0.5	
Chromium	100		14.1	
Lead	100		17.0	
Mercury	1		<0.25	
Selenium	4		<0.25	
Antimony	2		<1.2	
PHC	100	<20	<69.6	169
PCB	5		<0.01	
TOTAL VO	1	0.114	<0.005	<0.005

NOTES:
(1) Samples collected 4/14/87
(2) Results expressed in mg/kg dry weight basis
(3) Sample depths, below pavement surface:
B-1 (Metals) - 1.3'-1.8'; (VO & PHC) - 1.8'-2.2'
B-2 (Metals & PCB) - 0.6'-1.1'; (VO & PHC) - 1.4'-1.9'
B-3 (Metals) - 0.8'-1.3'; (VO & PHC) - 1.5'-2.0'
(4) Targeted VO compounds detected =
B-1 Toluene (0.029), Ethylbenzene (0.017), Xylene (0.068)
B-2 & B-3, none

ATTACHMENT VV45

3.3 Area C

DESCRIPTION - Area C consists of approximately 0.8 acres of unpaved land west of Building B. This field is entirely surrounded by asphalt paved parking and drive areas. Monitor well MW-102 is located at the north central end of the field.

The field designated Area C was purchased by Metz in 1981, along with Building B. Since that time, it has been used only for storage of temporarily out of service equipment.

CONCERN - There is no record of spillage or discharge of hazardous material on Area C. Environmental concern is based upon observation of heavy equipment and possibly drums on the unpaved areas in an aerial photograph taken December 3, 1979 (prior to ownership by Metz).

PROPOSED SAMPLING - Five sample locations were requested by the NJDEP for PHC, PCB, PP metals and VO. There were included unchanged in the Sample Plan. The method proposed was back hoe trench with sidewall samples.

ACTUAL SAMPLING - Samples were collected from Area C on April 1, 1987. The proposed sample method was changed from test pits to split spoon samples for the VO analysis. Soil for VO analysis was collected from the 1.5 to 2.0 foot level. Surface soil (0-0.5 feet) for PHC, PCB, and PP metal analysis was collected with stainless steel trowels.

RESULTS - A summary of analytic results for Area C is presented in Table 3-3. The laboratory report is presented in Appendix A.

All parameters of samples collected in Area C were below action levels (AL) except: (1) silver in samples C-1 through C-3 and C-5 at concentrations between 5 and 7.5 ppm; (2) thallium in all samples at concentrations between 5.7 and 7 ppm; and PHC in sample C-4 at 161 ppm.

ATTACHMENT VV-16

TABLE 3-3
METZ METALLURGICAL CORPORATION
SUMMARY OF ANALYTIC RESULTS - AREA C

PARAMETER	ACTION LEVEL	C-1	C-2	C-3	C-4	C-5
Nickel	100	37.4	44.8	35.4	32.6	37.8
Silver	5	5.02	6.13	5.61	4.86	7.41
Zinc	350	91.8	101	88.6	75.5	106
Cadmium	3	0.47	0.51	0.44	0.98	0.86
Copper	170	39.8	32.4	85.1	57.0	51.2
Thallium	5	5.68	6.94	6.08	5.85	6.76
Arsenic	20	2.30	2.15	2.70	2.05	1.18
Beryllium	---	<0.8	<1.0	<0.8	<0.7	<0.8
Chromium	100	23	27.7	22.6	18.7	18.4
Lead	100	43.2	43.0	49.8	44.7	54.0
Mercury	1	0.069	<0.07	<0.06	0.072	<0.07
Selenium	4	0.117	<0.14	<0.12	<0.11	<0.11
Antimony	2	<1.1	<1.4	<1.2	<1.1	<1.1
PHC	100	23.6	28.3	<20	161	36
PCB	5	<0.01	<0.01	<0.01	<0.01	<0.01
TOTAL VO	1	<0.005	<0.005	<0.005	<0.005	<0.005

NOTES:
(1) Samples collected 4/1/87
(2) Results in mg/kg dry weight basis
(3) Sample depths =
Metals, PHC, PCB - 0 - 0.5'
VO - 1.5' - 2.0'
(4) Targeted VO compounds detected = none

ATTACHMENT VV-17

3.4 Area D

DESCRIPTION - Area D is an open field of approximately 1.7 acres west of Building A. To the north the field is bounded by a stream which receives a NJPDES permitted outfall. To the south the area is bounded by asphalt paved driveway. On the west the field is bounded by wooden land. A security fence separates the east side of the field from the gravel area which lies between Area D and Building A.

The field is used by Metz only for storage of out of service equipment. Most of the area has been filled with approximately two feet of soil excavated for building construction.

CONCERN - There is no record of spillage or discharge of hazardous material in Area D. Concern was based primarily on observation of dirt piles on the December 3, 1979 aerial photograph. The piles, which originated from the excavation mentioned above have been graded level.

PROPOSED SAMPLING - Six sample locations were proposed for Area D. Two the these were to be collected from the fill and four from underlying soil. One fill sample and one underlying soil sample were to be analyzed for PHC, PCB, PP metals and VO. All other samples were to be analyzed for PCB, VO and the limited metals described in Section 3.1. The proposed sample method was back hoe trench with side wall samples.

ACTUAL SAMPLING - Samples for Area D were collected on April 2, 1987. The sampling method was changed from test pits to split spoon. Surface samples (0-0.5 feet) were collected with a stainless steel trowel. Numerous asphalt fragments were observed in the location of sample D-1.

RESULTS - A summary of analytic results from Area D is presented in Table 3-4. Laboratory data is presented in Appendix A.

Silver concentrations exceeded the AL in all samples from Area D in values between 5.62 and 63.0 ppm. Cadmium exceeded the AL in three of the six locations with a maximum concentration of 13 ppm in sample D-6. The copper concentration in that sample was 336 ppm. All other copper results were below the AL. Thallium values exceeded the AL in all samples with a maximum of 6.74 ppm. No other PP metals were detected above the AL.

No VO compounds or PCB was detected in any sample. PHC was above the AL in three of the six samples with a maximum concentration of 323 ppm in sample D-1.

ATTACHMENT VV-18

TABLE 3-4

METZ METALLURGICAL CORPORATION

SUMMARY OF ANALYTIC RESULTS - AREA D

PARAMETER	ACTION LEVEL	D-1	D-2	D-3	D-4	D-5	D-6
Nickel	100	37.4	38.9	31.0	36.5	34.5	32.6
Silver	5	17.5	63.0	16.0	9.0	5.62	9.99
Zinc	350	114	83	95.9	93	73	93.9
Cadmium	3	0.97	6.45	3.40	2.76	2.90	13.0
Copper	170	39.2	157	75.9	79.7	92.3	336
Thallium	5	6.74	5.86	6.6	6	5.36	5.36
Arsenic	20	---	---	2.35	---	---	1.28
Beryllium	---	---	---	<0.8	---	---	<0.8
Chromium	100	---	---	25.8	---	---	22.4
Lead	100	---	---	36.3	---	---	51.4
Mercury	1	---	---	0.469	---	---	0.368
Selenium	4	---	---	<0.1	---	---	<0.10
Antimony	2	---	---	<1	---	---	<1
PHC	100	323	218	<20	132	94.6	54.2
PCB	5	---	---	---	---	---	<0.01
TOTAL VO	1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

NOTES:

(1) Samples collected 4/2/87

(2) Results in mg/kg dry weight basis

(3) Samples D-2 and D-6 collected from fill at the following depths: Metals, PHC, PCB, - 0-0.5'
VO, 1.5' - 2.0'

Samples D-1, D-3, D-4, D-5 collected 0-0.5' below fill depths from ground surface are = D-1 - 1.5' -2.0'; D-3 - 1.5' - 2.0'; D-4 - 2.5' - 3.0'; D-5 - 2.0' - 2.5'

(4) Targeted VO compounds detected = none

ATTACHMENT VV-19

3.5 Area E

DESCRIPTION - Area E consists of the bed of a stream which flows westward along the northern property line. Flow in this stream is primarily storm water and non-contact cooling water authorized under NJPDES permit NJ 0034835. Rip rap has been placed for approximately 35 feet downstream from the NJPDES outfall.

CONCERN - There are two concerns for the environmental integrity of Area E. The primary concern is the extent of contamination from a spill of silver chloride which occurred on February 14, 1986. This spill was described in Item 13 of the Site Evaluation Submission. The secondary concern is residue from past discharges of VO compounds.

PROPOSED SAMPLING - The extent of contamination sampling proposed for Area E consisted of 26 samples downstream and 1 upstream from the outfall, to be analyzed for silver. Ten downstream sample stations were selected to a maximum distance of 300 feet from the outfall. At each station a centerline sample of the stream sediment (0-0.1 foot) was proposed. Vertical samples (along the centerline at a depth of 0.5 to 0.1 feet) and horizontal samples (from the north and south banks at 0 to 0.5 feet) were proposed at selected stations. A single sample for PP plus 40 was proposed from the stream centerline just downstream from the rip rap to evaluate any possible residual VO contamination.

The proposed sampling method was direct collection of sediment with scoops, probes and trowels.

ACTUAL SAMPLING - Area E was sampled on April 23, 1987. Sampling began at the downstream end, in order to minimize the effects of disruption of the stream sediment. All north and south samples were collected with trowels. Centerline and vertical samples were collected with a stainless steel bucket auger. No samples were collected from the 0 + 10 CL and 0 + 10 S locations, due to the presence of rip rap.

RESULTS - A summary of analytic results from the extent of contamination sampling is presented in Table 3-5. Table 3-5-A contains a summary of the PP plus 40 data. Laboratory reports are included in Appendix A.

Silver concentrations above the AL were found at all station including upstream. The source of upstream contamination is not known at this time. The most likely source is from the catalyst loading area located on the north driveway. Drainage from the north driveway flows into the stream upstream from the outfall. The full

ATTACHMENT VV-20

horizontal extent of contamination has not been determined. However, based on the geometry of the stream channel, the limit of silver contamination is not likely to be more than a few feet outside the present sample locations. The vertical samples indicate that the depth of silver contamination is approximately one foot. Post cleanup sampling will be adequate for verification of vertical and horizontal limits of contamination.

With the exception of copper and silver, no elements or compounds in the PP plus 40 samples were detected above AL. There is no record of a discharge of copper into this stream. However, copper will be included in any future samplings.

ATTACHMENT VU-21

TABLE 3-5

METZ METALLURGICAL CORPORATION

SUMMARY OF ANALYTIC RESULTS - AREA E (SILVER)

STATION	NORTH (0-0.1)	CENTER (0-0.1)	VERTICAL (0.5-1)	SOUTH (0-0.1)
0-50	---	1019	---	---
0+00	---	9458	---	---
0+10	282	---	---	---
0+20	---	584	---	---
0+40	1272	32.5	2.97	265
0+60	---	268	---	---
0+80	364	2053	---	19.9
0+110	---	2730	---	---
0+160	490	157	2.67	24.3
0+220	2071	1648	---	187
0+300	286	2304	5.48	30.7

NOTES:
(1) Samples collected 4/23/87
(2) Results in mg/kg dry weight basis
(3) Collection depths for North, Center, Vertical, and South Samples in feet as indicated in table

ATTACHMENT VV-22

TABLE 3-5-A

METZ METALLRGICAL CORPORATION

SUMMARY OF ANALYTIC RESULTS - AREA E (PP + 40)

PARAMETER	ACTION LEVEL	STATION 0+35 CL (0-0.5)
Nickel	100	31.9
Silver	5	99.5
Zinc	350	141
Cadmium	3	1.42
Copper	170	870
Thallium	5	1.96
Arsenic	20	2.05
Beryllium	---	0.750
Chromium	100	12.3
Lead	100	30.9
Mercury	1	0.262
Selenium	4	<0.10
Antimony	2	<1.0
Cyanide	12	0.269
Phenol	---	2.50
Total VO	1	<0.005
Total AE	---	<0.2
Total B/N	10	<0.2

NOTES:
(1) Sample collected 4/23/87
(2) Results in mg/kg dry weight basis
(3) Sample depth for all parameters = 0-0.5 feet
(4) Targeted VO, AE or B/N compounds detected = none

ATTACHMENT VV-23

3.6 Area F

DESCRIPTION - Area F is a portion of an asphalt paved parking area adjacent to the north wall of Building B.

CONCERN - An underground storage tank was removed from Area F prior to purchase of the property by Metz in 1981. No record exists of the integrity of this tank.

PROPOSED SAMPLING - Five boring samples were proposed in a standard NJDEP tank integrity test pattern. Proposed sample depth was 6.0 to 6.5 feet or at bedrock. Parameters proposed were PHC from all samples and Base/Neutrals organics plus 15 (B/N) from the center boring. As a condition of approval of the sample plan, the NJDEP requested that the B/N sample be selected by positive bias or be taken from the sample location nearest to the end of the tank where product pipe lines were connected.

ACTUAL SAMPLING - Samples from Area F were collected on April 14 and 15, 1987. A hand driven split spoon was used through pavement holes cut by Metz employees. Pavement thickness was measured at 0.6 to 0.7 feet.

No sample was collected at location F-3. The boring reached refusal at 1.9 feet, which was probably caused by a portion of the footing for Building B. Since F-3 was less than three feet from F-5, a field decision was made to abandon that sample.

The former product pipelines were located at the end nearest sample F-2. Sufficient recovery was obtained from the 6.0 to 6.5 foot increment to fill two vials (40 ml each) for PHC and one jar (8 ounce) for B/N. These were held in the event that no positively biased sample would be collected. Since no staining or odor was detected in any sample, the B/N fraction was analyzed from sample F-2.

RESULTS - A summary of analytic results from Area F samples is presented in Table 3-6. Laboratory data is presented in Appendix A.

All PHC samples were below the AL except at sample F-5, which had 2406 ppm. No B/N compounds were detected at a limit of 2 ppm. No staining or odor were observed in F-5. Since no contamination was found in samples F-1, F-2, and F-4, at a maximum distance of 4.0 feet from F-5, it is likely that the F-5 result was from asphalt contamination of the sample.

ATTACHMENT VV-24

TABLE 3-6

METZ METALLURGICAL CORPORATION

SUMMARY OF ANALYTIC RESULTS - AREA F

PARAMETER	ACTION LEVEL	F-1	F-2	F-3	F-4	F-5
PHC	100	46.6	93.2	---	<20	2406
Total B/N	10	---	<2	---	---	---

NOTES:
(1) Samples collected 4/14 and 4/15/87
(2) Results in mg/kg dry weight basis
(3) Sample depth, all samples = 6.0 - 6.5 feet
(4) Targeted B/N compounds detected = none

ATTACHMENT VV-25

3.7 Area G

DESCRIPTION - The designation Area G was not included in the approved Sample Plan. The area is a portion of the north driveway which extends from 50 feet east to 50 feet west of monitor well MW-105, as defined in Item 10 of the February 18, 1987 Conditional Approval. This area is shown on Drawing 1004.

CONCERN - Area G was defined by NJDEP as the location for soil samples to corroborate previously submitted groundwater data. The specific concern was concentrations of VO compounds found in groundwater samples.

PROPOSED SAMPLING - The sampling protocol for Area G was proposed by the NJDEP. It was to include four borings surrounding well MW-105 as shown on Drawing 1004. Sample depths were to be 1.5 to 2.0 feet and 3.5 to 4.0 feet or just above bedrock. Parameters were to be a VO scan to include trichlorofluoromethane and xylene.

ACTUAL SAMPLING - Area G was sampled on April 15, 1987. Samples were taken with a hand driven split spoon from the locations requested. A shallow sample only was collected at G-2 due to refusal (bedrock) at 1.9 feet. No recovery was obtained in the first spoon driven at G-4. Two samples were collected from the second spoon from approximate depths of 2.0 to 2.5 and 3.0 to 3.5 feet.

RESULTS - A summary of analytic results for Area G is presented in Table 3-7. Laboratory data is presented in Appendix A. No VO compounds were detected in any sample.

ATTACHMENT VV-26

TABLE 3-7

METZ METALLURGICAL CORPORATION

SUMMARY OF ANALYTIC RESULTS - AREA G

SAMPLE	DEPTH	TOTAL VO COMPOUNDS
G-1-a	1.5'-2.0'	<0.005
G-1-b	2.9'-3.4'	<0.005
G-2-a	1.4'-1.9'	<0.005
G-2-b	------	------
G-3-a	1.5'-2.0'	<0.005
G-3-b	3.0'-3.5'	<0.005
G-4-a	2.0'-2.5'	<0.005
G-4-b	3.0'-3.5'	<0.005

NOTES:
(1) Samples collected 4/15/87
(2) Results expressed in mg/kg dry weigh basis
(3) Targeted VO compounds detected = none

ATTACHMENT VV-27

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

The following conclusions can be drawn from the analytic results of the sample program conducted at Metz:

1. The sediment in the NJPDES permitted stream bed (Area E) is highly contaminated with silver. A sample from the center of the stream bed directly in line with the outfall contained nearly one percent silver. Lower concentrations were found up stream and down stream. The former probably resulted from previous run off from a catalyst loading area.

2. Copper concentration is Area E was found in excess of action levels. No other Priority Pollutant, organic or inorganic, was detected above action level.

3. Concentrations of silver and cadmium exceed action levels throughout most of Areas A, C. and D. Copper and nickel exceed action levels in a few samples from Area A. In general, the concentrations of contamination decrease markedly with distance between Area A and Area D. Based on the samples collected to date, concentrations in excess of action level are likely in virtually any of the previously sampled locations.

   No known release of silver or cadmium is responsible for the contamination. The most likely source is accumulation of residual material from equipment removed from the building and stored outside, on Areas A, C, and D. Most such equipment has been stored in Areas A and D. This is probably the reason that contamination levels are greater in these areas than in Area C.

4. Concentrations of thallium exceed the action level in almost all samples collected. The variation in concentration appears to represent a normal distribution. No thallium has ever been used at Metz. It is assumed that concentrations observed represent background conditions.

5. No contamination was found in Area B. Two values were observed above action levels - thallium and petroleum hydrocarbon. Thallium represents background. The PHC value (169 ppm) observed in

ATTACHMENT VV-28

a sample collected from below asphalt pavement does not represent contamination.

6. One value of PHC was found in excess of action levels in Area F. This location was surrounded on three sides within four feet by samples below the action level. On the fourth side is a building wall. No odor or staining was observed in any of the samples, and no B/N compounds were detected. The one value is assumed to have been the result of asphalt fragments.

7. No volatile compounds were detected in Area G, in the samples requested for corroboration of previously submitted data concerning VO contamination of groundwater. This supports the conclusion that VO contamination of the groundwater originates from off-site.

4.2 Proposed Action

The following actions will be required at Metz:

1. A supplemental sample plan will be required in order to define the horizontal extent of contamination. The plan will be submitted as a separate document. However, proposed sample locations and parameters are included on Drawing 1005, along with a summary of maximum concentrations of the parameters of concern. Based on drainage patterns (as shown on the drawing) it is unlikely that contamination has migrated past the perimeter. Thallium will be included in the analysis to confirm background concentration of this element.

2. A cleanup plan will be required for concentrations of silver, cadmium, and copper in Areas A, C, D, and E. Metz is currently conducting feasibility studies for on-site recovery of the metals from the stream bed and soil. The cleanup plan will be prepared and submitted when process development has been tested. If the process is technically feasible, exact delineation of vertical and horizontal extent of contamination will be unnecessary, except for perimeter samples as described above. All exposed soil within the perimeter would be assumed contaminated to the bedrock surface (average depth, approximately five feet). The conceptual plan for cleanup includes excavation of soil, recovery of metals, followed by replacement, grading and pavement.

ATTACHMENT VV-29

ATTACHMENT WW

REMEDIAL ACTION PLAN
FOR
METZ METALLURGICAL CORPORATION
3900 SOUTH CLINTON AVENUE
SOUTH PLAINFIELD, NEW JERSEY

ECRA CASE # 86108

Prepared by: CH2M HILL
99 Cherry Hill Road
Suite 304
Parsippany, New Jersey 07054

October 14, 1988

ATTACHMENT WW

CONTENTS

Section		Page
1	INTRODUCTION	1-1
	Site Description	1-1
	History of ECRA Investigation	1-2
	Hydrogeologic Background	1-3
2	SUMMARY OF ENVIRONMENTAL CONCERNS	2-1
	Area A	2-1
	Description	2-1
	Environmental Concern	2-2
	Area B	2-2
	Description	2-2
	Environmental Concern	2-3
	Area C	2-3
	Description	2-3
	Environmental Concern	2-3
	Area D	2-4
	Description	2-4
	Environmental Concern	2-4
	Area E	2-5
	Description	2-5
	Environmental Concern	2-5
	Area F	2-5
	Description	2-5
	Environmental Concern	2-5
	Area G	2-6
	Description	2-6
	Environmental Concern	2-6
3	PROPOSED REMEDIAL ACTIONS	3-1
	Objective and Approach	3-1
	Extent of Environmental Concern	3-1
	Vertical Migration	3-2
	Horizontal Migration	3-3
	Contact Exposure	3-4
	Remedial Options	3-4
	Area A	3-6
	Area B	3-7
	Area C	3-7
	Area D	3-7
	Area E	3-8
	Area F	3-8
4	WORK PLAN AND SCHEDULE	4-1
	Task 1	4-1
	Task 2. Area F	4-2
	Task 3. Area E	4-3
	Task 4. Area C	4-4
	Task 5. Area D	4-4
	Task 6. Area A	4-5
	Task 7. Reporting	4-5

ATTACHMENT WW-2

CONTENTS (cont.)

Section		Page
5	LIMIT OF CONTAMINATION AND POST-REMEDIATION SAMPLING	5-1
	Perimeter Samples	5-1
	Area E	5-2
	Area F	5-3
	QA/QC	5-3
6	COST OF REMEDIATION PLAN	6-1

Tables

2-1	SUMMARY OF SOIL SAMPLE ANALYTIC RESULTS
2-2	SUMMARY OF ANALYTIC RESULTS FROM SUPPLEMENTAL SAMPLE PROGRAM
2-3	SUMMARY OF ANALYTIC RESULTS FOR AREA D SUPPLEMENTAL SOIL SAMPLE PROGRAM
5-1	PROPOSED LIMIT-OF-CONTAMINATION AND POST-REMEDIATION SAMPLES
6-1	ESTIMATED COSTS FOR REMEDIATION PROGRAM

Figures

1-1	LOCATION MAP
1-2	SITE MAP
2-1	SUMMARY OF ANALYTIC RESULTS
3-1	PROPOSED REMEDIAL ACTIONS
4-1	REMEDIATION SCHEDULE
5-1	LIMIT-OF-CONTAMINATION AND POST-REMEDIATION SAMPLING

ATTACHMENT WW-3

Appendices

A	NJDEP CORRESPONDENCE
B	SUPPLEMENTAL SAMPLE PROGRAM
C	PHC SOIL RETENTION CAPACITY
D	SITE SAFETY PLAN
E	ANALYTIC DATA REPORTS

ATTACHMENT WW-4

Section 1
INTRODUCTION

SITE DESCRIPTION

The Metz Metallurgical Corporation (MMC) is located on South Clinton Avenue, in South Plainfield, Middlesex County, New Jersey (Figures 1-1 and 1-2). The 12-acre site contains two buildings, identified as Buildings A and B, which total more than 140,000 square feet. Remaining land is used for parking, equipment storage, or is vacant.

The company has produced precious metal products since it was founded in Newark in 1921. Primary products are chemically produced silver powder and silver oxide; silver plate for the microelectronics industry; silver and silver alloy strip; and silver, gold, platinum, and palladium powder. All MMC operations were moved to the present South Plainfield site in 1965, following construction of the initial segment of Building A on previously undeveloped land. Parcels of adjacent land were purchased in 1974 and again in 1981, including Building B.

Building A houses all manufacturing operations. Since the company is in the precious metal industry, an elaborate security system has been established, which includes double chain-link fencing, security guards and electronic surveillance systems. All persons exiting the security zone are required to pass through metal detection equipment, and, if necessary, are subject to a strip search.

All storage and handling of hazardous substances at the MMC site are contained within the security zone (within Building A and the adjacent fenced area). Silver is the hazardous material stored and used in the greatest quantity, either as silver metal or in ionic form as silver oxide, silver chloride, or silver nitrate.

Storm water runoff and non-contact cooling waters are discharged at a NJPDES-permitted outfall at the northwest corner of the security zone. Floor drains in the plant areas containing hazardous materials are routed through safety catchments and process pumps to the metal recovery systems before discharge to the sanitary sewer system.

Greater detail on the site description, history, and operation were included in the Site Evaluation Submission (SES), submitted to NJDEP in March, 1986 (1). Areas of environmental concern, are described and discussed in Section 2 of this Remedial Action Plan.

ATTACHMENT WW-5

HISTORY OF ECRA INVESTIGATION

The Initial Notice for MMC, including the General Information Submission (GIS, submitted February 10, 1986) (2) and the Site Evaluation Submission (SES, submitted March 4, 1988), were declared complete by the NJDEP on March 7, 1986. The business and real estate were sold under authority of an Administrative Consent Order (ACO), which was executed July 23, 1986. With the exception of expansion and continued upgrading of processes and environmental controls, operations continue unchanged under the new ownership.

The MMC site was inspected on June 24 and 25, 1986. Comments from the inspection report and the Sample Plan Review (October 2, 1986 Appendix A, Item 6), were incorporated into a Revised Sample Plan (3), which was submitted to NJDEP on December 10, 1986, and approved with conditions on February 18, 1987 (Appendix A, Item 3).

The soil sample program was conducted between April 1 and April 27, 1987. A report entitled "Analytic Results for Soil Sampling Program" (ARSSP)(4) was submitted to the NJDEP on July 31, 1987. The Analytical data in this report were declared acceptable by NJDEP on January 20, 1988 (Appendix A, Item 1). A summary of these results is presented in Section 2 of this report.

A groundwater investigation was initiated at MMC before the original Sample Plan in the SES was prepared and submitted. The objective of the investigation was to determine the integrity of below-grade structures in the plant, including quench pits, process sumps, safety catchments, and tanks. If these structures had leaked, above-normal silver concentrations would be expected to be observed in the groundwater.

Based on the groundwater analytical data for metals submitted with the Sample Plan in the SES, and additional data included in an Interim Report (5), (submitted in July 1986) it was concluded that these below grade structures have not affected groundwater quality. However, NJDEP did not accept these data, based upon sampling and analytic procedures. Consequently, the wells were resampled for metals analysis.

During the groundwater investigation, volatile organic compounds (VOC) were detected in the groundwater. Investigation of this problem (described in the July 1986 Interim Report) indicated an offsite source for the VOC problem. As a condition of approval of the Revised Sample Plan, the NJDEP required additional soil sampling to verify the groundwater results. The requested sampling was

ATTACHMENT WW-6

performed and results were included in the ARSSP. These data, which supported the previous conclusion, were accepted by NJDEP in the January 20, 1988 correspondence (Appendix A, Item 1).

HYDROGEOLOGIC BACKGROUND

The following discussion is taken from the SES (1), which was based on information found in Barksdale et ae. (6). The Metz site is located within the Piedmont Physiographic Province in central New Jersey. Situated between the Watchung Mountains and the Raritan River Valley, the topography is that of a dissected plain with gently rolling hills. Elevation is approximately 80 feet above mean sea level. Local topography is nearly flat, with a gentle northwesterly slope of less than 1 percent.

The nearest mapped surface water body is an unnamed tributary of Green Brook, which joins the Raritan River nearly 6 miles to the west in Bound Brook.

The site lies within the outcrop area of the Brunswick Formation, which composed of soft red shale with some interbedded sandstone and deposited during the Triassic Period. Total thickness of the Brunswick Formation has been estimated to exceed 6,000 feet, although numerous faults make estimates of formation thickness uncertain. Strike of the formation is approximately northeast to southwest, and it dips northwest from about 5° to 15°.

Groundwater flow in the Brunswick Formation is controlled by the degree of jointing and fracturing. While not as productive an aquifer as the unconsolidated Coastal Plain formations located a few miles to the south, the Brunswick is generally a good producer. Wells producing 100 to 500 gallons per minute have been completed in many localities.

Groundwater quality varies with location. While most wells contain less than 200 to 300 parts per million total dissolved solids, highly mineralized waters calcium, magnesium, sulfates, and iron, with total hardness greater than 900 parts per million, have been found locally.

ATTACHMENT WW-7

TABLE 2-1
METZ METALLURGICAL CORPORATION
SUMMARY OF SOIL SAMPLE ANALYTIC RESULTS (1)(2)

SAMPLE NUMBER	ANALYSIS	DEPTH (3)	RESULTS ABOVE GUIDELINE (4)(5) Ag	Cd	Cu	Ni	Cr	ORGANICS
A-1	PP METALS	0.0	BG	3.4	BG	BG	BG	
	PHC	0.0						270
	PCB	0.0						ND
	VOC	1.5						BG
A-2	PP METALS	0.0	BG	4.85	BG	BG	BG	
	PHC	0.0						1852
	PCB	0.0						ND
	VOC	1.5						ND
A-3	PP METALS	0.0	BG	BG	BG	BG	BG	
	PHC	0.0						262
	PCB	0.0						ND
	VOC	1.5						BG
A-4	PP METALS	0.0	154	BG	BG	BG		
	PHC	0.0						ND
	PCB	0.0						ND
	VOC	1.5						BG
A-5	PP METALS	0.0	11.5	ND	192	BG		
	PHC	0.0						ND
	PCB	0.0						ND
	VOC	1.5						ND
AXSW1	Cd	0.0		4.03				
	PHC	0.0						421
	Cd	1.5		8.68				
	PHC	1.5						135
AXSW2	Cd	0.0		5.61				
	PHC	0.0						417
	Cd	1.5		5.58				
	PHC	1.5						BG
AXSW3	Cd	0.0		7.15				
	PHC	0.0						404
	Cd	1.5		7.21				
	PHC	1.5						315

ATTACHMENT WW-8

TABLE 2-1 (CONTINUED)
METZ METALLURGICAL CORPORATION
SUMMARY OF SOIL SAMPLE ANALYTIC RESULTS (1)(2)

SAMPLE NUMBER	ANALYSIS	DEPTH (3)	RESULTS ABOVE GUIDELINE (4)(5) Ag	Cd	Cu	Ni	Cr	ORGANICS
A-6	TARGET METALS	0.0	BG	6.2	197	BG		
	PHC (6)	0.0						BG
	VOC	1.5						ND
A-7	PP METALS	0.0	674	10.6	206	BG	BG	
	PHC	0.0						ND
	PCB	0.0						ND
	VOC	1.5						ND
A-8	TARGET METALS	0.0	319	22.2	184	BG		
	PHC	0.0						1211
	VOC	1.5						ND
A-9	TARGET METALS	0.0	78.3	3.8	180	BG		
	PHC	0.0						ND
	VOC	1.5						ND
A-10	PP METALS	0.0	13.2	178	500	160	141	
	PHC	0.0						BG
	PCB	0.0						ND
	VOC	1.5						ND
A-11	TARGET METALS	0.0	20	3.5	BG	BG		
	PHC	0.0						ND
	VOC	1.5						ND
B-1	TARGET METALS	1.3	BG	ND	BG	BG		
	PHC	1.8						ND
	VOC	1.8						BG
B-2	PP METALS	0.6	BG	BG	BG	BG	BG	
	PHC	1.4						ND
	PCB	0.6						ND
	VOC	1.4						ND
B-3	TARGET METALS	0.8	BG	BG	BG	BG		
	PHC	1.5						169
	VOC	1.5						ND

ATTACHMENT WW-9

TABLE 2-1 (CONTINUED)
METZ METALLURGICAL CORPORATION
SUMMARY OF SOIL SAMPLE ANALYTIC RESULTS (1)(2)

SAMPLE NUMBER	ANALYSIS	DEPTH (3)	RESULTS ABOVE GUIDELINE (4)(5) Ag	Cd	Cu	Ni	Cr	ORGANICS
C-1	PP METALS	0.0	5.02	BG	BG	BG	BG	
	PHC	0.0						BG
	PCB	0.0						ND
	VOC	1.5						ND
C-2	PP METALS	0.0	6.13	BG	BG	BG	BG	
	PHC	0.0						BG
	PCB	0.0						ND
	VOC	1.5						ND
C-3	PP METALS	0.0	5.61	BG	BG	BG	BG	
	PHC	0.0						ND
	PCB	0.0						ND
	VOC	1.5						ND
C-4	PP METALS	0.0	BG	BG	BG	BG	BG	
	PHC	0.0						161
	PCB	0.0						ND
	VOC	1.5						ND
C-5	PP METALS	0.0	7.41	BG	BG	BG	BG	
	PHC	0.0						BG
	PCB	0.0						ND
	VOC	1.5						ND
D-1	TARGET METALS	1.5	17.5	BG	BG	BG		
	PHC	1.5						323
	VOC	1.5						ND
D-2	TARGET METALS	0.5	63	6.45	BG	BG		
	PHC	0.5						218
	VOC	1.5						ND
D-3	TARGET METALS	1.5	16	3.4	BG	BG	BG	
	PHC	1.5						ND
	VOC	1.5						ND
D-4	TARGET METALS	2.5	9	BG	BG	BG		
	PHC	2.5						132
	VOC	2.5						ND
D-5	TARGET METALS	2.0	5.62	BG	BG	BG		
	PHC	2.0						BG
	VOC	2.0						ND
D-6	PP METALS	0.0	9.9	13	336	BG	BG	
	PHC	0.0						BG
	PCB	0.0						ND
	VOC	1.5						ND

ATTACHMENT WW-10

TABLE 2-1 (CONTINUED)
METZ METALLURGICAL CORPORATION
SUMMARY OF SOIL SAMPLE ANALYTIC RESULTS (1)(2)

SAMPLE NUMBER	ANALYSIS	DEPTH (3)	RESULTS ABOVE GUIDELINE (4)(5) Ag	Cd	Cu	Ni	Cr	ORGANICS
E-0+35	PP METALS	0.0	99.5	BG	870	BG	BG	
	CYANIDE	0.0						BG
	PHENOL	0.0						2.5
	VOC	0.0						ND
	ACID ORGANIC	0.0						ND
	B/N ORGANIC	0.0						ND
F-1	PHC	6.0						BG
F-2	PHC	6.0						BG
	B/N ORGANIC	6.0						ND
F-3	PHC	6.0						
F-4	PHC	6.0						ND
F-5	PHC	6.0						2406
G-1-A	VOC	1.5						ND
G-1-B	VOC	2.9						ND
G-2-A	VOC	1.4						ND
G-3-A	VOC	1.5						ND
G-3-B	VOC	3.0						ND
G-4-A	VOC	2.0						ND
G-4-B	VOC	3.0						ND

NOTES

(1) Analytic methods, data & QA/QC presented in July 1, 1987 Report.
(2) Samples A-1 through AXSW were located within the area excavated for expansion of the water treatment department at MMC (Area AWT).
(3) Upper range of sample depth increment, measured from grade in feet. All sample increments were 0.5 foot.
(4) Summary does not include results of analysis for thallium. The NJDEP has determined that thallium concentrations observed represent background (Appendix A, Item 1). Thallium results were reported in July 31, 1987 submission. BG means results are below NJDEP guideline limits. ND means results are below detection limit. BLANK means not tested. NJDEP guideline limits are Aq (5), Cd (3), Cu (170), Ni (100), Cr (100), PHC (100), PCB (5), VOC (1), B/N Organic (10), Acid Organic (-), Phenol (-), and Cyanide (12).
(5) All concentrations expressed in mg/kg (ppm) on dry weight basis.
(6) "TARGET METALS" include: Ag, Cd, Cu, Ni, Zn, and Tl.

ATTACHMENT WW-11

TABLE 2-2
METZ METALLURGICAL CORPORATION
SUMMARY OF ANALYTIC RESULTS FROM SUPPLEMENTAL SOIL SAMPLE PROGRAM (1)

AREA	SAMPLE	DEPTH (2)	PHC CONCENTRATION (3)
A	A-8	1.5	< 30
		2.0	< 30
B	B-3	2.0	726
		2.5	279
F	F-3	7.0	3710
		7.5	137
		8.0	1200
		8.5	2920

NOTES

(1) Sample program conducted by Environics. Samples collected on May 28,1988. Laboratory analytic and QA/QC data are included in Appendix E.

(2) Upper range of depth increment, measured from grade in feet. All sample increments were 0.5 foot.

(3) All concentrations expressed in mg/kg (ppm) on dry weight basis.

ATTACHMENT WW-12

TABLE 2-3
METZ METALLURGICAL CORPORATION
SUMMARY OF ANALYTIC RESULTS FOR AREA D SUPPLMENTAL SOIL SAMPLE PROGRAM (1)

TEST PIT	DEPTH (2)	CONCENTRATION (3) SILVER	CADMIUM	COPPER	PHC
D-7	1.0	75.95	2.33	37.16	265
	2.0	0.57	0.23	4.65	< 13
	3.0	0.08	0.04		
	4.0	0.19			23
D-8	1.0	0.15	0.79	12.76	
	2.0	0.15	0.33	8.44	
	3.0	0.14	0.98	21.25	
	4.0	0.01	0.04		
D-9	1.0	0.23	0.23	5.20	16
	2.0	0.04	0.04	5.21	
	3.0	0.33	0.20	27.82	60
	4.0	0.22	0.12		
	5.0	0.19	0.10		
	6.0	0.34			18
D-10	1.0	49.92	3.37	112.96	110
	2.0	0.43	0.50	16.41	
	3.0	0.48	0.24	18.35	18
	4.5	0.13	0.06		< 11
D-11	1.0	0.03	0.31	5.19	
	2.0	0.20	0.32	24.62	
	3.0	0.13	0.12		
D-12	1.0	0.12	0.10	4.80	
	2.0	0.10	0.06		

ATTACHMENT WW-13

TABLE 2-3 (CONTINUED)
METZ METALLURGICAL CORPORATION
SUMMARY OF ANALYTIC RESULTS FOR AREA D SUPPLMENTAL SOIL SAMPLE PROGRAM (1)

TEST PIT	DEPTH (2)	CONCENTRATION (3) SILVER	CADMIUM	COPPER	PHC
D-13	1.0	0.28	0.45	12.43	
	2.0	0.46	0.41	11.72	
	3.0	0.10	0.10	6.90	
	4.0	0.10	0.03		
	5.0	0.12			
	6.0	0.18			
D-14	1.0	0.07	0.03	11.82	
	2.0	0.17	0.12	5.02	
	3.0	0.19			
D-15	2.0	0.25	0.36	409.52	
	3.0	0.13	0.08	8.74	
	4.0	0.09	0.03	5.68	
D-16	1.0	1.00	3.16	42.22	
	2.0	0.25	1.21	32.12	
	3.0	0.20	1.24	43.33	
	4.0	0.06	0.38		
	5.0	0.08			
	6.0	0.20			
D-17	1.0	4.23	1.34	38.67	
	2.0	0.22	1.20	14.24	
	3.0	0.14	0.09		

NOTES

(1) Sample program conducted by Environics. Samples collected on September 16, 17 and 23, 1987. Laboratory analytic and QA/QC data are included in Appendix E.

(2) Upper range of depth increment, measured from grade in feet. All sample increments were 0.5 foot.

(3) All concentrations expressed in mg/kg (ppm) on dry weight basis.

ATTACHMENT WW-14

Section 5
LIMIT OF CONTAMINATION AND
POST-REMEDIATION SAMPLING

PERIMETER SAMPLES

Samples from the site perimeter will be collected to document the limit of lateral migration of silver, cadmium, copper, and PHC found in surface samples from Areas A, C, D, and E. Data from previous studies suggest that these materials of concern have not migrated vertically. Although lateral migration (past the site perimeter) of significant concentrations is considered unlikely, the assumption requires documentation.

Proposed locations for perimeter samples (PS-1 through PS-11) are shown on Figure 5-1; these samples will all be collected at the ground surface. The rationale for proposed analytical parameters for each location is discussed below and a summary of these parameters is included in Table 5-1.

PS-1

PS-1 is located south of Area C, and separated from it by an asphalt-paved parking and vehicle access area approximately 60 feet wide. Silver at a concentration of 7.41 mg/kg was the only parameter of concern found in the nearest sample (C-5) collected earlier. Local drainage flows from both north and south onto the paved area. Sample PS-1 will be analyzed for silver only.

PS-2

PS-2 is located west of Area C. Drainage conditions are similar to the area around PS-1, discussed above, in that the site perimeter at this location is unlikely to receive runoff from Area C, the nearest area of environmental concern. The nearest previously collected sample (C-2) contained silver at concentrations of 6.13 mg/kg. Sample PS-2 will be analyzed for silver.

PS-3 and PS-4

PS-3 and PS-4 will be located south of Area D, and separated from it by an asphalt-paved parking lot, approximately 60 feet wide. Silver, cadmium, copper, and PHC were found in nearby Area D samples at concentrations above the NJDEP guidelines. Analysis for these parameters will be included in both samples.

ATTACHMENT WW-15

PS-5 and PS-6

PS-5 and PS-6 are located west of and downhill from the fill that was placed in Area D. Land west of the limit of fill (Figure 5-1) is wooded, and appears to have remained undisturbed for many years. Although it is unlikely that any out-of-service machinery (such as has been assumed to have introduced silver, cadmium, copper, and PHC to Area D) was ever stored west of the fill line, it is possible that these contaminants were carried there by erosion. Analysis for these four parameters will be included in both samples.

PS-7 through PS-10

PS-7 through PS-10 are all located north of Area E, the NJPDES-permitted stream. Silver is the primary material of concern in this location, due to the silver chloride spill. In addition to silver, the only parameter detected above NJDEP guidelines from an analysis for Priority Pollutant plus 40 was copper at a concentration of 870 mg/kg. Therefore, these samples will be analyzed for silver and copper.

PS-11

PS-11 is in the stream bed, approximately 100 feet upstream of the NJPDES outfall. A sample collected from the stream bed 50 feet above the outfall contained silver at a concentration of 1019 mg/kg. It is not known if silver upstream of the outfall resulted from the silver chloride spill, or from runoff from a silver catalyst loading area in the north driveway (Figure 5-1). The silver concentration in sample PS-11 will indicate the contribution (if any) from the catalyst loading area.

AREA E

Soil samples from the NJPDES-permitted stream bed will be collected for silver analysis following remedial excavation. The samples will be designated EX-1, EX-2 and EX-3, located as shown on Figure 5-1, and collected from the upper 0.5 foot of sediment following excavation. All samples will be located along the center line of the stream. Sample EX-1 will be collected at the NJPDES outfall. Samples EX-2 and EX-3 will be collected 150 and 300 feet, respectively, downstream from the outfall.

Silver is the parameter of concern. However, at the request of the NJDEP (Appendix A, Item 1), soil will be analyzed for PHC and VOCs as well. Sample collection and analytical methodology, documentation, and QA/QC information are discussed later in this section.

ATTACHMENT WW-16

AREA F

Samples will be collected for PHC analysis from the Area F excavation prior to backfill. Samples will be designated FX-1 through FX-4. Samples FX-1 through FX-3 will be collected from the west, north, and east side walls of the excavation, respectively. No sample will be collected on the south side of the excavation, due to the presence of the building foundation. Sample FX-4 will be collected from the bottom center of the excavation, from 0 to 0.5 foot below post-excavation grade. The sidewall samples will be collected from an elevation of one-half the total excavation depth, at the center of the excavation face. Penetration will be no more than 0.5 foot into the excavation wall.

Sample collection and analytical methodology, documentation, and QA/QC information are discussed below.

QA/QC

A QA/QC program is essential for the successful completion of any project based on the collection and analysis of data. The goal of the QA/QC program is to ensure that data collected are complete, representative, accurate, and precise. Key topics which must be considered include methods for sample collection, documentation, preservation, and custody.

Sample Equipment and Methods

A variety of sample equipment will be available for this project, including augers, scoops, probes, spatulas, and trowels. The selection of sample equipment will be made in the field, based on conditions at the time of sample collection. The choice will be documented in field notes.

Soil samples will be transferred directly to new, laboratory-prepared sample containers immediately following collection. Wide mouth, 8-ounce glass jars, with PTFE-lined phenolic closures are the container of choice for metals and PHC samples. Any modifications will be documented in field notes.

Samples collected for PHC will be packed fully into the sample jars to minimize loss of parameter in the head space. An effort will be made to avoid collection of asphalt fragments with the sample. The laboratory will be instructed to sieve all samples for PHC analysis to remove as much asphalt as possible.

Samples will be packed on ice immediately following collection.

Appendix B
SUPPLEMENTAL SAMPLE PROGRAM

Concentrations in excess of NJDEP guidelines of four parameters (silver, cadmium, copper, and PHC) were found in several locations on the MMC site in the results of the approved sample plan. Supplemental information on the distribution and concentration of these parameters was needed to develop a remedial action plan. Environics performed three episodes of sampling and analysis. The findings of these supplemental programs have been incorporated into the cleanup plan. Laboratory analytic and QA/QC reports are included in Appendix E. This Appendix discusses of the objectives and scope of each program, and presents a report of methodology, a summary of results, and a discussion of their significance.

AREA D SAMPLE PROGRAM

Objective

The objective of the Area D supplemental sample program was to define the vertical concentration distribution of the parameters of concern. Previously collected samples (D-1 through D-6) had shown that silver, cadmium and copper were distributed throughout the surface of Area D, and that PHC was distributed within the eastern and south-central portions of the site. It is assumed that the materials were introduced to the unpaved soil as residual material from out-of-service machinery.

The materials of greatest concern (silver and cadmium) tend to revert to insoluble forms (silver chloride and cadmium hydroxide) when released to soil. The PHC observed concentrations were below the soil retention capacity (Appendix C). Therefore, it was anticipated that vertical migration could result from physical processes only, and would therefore be minimal. Groundwater samples from wells MW-103 and MW 104, which are both downgradient from Areas D and A, show no evidence of significant vertical migration. This supplemental program in Area D was intended to document or disprove the lack of vertical migration.

Operations

Field operations were conducted on September 16, 17, and 23, 1987. Eleven test pits, numbered D-7 through D-17 (Figure B-1), were excavated to the bedrock surface. Side wall samples were collected from a depth of 1 foot to bedrock at 1-foot intervals.

ATTACHMENT WW-18

Prior to collection of samples, the sidewall of the test pits were scraped with a clean stainless steel trowel to remove traces of soil introduced during the excavation process. Sample depths were measured from grade. Each sample depth interval included a vertical span of no more than 0.5 foot, centered at the nominal depth. Soil logs of the test pits were prepared prior to backfilling. These logs are presented in Table B-1.

All sample equipment used for collection of samples for metals analysis was cleaned according to the following protocol:

- o detergent wash, with brushing
- o tap water rinse
- o distilled deionized water rinse
- o nitric acid (10%) rinse
- o distilled deionized water rinse

Samples from three test pits (D-7, D-9, and D-10) were collected for PHC analysis in addition to metals. Three depth zones (at the upper, middle, and lower levels) were sampled for PHC. Sample equipment used for PHC samples received an acetone rinse in place of nitric acid.

The samples collected for PHC analysis were sent to a certified New Jersey laboratory (Intech Biolabs) within 24 hours of collection. Results are presented and discussed below.

Samples for metals analysis were collected as split samples. One split was held in the custody of Environics, in a secure refrigerator, for up 6 months, the maximum holding time for metals in soil. Screening tests were made on the other split for selection of intervals to be sent for analysis by the certified laboratory (CFM).

Results

A summary of analytical results from this program is presented in Table B-2.

Undisturbed soil horizons were identified in nine of the eleven test pits at depths of three feet or less. In two of the test pit locations (D-9 and D-14) fill or reworked soil was found to depths of approximately 5 feet. The fill consisted of red/brown silty sand and fragments of weathered shale. Fragments of wood, concrete, asphalt, and other materials were observed in some locations. MMC has reported that all of the fill found within Area D originated from onsite excavations for construction of Building A.

ATTACHMENT WW-19

Surface grading in portions of the site is poor, allowing rain to collect. However, it has been observed that these zones retain ponded water for periods of days to weeks, suggesting that the permeability of the soil within the entire Area D is low. Also, perched water zones were observed on silty clay and clayey silt horizons in some of the test pits. It appears likely that groundwater recharge from within Area D is insignificant.

Of the nine samples sent for PHC analysis, only two contained PHC at concentrations greater than the NJDEP guideline. In test pits D-7 and D-9, concentrations of 265 and 110 mg/kg, respectively, were detected in the 1 foot interval. Concentrations of PHC in all other samples were not significant. These findings supplement the results presented in the ARSSP.

Concentrations of silver, cadmium, and copper greater than the NJDEP guideline were found only in samples from the 1-foot interval. Silver concentrations at the 1-foot level were observed within limits of 0.02 and 75.95 mg/kg, with an average of 13.2. At 2 feet and lower, no concentration greater than 0.57 mg/kg was observed. The average silver concentration in the 2-foot samples was 0.25 mg/kg, showing a 98 percent reduction in silver concentration within 1 foot.

Similar concentration patterns for cadmium and copper were observed, as shown in Table B-2.

The data obtained in the supplemental sample program for Area D support the findings of the earlier soil data. Concentrations of the parameters of concern exist in portions of the shallow soil. From the method of introduction, it must be assumed that they could exist at any location within the area. However, subsurface soil samples and groundwater data demonstrate that vertical migration is minimal; therefore, impact on the quality of groundwater is not a concern.

AREA AWT SAMPLE PROGRAM

Background

An area 85 feet by 50 feet at the northwest corner of Building A was the site of two constructed additions since the ECRA investigation began. The first addition was constructed within the 30 by 50 foot Area AX (Figure B-2). All soil from this excavation (approximately 225 cubic yards) was stockpiled onsite, in Area D. Sample results, from A-1 through A-3 from within this zone, and sidewall samples AXSW-1 through AXSW-3 were previously reported to NJDEP. Concentrations above NJDEP guidelines for silver, copper, cadmium, and PHC were observed within the area.

ATTACHMENT WW-20

Subsequent sample programs indicated that the depth of penetration of the materials of concern was limited to a maximum of approximately 3 feet and was generally less. Prior to excavation for the second structure (an addition to the water treatment system), Environics designed and executed the sampling program described below at the request of MMC in order to minimize the quantity of soil that would eventually need to be considered in a remediation plan.

Objective

The objective of this program was to define the concentrations of parameters of concern according to depth in order to segregate excavated soil into "acceptable" and "contaminated" stockpiles. NJDEP guidelines for the parameters were adopted as the maximum acceptable concentration. All soil within each zone, from a depth at or above the depth at which any parameter exceeded guideline concentration, was considered "contaminated" for this program.

Operations

Samples from area AWT were collected on February 17, 1988. The 50 by 65 foot zone was divided into six equal portions, as shown on Figure B-2. A test pit was excavated to bedrock at the center of each section. Logs of the test pits are presented in Table B-3.

Samples were collected at increments of 0.5 foot from the sidewall of the test pit excavations. Equipment preparation and sample collection techniques were identical to those described above for Area D. Samples were selected for initial analyses for silver, cadmium, copper and PHC from the 1.0- and 2.0-foot depths of the six test pits. Remaining samples were retained in a secure refrigerator in the custody of Environics. Additional samples were sent for analysis following receipt of data from the initial set.

Results

The shallowest material that could be positively identified as undisturbed was weathered shale (Brunswick Formation), at a depth of approximately 3 feet. A perched water zone was observed in the test pits.

Silver concentrations were below NJDEP guidelines in all samples collected from Area AWT (Table B-4). All cadmium concentrations were below the guideline concentration of 3.0 mg/kg except the 1 foot sample of AWT 4, which showed a concentration of 3.19 mg/kg. All PHC concentrations in zones 1,4, and 5 were below the 100 mg/kg guideline. Soil in zones 2 and 3 at depths shallower than 2.5 feet contained

PHC at concentrations above guideline. The highest PHC concentration observed was in zone 6, at over 2,500 mg/kg. As shown in Table B-4, concentration decreased rapidly with depth. The 3.5 foot sample, collected immediately above the weathered bedrock surface, showed a PHC concentration (107.85 mg/kg) approximately at the guideline.

The results described above defined the maximum depths of concern within Area AWT. All soil from zone 6 and all soil at 2 feet or less in zones 2 and 3 (approximately 170 cubic yards) was added to the stockpile of soil located in Area D which originated from the earlier excavation (Area AX).

In addition to defining the boundaries of concern for the foundation excavation, the sample program in Area AWT also defined the western boundary of PHC contaminated soil in the northeastern corner of Area A. This contaminated soil was observed in Samples A-1, A-2, and A-3 of the approved sample plan, and also in sidewall samples of the first excavation in Area AX. The absence of PHC in zones 1, 4, and 5 documents that the PHC did not extend further west, into the remaining portion of Area A.

MAY 1988 SAMPLE PROGRAM

Objective

The analytical results from three samples reported in the ARSSP were inconclusive. Discussions of the possible interpretations and significance of these results in Areas A, B, and F are included in Section 2. The objective of the May 1988 sample program was to resample the areas of question, at greater depth, in order to:

- verify the original results
- estimate mobility of the PHC fraction
- evaluate the extent of concern.

Operations

Environics sampled at the three locations on May 23, 1988. All samples were collected with a bucket auger. Preparation and cleaning of the sample equipment followed the protocol described above for Area D.

The location of the original A-8 sample (collected April 27, 1987) was reproduced by measurements to known objects. This unpaved location is covered with crushed trap rock to provide a stable surface for vehicles. The trap rock was removed to allow the auger to penetrate. Samples from the A-8 location were collected at depths of 1.0 to 1.5 and 1.5 to 2.0 feet, in a medium to coarse sand. No PHC odor was noted.

The Area B (number B-3) sample location is visible as a patch placed in the asphalt pavement after the original sample episode. The resampling took place adjacent to the original location. It was necessary to cut and remove a portion of the asphalt pavement to allow access for the auger. Samples were collected from depths of 1.5 to 2.0 and 2.0 to 2.5 feet below the top of pavement, in dry, weathered Brunswick soil. No PHC odor was noted.

The previous sample location in Area F (sample F-5) was also visible as a patch in the asphalt pavement. A hole was cut in the pavement adjacent to the original location and an auger boring was advanced. Samples were collected from moist to wet, brown silty sand at the following depths: 6.5 to 7.0; 7.0 to 7.5; 7.5 to 8.0; 8.0 to 8.5 feet. A PHC odor was noted in these soil samples.

Results

Analytic results from the May, 1988 samples are shown in Table B-5. No PHC for at a detection limit of 30 mg/kg was found in the Area A samples. Based on the facts that there was no visible stain, no hydrocarbon odor in the soil, and no detectable hydrocarbon in the samples, it is concluded that the original sample A-8 was an anomaly, and that PHC is not a concern in Area A.

PHC was found in concentrations above the NJDEP guideline in Area B. The maximum concentration was found at the 1.5- to 2.0-foot sample. The concentration is significantly lower in the immediately underlying sample. All detected concentrations are lower than the recommended maximum concentration (Appendix C). Furthermore, there was no visible staining, and no hydrocarbon odor noted during either sample episode, and the area is encapsulated with asphalt. Therefore, the PHC found in Area B is not a concern.

In Area F, the analytic results confirmed the physical observations made during the sampling. There is sufficient PHC present at the former tank location to be of concern.

ATTACHMENT WW-23

TABLE B-1
METZ METALLURGICAL CORPORATION
AREA D - TEST PIT SOIL LOGS

TEST PIT D-7 (9/16/87)

0 - 1.2	Rd/Brn $'y S, Rk Frgs. (seep)
1.2 - 2.2	Root zone, blk
2.2 - 3.8	Rd/Gry S'y C
3.8 - 6.0	Rd Sh (weathered)

TEST PIT D-8 (9/16/87

0 - 2.1	rd $'y S, rk, dry, misc fill, wood, etc
2.1 - 3.0	gry $'y f S, damp
3.0 - 4.4	gry c'y$, mottled, roots
4.4 - 5.4	Gryrd Sh & $'yS'yC
5.4 - 6.5	Rd Sh (weath)

TEST PIT D-9 (9/16/87

0 - 6.0	Rd/brn $'yS (wet @ 5.5 ft.)
6.0 - 7.0	Rd Sh (weathered)

TEST PIT D-10 (9/16/87)

0 - 2.2	misc fill, $, S, G, rk, plastic, wood, metal
2.2 - 4.5	Rd/gry/brn, $'yS, rk, mottled, moist
4.5 - 6.0	Rd Sh (weathered)

TEST PIT D-11 (9/17/87)

0 - 1.3	Rd, $'yS, Sh frgs, (fill)
1.3 - 1.8	Gry $'y vfS
1.8 - 1.9	lignite
1.9 - 2.3	Gry $'y, C'y, vfS
2.3 - 2.4	lignite
2.4 - 3.5	Gry/rd, $'y fS, mottled
3.5 - 4.1	Gry/rd, $'y mS, mottled
4.1 - 6.0	Rd/gry S'y mS & Sh frgs, mottled
6.0 - 7.0	Rd Sh, (weathered)

TEST PIT D-12 (9/16/87)

0 - 1.3	Rd $'yS, Rk frgs, roots
1.3 - 2.1	Ylo/brn $'y C'y S & G
2.1 - 3.0	Rd/brn $'y S & Sh frgs
3.0 - 3.4	Gry $'y S, Rk frgs
3.4 - 5.0	Rd $'y S
5.0 - 7.0	Gry/blk C'y$, roots

TEST PIT D-13 (9/23/87)

0 - 2.3	Misc fill, Shale, asphalt, wood
2.3 - 3.0	Blk C'y $, roots, wood
3.0 - 4.2	Gry/or $, mottled
4.2 - 5.8	Rd/gry $'y S, Sh frgs, mottled
5.8 - 6.0	Rd Sh, weathered

TEST PIT D-14 (9/16/87)

0 - 5.3	Rd/brn/gry, $'y m-c S, Rk, G (misc fill, asphalt, wood, concrete)
5.3 - 7.0	Rd $'y S, Sh frgs

TEST PIT D-15 (9/23/87)

0 - 2.1	Misc fill, shale, concrete, rk frgs
2.1 - 3.0	Dark gry $
3.0 - 4.1	Gry/or $, mottled
4.1 - 6.2	Rd/brn $'y S
6.2 - 7.0	Rd Sh (weathered)

TEST PIT D-16 (9/23/87)

0 - 0.7	Misc fill, shale, etc
0.7 - 2.3	Gry/blk organic $, roots, wood
2.3 - 3.1	Gry/or $'y S, mottled
3.1 - 4.4	Gry/or $, mottled
4.4 - 5.2	Rd/gry $, mottled
5.2 - 6.0	Rd Sh (weathered)

TEST PIT D-17 (9/17/87)

0 - 2.0	Rd $'y S & sh (misc fill)
2.0 - 3.0	Blk/gry $'y S, mottled, roots
3.0 - 6.0	Rd $'y S & Sh

ATTACHMENT 1

TABLE B-2
METZ METALLURGICAL CORPORATION
SUMMARY OF ANALYTIC RESULTS FOR AREA D SUPPLMENTAL SOIL SAMPLE PROGRAM

TEST PIT	DEPTH	CONCENTRATION (3) SILVER	CADMIUM	COPPER	PHC
D-7	1.0	75.95	2.33	37.16	265
	2.0	0.57	0.23	4.65	< 13
	3.0	0.08	0.04		
	4.0	0.19			23
D-8	1.0	0.15	0.79	12.76	
	2.0	0.15	0.33	8.44	
	3.0	0.14	0.98	21.25	
	4.0	0.01	0.04		
D-9	1.0	0.23	0.23	5.20	16
	2.0	0.04	0.04	5.21	
	3.0	0.33	0.20	27.82	60
	4.0	0.22	0.12		
	5.0	0.19	0.10		
	6.0	0.34			18
D-10	1.0	49.92	3.37	112.96	110
	2.0	0.43	0.50	16.41	
	3.0	0.48	0.24	18.35	18
	4.5	0.13	0.06		< 11
D-11	1.0	0.03	0.31	5.19	
	2.0	0.20	0.32	24.62	
	3.0	0.13	0.12		
D-12	1.0	0.12	0.10	4.80	
	2.0	0.10	0.06		

TEST PIT	DEPTH (2)	CONCENTRATION (3) SILVER	CADMIUM	COPPER	PHC
D-13	1.0	0.28	0.45	12.43	
	2.0	0.46	0.41	11.72	
	3.0	0.10	0.10	6.90	
	4.0	0.10	0.03		
	5.0	0.12			
	6.0	0.18			
D-14	1.0	0.07	0.03	11.82	
	2.0	0.17	0.12	5.02	
	3.0	0.19			
D-15	2.0	0.25	0.36	409.52	
	3.0	0.13	0.08	8.74	
	4.0	0.09	0.03	5.68	
D-16	1.0	1.00	3.16	42.22	
	2.0	0.25	1.21	32.12	
	3.0	0.20	1.24	43.33	
	4.0	0.06	0.38		
	5.0	0.08			
	6.0	0.20			
D-17	1.0	4.23	1.34	38.67	
	2.0	0.22	1.20	14.24	
	3.0	0.14	0.09		

NOTES

(1) Sample program conducted by Environics. Samples collected on September 16, 17 and 23, 1987. Laboratory analytic and QA/QC data are included in Appendix E.

(2) Upper range of depth increment, measured from grade in feet. All sample increments were 0.5 feet.

(3) All concentrations expressed in mg/kg (ppm) on dry weight basis.

ATTACHMENT VVW-2

TABLE B-3
METZ METALLURGICAL CORPORATION
AREA AWT - TEST PIT SOIL LOGS

TEST PIT AWT-1 (2/17/88)

0 - 0.6	fill, gravel
0.6 - 3.5	Sand
3.5 - 3.8	weathered bedrock
3.8 -	Brunswick bedrock

TEST PIT AWT-2 (2/17/88)

0 - 1.0	fill, gravel
1.0 - 1.5	Sand
1.5 - 4.2	fill, gravel & Brunswick soil
4.2 -	Brunswick bedrock

TEST PIT AWT-3 (2/17/88)

0 - 1.2	fill, gravel sand, clay
1.2 - 1.6	fill, large stones
1.6 - 2.6	fill, Brunswick soil
2.6 - 3.5	weathered bedrock
3.5 -	Brunswick bedrock

TEST PIT AWT-4 (2/17/88)

0 - 2.0	fill, gravel
2.0 - 2.6	sand & pebbles
2.6 - 3.7	coarse well sorted sand
3.7 - 4.2	weathered bedrock
4.2 -	Brunswick bedrock

TEST PIT AWT-5 (2/17/88)

0 - 2.0	fill, gravel
2.0 - 2.6	sand
2.6 - 3.3	fill, large stones
3.3 -	Brunswick bedrock

TEST PIT AWT-6 (2/17/88)

0 - 1.1	fill, gravel
1.1 - 1.2	black layer, PHC odor
1.2 - 2.2	fill, large stones
2.2 - 2.7	fill, Brunswick soil
2.7 - 4.0	weathered bedrock
4.0 -	Brunswick bedrock

ATTACHMENT WW-26

TABLE B-4
METZ METALLURGICAL CORPORATION
SUMMARY OF SUPPLEMENTAL SOIL SAMPLE PROGRAM ANALYTIC RESULTS
AREA AWT (1)

TEST PIT	DEPTH (2)	CONCENTRATION (3) SILVER	CADMIUM	COPPER	PHC
AWT - 1	1.0	0.11	0.04	2.36	65.11
	2.0	0.03	0.01	0.38	48.05
AWT - 2	1.0	0.24	0.11	10.18	79.72
	2.0	0.43	0.25	21.45	121.96
	2.5				79.31
AWT - 3	1.0	0.33	0.27	20.81	214.21
	2.0	0.19	0.79	2.56	88.35
	2.5				74.33
	3.0				53.77
AWT - 4	1.0	0.35	3.19	32.45	95.61
	1.5		0.15		
	2.0	0.09	0.03	1.18	48.52
AWT - 5	1.0	0.37	0.15	20.59	76.87
	2.0	0.27	0.13	15.51	86.87
AWT - 6	1.0	0.33	2.25	28.07	2552.34
	2.0	0.25	2.01	39.08	981.49
	3.0				358.56
	3.5				107.85

(1) Sample program conducted by Environics. Samples collected on February 17, 1988.

(2) Upper range of depth increment, measured from grade in feet. All sample increments were 0.5 foot.

(3) All concentrations expressed in mg/kg (ppm) on dry weight basis

ATTACHMENT WW-27

TABLE B-5
METZ METALLURGICAL CORPORATION
SUMMARY OF ANALYTIC RESULTS FROM SUPPLEMENTAL SOIL SAMPLE PROGRAM (1)

AREA	SAMPLE	DEPTH (2)	PHC CONCENTRATION (3)
A	A-8	1.5	< 30
		2.0	< 30
B	B-3	2.0	726
		2.5	279
F	F-3	7.0	3710
		7.5	137
		8.0	1200
		8.5	2920

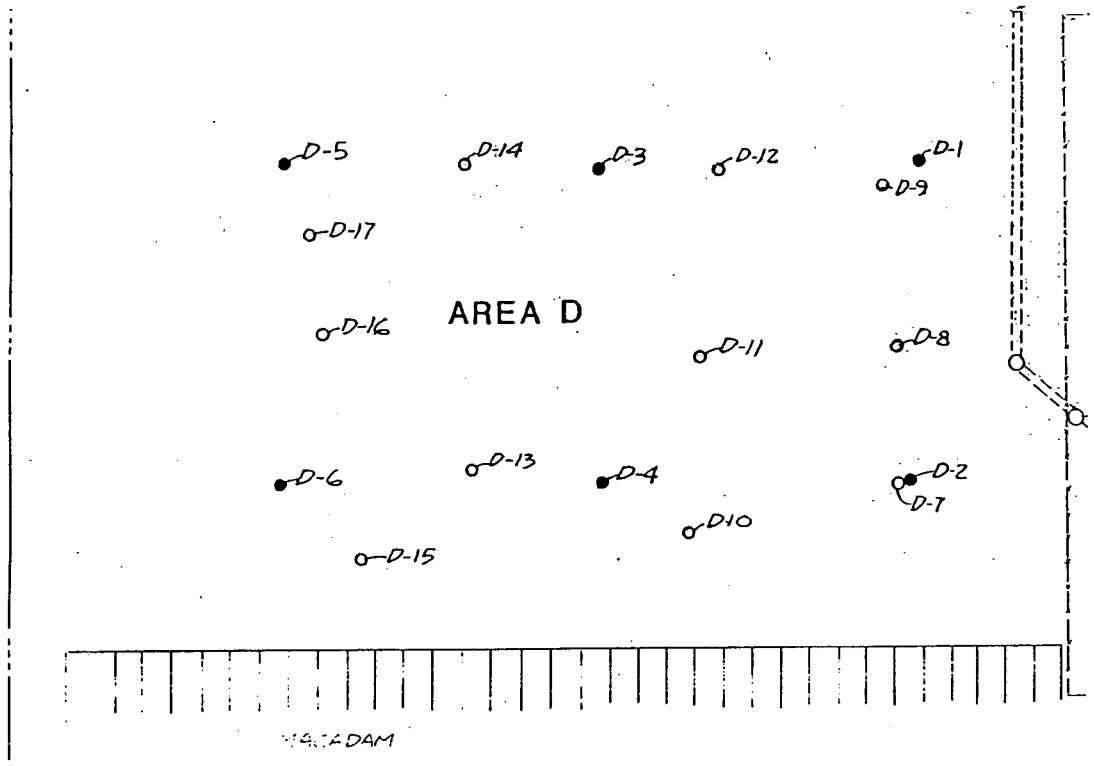
NOTES

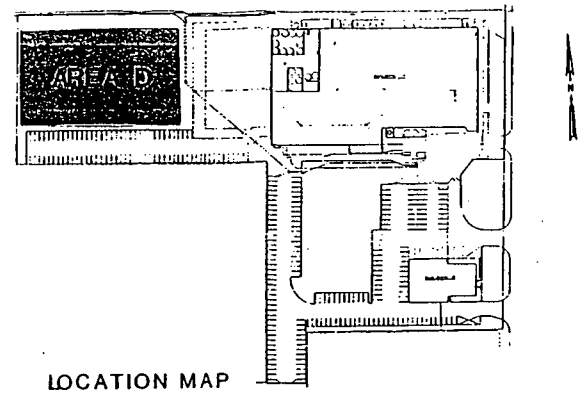
(1) Sample program conducted by Environics. Samples collected on May 28,1988. Laboratory analytic and QA/QC data are included in Appendix E.

(2) Upper range of depth increment, measured from grade in feet. All sample increments were 0.5 foot.

(3) All concentrations expressed in mg/kg (ppm) on dry weight basis.

ATTACHMENT WW-2





LOCATION MAP

AREA D

SAMPLE	DEPTH	CONCENTRATION (PPM) SILVER	CADMIUM	COPPER	PHC
D-1	1.5	17.5	BG	BG	323
D-2	0.0	63.0	6.5	BG	218
D-3	1.5	16.0	3.4	BG	< 20
D-4	2.5	9.0	BG	BG	132
D-5	2.0	5.6	BG	BG	95
D-6	0.0	9.9	13.0	336	54
D-7	1.0	76.0	BG	BG	265
	2.0	0.6	BG	BG	< 13
D-8		BG	BG	BG	
D-9	1.0	BG	BG	BG	16
D-10	1.0	49.9	3.4	BG	110
	3.0	BG	BG	BG	18
D-11		BG	BG	BG	
D-12		BG	BG	BG	
D-13		BG	BG	BG	
D-14		BG	BG	BG	
D-15	2.0	BG	BG	410	
	3.0	BG	BG	9	
D-16	1.0	BG	3.16	BG	
	2.0	BG	1.21	BG	
D-17		BG	BG	BG	

EXPLANATION

- ● SAMPLE LOCATION, INITIAL SAMPLE PROGRAM
- ○ SAMPLE LOCATION, SUPPLEMENTAL SAMPLE PROGRAM
- BG CONCENTRATION DETECTED BELOW NJDEP GUIDELINE.

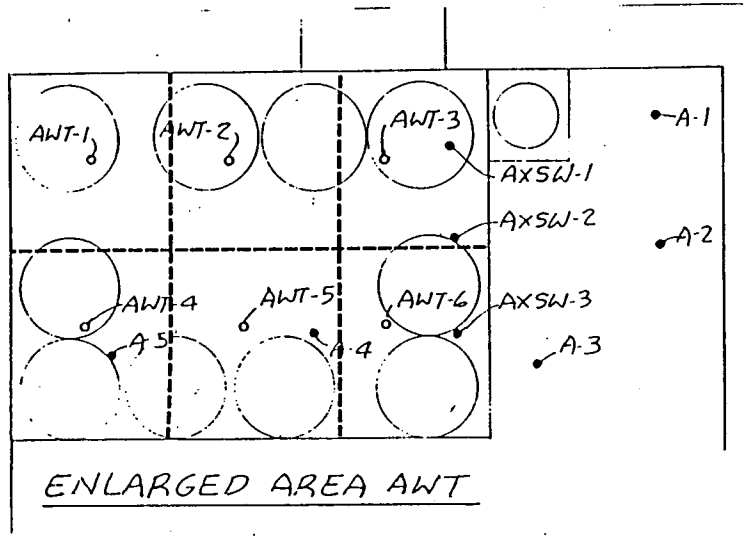
0 40 80 120 FEET

FIGURE B-1

AREA D SUPPLEMENTAL SAMPLE LOCATIONS

CH2M HILL

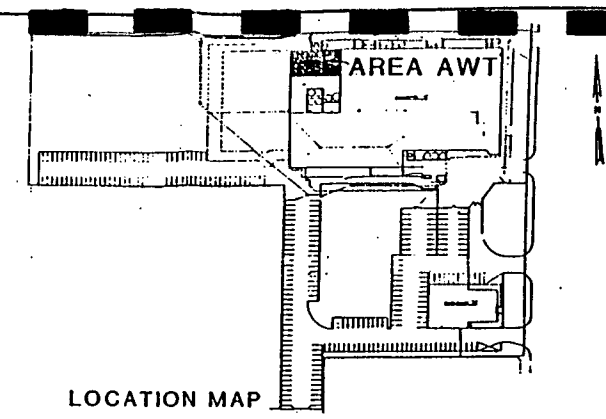
ATTACHMENT WW-26



EXPLANATION

- ● SAMPLE LOCATION, INITIAL SAMPLE PROGRAM
- ○ SAMPLE LOCATION, SUPPLEMENTAL SAMPLE PROGRAM
- BG CONCENTRATION DETECTED BELOW NJDEP GUIDELINE.

0 40 80 120 FEET



LOCATION MAP

AREA AWT

SAMPLE	DEPTH	CONCENTRATION (PPM) SILVER	CADMIUM	COPPER	PHC
A-1	0.0	BG	3.4	BG	270
A-2	0.0	BG	4.85	BG	1852
A-3	0.0	BG	BG	BG	262
A-4	0.0	154.0	BG	BG	< 20
A-5	0.0	11.5	ND	192	< 20
AXSW1	0.0		4.0		421
	1.5		8.7		135
AXSW2	0.0		5.6		417
	1.5		5.6		71
AXSW3	0.0		7.2		404
	1.5		7.2		315
AWT-1	1.0	BG	BG	BG	65
	2.0	BG	BG	BG	48
AWT-2	1.0	BG	BG	BG	80
	2.0	BG	BG	BG	122
	2.5				79
AWT-3	1.0	BG	BG	BG	214
	2.0	BG	BG	BG	88
	2.5				74
	3.0				54
AWT-4	1.0	BG	3.19	BG	96
	1.5		BG		
	2.0	BG	BG	BG	49
AWT-5	1.0	BG	BG	BG	77
	2.0	BG	BG	BG	87
AWT-6	1.0	BG	BG	BG	2552
	2.0	BG	BG	BG	981
	3.0				359
	3.5				108

FIGURE B-2

AREA AWT SUPPLEMENTAL SAMPLE LOCATIONS

CH2M HILL

ATTACHMENT WW-30

ATTACHMENT XX

GROUNDWATER SAMPLE RESULTS
FOR
METZ METALLURGICAL CORPORATION
3900 SOUTH CLINTON AVENUE
SOUTH PLAINFIELD, NEW JERSEY

ECRA CASE# 86108

Prepared By: CH2M HILL
99 Cherry Hill Road
Suite 304
Parsippany, New Jersey 07054

October 21, 1988

ATTACHMENT XX-1

INTRODUCTION

In a letter dated January 20, 1988, the New Jersey Department of Environmental Protection (NJDEP) required the collection and analysis of groundwater samples at Metz Metallurgical Corporation (MMC) from its South Plainfield, New Jersey plant. Analysis of the samples required by the NJDEP was for Priority Pollutant Metals (PP metals). Data submitted on PP metal analysis for samples collected previously had been classified invalid by the NJDEP, because those samples had been delivered from the site to the laboratory with instructions to filter and acid preserve immediately. In order for data to be considered acceptable, acid fixation on-site is required.

Samples of the seven monitor wells and two on-site production wells were collected and acid fixed on-site by Environics between February 1, and February 8, 1988. Analysis for PP metals was performed by CFM Environmental Services, Inc., of Whippany, New Jersey. This report is a summary of sample collection methodology and transmittal of analytic and QA/QC data.

WELL LOCATION AND CONSTRUCTION

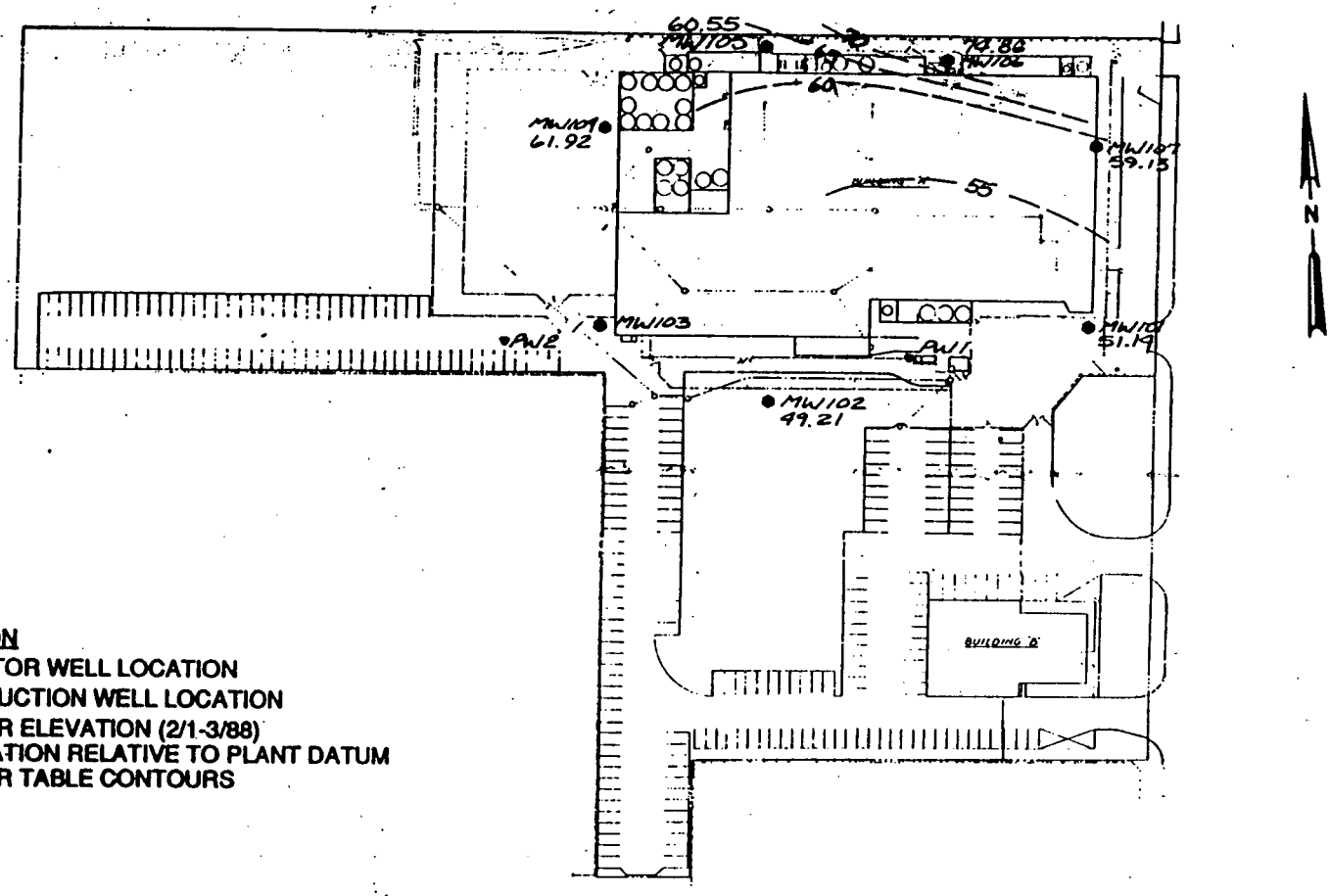
The location of the MMC site is shown in Figure 1. Locations of the monitor wells and production wells are shown in Figure 2. Details of well installation and construction were submitted to the NJDEP in the Site Evaluation Submission (SES) in March, 1986 (1). All seven monitor wells are completed as open holes in Brunswick Formation. As shown in Figure 3, monitor wells have an above-grade stickup except for MW-105. This well was originally completed with a standard flush-mount casing. Subsequently it was modified with a below-grade completion in a man hole as shown on Figure 3.

EVACUATION AND SAMPLING EQUIPMENT

Stainless steel submersible pumps (grundfos) with threaded Schedule 80 PVC pipe were used for evacuation and sampling of all monitor wells. During a previous sample episode, a pump lodged in MW-103. Since the pump is in operable condition, a sanitary well seal was installed, and the pump remains a permanent addition. Except for lack of access for measurement of water levels, MW-103 remains fully functional.

Three complete sets of pump, pipe, valves, and cables were available for sampling the remaining wells. These were lab-cleaned in accordance with the protocol included below prior to use at the site. Each was used in one well on the first day of sampling (February 1). Following this initial

ATTACHMENT XX-2



EXPLANATION

- ● MONITOR WELL LOCATION
- ▼ PRODUCTION WELL LOCATION
- 59.19 WATER ELEVATION (2/1-3/88) ELEVATION RELATIVE TO PLANT DATUM
- —55— WATER TABLE CONTOURS

0 100 200 300 FEET

Figure 2
GROUNDWATER CONTOUR MAP

CH2M HILL

ATTACHMENT XX-3

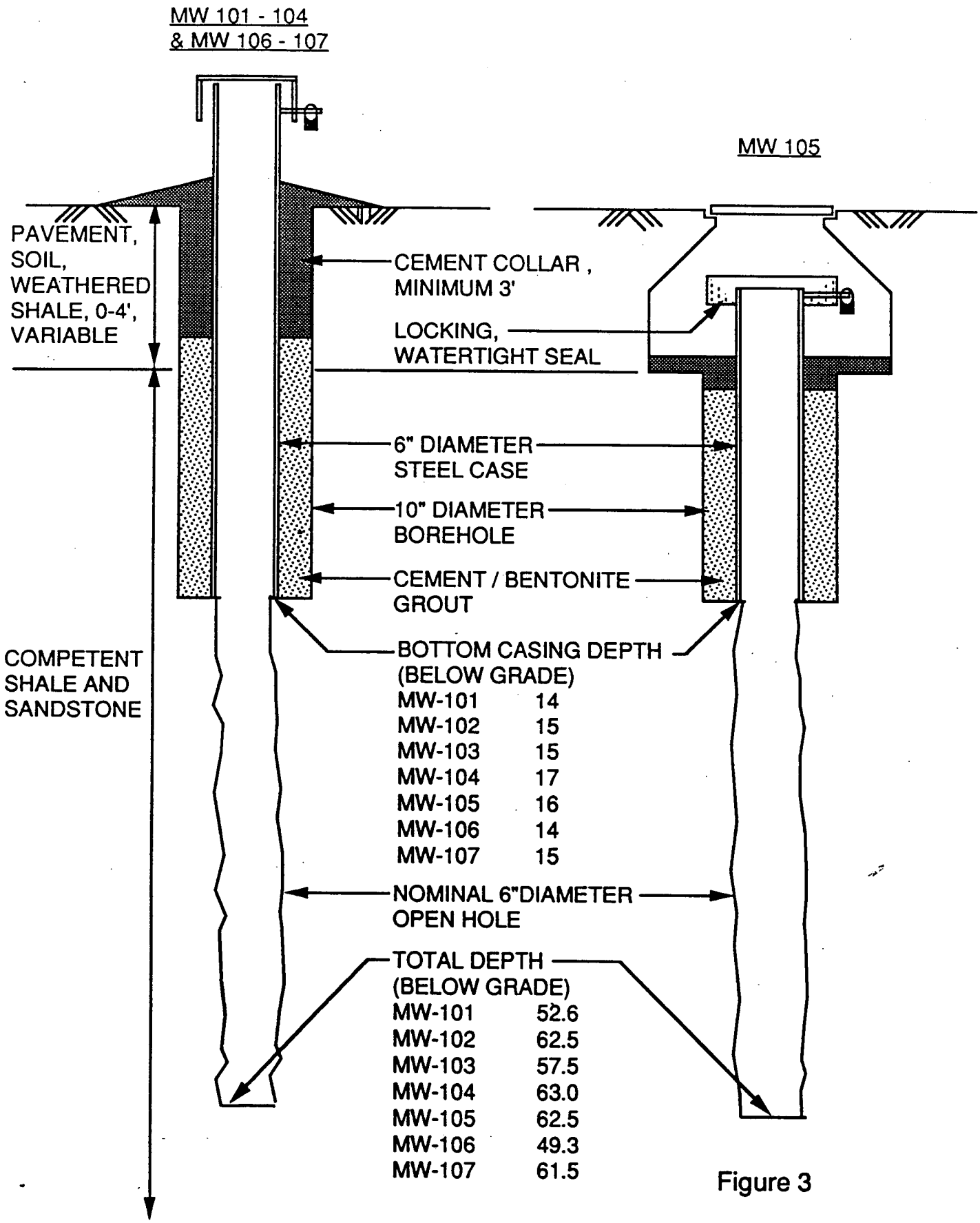


Figure 3

METZ METALLURGICAL CORPORATION
SOUTH PLAINFIELD, NEW JERSEY
MONITOR WELL CONSTRUCTION

ATTACHMENT XX-6

Table 1
Metz Metallurgical Corporation
Groundwater Sample Chronology

Sample	Date Collected	Filtered	Acid Fixed at	To lab on	Analysis Complete
Trip Blank	2/1/88	No	07:45	2/9/88	3/8/88
MW-104 (25-26636-5)	2/1/88	Yes	10:50	2/9/88	3/8/88
MW-105 (25-26637-3)	2/1/88	Yes	12:15	2/9/88	3/8/88
MW-106 (25-26638-1)	2/1/88	Yes	14:20	2/9/88	3/8/88
Field Blank A	2/1/88	No	14:30	2/9/88	3/8/88
MW-103 (25-26635-7)	2/1/88	Yes	16:35	2/9/88	3/8/88
MW-101 (25-26633-1)	2/3/88	Yes	11:20	2/9/88	3/8/88
Field Blank B	2/3/88	No	14:30	2/9/88	3/8/88
MW-107 (25-26639-0)	2/3/88	Yes	14:40	2/9/88	3/8/88
MW-102 (25-26634-9)	2/3/88	Yes	15:20	2/9/88	3/8/88
Production Well 1	2/8/88	No	12:05	2/9/88	3/8/88
Field Blank C	2/8/88	No	13:40	2/9/88	3/8/88
Production Well 2	2/8/88	No	13:50	2/9/88	3/8/88

ATTACHMENT AA-5

DATE ANALYSIS

PARAMETER: ARSENIC

Field Sample Number	Lab Sample Number	Results ug/L	Method Blank ug/L	Method Detection Limit ug/L
Trip Blank	B-9-10	U	U	0.3
MW 101	B-9-11	U	U	0.3
MW 102	B-9-12	(0.2)	U	0.3
MW 103	B-9-13	0.3	U	0.3
MW 104	B-9-14	0.3	U	0.3
MW 105	B-9-15	U	U	0.3
MW 106	B-9-16	U	U	0.3
MW 107	B-9-17	U	U	0.3
PW 1	B-9-18	U	U	0.3
PW 2	B-9-19	(0.2)	U	0.3
Field Blank A	B-9-20	U	U	0.3
Field Blank B	B-9-21	U	U	0.3
Field Blank C	B-9-22	U	U	0.3

U - Indicates that the element was analyzed for but not detected.

() - Indicates that the value was less than the Method Detection Limit (MDL).

ATTACHMENT XX-6

DATE ANALYSIS

PARAMETER: BERYLLIUM

Field Sample Number	Lab Sample Number	Results ug/L	Method Blank ug/L	Method Detection Limit ug/L
Trip Blank	B-9-10	U	U	20.0
MW 101	B-9-11	U	U	20.0
MW 102	B-9-12	U	U	20.0
MW 103	B-9-13	U	U	20.0
MW 104	B-9-14	U	U	20.0
MW 105	B-9-15	U	U	20.0
MW 106	B-9-16	U	U	20.0
MW 107	B-9-17	U	U	20.0
PW 1	B-9-18	U	U	20.0
PW 2	B-9-19	U	U	20.0
Field Blank A	B-9-20	U	U	20.0
Field Blank B	B-9-21	U	U	20.0
Field Blank C	B-9-22	U	U	20.0

U - Indicates that the element was analyzed for but not detected.

() - Indicates that the value was less than the Method Detection Limit (MDL).

ATTACHMENT 11-7

DATE ANALYSIS

PARAMETER: CADMIUM

Field Sample Number	Lab Sample Number	Results ug/L	Method Blank ug/L	Method Detection Limit ug/L
Trip Blank	B-9-10	U	U	20.0
MW 101	B-9-11	U	U	20.0
MW 102	B-9-12	U	U	20.0
MW 103	B-9-13	U	U	20.0
MW 104	B-9-14	U	U	20.0
MW 105	B-9-15	(15)	U	20.0
MW 106	B-9-16	U	U	20.0
MW 107	B-9-17	U	U	20.0
PW 1	B-9-18	U	U	20.0
PW 2	B-9-19	U	U	20.0
Field Blank A	B-9-20	U	U	20.0
Field Blank B	B-9-21	U	U	20.0
Field Blank C	B-9-22	U	U	20.0

U - Indicates that the element was analyzed for but not detected.

() - Indicates that the value was less than the Method Detection Limit (MDL).

ATTACHMENT XI-8

DATE ANALYSIS

PARAMETER: CHROMIUM

Field Sample Number	Lab Sample Number	Results ug/L	Method Blank ug/L	Method Detection Limit ug/L
Trip Blank	B-9-10	U	U	30.0
MW 101	B-9-11	U	U	30.0
MW 102	B-9-12	U	U	30.0
MW 103	B-9-13	(2.5)	U	30.0
MW 104	B-9-14	U	U	30.0
MW 105	B-9-15	(20)	U	30.0
MW 106	B-9-16	U	U	30.0
MW 107	B-9-17	U	U	30.0
PW 1	B-9-18	U	U	30.0
PW 2	B-9-19	U	U	30.0
Field Blank A	B-9-20	U	U	30.0
Field Blank B	B-9-21	U	U	30.0
Field Blank C	B-9-22	U	U	30.0

U - Indicates that the element was analyzed for but not detected.

() - Indicates that the value was less than the Method Detection Limit (MDL).

ATTACHMENT XX-9

DATE ANALYSIS

PARAMETER: COPPER

Field Sample Number	Lab Sample Number	Results ug/L	Method Blank ug/L	Method Detection Limit ug/L
Trip Blank	B-9-10	U	U	50.0
MW 101	B-9-11	U	U	50.0
MW 102	B-9-12	U	U	50.0
MW 103	B-9-13	U	U	50.0
MW 104	B-9-14	U	U	50.0
MW 105	B-9-15	(25)	U	50.0
MW 106	B-9-16	U	U	50.0
MW 107	B-9-17	U	U	50.0
PW 1	B-9-18	U	U	50.0
PW 2	B-9-19	U	U	50.0
Field Blank A	B-9-20	U	U	50.0
Field Blank B	B-9-21	U	U	50.0
Field Blank C	B-9-22	(15)	U	50.0

U - Indicates that the element was analyzed for but not detected.

() - Indicates that the value was less than the Method Detection Limit (MDL).

ATTACHMENT XX-10

DATE ANALYSIS

PARAMETER: LEAD

Field Sample Number	Lab Sample Number	Results ug/L	Method Blank ug/L	Method Detection Limit ug/L
Trip Blank	B-9-10	(50)	U	80.0
MW 101	B-9-11	(50)	U	80.0
MW 102	B-9-12	(50)	U	80.0
MW 103	B-9-13	(50)	U	80.0
MW 104	B-9-14	(75)	U	80.0
MW 105	B-9-15	(75)	U	80.0
MW 106	B-9-16	(50)	U	80.0
MW 107	B-9-17	U	U	80.0
PW 1	B-9-18	(50)	U	80.0
PW 2	B-9-19	U	U	80.0
Field Blank A	B-9-20	U	U	80.0
Field Blank B	B-9-21	(75)	U	80.0
Field Blank C	B-9-22	(50)	U	80.0

U - Indicates that the element was analyzed for but not detected.

() - Indicates that the value was less than the Method Detection Limit (MDL).

ATTACHMENT XX-11

DATE ANALYSIS

PARAMETER: MERCURY

Field Sample Number	Lab Sample Number	Results ug/L	Method Blank ug/L	Method Detection Limit ug/L
Trip Blank	B-9-10	U	U	2.0
MW 101	B-9-11	U	U	2.0
MW 102	B-9-12	U	U	2.0
MW 103	B-9-13	U	U	2.0
MW 104	B-9-14	U	U	2.0
MW 105	B-9-15	U	U	2.0
MW 106	B-9-16	U	U	2.0
MW 107	B-9-17	(0.2)	U	2.0
PW 1	B-9-18	U	U	2.0
PW 2	B-9-19	(0.15)	U	2.0
Field Blank A	B-9-20	(0.25)	U	2.0
Field Blank B	B-9-21	U	U	2.0
Field Blank C	B-9-22	U	U	2.0

U - Indicates that the element was analyzed for but not detected.

() - Indicates that the value was less than the Method Detection Limit (MDL).

ATTACHMENT XX-12

DATE ANALYSIS

PARAMETER: NICKEL

Field Sample Number	Lab Sample Number	Results ug/L	Method Blank ug/L	Method Detection Limit ug/L
Trip Blank	B-9-10	U	U	100.0
MW 101	B-9-11	U	U	100.0
MW 102	B-9-12	U	U	100.0
MW 103	B-9-13	(4.0)	U	100.0
MW 104	B-9-14	U	U	100.0
MW 105	B-9-15	(6.0)	U	100.0
MW 106	B-9-16	(4.0)	U	100.0
MW 107	B-9-17	U	U	100.0
PW 1	B-9-18	U	U	100.0
PW 2	B-9-19	U	U	100.0
Field Blank A	B-9-20	U	U	100.0
Field Blank B	B-9-21	U	U	100.0
Field Blank C	B-9-22	U	U	100.0

U - Indicates that the element was analyzed for but not detected.

() - Indicates that the value was less than the Method Detection Limit (MDL).

ATTACHMENT 44-13

DATE ANALYSIS

PARAMETER: SELENIUM

Field Sample Number	Lab Sample Number	Results ug/L	Method Blank ug/L	Method Detection Limit ug/L
Trip Blank	B-9-10	U	U	0.6
MW 101	B-9-11	U	U	0.6
MW 102	B-9-12	U	U	0.6
MW 103	B-9-13	U	U	0.6
MW 104	B-9-14	U	U	0.6
MW 105	B-9-15	U	U	0.6
MW 106	B-9-16	U	U	0.6
MW 107	B-9-17	U	U	0.6
PW 1	B-9-18	U	U	0.6
PW 2	B-9-19	U	U	0.6
Field Blank A	B-9-20	U	U	0.6
Field Blank B	B-9-21	U	U	0.6
Field Blank C	B-9-22	U	U	0.6

U - Indicates that the element was analyzed for but not detected.

() - Indicates that the value was less than the Method Detection Limit (MDL).

ATTACHMENT XX-14

DATE ANALYSIS

PARAMETER: SILVER

Field Sample Number	Lab Sample Number	Results ug/L	Method Blank ug/L	Method Detection Limit ug/L
Trip Blank	B-9-10	U	U	30.0
MW 101	B-9-11	U	U	30.0
MW 102	B-9-12	U	U	30.0
MW 103	B-9-13	U	U	30.0
MW 104	B-9-14	U	U	30.0
MW 105	B-9-15	(20)	U	30.0
MW 106	B-9-16	U	U	30.0
MW 107	B-9-17	U	U	30.0
PW 1	B-9-18	U	U	30.0
PW 2	B-9-19	U	U	30.0
Field Blank A	B-9-20	U	U	30.0
Field Blank B	B-9-21	U	U	30.0
Field Blank C	B-9-22	U	U	30.0

U - Indicates that the element was analyzed for but not detected.

() - Indicates that the value was less than the Method Detection Limit (MDL).

ATTACHMENT XX-15

DATE ANALYSIS

PARAMETER: THALLIUM

Field Sample Number	Lab Sample Number	Results ug/L	Method Blank ug/L	Method Detection Limit ug/L
Trip Blank	B-9-10	U	U	80.0
MW 101	B-9-11	U	U	80.0
MW 102	B-9-12	U	U	80.0
MW 103	B-9-13	(4.0)	U	80.0
MW 104	B-9-14	U	U	80.0
MW 105	B-9-15	(6.0)	U	80.0
MW 106	B-9-16	(4.0)	U	80.0
MW 107	B-9-17	U	U	80.0
PW 1	B-9-18	U	U	80.0
PW 2	B-9-19	U	U	80.0
Field Blank A	B-9-20	U	U	80.0
Field Blank B	B-9-21	U	U	80.0
Field Blank C	B-9-22	U	U	80.0

U - Indicates that the element was analyzed for but not detected.

() - Indicates that the value was less than the Method Detection Limit (MDL).

ATTACHMENT XX-16

DATE ANALYSIS

PARAMETER: ZINC

Field Sample Number	Lab Sample Number	Results ug/L	Method Blank ug/L	Method Detection Limit ug/L
Trip Blank	B-9-10	(13.0)	U	30.0
MW 101	B-9-11	(10.0)	U	30.0
MW 102	B-9-12	(13.0)	U	30.0
MW 103	B-9-13	(20.0)	U	30.0
MW 104	B-9-14	(13.0)	U	30.0
MW 105	B-9-15	(20.0)	U	30.0
MW 106	B-9-16	(15.0)	U	30.0
MW 107	B-9-17	(15.0)	U	30.0
PW 1	B-9-18	(25.0)	U	30.0
PW 2	B-9-19	(11.0)	U	30.0
Field Blank A	B-9-20	(10.0)	U	30.0
Field Blank B	B-9-21	(13.0)	U	30.0
Field Blank C	B-9-22	(28.0)	U	30.0

U - Indicates that the element was analyzed for but not detected.

() - Indicates that the value was less than the Method Detection Limit (MDL).

ATTACHMENT XX-17

ATTACHMENT YY

Accredited Laboratories
Incorporated

Foot of Pershing Avenue
P.O. Box 369
Carteret, New Jersey,
07008-0369
Telephone (201) 541-2025

ANALYTICAL DATA REPORT

for

Environics
46 Jackson Drive
Cranford, NJ 07016

PROJECT: Metz
ACCREDITED LABS CASE No. C-800452
DATE RECEIVED: 5/24/88

Client Sample ID	Field Sample #	Laboratory Sample #
Soil	B3-2.0	883067
"	" 2.5	883068
"	F-7.0	883069
"	" 7.5	883070
"	" 8.0	883071
"	" 8.5	883072
"	A8-1.5	883073
"	" 2.0	883074
Water	FB-1	883075

Accredited Laboratories, Inc. New Jersey Certification Number 12486 **This data has been reviewed and accepted by:**

SS Wiedman
Suzanne S. Wiedman
Laboratory Manager

SSW:jp
5/24/88

ATTACHMENT YV-1

Accredited Laboratories
Incorporated

Foot of Pershing Avenue P.O. Box 369
Carteret, New Jersey 07008-0369
Telephone (201) 541-2025

May 25, 1988

Total Petroleum Hydrocarbon Analysis Report

Client : Environics

Project: Metz

Field #	Sample No.	Results	MDL	Units
B3-2.0	883067	726	30	mg/kg
" 2.5	883068	279	30	mg/kg
F 7.0	883069	3710	30	mg/kg
" 7.5	883070	137	30	mg/kg
" 8.0	883071	1200	30	mg/kg
" 8.5	883072	2920	30	mg/kg
A8-1.5	883073	ND	30	mg/kg
" 2.0	883074	ND	30	mg/kg
FB 1	883075	ND	30	mg/kg

QC Data

Method Blank:	<.5 mg/l
Mean Percent Spike Recovery:	98.2%
Relative Percent Difference Duplicate Spikes:	2.5

ATTACHMENT YY-2

ATTACHMENT ZZ

Section 1
INTRODUCTION

Silver chloride has been accidentally discharged from a NJPDES-permitted outfall from the Metz Metallurgical Corporation (MMC) facility in South Plainfield, New Jersey on three occasions. The first event occurred on February 14, 1986, prior to the date that the facility came under jurisdiction of the Environmental Cleanup Responsibility Act (ECRA). A summary of the sample program that was conducted in this onsite streambed (Area E) is included in the main portion of this Report of Analytic Results (RAR), and proposed remedial actions are addressed in the Cleanup Plan which is submitted concurrently.

The second and third spills, which occurred on January 9, 1989 and September 13, 1989 respectively, are the subject of this appendix to the RAR. These events should be considered separately from the 1986 spill for two important reasons:

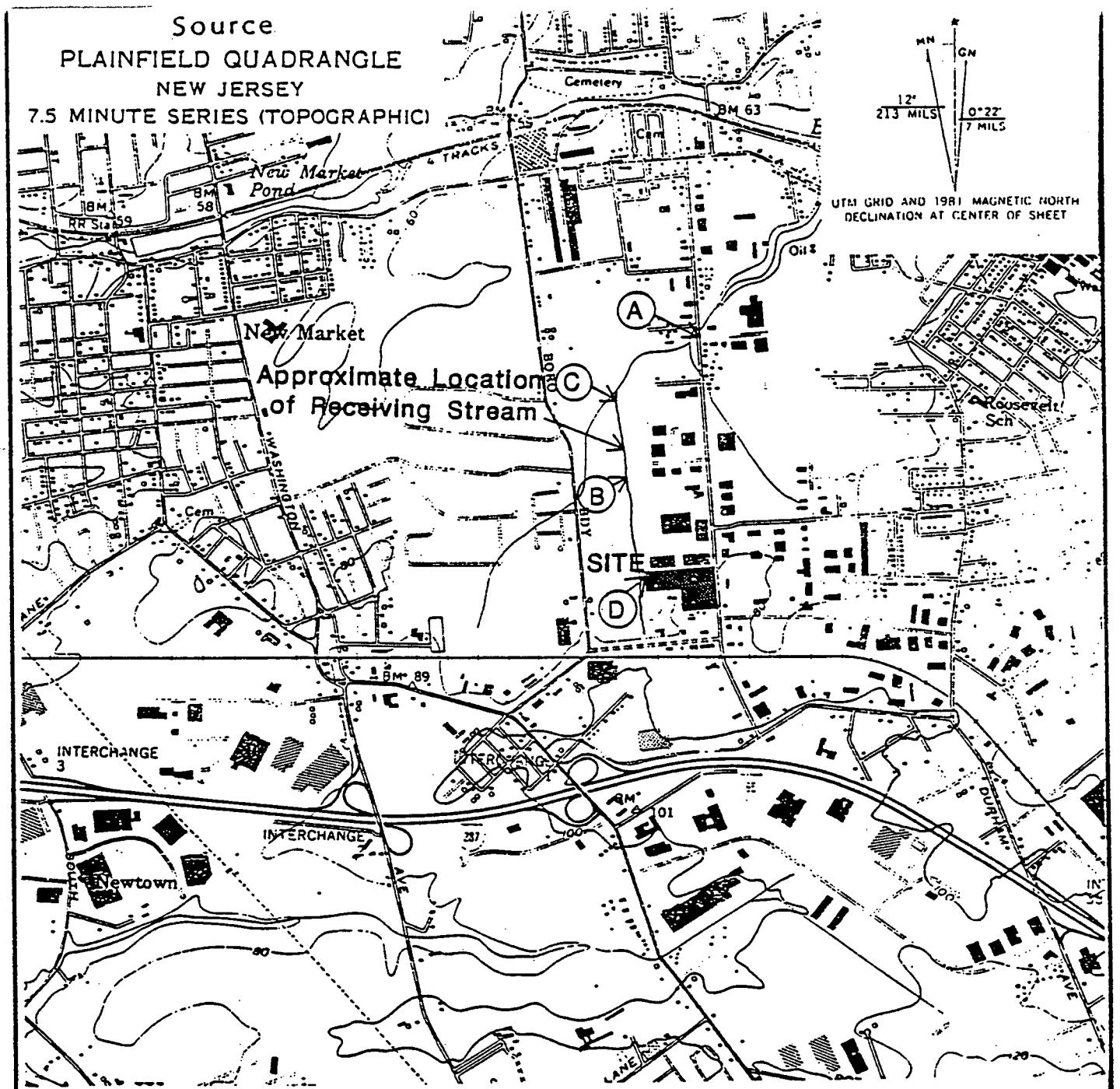
- The 1989 spills occurred more than 2 years after the MMC ECRA Case (86108) was initiated
- The 1989 spills impacted offsite portions of the streambed

This appendix contains a description of the sample programs conducted to evaluate the downstream (offsite) impact of the 1989 spills, and a summary of the sampling data. Laboratory analytic reports, including Tier II deliverables, are included in Appendix B, along with laboratory deliverables for the most recent ECRA sample results. Remedial activities proposed for the offsite portions of the stream are included in the Cleanup Plan.

DESCRIPTION OF SPILLS

The January 1989 spill originated on the roof of Building A. A pipe used for transport of silver nitrate liquid was fractured by freeze-thaw activity over the preceding weekend. The fracture was discovered on January 9, 1989 at approximately 08:40, when a pump was started. An estimated 300 pounds had spilled before the pump could be shut down. Approximately half the total spill (150 pounds) was recovered on the plant roof. The remainder reacted with chloride available from salt used for roof ice control to precipitate insoluble silver chloride, which then flowed down roof drains and out the NJPDES-permitted outfall.

The path of the spilled material is shown on Figures C-1 and C-2. At the time of the January spill, storm drainage from building roofs and paved areas as well as non-contact cooling water were discharged at "1" on Figure C-1 to a ditch along the north west portion of the MMC property. Limited flow from surface drainage joined the ditch from east of the outfall. From "1", the ditch extends west, along the property



SCALE 1:24000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

QUADRANGLE LOCATION

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

METZ METALLURGICAL CORP.

3900 South Clinton Ave.

South Plainfield N.J.

ATTACHMENT 22-2

Figure C-2
LOCATION MAP

CH2M HILL

line between MMC property and the "Source" building to the north, to point "2". At that location, additional surface drainage is added from the south, and flow continues north toward the Wade Avenue cul-de-sac. The segment between "1" and "2" corresponds to ECRA "Area E". At point "3" the stream bends to the west, is culverted beneath an abandoned railroad track, and is discharged to a north-flowing stream at point "4". Approximately 155 feet downstream from "4", the stream is culverted through two 24-inch reinforced concrete pipes, at the crossing point of the Buckeye pipeline (point "5"). The distal portions of the stream are shown on Figure C-2. Flow is northward from the MMC property at "D", past "B", to a confluence with another stream at point "C". Flow continues essentially northeast, where it is joined by another stream at point "A", where the combined flow is culverted beneath South Clinton Avenue.

The second offsite spill occurred at approximately 10:00 on September 13, 1989, when silver chloride entered the plant non-contact cooling water collection system and discharged into the offsite stream through the temporary ditch of the NJPDES-permitted outfall. The temporary ditch was constructed after the January 9, 1989 spill to bypass the onsite segment of the stream (Figure C-1).

The silver, which was released only in the insoluble silver chloride form, entered the plant non-contact cooling water collection system because of blocked overflow pipes from a receiver tank. The overflow pipes normally carry any material which is overfilled into the receiver tanks to a safety tank which is equipped with a high level alarm. Because the overflow pipes were blocked, material overflowed the tank and entered the plant non-contact cooling water collection system. The silver chloride discharged through the NJPDES outfall, aided by the normal discharge of non-contact cooling water.

SUMMARY OF INITIAL REMEDIATIONS

January 9, 1989 event

On the morning of the January 9, 1989 spill, containment efforts were begun concurrently with notification of appropriate State, County and local authorities. By 09:30, a dam of sand had been constructed at Point "A" (Figure C-2). Based on the results of a visual inspection of the stream bed by the county Health Department, the dam at A was replaced by a second dam at Point "B", the maximum observed downstream extent of the visible silver chloride. Tank trucks were used to pump stream water and transport it to the MMC plant for metal recovery. At 16:00 on January 10, 1989, MMC was authorized by the county Health Department to discontinue the pumping operation, after water samples from "B" showed no detectable silver.

During the period of water collection, plant operations were virtually terminated to minimize the water volume at the outfall. Visual inspection indicated that the

majority of the silver chloride had settled out between points "1" and "2". A temporary ditch (shown on Figure C-1) was constructed to by-pass this segment of the stream, and operations were resumed.

The initial recovery of silver chloride from the stream bed was conducted manually on January 10 and 11. Workers using shovels and buckets collected the visible silver chloride precipitate. Approximately 2 cubic yards of contaminated sediment was collected. This material is currently stored on the MMC property.

The maximum downstream extent of migration of the silver was determined by a preliminary screening sample program supervised by the county on January 10. Ten samples were collected between the temporary dam at B (Figure C-2) and the stream confluence, C. Analysis for silver in the MMC laboratory showed a maximum value of 10 mg/kg near point B, and less than 5 mg/kg downstream. The preliminary results were subsequently confirmed by the sample program discussed later in this report.

September 13, 1989 event

On the morning of September 13, 1989, the cooling water discharge from the plant was shut down and the stream was dammed on the Metz site (location D, Figure C-2) as an immediate mitigating action while appropriate State, County, and local authorities were notified. As a precautionary measure, approximately 200 pounds of salt (sodium chloride) was distributed through a portion of the stream to stabilize the silver as an insoluble precipitate. It was subsequently learned that the silver was released only in the insoluble silver chloride form and that the salt had been unnecessary.

A private environmental emergency response company, American Industrial Marine (AIM) was called at 10:25 and arrived on site at approximately 10:45. The Local Emergency Planning Commission (LEPC) had arrived on site at 10:40 and dammed the receiving stream at the end of Century Avenue (location B on Figure C-2). Under the direction of facility personnel, AIM removed approximately 5000 gallons of contaminated water from behind the dam on the company property (location D) first, and then removed all the water from behind the dam at location B. Facility personnel then directed AIM to remove the contaminated water that had collected behind the on site dam (location D) to relieve the hydraulic pressure.

The contaminated water removed from the two locations by AIM was discharged into the Metz wastewater treatment plant to recover the contained silver value.

After the contaminated water was removed from behind the dam at location B, a sample was taken of the small puddles remaining, and analyzed for silver content in the MMC laboratory. The concentration of silver was found to be 1.2 ppm. In concurrence with the LEPC and the County Hazardous Materials Response Unit, the dam at location B was left in place and was allowed to breach during the natural course of events.

ATTACHMENT ZZ-4

Section 2
SAMPLE PROGRAM

OBJECTIVE

The initial CH2M HILL sample program was undertaken in order to determine the maximum downstream extent of silver at a concentration which would mandate additional remediation after the January 9, 1989 spill. In order that a high degree of confidence be placed on the results, the program was designed to use NJDEP approved methods of sample collection, handling and documentation. An NJDEP-Certified laboratory was contracted to perform the analytic portion of the program, using NJDEP TIER II quality assurance. A concentration of 5 mg/kg silver was adopted as an action level. This concentration is the ECRA guideline.

A supplemental sample program was undertaken after the September 13, 1989 spill to determine if the downstream extent of silver at a concentration above 5 mg/kg had increased.

APPROACH

For the initial sample program, a combined random and biased sample strategy was adopted, based on the following assumptions:

- From the time of the spill, silver chloride precipitate began to settle after discharge from the original NJPDES outfall (point "1" on Figure C-1). As a result of the settling, the concentration distribution under ideal conditions would decrease with distance from the outfall.

- Higher concentrations would likely be found in areas where streambed conditions and local flow velocities would favor deposition of the particle size range of the silver chloride precipitate.

If the first assumption were correct, the probability of detecting silver at a concentration above the action level would decrease with distance from the outfall. The method adopted to detect the endpoint of migration was a series of samples collected at predetermined locations, without concern for local flow variations. The starting point for these "random samples" (Point A on Figure C-2), was beyond the maximum distance considered likely to have been impacted by the spill. Point A is at the culvert adjacent to South Clinton Avenue, which is 4350 feet downstream from point D, and 4670 feet from the NJPDES outfall.

A three tier sample interval was established. From A to C, three samples were collected, at an interval of approximately 600 feet. From C to B, three samples were collected at an interval of approximately 325 feet. From B to "4" (the discharge of the culvert beneath the railroad track), 10 samples were collected, at an interval of

approximately 145 feet. Point "4" is approximately 260 feet downstream from point D (the corner of the MMC property) and approximately 580 feet downstream from the NJPDES outfall.

Four additional "biased" samples were collected at locations observed in the field, where as a result of reduction in flow velocity, the fine grained precipitate would be most likely to accumulate.

The objective of the supplemental sampling after the September 13, 1989 spill, was to determine if the downstream extent of silver concentrations in excess of 5 mg/kg had been extended. The starting point for these additional samples was the end-point of the silver migration from the January 9, 1989 spill. These eighteen samples were collected starting at a distance of 485 feet from point D, which is 805 feet downstream from the NJPDES outfall.

SAMPLE OPERATIONS

Twenty samples were collected on March 16, 1989. Samples S-1 through S-16 are the predetermined interval (random) samples. Samples B-1 through B-4 (biased) were collected at probable concentration points in the stream bed.

An additional four samples (S-17 through S-20) were collected on April 6, 1989, after receipt of data from the initial samples, in order to refine the determination of the end point of migration of the silver.

Eighteen supplemental samples (SS-1 through SS-18) were collected on September 22, 1989 to address the September 13, 1989 release. Sample operations were initiated from the downstream end (point A) to avoid contamination of downstream samples by sediment from the upstream area. Distance between samples was measured in feet with a calibrated wheel (rolltape).

Sediment was collected from the center of the stream, except at locations S-8 and S-15. At these locations, weathered bedrock (Brunswick shale) was exposed in the center of the stream channel. These samples were collected from sediment at the waters edge. In order to maximize the chance of detecting silver from the spill, an attempt was made to limit the depth interval of the samples to the sediment surface (approximately 0.1 foot). Samples were collected in 1-liter glass jars provided by the laboratory. Bottles were labeled, and waterproof tape was applied over the labels. The containers were then placed at the sediment-water interface, and sediment was pushed directly into the container with disposable wooden spatulas (tongue depressors). Excess water was decanted, and the jars were closed.

Samples were transported to the laboratory in coolers, at 4 degrees C. Analysis for total silver was conducted by CFM Environmental Services, Inc., Whippany, New Jersey (NJDEP Certification # 14367). Analytic methods were in accordance with EPA SW-846. Quality assurance was performed in accordance with NJDEP tier II.

Table C-2
Metz Metallurgical Corporation
Stream Sediment Supplemental Sample Program Summary of Analytical Results

Sample Number	Distance from Point D (feet)	Date Collected	Silver Concentration (mg/kg)
SS-1	475	9/22/89	0.43
SS-2	500	9/22/89	1.01
SS-3	525	9/22/89	0.61
SS-4	575	9/22/89	3.89
SS-5	600	9/22/89	0.36
SS-6	650	9/22/89	0.48
SS-7	700	9/22/89	0.32
SS-8	750	9/22/89	0.55
SS-9	800	9/22/89	0.32
SS-10	850	9/22/89	0.40
SS-11	900	9/22/89	0.38
SS-12	950	9/22/89	0.28
SS-13	1000	9/22/89	0.54
SS-14	1100	9/22/89	0.37
SS-15	1200	9/22/89	0.44
SS-16	1300	9/22/89	0.28
SS-17	1400	9/22/89	0.33
SS-18	1500	9/22/89	0.40

ATTACHMENT 22-7

ATTACHMENT

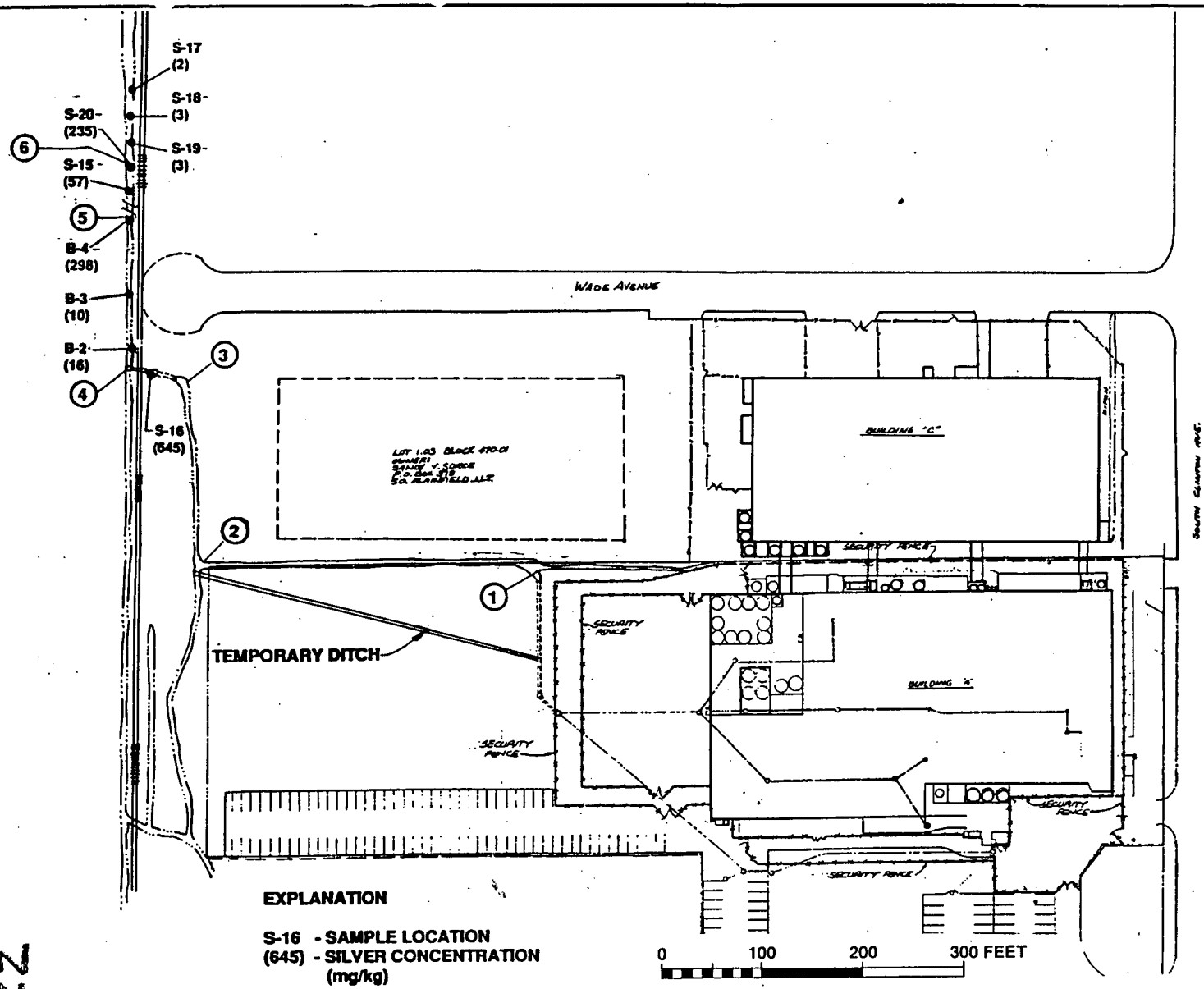


Figure C-1
DISCHARGE PATH
METZ METALLURGICAL CORP.
3900 SOUTH CLINTON AVE.
SOUTH PLAINFIELD, N.J.

CH2M HILL

ATTACHMENT 22-8

ATTACHMENT AAA

REPORT OF ANALYTIC RESULTS
FOR METZ METALLURGICAL CORPORATION
3900 SOUTH CLINTON AVENUE
SOUTH PLAINFIELD, NEW JERSEY

ECRA CASE NO. 86108

Prepared by: CH2M HILL
99 Cherry Hill Road
Suite 304
Parsippany, New Jersey 07054

July 31, 1990

ATTACHMENT AAA-1

NJR53/062R53.51

CONTENTS

		Page
1	Introduction	1-1
	Site Description	1-1
	History of ECRA Investigation	1-1
	Hydrogeologic Background	1-6
2	Field Investigation and Results	2-1
	Objective of Sample Program	2-1
	Area A	2-3
	Area B	2-10
	Area C	2-14
	Area D	2-15
	Area E	2-21
	Area F	2-21
	Area G	2-26
	Site Perimeter	2-28
	Waste Piles	2-32
3	Conclusions and Recommendations	3-1
	Area A	3-1
	Area B	3-1
	Area C	3-1
	Area D	3-2
	Area E	3-2
	Area F	3-3
	Area G	3-3
	Perimeter Sample	3-3
	Waste Piles	3-3
	References	3-4

Appendix A. NJDEP Correspondence
Appendix B. (Under Separate Cover). Laboratory Data Sheets and ECRA Tier II Deliverables, (3 Volumes)
Appendix C. Streambed Sample Report

ATTACHMENT AAA-2

TABLES

2-1	Area A Delineation - Analytic Results	2-7
2-2	Area A Characterization - Analytic Results	2-8
2-3	Area A Former Drum Storage and Corrosive Spill Areas - Analytic Results	2-9
2-4	Area B - Analytic Results	2-13
2-5	Area C - Analytic Results	2-16
2-6	Area D - Analytic Results	2-20
2-7	Area E - Analytic Results	2-25
2-8	Area F - Analytic Results	2-29
2-9	Perimeter - Analytic Results	2-31
2-10	Area C Stockpile 1 - Analytic Results	2-34
2-11	Area AWT Stockpile - Analytic Results	2-36

FIGURES

1-1	Site Location	1-2
1-2	Site Plan	1-3
1-3	Areas of Environmental Concern	1-5
2-1	Summary of Analytic Results	2-2
2-2	Area A - Sample Locations and Analytic Results	2-4
2-3	Areas B and C - Sample Locations and Analytic Results	2-11
2-4	Area D - Sample Locations and Analytic Results	2-17
2-5	Area F - Sample Locations and Analytic Results	2-22
2-6	Area G - Sample Locations and Analytic Results	2-27
2-7	Perimeter - Sample Locations and Analytic Results	2-30

Extensive investigations of both soil and groundwater have been conducted at MMC to address environmental concerns in portions of the site designated A through G (Figure 1-3). Results of these investigations have been documented in reports submitted to the NJDEP. A complete discussion of the history of the ECRA investigation is included in the Amended Sample Plan (3).

The results of the first soil sample program, conducted during April 1987, were reported in the Analytic Results of Soil Sample Program (ARSSP) (4). Concentrations in excess of NJDEP guidelines of four parameters [silver, cadmium, copper, and total petroleum hydrocarbon compounds (PHC)] were found in several locations on the MMC site. Supplemental information on the distribution and concentration of these parameters was needed to develop a remedial action plan.

Three episodes of supplemental programs were conducted following the April 1987 program. The first episode was conducted in September, 1987 in Area D, and the second episode was conducted in February, 1988 in Area AWT located within Area A. The third episode, conducted in May 1988, addressed three sample locations, A-8, B-3, and F-5. The objective, sample program, and results for all three episodes are discussed in Appendix B of the Remedial Action Plan (5).

A meeting was held in the office of the Bureau of Environmental Evaluation and Cleanup Responsibility Assessment (BEECRA) on April 19, 1988. The meeting was attended by Messrs. Nalbone, Lux and Gillespie, who represented the NJDEP, Mr. Rabinowitz, of McCarter & English, and Mr. Dahlgren, of Environics, Inc., both of whom represented MMC. The philosophy of a proposed remedial action for the site was discussed. Since low concentrations of silver were wide-spread on the MMC property, and since silver has an extremely low mobility in the environment, the conceptual plan presented included encapsulation of the material, without full delineation of contamination. Based on the verbal agreement with the conceptual plan by NJDEP representatives at the meeting, CH2M HILL and MMC subsequently prepared and submitted a formal Remedial Action Plan (RAP) conforming to their verbal recommendation, dated October 14, 1988 (5).

In the letter dated June 20, 1989, the NJDEP determined the RAP (3) "...to be inadequate and incomplete, and therefore, unapprovable." The NJDEP required the submission of an amended Sample Plan, to address "...the sampling deficiencies as provided in Part A ..." (Appendix A, Item 3) of the letter. CH2M HILL, on behalf of MMC, submitted a response to the major NJDEP concerns on July 21, 1989 (Appendix A, Item 2). In addition, an Amended Sample Plan (ASP) (3) was prepared in compliance with the requirement included in the NJDEP letter of June 20, 1989. The plan was submitted to the NJDEP on August 21, 1989, and approved with conditions on March 8, 1990 (Appendix A, Item 1).

Field operations for the soil sample program were conducted during November 1989, and March and April, 1990. Sampling in Area C, conducted in November 1989, was performed "at peril" due to operational requirements. Pavement for additional parking was required for business expansion of MMC. The "at peril" operations were conducted as proposed in the ASP (3) with exceptions based on verbal communications with the NJDEP case manager. The exceptions, discussed in Section 2 of this report, included additional sampling performed to determine full vertical delineation of parameters in excess of NJDEP guidelines.

This report, entitled "Report of Analytic Results" (RAR), evaluates the environmental conditions at the MMC site. The laboratory data sheets and ECRA Tier II deliverables have been submitted in Appendix B, under separate cover. A separate report, entitled Streambed Sample Results and Proposed Remediation (SSR) was prepared following two accidential discharges of silver chloride to the offsite stream. The SSR is included in Appendix C. In addition, the Cleanup Plan has been prepared and submitted in compliance with the requirement included in the NJDEP letter of March 8, 1990.

HYDROGEOLOGIC BACKGROUND

The following discussion is taken from the SES (1), which was based on information found in Barksdale et al. (6). The Metz site is located within the Piedmont Physiographic Province in central New Jersey. Situated between the Watchung Mountains and the Raritan River Valley, the topography is that of a dissected plain with gently rolling hills. Elevation is approximately 80 feet above mean sea level. Local topography is nearly flat with a gentle northwesterly slope of less than 1 percent.

The nearest mapped surface water body is an unnamed tributary of Bound Brook, which joins the Raritan River nearly 6 miles to the west in Bound Brook.

The site lies within the outcrop area of the Brunswick Formation, which is composed of soft red shale with some interbedded sandstone and was deposited during the Triassic Period. Total thickness of the Brunswick Formation has been estimated to exceed 6,000 feet, although numerous faults make estimates of formation thickness uncertain. Strike of the formation is approximately northeast to southwest, and it dips northwest from about 5 to 15 degrees.

Groundwater flow in the Brunswick Formation is controlled by the degree of jointing and fracturing. While not as productive an aquifer as the unconsolidated Coastal Plain formations located a few miles to the south, the Brunswick is generally a good producer. Wells producing 100 to 500 gallons per minute have been completed in many localities.

ATTACHMENT AAA-5

Groundwater quality varies with location. While most wells contain less than 200 to 300 parts per million total dissolved solids, highly mineralized waters containing calcium, magnesium, sulfates, iron, and with total hardness greater than 900 parts per million, have been found locally.

ATTACHMENT AAA-6

Section 2
FIELD INVESTIGATION AND RESULTS

OBJECTIVE OF SAMPLE PROGRAM

The objective of this sample program was to generate additional data on the distribution of contaminants previously identified at the MMC site. The objective also included characterizing total petroleum hydrocarbon compounds (PHC) in sections of Areas A, B, C, and D, and the previously excavated soils from Areas AWT, and C.

Based on existing environmental data, it is apparent that extensive portions of the MMC site contain low levels of hazardous materials in concentrations above the NJDEP guidelines. An attempt was made to determine the full vertical and horizontal extent of contamination at locations with elevated concentrations of contaminants. In certain locations where a full delineation was not accomplished, excavation will be followed by post-excavation sampling to confirm that required cleanup levels are achieved.

Environmental concerns have been identified and extensively investigated at the MMC site. Detailed discussions of the identification of these concerns, the rationale for investigation, and the proposed method of investigation are included in the SES (1), Revised Sample Plan (RSP) (7), ARSSP (4), and RAP (5).

A supplemental sample program, conducted between November 1989 and April 1990, obtained additional data to define the distribution and concentration of parameters previously identified in concentrations above ECRA guidelines. This section contains a summary of the investigation program and results presented by area of concern. Analytic results from former sampling programs as well as data generated during this investigation are included together on Figure 2-1.

Sample methodology and field procedures were conducted in accordance with Section 4 of the ASP (3), Quality Assurance/Quality Control. Laboratory analysis was performed at Accutest Laboratories, Dayton, New Jersey, Certification Number 12129. Laboratory data sheets and ECRA Tier II deliverables have been submitted in Appendix B, under separate cover.

Only parameters found in excess of NJDEP guideline concentrations are included in the summary. For clarity, sample depths are presented at the top of the 6-inch interval. For example, a sample depth described as 1.5 feet represents the interval from 1.5 to 2.0 feet.

ATTACHMENT AAA-7

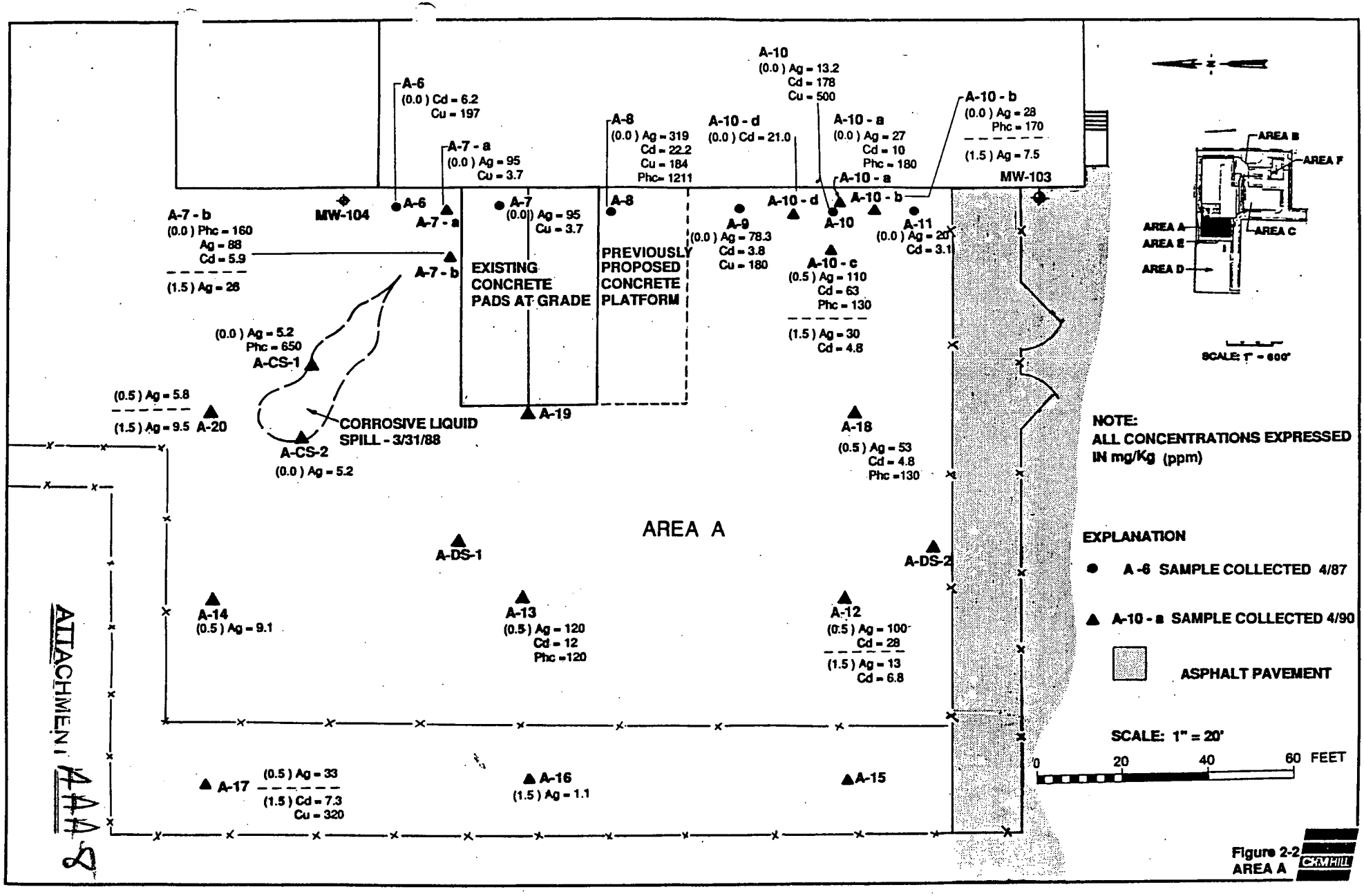
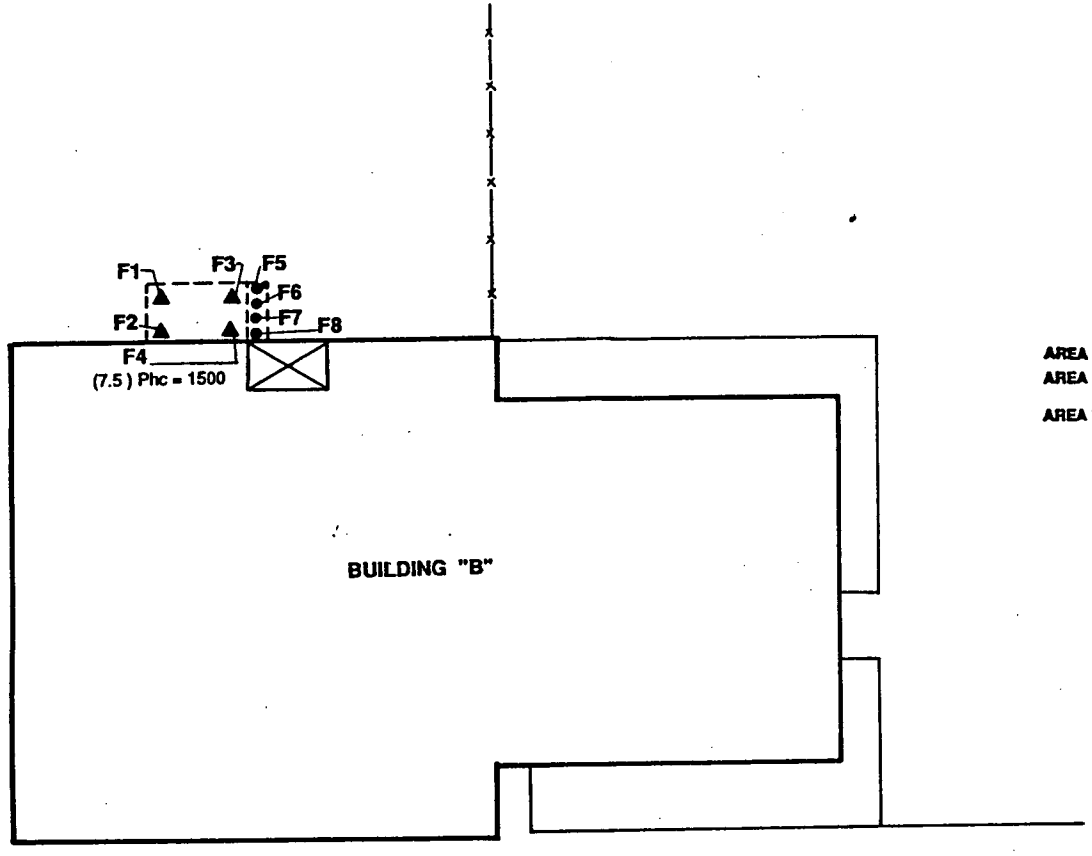
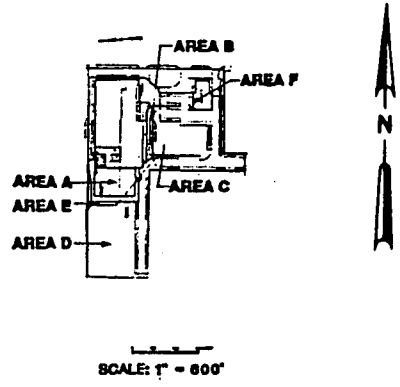


Figure 2-2
AREA A

CH2M HILL

ATTACHMENT AAA 8





EXPLANATION

▲ SAMPLE COLLECTED 4/10/90

● SAMPLE COLLECTED 4/27/90

APPROXIMATE
SCALE 1"=20'-0"

Figure 2-5
AREA F

CH2M HILL

ATTACHMENT AAA-9

AREA A

ENVIRONMENTAL CONCERN

Area A is unpaved ground, covered with crushed trap rock, west of Building A (Figure 2-2). MMC has since 1986 frequently requested permission of NJDEP to pave Area A for environmental and commercial purposes. Dimensions are approximately 150 by 220 feet. To the east, the area is bounded by the manufacturing building. The north, west, and south sides are enclosed within inner 12-foot-high and outer 8-foot-high, barbed wire capped chain-link fences, spaced approximately 15 to 20 feet apart, as part of the security zone perimeter.

No manufacturing is conducted within Area A, although it is actively used for transportation and temporary storage of materials and equipment.

Previous sample locations A-6 through A-11, and analytic results which exceed NJDEP ECRA guideline concentrations, are shown on Figure 2-2, and are detailed in the ASP (3). The primary materials of concern within Area A are silver and cadmium. The highest observed concentrations of these metals were 674 mg/kg and 178 mg/kg, respectively.

Another former sample area at the northeast corner of Area A was within an extension to Building A which was completed in the fall of 1988. This area was designated Area AWT, and now houses a water treatment facility.

All soil within the zone designated AWT on Figure 2-1 has been excavated to bedrock at an average depth of 4 feet. The contaminated portion of the excavated soil has been stockpiled onsite, within Area D. Since the soil is no longer a part of Area A, a separate discussion of the soil from Area AWT is more appropriate. The results of the AWT sample program conducted prior to excavation are included in Appendix B of the RAP (5). The results of the post-excavation sampling of the stockpile are included at the end of Section 2 of this report.

Since the initial sampling in April 1987, two adjacent concrete pads were constructed at grade level for installation of a trash compactor. These pads are shown on Figure 2-2. The southern pad will be removed and covered by a vaulted platform to be described in the Cleanup Plan.

ATTACHMENT AAA-10

MMC had proposed construction of a second concrete pad at loading dock elevation, for storing compressed gas cylinders. The proposed platform would have been constructed immediately south of the existing pads (Figure 2-2), as a concrete vault. This location lies within the newly proposed vaulted platform. Since sample location A-8 is located within the newly proposed concrete vault, the proposed samples A-8-a through A-8-f were not collected.

SAMPLE PROGRAM

In accordance with the Amended Sample Plan (3), soil samples to be analyzed for target metals: silver, cadmium, copper, chromium, and nickel, were collected near former sample locations A-7 and A-10. In addition, PHC analysis was performed on these samples in compliance with the March 8, 1990 letter, item 1.c.

A meeting was held at the MMC site on February 20, 1990. The meeting was attended by Messrs. S. Maybury, and F. Cornell, representing the NJDEP, Messrs. P. Metz, and S. Eves, of MMC, and Messrs. P. Dahlgren, and T. Norris of CH2M HILL. During this meeting, sample locations within the proposed platform area (A-8-a through f) were eliminated and replaced with an additional row of three samples in the yard. These three samples were designated A-18, A-19, and A-20 and are shown on Figure 2-2.

One of the conditions of approval of the March 8, 1990 letter, item 1.b., required that all sample locations within Area A be analyzed at two depths. All surface samples were collected at 0.5 foot with the exception of samples along the building which were collected at the surface. In addition, all samples were collected at 1.5 feet in an effort to delineate the vertical extent of contamination. As per item 1.c. of the letter, all samples were analyzed for PHC. The two samples with the highest PHC concentration were analyzed for priority pollutant base neutral compounds plus fifteen tentatively identified compounds (BN+15).

In the March 8, 1990 letter, the NJDEP outlined three additional areas of concern within Area A. These areas included two former drum storage areas observed during a 1984 inspection of the site by the NJDEP, and a corrosive liquid spill area which occurred after the transfer of property ownership and which has been remediated (MMC, 1989) (8).

One soil sample from immediately beneath the surficial gravel layer was collected in each of the two former drum storage areas biased to drainage patterns. As required in the March 8, 1990 letter, these samples were analyzed for priority pollutant compounds plus identification and quantification of the forty highest non-priority peaks (PP+40) minus the pesticides fraction, palladium, and PHC. The volatile fraction was collected at 1.5 feet. In addition to the NJDEP requirements of their March 8, 1990 letter, the sample collected from 1.5 feet was also analyzed for PHC.

Table 2-1
Area A Delineation - Analytic Results

Sample	Depth	PHC mg/kg	Ag mg/kg	Cd mg/kg	Cu mg/kg	Cr mg/kg	Ni mg/kg	BN+15 Tar(TIC) mg/kg
A-7-a	0.0	88	95.0	3.7	120	17	28	---
	1.5	<25	<3.0	<1.0	7.5	7.7	4.6	---
A-7-b	0.0	160	88.0	5.9	170	15	34	---
	1.5	86	26.0	1.8	31	13	12	---
A-10-a	0.0	180	27.0	10	21	7.9	4.1	ND(9.4) ND(8.3)
	1.5	43	3.8	2.4	16	21	21	---
A-10-b	0.0	170	28.0	2.6	44	11	11	2.8(1.5) 2.5(0)
	1.5	35	7.5	2.1	31	20	21	---
A-10-c	0.5	130	110.0	63	73	20	22	---
	1.5	51	30.0	4.8	96	25	29	---
A-10-d	0.0	<25	4.5	21	9.3	7.7	5.6	---
	1.5	<25	<3.0	1.8	11	24	26	---

--- Not Analyzed
ND Not Detected

BN+15 results are presented as total concentration of targeted compounds, followed by total concentration of tentatively identified compounds in parenthesis. The second line is the corresponding totals without including those concentrations which had qualifiers placed upon them by the laboratory.

NJR53/051R53.51

ATTACHMENT AA-A-12

Table 2-2
Area A Characterization - Analytic Results

Sample	Depth	PHC mg/kg	Ag mg/kg	Cd mg/kg	Cu mg/kg	Cr mg/kg	Ni mg/kg
A-12	0.5	85	100.0	28.0	100	21.0	30.0
	1.5	37	13.0	6.8	18	24.0	32.0
A-13	0.5	120	120.0	12.0	170	18.0	35.0
	1.5	<25	<3.0	<1.0	3.8	5.2	<4.0
A-14	0.5	<25	9.1	1.2	7.4	31.0	11.0
	1.5	<25	<3.0	<1.0	4.5	7.1	7.3
A-15	0.5	<25	<3.0	<1.0	7.6	12.0	8.7
	1.5	<25	<3.0	<1.0	12	14.0	9.9
A-16	0.5	26	<3.0	1.6	130	24.0	23.0
	1.5	<25	11.0	<1.0	18	10.0	7.7
A-17	0.5	36	33.0	3.0	68	16.0	13.0
	1.5	<25	<3.0	7.3	320	10.0	38.0
A-18	0.5	130	53.0	4.8	110	21.0	30.0
	1.5	54	<3.0	1.7	110	17.0	23.0
A-19	0.5	<25	<3.0	<1.0	10	7.2	8.0
	1.5	<25	<3.0	<1.0	7.5	7.6	6.8
A-20	0.5	26	5.8	1.2	31	12.0	15.0
	1.5	51	9.5	2.3	53	24.0	25.0

--- Not Analyzed

NJR53/052R53.51

ATTACHMENT AAA-13

On March 31, 1988, a spill of corrosive liquid (Ph >9) occurred from a shipment of precious metal sweeps being sent out for recovery. The liquid leaked out of several of the drums and onto the ground. The drums were removed to a contained area and the liquid was absorbed using absorbent booms and pads. The moistened soil was excavated until the bottom of the excavation showed a pH <9. Since the depth of penetration was less than 0.5 foot, no backfill of the area was required. The approximate location of the spill is shown on Figure 2-2.

Two soil samples at 0.5 foot (1.5 feet for VOC analysis) for PP+40 minus the pesticides fraction, PHC, and osmium were collected to confirm cleanup of the corrosive liquid spill area. The soil collected from 1.5 feet was analyzed for PHC as well as VOC+15.

RESULTS

Analytic results in excess of NJDEP guidelines for Area A are presented on Figure 2-2, and Tables 2-1 through 2-3.

Soil Characterization Samples

Fifteen boring locations within the yard of Area A were each sampled at two depths, yielding a total of 30 samples. This total does not include the samples collected within the former drum storage locations nor the spill location. The results of these three areas are discussed later in this section.

PHC concentrations ranging from 120 to 180 mg/kg were found in 6 of the 15 surface samples. The PHC concentrations at 1.5 feet were below the NJDEP guideline of 100 mg/kg in all soil borings. Base neutral analysis was performed on the two samples with the highest PHC concentrations (170 and 180 mg/kg). The results of these analyses were below NJDEP guidelines for both samples.

Silver concentrations ranged from 5.8 to 120 mg/kg in seventeen samples representing twelve boring locations. In six of the twelve borings, the silver concentration exceeded the NJDEP guideline at the surface, but was below the guideline at 1.5-feet depth. The concentration of the six samples at 1.5-feet which exceeded the NJDEP guideline ranged from 7.5 to 30 mg/kg.

Cadmium concentrations ranged from 3.7 to 63 mg/kg in 11 of the 30 samples. Nine borings contained cadmium concentrations above the NJDEP guideline of 3.0 mg/kg. In six of these nine borings, the vertical extent of contamination was shown to be less than 1.5 feet. The highest cadmium concentration at the 1.5-foot depth was 7.3 mg/kg at A-17.

ATTACHMENT AAA-14

Table 2-3
Area A - Former Drum Storage and Corrosive Spill Areas
Analytic Results

Sample	Depth	BN+15 Tar(TIC)	AE+10	VOA+15 mg/kg	PPM mg/kg	PCB	PHC mg/kg	Pallad/ Osmium
A-DS-1	0.5	0.15(1.2) ND (0)	ND	—	Below A.L.	ND	<25	ND
	1.5	—	—	ND(0.01) ND (0)	—	—	31	—
A-DS-2	0.5	0.2(1.37) ND(0.3)	ND	—	Below A.L.	ND	<25	ND
	1.5	—	—	ND(0.02) ND(0.01)	—	—	<25	—
A-CS-1	0.5	0.12(2.6) ND (1.25)	ND	—	Ag= 5.2	ND	650	ND
	1.5	—	—	ND(0.01) ND (0)	—	—	28	—
A-CS-2	0.5	0.61(2.7) ND (1.55)	ND	—	Ag= 5.2	ND	<25	ND
	1.5	—	—	ND(0.01) ND (0)	—	—	32	—

— Not Analyzed
ND Not Detected

BN+15 and VOA+15 results are presented as total concentration of targeted compounds, followed by total concentration of tentatively identified compounds in parenthesis. The second line is the corresponding totals without including those concentrations which had qualifiers placed upon them by the laboratory.

NJR53/053R53.51

ATTACHMENT AAA-15

Sample location A-10, analyzed during a previous field investigation, yielded a cadmium concentration of 178 mg/kg. In an effort to delineate the horizontal extent of contamination, four sample borings were located around location A-10. For these four borings, the surface concentration ranged from below guideline to 63 mg/kg at sample location A-10-c. At 1.5-feet, the only boring to yield a concentration above the NJDEP guideline was A-10-c, with a concentration of 4.8 mg/kg.

Analysis was performed on all 30 samples for copper, chromium, and nickel in addition to the PHC, silver, and cadmium discussed earlier. One sample, A-17, at 1.5 feet, exceeded the copper guideline with a concentration of 320 mg/kg. All other parameters were below their respective NJDEP guidelines.

Former Drum Storage Areas

One sample was collected at each of the two former drum storage areas observed during a 1984 inspection of the site by the NJDEP. Analysis was performed in compliance of the March 8, 1990 NJDEP letter, which was discussed above. All sample results were below NJDEP guidelines. Palladium, which does not have a specific NJDEP guideline, was not detected at a minimum detection limit of 5.5 mg/kg.

Corrosive Spill Area

Two samples were collected from the location of the March 31, 1988 corrosive liquid spill. These samples were analyzed according to the NJDEP requirements of the March 8, 1990 letter, which are discussed above.

Sample ACS-1 yielded a PHC concentration of 650 mg/kg at the surface, and below NJDEP guideline at 1.5 feet. PHC concentration of both depths from ACS-2 were below NJDEP guideline. BN+15, acid extractable compounds (AE+10), and PCB analyses of both surface samples were below NJDEP guidelines. PP metals analysis of the surface samples yielded a silver concentration of 5.2 mg/kg in both borings. All other priority pollutant metal concentrations were below NJDEP guidelines. Osmium, which does not have a specific NJDEP guideline, was not detected at a minimum detection limit of 2.3 mg/kg.

AREA B

ENVIRONMENTAL CONCERN

Area B is an asphalt-paved driveway, located south of Building A (Figure 2-3). There is no record of hazardous discharge in the vicinity of Area B. NJDEP required

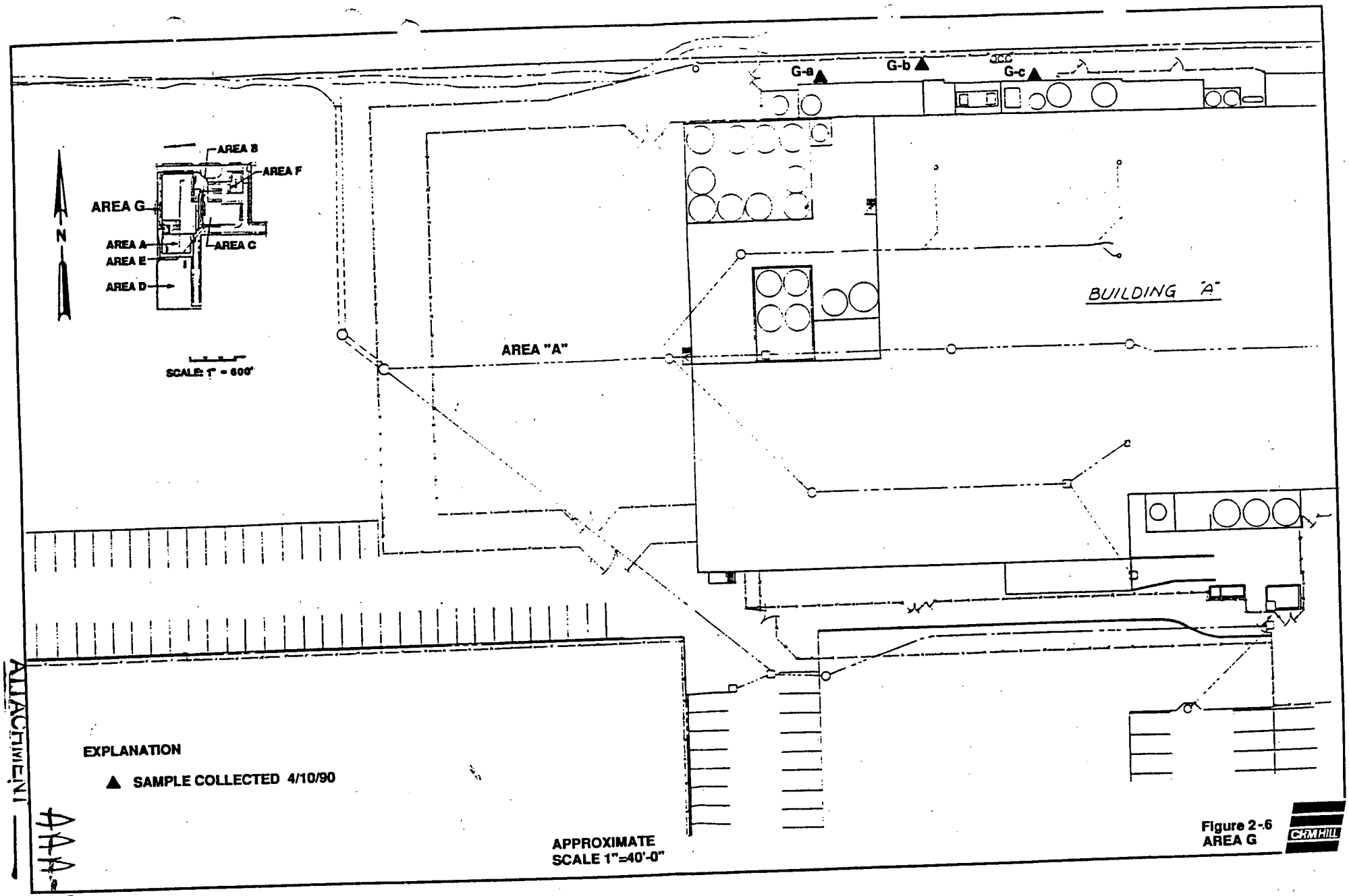


Figure 2-6
AREA G

ATTACHMENT AAA-17

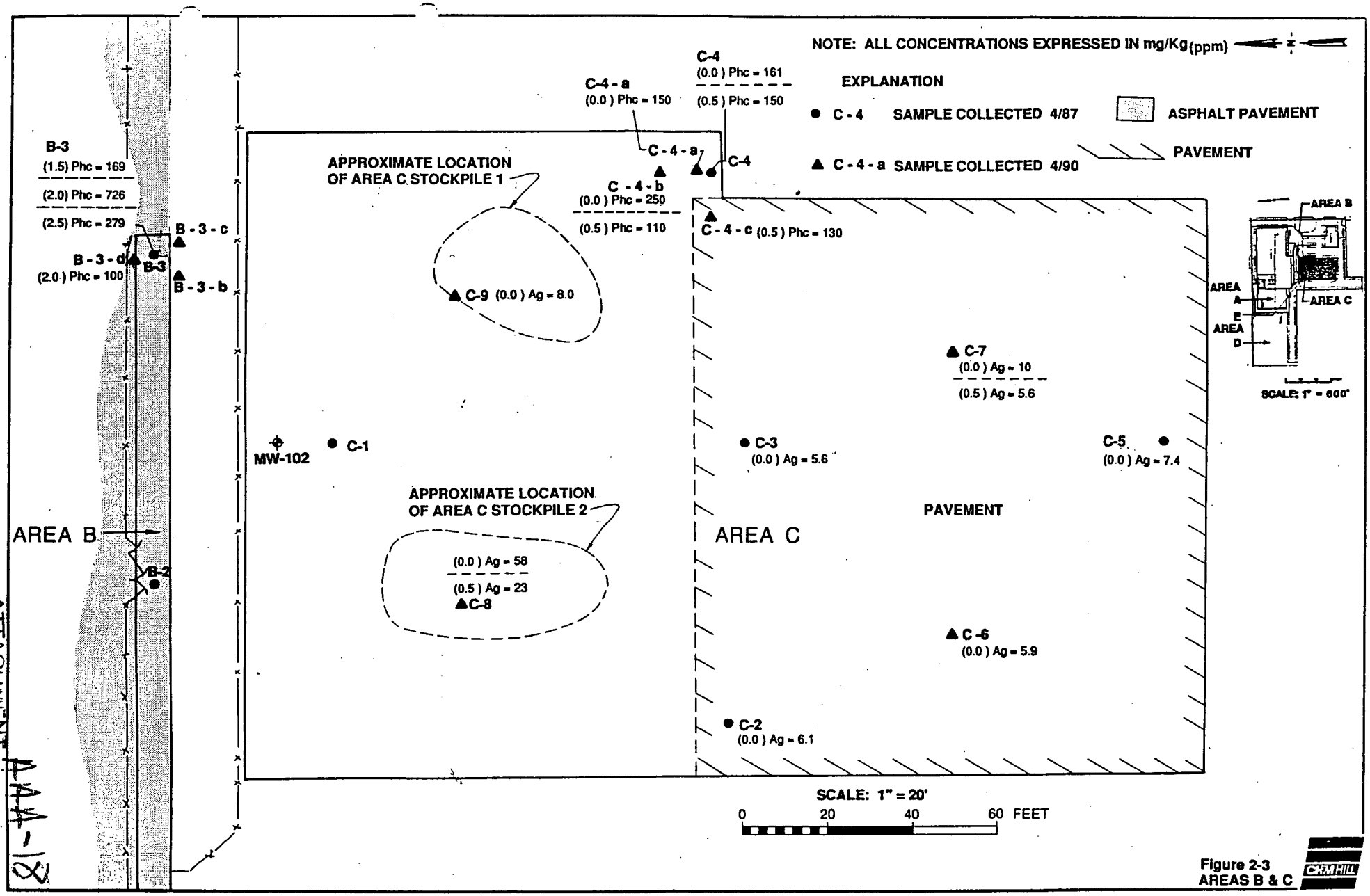


Figure 2-3
AREAS B & C

CH2M HILL

ATTACHMENT AAA-18

sampling for this area, as described in the site inspection report (Appendix A, Item 4).

Parameters selected for analysis included metals, PHC, PCB, and VOC+15. A summary of findings is included in Figure 2-1 and in the ARSSP (4). Only the PHC concentration in sample B-3 exceeded NJDEP guidelines at 169 mg/kg. Subsequent resampling detected PHC at concentrations of 726 and 279 mg/kg at depths of 2.0 feet and 2.5 feet, respectively.

SAMPLING PROGRAM

Four boring locations in the vicinity of sample B-3 were proposed in the ASP (3) for analysis of PHC at 2.0 feet. As amended in the February 20, 1990 meeting with the NJDEP at MMC, sample B-3-a was eliminated from the sampling requirements, and BN+15 analysis of the sample with the highest PHC concentration was added.

Item 2a. of the March 8, 1990 letter required that samples also be collected at 3.0 feet if bedrock is deeper than 4.0 feet. Since bedrock was observed at an approximate depth of 2.5 feet at all three borings, only one sample was collected from each boring.

RESULTS

Analytic results in excess of NJDEP guidelines for Area B are presented on Figure 2-3, and Table 2-4.

PHC analysis was performed on the soil collected at 2.0 feet at each of the three boring locations, and BN+15 analysis was performed on the sample with the highest PHC concentration. Concentrations for all analyses performed were at or below the NJDEP guidelines.

These results indicate that the elevated PHC concentration is located at boring B-3 only. Horizontal sampling has shown that the elevated PHC concentration does not extend outward from boring B-3. Because the area is encapsulated with asphalt, potential vertical migration of PHC is minimal. In addition, targeted base neutral compounds were all non-detected, and estimated concentrations of tentatively identified compounds totaled 0.91 mg/kg. For these reasons, no further investigation or remediation is proposed for Area B.

Table 2-4
Area B - Analytic Results

Sample	Depth	PHC mg/kg	BN+15 Target (TIC)
B-3-b	2.0-2.5	<25	—
B-3-c	2.0-2.5	<25	—
B-3-d	2.0-2.5	100	ND (0.91) ND (0)

— Not Analyzed
ND Not Detected

BN+15 results are presented as total concentration of targeted compounds, followed by total concentration of tentatively identified compounds in parenthesis. The second line is the corresponding totals without including those concentrations which had qualifiers placed upon them by the laboratory.

NJR53/054R53.51

ATTACHMENT AAA-20

AREA C

ENVIRONMENTAL CONCERN

Area C was an unpaved field, south of Building A. (Figure 2-3). The area is approximately 140 feet by 225 feet. Area C, which is surrounded by asphalt-paved parking and vehicle access areas, is not used by MMC in manufacturing. In the past, the field was used briefly for storing out-of-service equipment.

Five evenly spaced locations were sampled previously for metals, PHC, PCB, and VOC+15. Silver was found at or slightly above the NJDEP guideline in four of the samples. The maximum value observed was 7.4 mg/kg. In addition, PHC was detected in one sample, collected approximately 5 feet from the edge of an asphalt parking area. PHC in this sample (C-4) was 161 mg/kg.

In December 1989, the southern half of Area C (140 feet by 122 feet) was paved to provide additional parking. Prior to paving, the top 0.5 foot of soil was excavated and stockpiled on the northern section of Area C. The soil was separated into two piles, stockpile 1 from the area of elevated PHC and silver concentrations, and stockpile 2 from the area of elevated silver concentrations only. Analysis of the stockpiles is discussed later in Section 2.

SAMPLE PROGRAM

The sample program executed in Area C was detailed in the ASP (3). The sampling in Area C was performed "at peril" due to operational requirements. Pavement for additional parking was required for business expansion of MMC. The "at peril" operations were conducted as proposed in the ASP (3) with exceptions which included additional sampling performed to determine full vertical delineation of parameters in excess of NJDEP guidelines.

Three surface locations were sampled for PHC near previous sample C-4. In addition to the surface sample proposed, a second sample for PHC was collected at 0.5 foot at each of the three locations. In accordance with the March 8, 1990 letter, sample location C-4, which contained the highest PHC concentration, was analyzed for BN+15.

Contaminant distribution samples were collected from four locations as proposed in the ASP (3). These samples were collected at grade level and analyzed for silver. In addition to these four samples, samples were collected at 0.5 foot at the three borings with previous silver concentrations above the ECRA guideline, and at the four sample locations proposed in the ASP (3).

ATTACHMENT AAA-21

The NJDEP required sampling of the stockpiled waste soil generated during the excavation of the south half of Area C. The results of this sampling, as well as a discussion of the excavation conducted are included in a separate portion of Section 2 of this report.

RESULTS

Analytic results in excess of NJDEP guidelines for Area C are presented on Figure 2-3, and Table 2-5.

Two of the three surface soil samples collected from the borings surrounding location C-4 yielded PHC concentrations in excess of the NJDEP guideline. For one of these borings, C-4-a, the sample collected from 0.5 foot was below the NJDEP guideline. For the other boring, C-4-b, the sample collected at 0.5 foot was slightly above the guideline at a value of 110 mg/kg. Although the PHC concentration for the surface sample collected at boring C-3-c was below the NJDEP guideline, the sample collected at 0.5 foot had a PHC concentration of 130 mg/kg.

Base neutral analysis was performed on the sample collected at the surface at the original sample location, C-4. The concentrations of targeted compounds detected were all below the method detection limit for that compound. The total of the estimated values for the targeted compounds was 3.5 mg/kg. The estimated concentration of tentatively identified compounds (TIC) detected totaled 15.4 mg/kg.

The silver concentrations of the four surface samples collected during this phase of the field investigation ranged from 5.9 mg/kg at boring C-6 to 58.0 mg/kg at boring C-8. Seven borings, C-2, C-3, and C-5 through C-9 had surface concentrations of silver above the NJDEP guideline. In five of these borings, the concentration of silver was below the NJDEP guideline at 0.5 foot. The concentration of silver at 0.5 foot for borings C-7 and C-8 was 5.6 mg/kg and 23.0 mg/kg, respectively.

AREA D

ENVIRONMENTAL CONCERN

Area D is an unpaved field, approximately 200 feet by 330 feet, located west of Building A (Figure 2-4). The field is bounded to the north by a stream that is the receiving water for the NJPDES-permitted outfall. Area A is located to the east. The southern boundary is an asphalt-paved parking area, and the west is wooded land. The field has never been used in the manufacturing process but has been used extensively for storing out-of-service equipment. Currently, contaminated soil excavated from Area AWT is stored in Area D.

ATTACHMENT AAA-22

Table 2-5
Area C - Analytic Results

Sample	Depth	PHC mg/kg	Ag mg/kg	BN+15 Target (TIC)
C-4	0.0	161	—	3.5 (18.3) ND (15.4)
	0.5	150	—	—
C-4-a	0.0	150	—	—
	0.5	90	—	—
C-4-b	0.0	250	—	—
	0.5	110	—	—
C-4-c	0.0	83	—	—
	0.5	130	—	—
C-2	0.5	—	<3.0	—
C-3	0.5	—	3.0	—
C-5	0.5	—	<3.0	—
C-6	0.0	—	5.9	—
	0.5	—	<3.0	—
C-7	0.0	—	10.0	—
	0.5	—	5.6	—
C-8	0.0	—	58.0	—
	0.5	—	23.0	—
C-9	0.0	—	8.0	—
	0.5	—	3.2	—

— Not Analyzed
ND Not Detected

BN+15 results are presented as total concentration of targeted compounds, followed by total concentration of tentatively identified compounds in parenthesis. The second line is the corresponding totals without including those concentrations which had qualifiers placed upon them by the laboratory.

ATTACHMENT AAA-23

Area D was thoroughly investigated in two previous sample programs. A total of 17 locations were sampled with a combination of borings and test pits (Figure 2-4). Analytical parameters included metals, PHC, PCB, and VOC+15. The only materials detected above the ECRA guideline concentrations were silver, cadmium, and copper (target metals), and PHC. The maximum concentrations of these parameters observed were 75.95, 6.45, 409.52, and 323 mg/kg, respectively. Concentrations were found to diminish rapidly with depth. The highest concentrations of silver and PHC were found in samples from locations D-1, D-2, D-4, D-7, and D-10, from the eastern and southeastern portions of the area.

SAMPLE PROGRAM

The sample program proposed in the ASP (3), was to collect three samples in a triangular pattern, approximately 10 feet apart, centered at three previous sample locations. The samples were to be collected at grade level and analyzed for PHC.

In their March 8, 1990 letter, the NJDEP required further sampling in Area D. The NJDEP requested five perimeter samples along the south side of Area D, north of the parking area, and one sample collected south of the parking area. Of these six sample locations, three were collected during sampling of other areas. Perimeter samples PS-3 and PS-5 satisfied the requirements of two of the samples, and sample A-15 satisfied the requirement of a third sample. Therefore, three samples were collected along the perimeter of Area D to satisfy the requirement for six total samples.

The NJDEP also required that the soil surrounding sample D-6 be excavated and that post-excavation samples be collected. One additional sample was required to the west of sample D-6.

In compliance with the NJDEP requirements, a sample was collected north of sample D-3. In addition, samples were collected at two depths in at least 50 percent of the borings. All samples included PHC analysis, and the two samples with the highest PHC analysis were analyzed for BN+15.

In their letter of March 8, 1990, the NJDEP also required sampling of the roof drain discharge point and drainage pathway to characterize the Therminol 55 spill area. One sample was collected in Area D, at the discharge point of the former ditch/roof drain. This sample was located at the eastern edge of the drainage ditch which was in use during the time of the spill, and is shown on Figure 2-4. This sample was analyzed for PHC, BN+15, and PCBs.

Ten samples were collected from the Area AWT stockpile which is located in Area D (Figure 2-4). The discussion of the sample program and analytic results are included later in Section 2 of this report.

RESULTS

Analytic results in excess of NJDEP guidelines for Area D are presented on Figure 2-4, and Table 2-6.

PHC concentrations exceeded the ECRA guideline of 100 mg/kg in 9 of the 21 samples collected, representing seven boring locations. The PHC concentrations of these nine samples ranged from 150 to 230 mg/kg.

Base neutral analysis was performed on sample D-2-a at 0.5 foot, which had a PHC concentration of 200 mg/kg, and sample DPS-2 at the surface, with a PHC concentration of 230 mg/kg. The BN results of sample D-2-a were influenced by laboratory contamination. Dioctyl ester hexanedioic acid was detected at 18 mg/kg in this sample. The laboratory qualifier indicates that this compound is a result of extraction filter paper byproduct. If the concentration of this compound is excluded from the BN total concentration, then the total BN concentration for both samples is below the NJDEP guideline.

Silver concentrations of eight samples collected from five boring locations exceeded the ECRA guideline. The concentrations ranged from 15 to 150 mg/kg. Of these five borings, three were the perimeter samples collected, while the other two boring locations were D-3-a, and D-6-a.

The cadmium concentration in sample D-3-a was below the NJDEP guideline at both the surface and 1.5 feet. However, the concentration exceeded the guideline at sample D-6-a, and at the surface of all three perimeter samples. Two of the perimeter samples, DPS-1 and DPS-3, were also analyzed at 1.5 feet. One of these 1.5 feet deep samples, DPS-1, exceeded the NJDEP guideline with a cadmium concentration of 14 mg/kg. In the other sample, DPS-3, the cadmium concentration was observed below the guideline level.

Copper was also analyzed in six samples at four boring locations. Two of these samples exceeded the NJDEP guideline for copper. Sample D-6-a resulted in a concentration of 200 mg/kg, and the sample collected at 1.5 feet at DPS-1 results in a concentration of 230 mg/kg.

Analysis of the sample collected to characterize the Therminol 55 spill area included PHC, BN+15, and PCBs. No compounds were detected above the NJDEP guidelines.

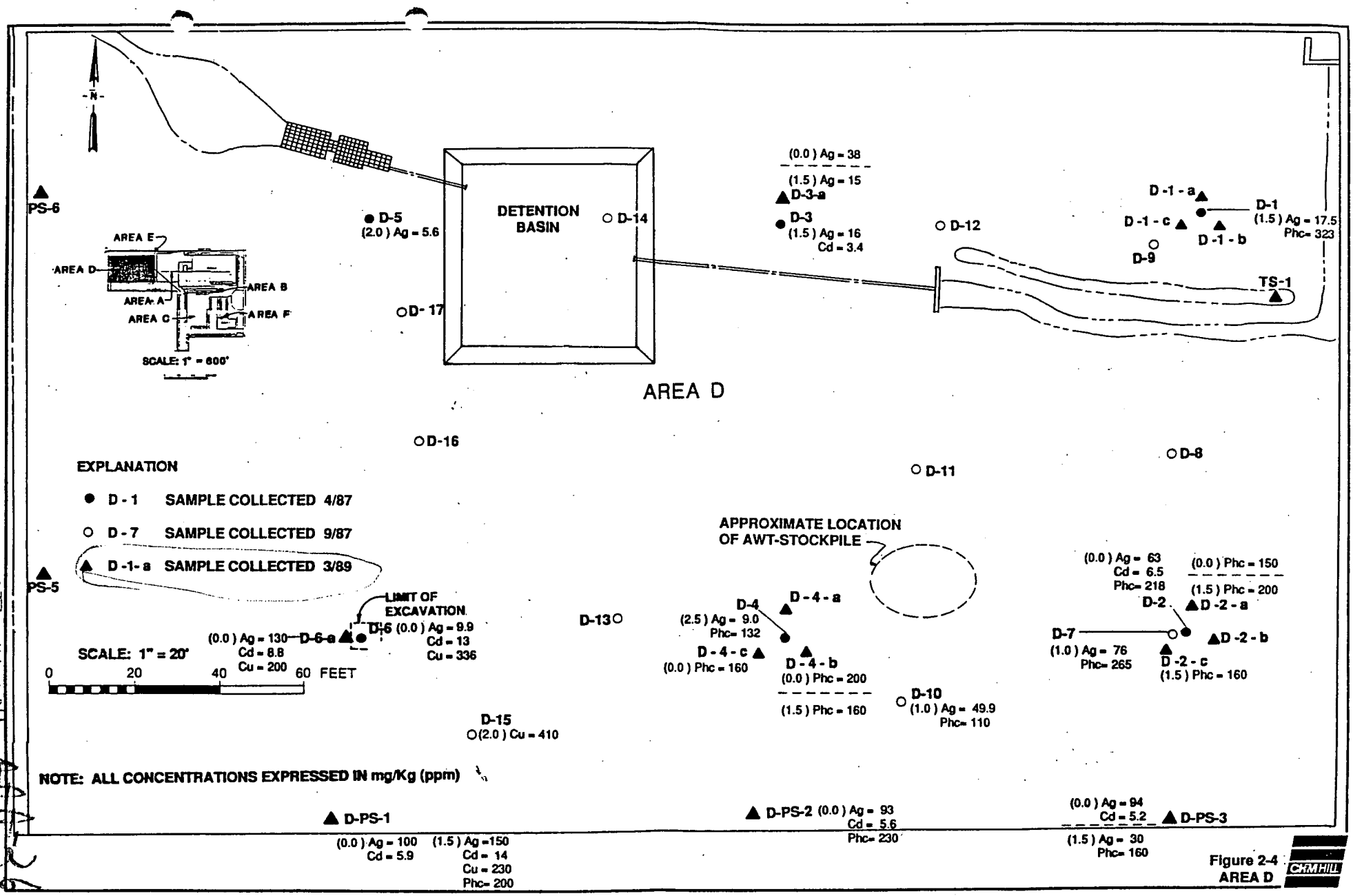


Figure 2-4
AREA D

CH2M HILL

ATTACHMENT 1

Table 2-6
Area D - Analytic Results

Sample	Depth	PHC mg/kg	Ag mg/kg	Cd mg/kg	Cu mg/kg	BN+15 Target (TIC)
D-1-a	0.0	<25	—	—	—	—
D-1-b	0.0	<25	—	—	—	—
	1.5	52	—	—	—	—
D-1-c	0.0	42	—	—	—	—
D-2-a	0.0	150	—	—	—	—
	1.5	200	—	—	—	4.18 (19.33) 1.3 (0)
D-2-b	0.0	85	—	—	—	—
D-2-c	0.0	77	—	—	—	—
	1.5	160	—	—	—	—
D-3-a	0.0	60	38	1.7	—	—
	1.5	<25	15	1.1	—	—
D-4-a	0.0	73	—	—	—	—
D-4-b	0.0	200	—	—	—	—
	1.5	160	—	—	—	—
D-4-c	0.0	160	—	—	—	—
D-6-a	0.0	50	130	8.8	200	—
D-PS-1	0.0	95	100	5.9	150	—
	1.5	200	150	14	230	—
D-PS-2	0.0	230	93	5.6	160	0.33 (3.28) ND (0)
D-PS-3	0.0	100	94	5.2	100	—
	1.5	160	30	2.4	42	—

Therminol Spill Discharge Point

Sample	Depth	PHC mg/kg	BN+15 Target (TIC)	PCB
TS-1	0.0	26	ND (1.48) ND (0)	ND

— Not Analyzed

ATTACHMENT AAA-27

AREA E

Area E is the bed of a former stream which flowed westward along the northern property line (Figure 2-1). Dimensions of the area of concern are approximately 10 feet by more than 300 feet. Most flow in the stream was from storm water runoff and non-contact cooling water from an outfall near the northwest corner of the Building A security zone.

The water flow had been relocated to a diversion through a temporary ditch which was excavated adjacent to the Area E stream bed. A third water course, culverted through a below surface pipeline, has been installed to the south of the temporary ditch. The water currently flows through this third water course, into a retention basin located on the western portion of Area D. The continuous flow outfall can be discontinued using a remote control valve system in the event of a spill. The outfall is authorized under NJPDES permit NJ0034835.

Two concerns were addressed during previous field investigations. The primary concern was a discharge of silver chloride which occurred on February 14, 1986. This discharge was reported in Item 13 of the SES (1). The secondary concern was the possibility of residue from VOC detected in previous monitoring as reported in Item 16 of the SES (1).

The possible presence of other hazardous materials in the stream sediment was addressed by collecting a sediment sample, downstream of the outfall, for PP+40 analysis. A summary of these results is presented in Table 2-1 of RAP (5).

Results from the sample program reported in the ARSSP (4) confirm that sediment in the stream bed contains silver at concentrations above the NJDEP guidelines. The maximum silver concentration observed was 9.5 mg/kg. The only other parameter detected above the guideline concentrations was copper, at 870 mg/kg.

Remedial action for Area E is discussed in detail in Section 3 of the RAP (5). The excavation of the silver-bearing sediment of the stream will be conducted during the cleanup phase of this site. No sampling of Area E was conducted during this phase of the field investigation.

AREA F

ENVIRONMENTAL CONCERN

Area F is adjacent to the north wall of Building B (Figure 2-5). An underground storage tank was removed prior to purchase of that property by MMC in 1981. No record exists of the integrity of the tank.

ATTACHMENT AAA-28

Four soil borings were advanced through the former location of the tank as part of the initial soil sample program for this site. Results of the sampling, reported in the ARSSP (4), are summarized on Figure 2-1. Of the four soil borings, only the boring located through the presumed tank center location contained PHC above the NJDEP guideline. The PHC concentration of this sample was 2,406 mg/kg.

A supplemental sample program was conducted at Area F in May 1988. PHC concentrations of samples collected at incremental depths below the original center sample ranged from 137 to 3710 mg/kg. These results, reported in the ASP (3), indicated that PHC was present in unacceptable concentrations at the former tank location.

SAMPLE PROGRAM

The initial excavation of Area F was conducted on April 10, 1990. The foundation of Building B limited the excavation on the southern side of the area. The limit of excavation on the north, east, and west sides was the locations of borings F-1, F-2, and F-4 respectively. The initial excavation was 8.5 feet in width by 15 feet in length. As decided during the February 20, 1990 meeting at MMC, the soil collected from the first 5 feet of excavation was stockpiled separately as clean material.

The asphalt cover over Area F was removed. The eastern edge of the pit was located approximately 1 foot to the west of an access doorway to Building B. The eastern edge of the pit was limited to this location because of ongoing use of the access doorway during the excavation.

The depth to bedrock on the western side of the excavation was 4.0 feet. Toward the center of the excavation, the depth to bedrock dropped to 8.0-8.5 feet. This indicated that the bedrock was originally excavated to allow for placement of the tank. Due to the limitation on the eastern extent of excavation, the rise in bedrock depth was not observed during the first day of excavation. The soil on the west side of the pit was excavated to bedrock.

At a depth of 6.0 to 6.5 feet, a petroleum hydrocarbon odor was detected on the eastern side of the excavation. The odorous soil was placed directly from the backhoe bucket into 55 gallon drums to await disposal. The backhoe met refusal due to bedrock at 8.5 feet deep, and the soil was removed to this depth. Since the asphalt adjacent to the access doorway could not be removed, excavation was conducted underneath the asphalt edge in an attempt to remove all contaminated soil from the eastern edge of the excavation.

Four post-excavation samples were collected on April 10, 1990. These samples were initially labelled F-1 through F-4, and appear as such on chain of custody forms and

ATTACHMENT AAA-29

analytic data sheets. However, to avoid possible confusion with the samples collected in 1987 and 1988, they have been renamed F-1a through F-4a in this report.

Samples F-1a and F-2a were collected on the western corners of the excavation. These samples were collected from the base of the sidewall at a depth of 3.5 feet. Samples F-3a and F-4a were collected on the eastern edge of excavation, below the asphalt cover, at a depth of 7.5 feet.

For safety reasons, the pit was temporarily backfilled with the soil excavated from the top 5 feet of the pit while awaiting analytic results. Since no compaction was conducted, the soil filled the pit to approximately 1.5 feet below grade. The pit was then roped off with safety tape.

RESULTS

Analytic results in excess of NJDEP guidelines for Area F are presented on Figure 2-5, and Table 2-7.

Three of the four samples, F-1a through F-3a, yielded PHC concentrations below the NJDEP guideline. However, PHC concentration of F-4a was 1500 mg/kg. This indicated that the excavation did not address the full extent of contamination and that subsequent excavation would be required. Sample F-4a was also analyzed for BN+15, VOC+15, priority pollutant metals, and PCBs. Analytical results for these parameters were all below NJDEP guidelines.

On April 27, 1990, permission was obtained from MMC to extend the excavation beyond the access doorway into Building B. The asphalt cover was removed so that the pit could be extended 4 feet to the east. Since post-excavation samples F-1a and F-2a showed no contamination on the west side of the pit, the second excavation began 4 feet from the western edge of the original pit. The soil from the west half of the pit was not removed a second time. Figure 2-5 shows the horizontal limits of both excavations.

In the same manner as the initial excavation, the soil collected from the first 5 feet of excavation was stockpiled separately as clean material. Once a depth of 5 feet was excavated, the soil was placed directly into 55-gallon drums for disposal. Petroleum hydrocarbon odor was detected at a depth of 6.0 feet.

At the extreme eastern edge of the excavation, the depth to bedrock measured from grade was approximately 4.0 feet. This observation confirms that the former tank rested in a basin excavated approximately 4 feet into the bedrock, at a depth of approximately 8 feet below the present ground surface.

Table 2-7
Area F - Analytic Results

Sample	Depth	PHC mg/kg	BN+15 Target (TIC)	VOA+15	PPM	PCB
F-1-a	3.5	31	—	—	—	—
F-2-a	3.5	<25	—	—	—	—
F-3-a	7.5	34	—	—	—	—
F-4-a	7.5	1500	4.27 (2.7) 1.73 (1.5)	ND (0.014) ND (0)	Below A.L.	ND
F-5-a	7.5	<25	—	—	—	—
F-6-a	7.5	<25	—	—	—	—
F-7-a	7.5	30	ND (2.3) ND (0)	—	—	—
F-8-a	7.5	<25	—	—	—	—

— Not Analyzed
ND Not Detected

BN+15 and VOA+15 results are presented as total concentration of targeted compounds, followed by total concentration of tentatively identified compounds in parenthesis. The second line is the corresponding totals without including those concentrations which had qualifiers placed upon them by the laboratory.

NJR53/057R53.51

ATTACHMENT AAA-31

The soil was removed from the bottom of the pit to bedrock depth. Four post-excavation samples were collected from the extended area of the excavation. These samples are shown on Figure 2-5. All four samples were collected at 7.5 feet from the base of the sidewall.

PHC concentrations of three of the four samples were below detection level, and the fourth concentration, at 30 mg/kg, was below the ECRA guideline of 100 mg/kg. In addition, base neutral analysis was performed on the sample with 30 mg/kg PHC. The targeted base neutral compounds were all non-detected, and estimated concentrations of tentatively identified compounds totaled 2.3 mg/kg. This BN+15 concentration is below the ECRA guideline.

The results of these post-excavation samples confirm that clean closure was obtained in Area F. The petroleum hydrocarbon contamination was fully addressed after the second excavation. The area was backfilled using the soil excavated from the top 5 feet of the pit. Replacement soil was obtained from the stockpile generated during excavation of the retention basin located in Area D.

AREA G

ENVIRONMENTAL CONCERN

Area G is a portion of the north driveway at the MMC plant, surrounding monitoring well MW-105 (Figure 2-6). This area was selected by the NJDEP for collection of soil samples for VOC+15 analysis to corroborate a postulated offsite source for VOC in groundwater samples from MMC. Data concerning VOC concentrations in groundwater were submitted to the NJDEP in the July 1986 Hydrogeologic Investigation Interim Report (9).

Results of the Area G soil sampling were submitted in the ARSSP (4). No VOCs were detected in any sample at a detection limit of 5 ug/kg. This finding is consistent with analytical results of soil samples throughout the site. The absence of the VOC in the soil of Area G as well as the remainder of the site confirms the previously reached consensus of an offsite source of the VOC compounds in groundwater.

In the March 8, 1990 letter, the NJDEP required submittance of the ECRA Tier II deliverables for the soil samples collected in Area G. The laboratory deliverables could not be obtained from the laboratory since three years have passed since the initial sampling. Therefore, at great expense additional samples were collected and analyzed for VOC+15.

SAMPLE PROGRAM

The NJDEP required three confirmatory samples collected in Area G. These samples were to be collected as close to the original locations as possible. See Figure 2-1 for the sample locations of both sampling events.

RESULTS

No analytic results in excess of NJDEP guidelines for Area G were detected, as presented on Figure 2-6, and Table 2-8.

No VOC were detected in any sample at a detection limit of 6 ug/kg. These results confirm the initial consensus of an offsite source of the VOC compounds in groundwater.

SITE PERIMETER

ENVIRONMENTAL CONCERN

Samples from the site perimeter were proposed to document the limit of lateral migration of silver, cadmium, copper, and PHC found in surface soil samples from Areas A, C, D, and E. Data from previous studies have shown that significant vertical migration has not occurred, suggesting that the metals revert to low mobility species in the environment, and the low PHC concentrations observed are below the minimum necessary for significant migration through unsaturated soils. The site perimeter samples were proposed to document that lateral migration, by surface drainage, has not occurred.

SAMPLE PROGRAM

Perimeter samples 1 through 6 were collected as proposed in the ASP (3). The proposed northern perimeter sampling of Area D, PS-7 through PS-10, were deferred at this time, and will be incorporated into the Cleanup Plan for Area E. This deferment was approved in item 4f. in the March 8, 1990 letter from the NJDEP.

RESULTS

Analytic results in excess of NJDEP guidelines for Perimeter Samples are presented on Figure 2-7, and Table 2-9.

PHC analysis was performed on samples PS-3 through PS-6. The results of these four analysis were all below the NJDEP guideline of 100 mg/kg.

ATTACHMENT AAA-33

Table 2-8
Area G - Analytic Results

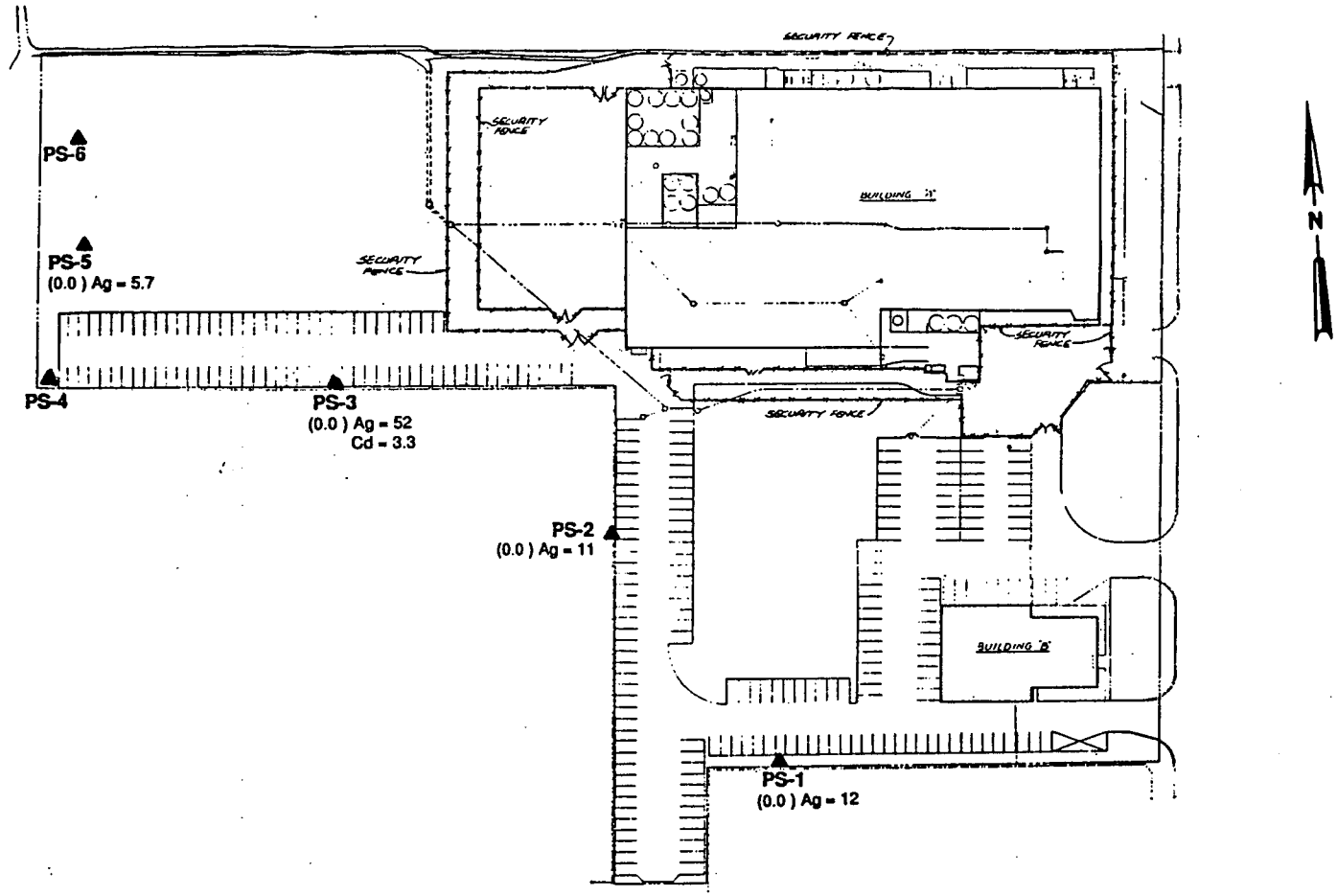
Sample	Depth	VOA + 15 Target (TIC)
G-a	3.5	ND
G-b	3.5	ND
G-c	3.5	ND

ND Not Detected

VOA+15 results are presented as total concentration of targeted compounds, followed by total concentration of tentatively identified compounds in parenthesis. The second line is the corresponding totals without including those concentrations which had qualifiers placed upon them by the laboratory.

NJR53/058R53.51

ATTACHMENT AAA-34



EXPLANATION

▲ SAMPLE COLLECTED 3/89

0 100 200 300 FEET

Figure 2-7
PERIMETER SAMPLE LOCATIONS

CH2M HILL

ATTACHMENT AAA-35

Table 2-9
Perimeter - Analytic Results

Sample	Depth	PHC mg/kg	Ag mg/kg	Cd mg/kg	Cu mg/kg
PS-1	0.0	---	12.0	---	---
PS-2	0.0	---	11.0	---	---
PS-3	0.0	76	52.0	3.3	64
PS-4	0.0	<25	3.9	1.2	83
PS-5	0.0	<25	5.7	1.3	61
PS-6	0.0	<25	3.3	1.1	57

--- Not Analyzed

NJR53/059R53.51

ATTACHMENT AAA-36

Silver analysis was performed on all six perimeter samples. Silver concentrations of samples PS-1 through PS-3 exceeded the NJDEP guideline with concentrations ranging from 11 to 52 mg/kg. In addition, PS-5, located on the western edge of Area D, exceeded the NJDEP guideline with a concentration of 5.7 mg/kg.

Cadmium and copper analysis were also performed on samples PS-3 through PS-6. The only concentration which exceeded ECRA guidelines was cadmium in PS-3 at a concentration of 3.3 mg/kg.

WASTE PILES

In their March 8, 1990 letter, the NJDEP required sampling of the stockpiled soil on-site, if this soil was excavated from a contaminated area. The NJDEP requested information regarding three stockpiles, originating separately from Area AWT, the retention basin, and Area C.

RETENTION BASIN STOCKPILE

The soil originating from construction of the retention basin was temporarily stockpiled in Area D. The soil was placed on a plastic layer and covered with plastic. The pile was located to the north of the Area AWT stockpile, which is shown on Figure 2-4.

This soil was excavated from a portion of Area D as shown on Figure 2-4. Sample location D-14 is the only sample located within the retention basin area. This sample was analyzed for silver, cadmium, and copper at the surface. All parameters were below ECRA guidelines.

The NJDEP required sampling of this pile if the soil was excavated from a contaminated area (Item 10b., March 8, 1990). Since this soil was not collected from an area which had contaminants above ECRA guidelines, analysis was not performed on this stockpile.

A portion of this pile was used as replacement soil for the excavation conducted in Area F. The remainder of this stockpile was removed from the site in May 1990.

AREA C STOCKPILES

In December 1989, the southern half of Area C (140 feet by 122 feet) was paved to provide additional parking. Prior to paving, the top 0.5 foot of soil was excavated and stockpiled on the northern section of Area C. The soil was separated into two piles, stockpile 1 from the area of elevated PHC and silver concentrations, and stockpile 2

from the area of elevated silver concentrations only. The stockpiles had an underlying layer of plastic and a plastic cover.

Stockpile 1

The soil excavated from the section with elevated PHC concentrations (C-4), was stockpiled to the north of sample C-4. With the exception of sample location C-4-c, the area surrounding sample location C-4, was not paved (see Figure 2-3).

Ten samples were collected from evenly distributed locations of this stockpile and analyzed for silver and PHC. The two samples with the highest PHC concentrations were analyzed for BN+15. Five of the samples were collected from the surface of the pile, and five were collected from soil located two feet into the pile at a height of 5 feet above ground surface. Analytic results of these samples are summarized in Table 2-10.

The silver concentration in all ten samples collected from the stockpile exceeded the ECRA guideline. The concentrations ranged from 7.9 to 41 mg/kg.

The PHC concentration observed exceeded the ECRA guideline in only two samples, CSP-3 and CSP-5. The PHC concentration of both samples was 170 mg/kg. Base neutral analysis of both of these samples yielded concentrations which were either not detected or below ECRA guidelines.

Stockpile 2

The soil excavated from the portion of the area with elevated silver concentrations only was stockpiled to the west of the first stockpile. This pile was located directly above sample location C-8.

Extensive sampling was performed in Area C prior to excavation of the southern half of the area. Analytic data has been generated in more than ten locations for this portion of Area C. Analysis for silver, cadmium, copper, and PHC has been performed. Silver was the only contaminant above ECRA guidelines for this soil, in concentrations ranging from below the ECRA guideline to 10.0 mg/kg. Since extensive data existed prior to excavation of the soil, no samples were collected from this stockpile.

AREA AWT STOCKPILE

Area AWT stockpile originated from soil excavated during the construction of an extension to building A. Area AWT, located in the northeast corner of Area A (Figure 2-2), now houses a water treatment facility.

ATTACHMENT AAA-38

Table 2-10
Area C Stockpile 1 - Analytic Results

Sample	Depth	PHC mg/kg	Ag mg/kg	BN+15 Target(TIC)
C-SP-1	0.0	74	23.0	—
C-SP-2	a=5	43	20.0	—
C-SP-3	0.0	170	27.0	2.05 (1.99) ND (0.43)
C-SP-4	a=5	82	41.0	—
C-SP-5	0.0	170	24.0	1.32 (1.11) ND (0)
C-SP-6	a=5	89	8.3	—
C-SP-7	0.0	84	17.0	—
C-SP-8	a=5	33	30.0	—
C-SP-9	0.0	88	7.9	—
C-SP-10	a=5	64	11.0	—

— Not Analyzed
ND Not Detected
a=5 Height is 5 feet above ground surface

BN+15 results are presented as total concentration of targeted compounds, followed by total concentration of tentatively identified compounds in parenthesis. The second line is the corresponding totals without including those concentrations which had qualifiers placed upon them by the laboratory.

NJR53/060R53.51

ATTACHMENT AAA-39

All soil within the zone designated AWT was excavated to bedrock at an average depth of 4 feet. The contaminated portion of the excavated soil was stockpiled in Area D. A sampling program was executed prior to excavation for determination of an appropriate method for disposition of the soil. Only the three target metals and PHC were found above NJDEP guidelines. Maximum concentrations were 154, 7.2, 192, and 2,552 mg/kg for silver, cadmium, copper, and PHC respectively. The results of the AWT sample program conducted prior to excavation are included in Appendix B of the RAP (5).

In the ASP (3), collection of ten samples for silver and PHC analysis were proposed for the stockpiled soil. In fulfillment of requirement 10a. of the March 8, 1990 approval letter from the NJDEP, cadmium analysis was also performed, and the two samples with the highest PHC concentrations were analyzed for BN+15. Analytic results of these samples are summarized in Table 2-11.

The 10 samples were evenly distributed over the stockpile. Five of the samples were collected from the surface of the pile, and five were collected from soil located two feet into the pile at a height of 5 feet above ground surface.

Of the 10 Area AWT waste pile samples, six exceeded the NJDEP guideline for PHC. These PHC concentrations ranged from 110 to 420 mg/kg. Base neutral analysis of sample AWT-SP-4, with 150 mg/kg PHC, yielded a BN concentration below the NJDEP guideline. However, analysis of sample AWT-SP-6, with 420 mg/kg PHC, exceeded the NJDEP guideline with a BN total concentration of 44.2 mg/kg.

All 10 samples collected from the waste pile exceeded the NJDEP guidelines for both silver and cadmium. These results were expected considering the analytic data on the soil prior to excavation. The silver concentrations ranged from 68 to 110 mg/kg. The cadmium concentrations ranged from 3.3 to 6.8 mg/kg.

ATTACHMENT AAA-4/C

Table 2-11
Area AWT Stockpile - Analytic Results

Sample	Depth	PHC mg/kg	Ag mg/kg	Cd mg/kg	BN+15 Target (TIC)
AWT-SP-1	0.0	130	94	5.4	—
AWT-SP-2	a=5	54	89	6.5	—
AWT-SP-3	0.0	60	97	4.3	—
AWT-SP-4	a=5	150	110	6.4	6.69 (1.15) 1.4 (0.45)
AWT-SP-5	0.0	110	81	5.8	—
AWT-SP-6	a=5	420	68	3.3	35.18 (9.07) 33.9 (7.77)
AWT-SP-7	0.0	46	91	6.8	—
AWT-SP-8	a=5	150	79	4.5	—
AWT-SP-9	0.0	72	79	4.9	—
SWT-SP-10	a=5	120	84	5.1	—

— Not Analyzed
a=5 Height is 5 feet above ground surface

BN+15 results are presented as total concentration of targeted compounds, followed by total concentration of tentatively identified compounds in parenthesis. The second line is the corresponding totals without including those concentrations which had qualifiers placed upon them by the laboratory.

NJR53/061R53.51

ATTACHMENT AAA-411

Section 3
CONCLUSIONS AND RECOMMENDATIONS

Conclusions which can be drawn from the analytic results of this supplemental sample program conducted at MMC are discussed below. Recommendations for cleanup or remedial action are discussed in the Cleanup Plan, which has been submitted as a separate report.

AREA A

Elevated concentrations of PHC, silver, and cadmium are located throughout Area A. In addition, elevated concentrations of copper exist in certain discrete locations in Area A. In many locations of surface contamination, the vertical extent of contamination was shown to be 1.5 feet or less. In addition, horizontal extent of contamination was determined for certain sample locations.

AREA B

PHC concentrations in excess of the ECRA guideline were detected at varying depths in one sample location in Area B. Three additional borings, located in a triangular pattern 5 feet from location B-3, were sampled for PHC at a depth of 2.0 feet.

These results indicate that the elevated PHC concentration is located at boring B-3 only. Horizontal sampling has shown that the elevated PHC concentration does not extend outward from boring B-3. Because the area is encapsulated with asphalt, potential vertical migration of PHC is minimal. In addition, targeted base neutral compounds were all non-detected, and estimated concentrations of tentatively identified compounds totaled 0.91 mg/kg, well below the ECRA guideline. For these reasons, no further investigation or remediation is proposed for Area B.

AREA C

Elevated PHC concentrations are located in one portion of Area C, centered at sample location C-4. PHC concentrations ranged from 110 to 250 mg/kg at this portion of the area.

The top 0.5 feet of soil was excavated from this area and is currently stockpiled in the northeast portion of Area C. This stockpile has been designated Area C Stockpile 1.

ATTACHMENT AAA-42

Elevated silver concentrations exist throughout Area C. Vertical delineation of the silver has been obtained at all but two sample locations within Area C. In one of these locations, C-7, the silver concentration at 0.5 feet was only slightly above the ECRA guideline at a concentration of 5.6 mg/kg.

The top 0.5 feet of soil from the southern half of Area C, with the exception of the area surrounding sample location C-4, was stockpiled in the northwest portion of Area C. This stockpile has been designated Area C Stockpile 2.

AREA D

Elevated PHC concentrations exist at two sample cluster locations within Area D. In addition, three Area D perimeter samples indicated PHC concentrations above ECRA guidelines. Base neutral results of the two samples with the highest PHC concentrations were below ECRA guidelines.

Elevated silver concentrations exist at seven sample cluster locations. For all but two of these locations, D-3 and D-6, vertical and horizontal extent of contamination has been fully delineated.

Cadmium concentrations in excess of the ECRA guideline are located at five sample cluster locations. Vertical and horizontal delineation of the cadmium contamination has been completed at all but location D-6. In addition, cadmium contamination was found in three Area D perimeter samples.

At one sample location, D-6, copper concentrations were found in excess of the ECRA guideline. In addition, copper was found in one Area D perimeter sample, at a depth of 1.5 feet.

The roof discharge point was sampled to delineate any contamination resulting from a Therminol 55 spill. The compounds analyzed at this discharge point resulted in no concentrations above ECRA guidelines. These results indicate that the Therminol 55 spill has not impacted the soils surrounding the discharge point.

AREA E

The sediment in the stream bed contains silver at concentrations above the ECRA guidelines. The maximum silver concentration observed was 9.5 mg/kg. The only other parameter detected above the guideline concentrations was copper, at 870 mg/kg.

The remedial action plan for Area E is discussed in detail in the RAP (3) and is modified in the Cleanup Plan. The excavation of the silver-bearing sediment of the stream will be conducted during the cleanup phase of this site. No sampling of Area E was conducted during this phase of the field investigation.

AREA F

Excavation of the soil within Area F was conducted to address the PHC contamination in this area. After two separate excavation events, post-excavation sampling confirmed that the PHC contamination has been fully addressed. Clean closure of the former underground tank area has been completed.

AREA G

Initial analysis of the soil in Area G indicated that VOC compounds were not present in the soil above ECRA guidelines. Due to insufficient laboratory deliverables for these four samples, three additional samples were collected and analyzed for VOC.

Analytic results of the supplemental phase of sampling in Area G confirm the initial findings that VOC contamination is not present in the soil. ECRA Tier II laboratory deliverables for the second sampling event are included in Appendix B, under separate cover.

PERIMETER SAMPLES

Perimeter samples were collected to document the limit of lateral migration of silver, cadmium, copper, and PHC found in surface soil samples in Areas A, C, and D.

Silver concentrations in excess of the ECRA guideline were found in four of the six perimeter samples collected. In addition, cadmium was found at 3.3 mg/kg in one perimeter sample. All PHC and copper results were below NJDEP guidelines.

WASTE PILES

The NJDEP requested further characterization of the stockpiled soils which originated from contaminated areas. Two stockpiles, Area AWT Stockpile, and Area C Stockpile 1, were generated during excavation of soil with contaminants in excess of ECRA guidelines. The results of laboratory analysis of the stockpiled soil concur with the analytic results of the soil prior to excavation.

ATTACHMENT BBB

CLEANUP PLAN
FOR
METZ METALLURGICAL CORPORATION
3900 SOUTH CLINTON AVENUE
SOUTH PLAINFIELD, NEW JERSEY

ECRA CASE # 86108

Prepared by: CH2M HILL
99 Cherry Hill Road
Suite 304
Parsippany, New Jersey 07054

July 31, 1990

ATTACHMENT BBB-1

NJR54/049R54.51

CONTENTS

		Page
1	INTRODUCTION	1-1
	Site Description	1-1
	History of ECRA Case	1-1
	Summary of Sample Programs	1-6
2	SUMMARY OF ENVIRONMENTAL CONCERN	2-1
	Area A	2-1
	Area B	2-3
	Area C	2-3
	Area D	2-4
	Area E	2-5
	Area F	2-6
	Area G	2-6
	Site Perimeter	2-7
	Waste Piles	2-7
3	PROPOSED REMEDIAL OPERATIONS	3-1
	Objective and Approach	3-1
	Proposed Cleanup Levels	3-2
4	DETAILED WORK PLAN	4-1
	Area A	4-1
	Area B	4-4
	Area C	4-4
	Area D	4-4
	Area E and Offsite Stream	4-7
	Area F	4-11
	Area G	4-11
	Site Perimeter	4-11
	Waste Piles	4-13
5	POST REMEDIATION MONITORING	5-1
	Monitoring Program	5-1
	Contingencies	5-3

ATTACHMENT BBBB-2

6	QUALITY ASSURANCE/QUALITY CONTROL PROGRAM		6-1
	Sample Equipment and Methods		6-1
	Sample Documentation		6-2
	Equipment Decontamination		6-2
	Laboratory and Methodology		6-3
	Chain of Custody		6-4
7	PROPOSED SCHEDULE		7-1
	Task 1	Design, Permit, and Bid Preparation	7-1
	Task 2	Area E and Offsite Stream	7-3
	Task 3	Area C	7-4
	Task 4	Site Perimeter	7-4
	Task 5	Area D	7-5
	Task 6	Area A	7-5
	Task 7	Soil Disposal	7-6
	Task 8	Reporting	7-7
8	COST OF CLEANUP AND REMEDIAL PLAN		8-1

Appendix A. NJDEP Correspondence
Appendix B. Chloride Sample Program and Analytic Methodology

ATTACHMENT BBS-3

TABLES

4-1	Proposed Post-Excavation Samples	4-2
8-1	Estimated Costs for Remediation Program	8-2

ATTACHMENT BBB-1

FIGURES

1-1	Site Location	1-2
1-2	Site Plan	1-3
1-3	Areas of Environmental Concern	1-5
2-1	Summary of Analytic Results	2-2
4-1	Proposed Remediation of Area A	4-3
4-2	Proposed Remediation of Area C	4-5
4-3	Proposed Remediation of Area D	4-6
4-4	Area E Post-Remediation Sample Locations	4-8
4-5	Proposed Remediation of Site Perimeter	4-12
5-1	Post-Remediation Monitoring	5-2
7-1	Remediation Schedule	7-2

ATTACHMENT BBB-5

Section 1
INTRODUCTION

SITE DESCRIPTION

The Metz Metallurgical Corporation (MMC) is located on South Clinton Avenue, in South Plainfield, Middlesex County, New Jersey (Figure 1-1). The site is in an industrial area, approximately one half mile north of Interstate Highway 287. The 12-acre site contains two buildings, identified as Buildings A and B, which total more than 140,000 square feet (Figure 1-2). Remaining land is used for parking and equipment storage, or is vacant.

Since its founding in 1921, in Newark, New Jersey, MMC has been a producer of precious metal products. The primary products include silver alloys and compounds for the microelectronics industry. Other metals are produced in smaller quantities, including gold, platinum, and palladium. All MMC operations were moved from Newark to the present South Plainfield site in 1965. Several property acquisitions and construction programs have occurred since then. Figure 1-2 shows the site as it was in February, 1986, when MMC came under the jurisdiction of New Jersey's Environmental Cleanup Responsibilities Act (ECRA). Since that time, additional property, including a building identified as Building C, has been leased. The property is located to the north of the original site. Due to the former SIC code of the property, this transaction did not come under the jurisdiction of ECRA.

Storm water runoff and non-contact cooling waters are discharged at a New Jersey Pollutant Discharge Elimination System (NJPDES) permitted outfall. The discharge point has recently been upgraded to include a water retention area. The discharge is continuously monitored for water quality, and will shut down automatically or manually with an alarm in the event of a spill. Floor drains in the plant are routed through safety catchments and process sumps to metal recovery systems. The recovery system effluent discharges to the sanitary sewer system. Greater detail on the site description, history, and operation were included in the Site Evaluation Submission (SES), submitted to the New Jersey Department of Environmental Protection (NJDEP) in March 1986 (1).

HISTORY OF ECRA CASE

The MMC ECRA investigation has been ongoing since the submission of the General Information Submission (GIS) (2), on February 10, 1986. The business and real estate were sold under the authority of an Administrative Consent Order (ACO) dated July 23, 1986.

ATTACHMENT BBB-6

Extensive investigations of both soil and groundwater have been conducted at MMC. Results of these investigations have been documented in reports submitted to the NJDEP. A complete discussion of the history of the ECRA investigation is included in the Amended Sample Plan (ASP) (3).

A meeting was held in the office of the Bureau of Environmental Evaluation and Cleanup Responsibility Assessment (BEECRA) on April 19, 1988. The meeting was attended by Messrs. Nalbone, Lux and Gillespie, who represented the NJDEP, Mr. Rabinowitz, of McCarter & English, and Mr. Dahlgren, of Environics, Inc., both of whom represented MMC. The philosophy of a proposed remedial action for the site was discussed. Since low concentrations of silver were wide-spread on the MMC property, and since silver has an extremely low mobility in the environment, the conceptual plan presented included encapsulation of the material, without full delineation of contamination. Based on the verbal agreement with the conceptual plan by NJDEP representatives at the meeting, CH2M HILL and MMC subsequently prepared and submitted a formal Remedial Action Plan (RAP) conforming to their recommendation, dated October 14, 1988 (4).

In the letter dated June 20, 1989, the NJDEP determined the RAP (4) "...to be inadequate and incomplete, and therefore, unapprovable." The NJDEP required the submission of an amended Sample Plan, to address "...the sampling deficiencies as provided in Part A ..." (Appendix A, Item 3) of the letter. CH2M HILL, on behalf of MMC, submitted a response to the major NJDEP concerns on July 21, 1989 (Appendix A, Item 2). In addition, an Amended Sample Plan (3) was prepared in compliance with the requirement included in the NJDEP letter of June 20, 1989. The plan was submitted to the NJDEP on August 21, 1989, and approved with conditions on March 8, 1990 (Appendix A, Item 1).

Field operations for the soil sample program were conducted during November 1989, and March and April, 1990. Sampling in Area C (Figure 1-3), conducted in November 1989, was performed "at peril" due to operational requirements. Pavement for additional parking was required for business expansion of MMC. The "at peril" operations were conducted as proposed in the ASP (3) with exceptions as discussed in Section 2 of the Report of Analytic Results (RAR) (5). The exceptions included additional sampling performed to determine full vertical delineation of parameters in excess of NJDEP guidelines.

The Report of Analytic Results (5), submitted with this report, presents the analytic results obtained during implementation of the Amended Sample Plan. In addition, this Cleanup Plan has been prepared and submitted in compliance with the requirement included in the NJDEP letter of March 8, 1990.

ATTACHMENT BBB-7

SUMMARY OF SAMPLE PROGRAMS

The MMC site was inspected by the NJDEP on June 24 and 25, 1986. Comments from the inspection report (July 28, 1986 Appendix A, Item 7) and the Sample Plan Review (October 2, 1986 Appendix A, Item 6), were incorporated into a Revised Sample Plan (6), which addressed environmental concerns in portions of the site designated A through G, which are discussed in Section 2 (Figure 1-3). The plan was submitted to the NJDEP on December 10, 1986, and approved with conditions on February 18, 1987 (Appendix A, Item 5).

Field operations for the soil sample program were conducted during April, 1987, and a report entitled "Analytic Results for Soil Sampling Program" (ARSSP) (7) was submitted to the NJDEP on July 31, 1987. The analytic data were declared acceptable by the NJDEP on January 20, 1988 (Appendix A, Item 4). NJDEP then required further delineation.

A groundwater investigation was initiated at the MMC site prior to submitting the ECRA Initial Notice. The groundwater analytic data submitted in the SES (1), and additional data included in an Interim Report (8), submitted in July 1986, showed no evidence of groundwater contamination by silver or any other metal used by MMC.

However, the NJDEP did not accept the analytic data, based on sampling and analytic procedures, and required resampling (January 20, 1988 letter). The wells were resampled and the results were submitted in a report dated October 21, 1988 (9). These data, accepted by NJDEP in the June 20, 1989 letter (Appendix A, Item 3), confirmed the earlier finding of no groundwater contamination by precious metals.

The Amended Sample Plan (3) was prepared in compliance with the requirement included in the NJDEP letter of June 20, 1989. The plan was submitted to the NJDEP on August 21, 1989, and approved with conditions on March 8, 1990 (Appendix A, Item 1).

Field operations for the soil sample program were conducted during November 1989, and March and April, 1990. Sampling in Area C, conducted in November 1989, was performed "at peril" due to operation requirements. Pavement for additional parking was required for business expansion of MMC. The "at peril" operations were conducted as proposed in the ASP (3) with exceptions based on conversations with the NJDEP ECRA case manager. The exceptions included additional sampling performed to determine full vertical delineation of parameters in excess of NJDEP guidelines.

ATTACHMENT BBB-8

Section 2
SUMMARY OF ENVIRONMENTAL CONCERNS

AREA A

Area A is an unpaved zone, approximately 230 by 150 feet, west of Building A. It is surrounded on three sides by double chain-link, barbed wire capped fences, which form part of the MMC security system.

The area is used as an access way to loading docks on the west end of Building A. Historically, there has been storage of out-of-service equipment and drums of various materials. A corrosive liquid spill occurred on March 31, 1988, which was remediated by excavation of soil (MMC, 1989) (10). Since 1986, MMC has frequently requested permission from NJDEP to pave Area A for environmental and commercial purposes.

Soil sampling has been conducted on three occasions, from 1987 to 1990. Detailed descriptions of the sample programs, and laboratory data have been reported to the NJDEP for each occasion (ARSSP (7), RAP (4), RAR (5)). The following summary is based on all the samples to date.

Silver, cadmium, copper, nickel, chromium, and petroleum hydrocarbons (PHC) have been detected in concentrations above ECRA guidelines. Figure 2-1 contains a summary of analytic results for all soil sampling events.

Forty samples from the ground surface and at a depth of 1.5 to 2.0 feet were analyzed for silver. Of these, 40 percent contained silver at concentrations less than the 5 ppm ECRA guideline, and more than 75 percent contained less than 50 ppm. The highest concentrations were observed along the eastern side, adjacent to Building A, and in the southwest corner. With few exceptions, the concentrations above guideline were restricted to the surface samples.

Cadmium was either not detected or was found below the 3 ppm ECRA guideline in 58 percent of the 40 samples analyzed. Like silver, cadmium was concentrated in the surface samples. Concentrations of cadmium were below 10 ppm in more than 80 percent of the samples, and were below 30 ppm in 95 percent. As shown in Figure 2-1, the distribution of cadmium was similar to that of silver. The highest concentrations were found in the southeast corner of Area A, in the vicinity of Sample A-10.

Copper was below the 170 ppm guideline in 85 percent of the 40 samples tested. Concentrations were below 300 ppm in 95 percent of the samples. The highest copper concentration (500 ppm) was in Sample A-10, in the southeast corner. The second highest (320 ppm) was in A-17, in the northwest corner.

ATTACHMENT BBB-9

Nickel and chromium were detected above the 100 ppm guideline only in sample A-10, in the first sample program. Those concentrations were 160 and 141 ppm, respectively. These metals were not detected at or near the guideline in any of the samples collected in the recent sample program, which included 8 samples at 2 depths in the vicinity of the original A-10.

Petroleum hydrocarbon (PHC) concentrations were below the 100 ppm guideline in 83 percent of 46 samples tested, and were below 200 ppm in 98 percent. The highest concentration observed was in Sample A-8, which was collected in the first sample program, conducted in 1987. The six samples from the recent sample program which contained the highest concentrations of PHC were also analyzed for base neutral organics (BN+15). Of these samples, none were found above the guideline of 10 ppm.

AREA B

Area B is asphalt-paved land south of Building A, and was formerly used as a driveway (Figure 2-1). Recently, as a result of modifications in the security zone, it has been blocked off to vehicle traffic, and is enclosed with barbed wire-capped, 8-foot-high, chain link fence.

Sampling was initially requested by the NJDEP as a result of the observation in historic aerial photographs of objects that resembled drums. Only PHC was detected above ECRA guidelines.

Extensive sampling in the vicinity of the initial sample B-3, has documented that soil beneath asphalt pavement contains PHC at concentrations less than 730 ppm. The soil rests on shale bedrock at a depth of approximately 3 feet. Clustered samples in a triangular pattern with 10-foot sides centered over the original sample show that the extent of the hydrocarbon is less than 5 cubic yards in volume, does not extend past the edge of the existing pavement, and does not contain base neutral organic compounds in concentrations above ECRA guidelines.

AREA C

Area C was originally defined as an unpaved field, south of Building A and west of Building B. Dimensions were approximately 150 feet by 220 feet (Figure 2-1).

Silver and PHC have been detected above ECRA guidelines. Silver is distributed throughout the area, and concentrations above ECRA guidelines are restricted to the surface soil. The maximum concentration observed was 58 ppm.

PHC was restricted to a zone immediately adjacent to an asphalt paved parking lot, in the vicinity of sample C-4. The maximum concentration observed was 250 ppm.

Prior to the approval of the SSP, the southern half of Area C was paved to provide parking. The sample program proposed in the SSP was performed "at-peril," with additional samples collected to provide vertical delineation of the silver contamination. As part of the grading for the pavement, all soil with silver concentrations above the ECRA guideline was stripped from the southern portion of the area.

In addition to the silver sampling, additional characterization of the petroleum hydrocarbon was performed around sample C-4. Soil below the excavation depth required for grading was found to contain petroleum hydrocarbon at a maximum concentration of 130 ppm. Furthermore, targeted base neutral organic levels were below the ECRA guideline of 10 ppm.

The sample results, which are discussed in greater detail in the RAR (5), document that clean closure was achieved in the southern half of Area C (the portion now paved). Therefore, Area C is now redefined as an unpaved field, approximately 100 feet by 150 feet, located south of Area B.

AREA D

Area D is an unpaved field, west of Area A. Dimensions are approximately 330 feet by 200 feet. It is bounded to the north by a swale, which has been identified as Area E. The southern portion is bounded by a paved parking lot (Figure 2-1).

The non-contact cooling water and storm runoff that was formerly routed through the stream bed of Area E has been relocated to transect Area D. This flow is through an open ditch and piping. A temporary earthen basin has been constructed in the north central part of Area D. The basin provides a mechanism for capturing a potential spill within the facility boundary. During normal operation, flow passes through the basin and is discharged at the northwest corner of Area D. Water quality is continuously monitored by electronic sensors, which will sound an alarm and automatically shut the flow gate if a problem is detected.

The temporary basin was constructed in a portion of Area D which was determined to be free of contaminants. A larger basin will be required to comply with the provisions of the New Jersey Stormwater Management Act (PL 1981, c.82) and its implementing regulations (N.J.A.C. 7:8-1.1 et.seq.). The permanent basin, which has not yet been designed, will incorporate the spill control features of the temporary basin.

Silver, cadmium, copper and petroleum hydrocarbon have been detected above ECRA guidelines in Area D. Extensive sampling has been performed in this field, from the surface, shallow borings, and test pits, which provided an analytical profile at 1-foot increments from ground surface to bedrock (RAP, Appendix B).

The contaminants in Area D were distributed in isolated pockets, surrounded by uncontaminated soil. For all of the contaminants, concentration decreased rapidly with depth. No contaminants above ECRA guideline were detected deeper than 2.5 feet in any location

The maximum silver concentration observed was near the southeast corner of Area D, at 150 ppm. Concentrations above the 5 ppm guideline were detected at most sample locations along the southern portion of the area, and along the northern border at generally lower concentrations.

Cadmium was found above the ECRA guideline at several locations along the southern boundary of Area D, and in one sample in the north central part of the field. In two locations, the concentration exceeded 10 ppm: samples D-6 (13 ppm) and D-PS-1 (14 ppm). In most other locations, cadmium was below the 3 ppm guideline, with a few exceptions up to 6 ppm.

Copper concentrations were below the ECRA guideline of 170 ppm at all locations except the south west corner. The maximum observed was 409 ppm.

PHC was found above the 100 ppm guideline in the northeast corner, and at several locations along the southern boundary, adjacent to an asphalt paved parking lot. The maximum concentration observed was in D-1 at 323 ppm. The PHC concentration was below the guideline concentration in all of the clustered samples collected in the ASP (3) program. It is apparent from the results in samples D-2-a and D-PS-2 that base neutral organic compounds are not present above ECRA guideline in Area D.

AREA E

In the initial stages of the ECRA process for MMC, Area E was defined as the bed of a stream which flowed westward along the northern property line. Dimensions of the area of concern were approximately 10 feet by more than 300 feet. Most flow in the stream was from storm water runoff and non-contact cooling water from an outfall near the northwest corner of the Building A security zone.

Two concerns were addressed during previous field investigations. The primary concern was a discharge of silver chloride which occurred on February 14, 1986. This discharge was reported in Item 13 of the SES (1). The secondary concern was the possibility of residue from volatile organic compounds (VOC) detected in previous monitoring as reported in Item 16 of the SES (1).

Two additional discharges of silver have occurred since the 1986 incident. On January 9, 1989, silver chloride passed through Area E, and continued offsite. After the emergency remediation was complete, an extensive sampling program was performed to document the full extent of the silver problem. The maximum extent of silver at concentrations above the NJDEP guideline was located approximately 480 feet downstream from the northwest corner of the MMC property, or approximately

780 feet from the original NJPDES outfall. As part of the emergency remediation, the course of the outfall was relocated to cross the northeast corner of Area D.

A third silver spill occurred on September 13, 1989. Additional stream sampling after the emergency response was complete confirmed that there was no impact beyond the previously determined endpoint. Area E is now defined to include the 780 feet from the original outfall to the end point of the silver contamination. A complete description of the January 9, 1989 and September 13, 1989 releases, emergency remediation, and post-remediation sampling is included in Appendix C of the Report of Analytic Results (RAR).

Silver concentrations in Area E are highest in the segment next to the original NJPDES outfall, at 9458 ppm. At the distal end, observed concentrations drop from over 200 ppm to less than 5 ppm within approximately 25 feet.

The only parameter other than silver detected above the guideline concentrations was copper, at 870 ppm. This was observed in a sample collected near the original NJPDES outfall, which was subjected to full priority pollutant plus 40 analysis.

AREA F

Area F is the site of a former underground tank, north of Building B. The tank was used and removed by the former owners of that site, prior to purchase by MMC in 1981. There was no documentation of the integrity of the tank.

PHC was detected in boring samples at concentrations up to 3710 ppm. As described in the RAR (5), contaminated soil was excavated, and post-excavation samples for petroleum hydrocarbon and base neutral organics confirm that clean closure was achieved.

AREA G

Area G was identified as an environmental concern by the NJDEP. A pre-ECRA groundwater investigation had identified volatile organic compounds in monitor wells on the site. The highest concentrations observed were in MW-105, located in the driveway north of Building A. In addition to having the highest concentrations of VOCs, this well was located within approximately five feet of the site boundary, on the up gradient side. The NJDEP requested soil samples to document that the VOCs did not originate from the MMC site.

The sample results presented in the ARSSP (7) detected no VOCs at a limit of 5 ppb. However, the QA/QC for these samples was not adequate for NJDEP Tier II standards.

As described in the RAR (5), the soil was resampled in the recently completed sample program. Analytic results, including NJDEP Tier II reporting standards, were submitted in the RAR (5). The results confirmed the original hypothesis of an offsite source of groundwater contamination.

SITE PERIMETER

Samples from the site perimeter were collected to document the limit of lateral migration of silver, cadmium, copper, and petroleum hydrocarbon found in surface soil samples from Areas A, C, and D. Six samples were collected during this sampling event, while the proposed northern perimeter sampling of Area D (PS-7 through PS-10) was deferred until after remediation of Area E. This deferment was approved in item 4f of the NJDEP March 8, 1990 conditional approval of the ASP (Appendix A, Item 1).

Petroleum hydrocarbons, cadmium, and copper were analyzed in four of the perimeter samples (PS-3 through PS-6). The only concentration that exceeded ECRA guidelines was cadmium in PS-3 at a concentration of 3.3 mg/kg.

Silver analysis was performed at all six perimeter sample locations. The silver concentrations in four of the samples exceeded the ECRA guideline with concentrations ranging from 5.7 to 52 ppm.

The northern perimeter sampling of Area D, PS-7 through PS-10, was deferred until after remediation of Area E. This deferment was approved in Item 4f. in the March 8, 1990 letter from the NJDEP (Appendix A, Item 1). The results of these samples will be reported in the Final Cleanup Report.

WASTE PILES

Excavated soil, originating separately from Area AWT and Area C, are stockpiled on-site. Samples were collected of the stockpiled soils during implementation of the Amended Sample Plan. In addition, disposal analysis has been performed on the soil originating from Area AWT.

A third stockpile, originating from construction of the temporary detention basin in Area D, was excavated from a portion of Area D that had no contaminants above ECRA guidelines. A portion of this pile was used as replacement soil for the excavation conducted in Area F. The remainder of this stockpile was removed from the site in May 1990.

ATTACHMENT BBB-14

Section 3
PROPOSED REMEDIAL OPERATIONS

OBJECTIVE AND APPROACH

The optimum remedial strategy is one that will provide a level of remediation appropriate to the level of contamination, at a reasonable expense, and with minimum disruption to the operations of the facility.

There are no appropriate standards available for maximum allowable concentrations of the contaminants found in the soil at the MMC site. However, the NJDEP Division of Hazardous Site Mitigation has issued "Interim NJDEP Soil Action Levels."

The extensive sample programs conducted at the MMC site have been summarized in Section 2, and presented in detail in separate submissions. Silver, cadmium, copper, nickel, chromium and petroleum hydrocarbons have been detected in one or more samples at concentrations above the NJDEP guidelines. In lieu of standards, the NJDEP action levels can either be adopted as cleanup levels, or alternate mutually acceptable levels can be adopted. Since MMC will remain an industrial facility, site specific cleanup levels higher than NJDEP action levels are proposed below.

Once cleanup levels have been established, there is a limited choice of techniques for achieving them. MMC has already determined that extraction of metals at the low concentrations present is not feasible in a cost-effective manner (RAP) (4).

In keeping with sound environmental principles, offsite disposal should be considered only as a last resort, as it only moves a problem from one location to another, at great expense and potential increase of public exposure during transportation.

MMC and CH2M HILL have previously proposed encapsulation as an appropriate method of remediation of silver (RAP) (4). The NJDEP indicated in the letter of conditional approval of the ASP (3) (March 8, 1990) that this would be an acceptable method, provided the chloride concentrations were sufficiently high to assure that silver remained in the insoluble silver chloride form. A discussion on the proposed sampling program and analytic methodology for determination of chloride concentration is included in Appendix B.

Encapsulation will be included in this plan, although it will be supplemented where appropriate with excavation. To the greatest extent possible, excavated soil will be encapsulated on the site.

Three mechanisms for encapsulation will be used in the proposed remediation, which will provide levels of security appropriate to the materials and concentrations found at the different portions of the site.

ATTACHMENT BBB-15

The highest security will be a newly proposed monolithic concrete vault, which will be constructed within Area A. Footings will be constructed on the bedrock surface, and poured concrete walls will be constructed to a height of approximately 5 feet above existing grade. Dimensions of this structure will be approximately 60 feet by 90 feet. Once the base structure is constructed, it will have sufficient volume for approximately 600 cubic yards of soil.

All soil to be excavated from onsite and offsite portions of Area E will be mixed with sodium chloride, to maintain silver in chloride form, and placed in the vault. Based on current estimates of the volume of contaminated soil in Area E, the vault will have remaining capacity, which will be allocated to remaining excavated and stockpiled soil from the plant.

Area F has already been remediated to below ECRA guidelines. The excavated material is currently being stored onsite in drums. This soil will be placed in the Area A vault.

Approximately one-half of Area C has been cleared of soil above ECRA guidelines, prior to pavement. The remaining half of Area C will be remediated to the proposed cleanup levels and will be capped with asphalt following sodium chloride treatment.

Selected portions of Areas A and D will be excavated, to achieve the proposed cleanup levels discussed in the next section. The excavated soil will be placed in the Area A vault if space permits, or will be disposed of offsite as a last resort, along with previously excavated soil. Area A and part of Area D will be treated with sodium chloride and then capped with asphalt. The remainder will be treated with sodium chloride and covered with a vegetative cap.

Details of the proposed cleanup and remediation are discussed in Section 4.

PROPOSED CLEANUP LEVELS

The primary considerations in the selection of cleanup levels proposed below are prevention of contact and control of migration. Direct contact with contaminated soil by the general public within the security zone (Area A) is already exceedingly unlikely, but at the present time, contaminated soil could migrate from the site by wind action, or from storm runoff. Area D is currently outside the security zone, but will be included within new security fencing as part of the remedial action. However, wind or water could continue to cause migration unless controlled.

A final factor is the ratio of cost to benefit applied to available remedial options. In this context, cost is not restricted to financial considerations, but includes potential dangers to the public from truck transportation, and impairment of operations at the facility. As discussed in the RAP (4), reclamation of metals in the low concentrations observed is not feasible. Therefore, the only mechanism for removal of contaminants to ECRA guideline would require removal of the soil matrix. Excavation of all soil

that contains one or more contaminants at concentrations above guidelines is not a viable alternative for the following reasons:

- It would disrupt operations at the facility
- Transportation of hundreds or thousands of cubic yards of soil would be potentially more dangerous to the public and damaging to the environment simply from the number of trucks that would be required, and the distance to be travelled
- Waste disposal analyses performed to date on areas of high concentration (e.g., Area A) have shown the material to be non hazardous
- Offsite disposal only moves a problem; it does not solve it.

Migration to groundwater is possible, although it is considered unlikely, since the materials of concern have very low solubility. Furthermore, existing groundwater data [Interim Report (8), and Groundwater Sample Results (GSR) (9)] document that groundwater has not been affected despite the concentrations of silver and other materials in close proximity to monitor wells.

As discussed in the beginning of Section 3, three mechanisms for encapsulation will be used in the proposed remediation, which will provide levels of security appropriate to the materials and concentrations found at the different portions of the site. The soil with concentrations above the proposed cleanup levels will be excavated, treated with sodium chloride, and placed within the newly proposed monolithic concrete vault. The soil with concentrations below the proposed cleanup levels but above the ECRA guidelines will be treated with sodium chloride and then covered with either asphalt or a vegetative cap.

SILVER

The ECRA guideline of 5 ppm will be used for the offsite portion of Area E. This area is entirely outside the control of MMC, and therefore deserves the most strict cleanup level. This level will also be used for the perimeter sample locations, due to their proximity to the site boundaries.

A limit of 100 ppm is proposed for areas to be capped following treatment with sodium chloride. The increased limit is justified in these locations by the control that will be provided by security fencing, which will inhibit unauthorized access, and by the application of sodium chloride prior to grading and application of a cap.

All soil above the proposed cleanup limit of 100 ppm is proposed to be placed in the monolithic concrete vault. This vault will form the foundation for a new building. In

addition to being within the high security zone, the construction of the vault will prevent contact with water, and the soil will be treated with sodium chloride prior to placement.

CADMIUM

The ECRA guideline of 3 ppm will be used for the perimeter sample locations, due to their proximity to the site boundaries. Only one perimeter sample, PS-3, slightly exceeded the ECRA guideline. The concentration of this sample was 3.3 mg/kg.

A cleanup level of 30 ppm is proposed for the remainder of the site. A cap will be maintained over areas with cadmium levels below 30 ppm but in excess of the ECRA guideline. The proposed method of capping for particular areas of the site is discussed in Section 4 of this report. This increased limit is considered justified by the fact that casual contact will be prevented due to restricted access and by the application of a cap.

The only location which exceeds the proposed cleanup level of 30 ppm is in the vicinity of A-10. This soil will be contained within the proposed vault.

COPPER

The proposed cleanup level for copper is 500 ppm. This level was exceeded in the priority pollutant sample from Area E, in the portion of stream sediment that will be placed within the concrete vault. It was also observed at the location of A-10, which will be enclosed within the newly proposed concrete vault.

NICKEL AND CHROMIUM

The NJDEP guideline of 100 ppm will be used for remediation of nickel and chromium. Only sample location A-10 exceeded these guidelines, and the location is within the boundaries of the proposed vault.

PETROLEUM HYDROCARBON

A conditional cleanup level of 1500 ppm is proposed for petroleum hydrocarbon. The condition for this level is that base neutral organics not be present above the ECRA guideline of 10 ppm.

ATTACHMENT BBB-18

Section 4
DETAILED WORK PLAN

This section of the Cleanup Plan contains a work plan for the operations described in Section 3.

As discussed in the Report of Analytic Results (5), remediation in Areas B, F, and G has been completed. No further action is proposed in these three areas.

Remediation in Areas A, C, and D will include localized excavation followed by encapsulation. Encapsulation was selected based on the low mobility of the silver, cadmium, copper, and PHC in these areas. Area E, including the off-site portion of the stream, will be excavated to remove silver in excess of the ECRA guideline from the sediment. The sample locations on the site perimeter with silver concentrations in excess of the ECRA guidelines will be excavated.

Confirmatory post-excavation samples to be collected at the completion of excavation are specified below and are summarized in Table 4-1. Sample collection and analysis methods are described in the QA/QC Program in Section 6. Analytic results will be submitted to the NJDEP in the Final Cleanup Report.

AREA A

Area A, excluding the baseline area for the vault, will be encapsulated with asphalt pavement. The area is actively used for transportation and temporary storage of materials and equipment. Paving this area will reduce the potential for migration and direct contact with a material, and facilitate business operations. Localized areas will be excavated at certain sample locations to address contaminants in excess of proposed cleanup levels. Confirmatory post-excavation sampling will be conducted as described below.

The concrete vault will be constructed in Area A, where shown on Figure 4-1. The location will encompass sample locations A-8 and A-10 through A-10-d. The soil in the vicinity of these samples will be contained within the vault.

Soil in the vicinity of sample A-13 exceeded the proposed silver cleanup level of 100 ppm. This soil will be excavated to a depth of 1.5 feet and placed within the vault. One confirmatory post-excavation sample will be collected from the base of the excavation and analyzed for silver.

All other contaminant concentrations within Area A are either below the proposed cleanup levels for the area or will be contained within the concrete vault. When post-excavation sample results are below the proposed cleanup levels, sodium chloride will

ATTACHMENT BBB-19

Table 4-1
Summary of Proposed Post-Excavation Samples

Sample Location	Sample Designation	Anticipated Depth (feet)	Analytic Parameters
A-13	A13-p	1.5	Ag
D-6	D6-p	1.0	Ag
DPS-1	DPS1-p	2.0	Ag, Cd
PS-1	PS1-p	0.5	Ag
PS-2	PS1-p	0.5	Ag
PS-3	PS3-p	0.5	Ag, Cd
PS-4	PS4-p	0.5	Ag
Area E	EX-1	0.5	Ag, PHC, VOC
Area E	EX-2	0.5	Ag, PHC, VOC
Area E	EX-3	0.5	Ag, PHC, VOC

ATTACHMENT BBB-20

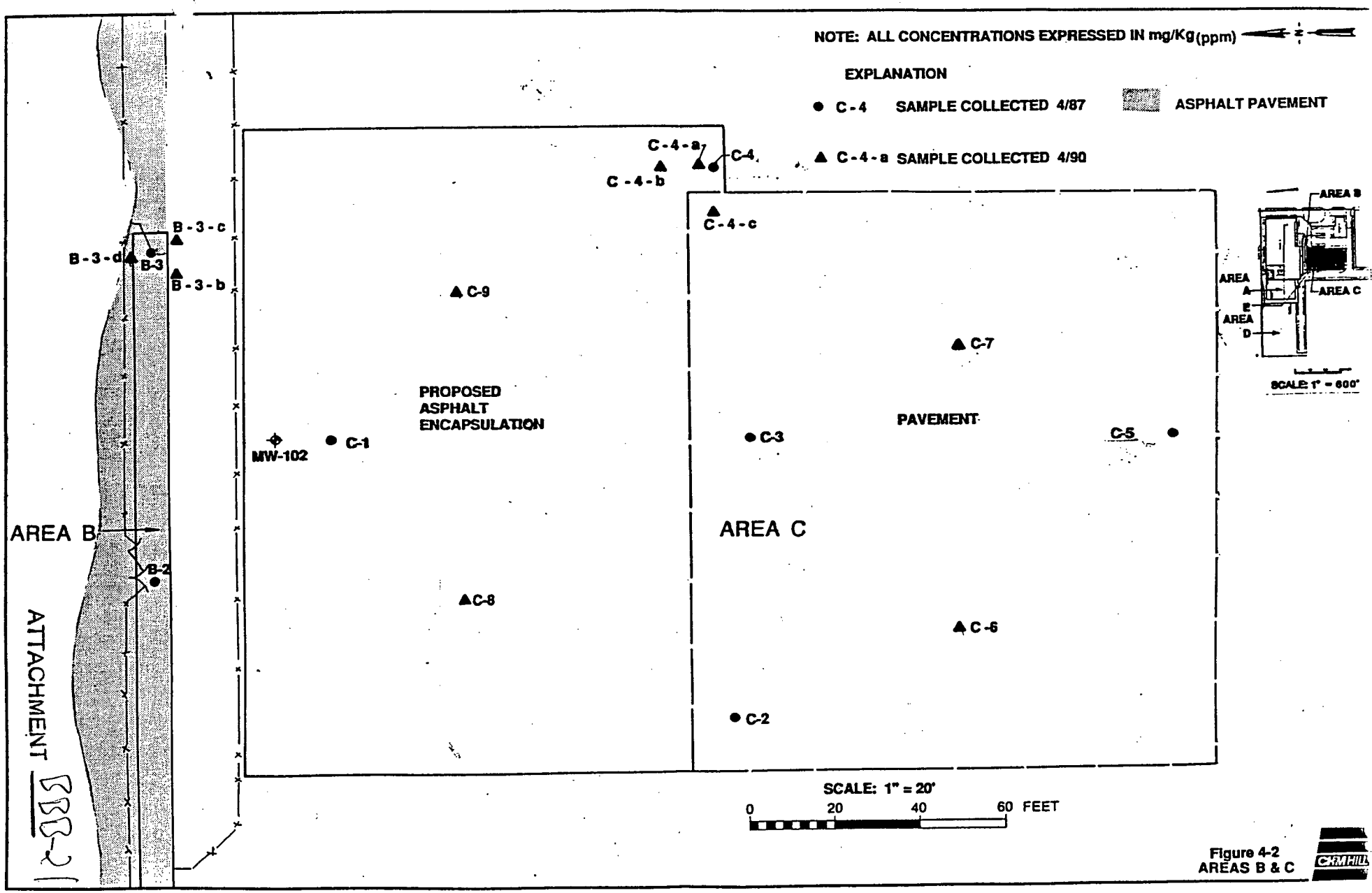


Figure 4-2
AREAS B & C

ATTACHMENT BBB-2

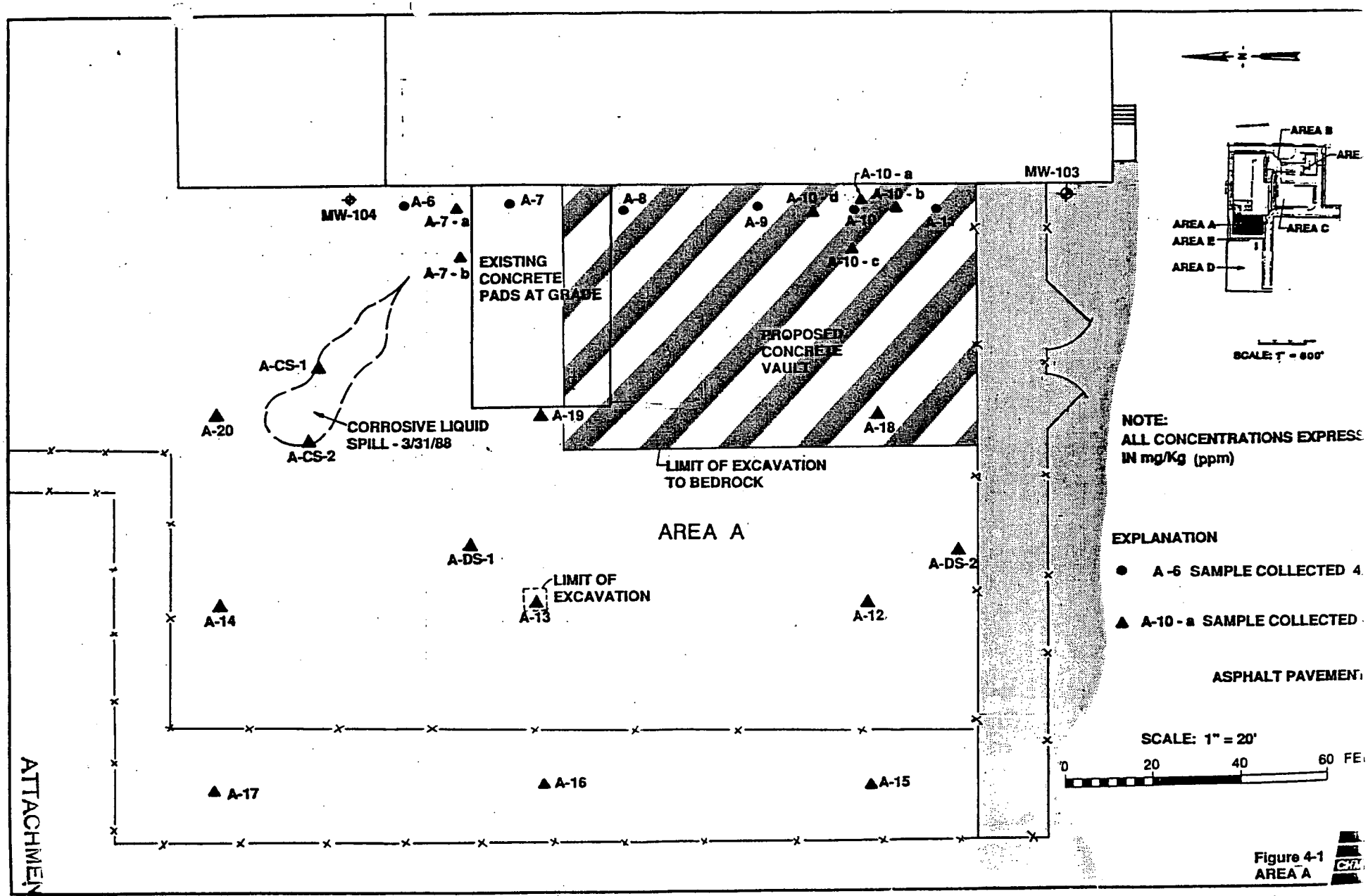


Figure 4-1
AREA A

ATTACHMENT B-22

Bedrock, composed of weathered red shale, is exposed locally in the stream west of the railroad track. This shallow depth of sediment will limit the excavation methods available. Additional limitation will be imposed by woods along the banks, and by the steep banks, which drop sharply approximately 6 feet to the stream.

The depth of concern was not determined in the recent sample program. However, as described in the Remedial Action Plan (4), the depth of contamination above the 5 mg/kg level in Area E was less than 0.5 foot. It is assumed that the maximum depth of concern will decrease with distance from the source area. Confirmatory samples will be collected as discussed below.

Conditions along the onsite and offsite sections of the stream differ in significant aspects, which will affect the manner in which cleanup can be executed. Therefore, it is anticipated that several methods of operation will likely be required. Furthermore, unanticipated conditions may necessitate modification of the proposed techniques.

Careful preparation will be essential to prevent down-stream migration of silver-bearing sediment during excavation. Control of flow in the stream will be essential in preventing migration. During dry conditions, minor contributions to flow enter from upstream of the MMC site, while approximately 90 percent of the base flow is cooling water discharged from MMC. In order to allow plant operations to continue with as little interruption as possible, cooling water will be diverted past the segment of stream that requires cleanup.

Diversion of high-volume run off during wet weather may not be practical. Therefore, a flexible schedule will be necessary to make maximum advantage of favorable weather.

Additional protection against downstream migration during operations will be gained by constructing of a sediment filter at the downstream end of excavation. Also, operations will begin at the downstream end, where concentrations are lowest, and work toward areas of higher concentration.

Excavation techniques will be adopted to suit the variable conditions. A vacuum truck, portable vacuum pump, or manual excavation are the likely choices for segment C. A back hoe may be possible to use in all or most of segments B and A. Other techniques may be used as well, such as hydraulic washing of sediment to a vacuum system.

Excavated material will be stockpiled on the MMC site to await final disposal. Wet material will be placed on plastic sheeting in a hay bale-surrounded enclosure. Prior to use, this area will be graded, so that runoff can be controlled. Water from the dredged sediment, and any precipitation that falls on it, will be directed through a sediment filter, and then directed back to the stream.

ATTACHMENT BBB-23

Large objects, such as the cobble-size rock used as rip-rap near the outfall, will be washed of finer sediment, and segregated from other material. After silt is washed from these rocks, there will be no further consideration of them in this cleanup plan.

It is anticipated that all sediment containing silver at concentrations above the cleanup level is restricted to the upper surface of the stream bed. A minimum thickness will be collected during the excavation operation. Depending on the nature of the sediment in any particular location, and the method of excavation used, a depth from approximately 0.1 to 0.3 foot will be collected from the stream bed. Sediment samples will be collected from below the excavation depth at increments of approximately 50 feet along the stream bed. Analysis for silver will be performed in the MMC laboratory. This will allow rapid turnaround of sample analysis, so that "real-time" adjustments to the program will be feasible.

The anticipated depth of excavation will be approximately 0.5 foot. At the conclusion of the program, confirmatory samples will be collected for analysis in an NJDEP-certified laboratory. Six samples will be collected at intervals of 150 feet, measured from the NJPDES outfall.

Soil samples from the onsite former NJPDES-permitted stream bed will be collected for silver analysis following remedial excavation. The samples will be designated EX-1, EX-2, and EX-3, located as shown on Figure 4-4, and collected from the upper 0.5 foot of sediment following excavation. All samples will be taken from the center line of the stream. Sample EX-1 will be collected at the NJPDES outfall. Samples EX-2 and EX-3 will be collected 150 and 300 feet, respectively, downstream from the outfall. The results of these three samples will be reported in the Final Cleanup Report.

Silver is the only parameter of concern. However, as requested by NJDEP, analysis of samples from locations EX-1, EX-2, and EX-3 will include PHC and VOC (Appendix A, Item 4). Sample collection techniques will be as described in Section 6.

A sample for disposal classification was collected on June 16, 1989. One sample was prepared as a composite from 5 grab samples, which were collected at evenly spaced intervals between the outfall and end of the area of concern. The sample was analyzed for RCRA disposal parameters. The results show the waste to be non-hazardous.

Approximately 100 cubic yards of total sediment are anticipated to be recovered during the cleanup operation. The excavated sediment will be transported to the eastern portion of Area D and spread in thin lifts (1 foot or less) to assist drying.

All soil to be excavated from onsite and offsite portions of Area E will be mixed with sodium chloride, to maintain silver in chloride form, and placed in the concrete vault. In addition to being within the high security zone, the construction of the vault will prevent contact with water.

ATTACHMENT BBB-24

Upon receipt of post-excavation sample results, the onsite area will be treated with sodium chloride, filled to grade, and covered with a vegetative cap. A Fresh Water Wetlands Permit and a Stream Cleaning permit from the Division of Coastal Resources are pending. Approval for both permits is anticipated; however, no action can be conducted in Area E until the permits are issued.

The NJPDES-permitted outfall had been relocated to a diversion through a temporary ditch which was excavated adjacent to the Area E stream bed. A third water course, partially culverted through a below-surface pipeline, has been installed south of the temporary ditch. The water currently flows through this third water course into a retention basin located on the western portion of Area D.

Prior to encapsulation of Area D as discussed above, the below-surface pipeline will be completed directly to the retention basin. The retention system has recently been upgraded to include continuous monitoring of the discharge for water quality, and will shut down automatically or manually with an alarm, if required.

AREA F

As discussed in the RAR (5), clean closure has been completed for this former underground tank location. No further action is required for Area F.

AREA G

Analysis for VOCs was conducted twice in Area G during the course of this ECRA investigation. No VOCs were detected during either sampling program. The Tier II laboratory deliverables for the second sampling program are included in the RAR (5). No further action is required for Area G.

SITE PERIMETER

Four perimeter samples contained silver in excess of the ECRA guideline of 5 ppm. In addition, one of these samples also contained cadmium at 3.3 ppm. As proposed, the ECRA guidelines of 5 ppm and 3 ppm for silver and cadmium, respectively, will be used for the perimeter sample locations.

Soils will be excavated to a depth of 0.5 foot at sample locations PS-1, PS-2, PS-3, and PS-5. One confirmatory post-excavation sample will be collected from the base of each of the four locations. The samples collected from PS-1, PS-2, and PS-5 will be analyzed for silver only. The sample collected at PS-3 will be analyzed for silver and cadmium (Figure 4-5).

ATTACHMENT BBB-25

Future upgrading of the facility may include asphalt encapsulation on a 60-foot wide section in the southern portion of Area D. Paving of this section, shown on Figure 4-3, will depend on facility requirements.

AREA E AND OFFSITE STREAM

The environmental investigation of both the onsite and offsite portions of Area E is discussed in a report entitled Streambed Sample Report (SSR). This report has been submitted in Appendix C of the RAR (5). As discussed in SSR, the maximum extent of contamination in the offsite portion of the streambed is less than 485 feet from the northwest property corner.

Under appropriate permitting authority, the stream flow will be diverted while the sediment containing silver chloride is excavated. The cleanup level will be the ECRA guideline of 5 ppm silver in the offsite area, and 100 ppm silver in the onsite portion. The onsite level is justified since flowing water has been diverted, and the area will be filled to grade and covered with a vegetative cap following remediation.

The area in which cleanup is required can be conveniently divided into three parts (Figure 4-4), based on location and characteristics.

The onsite segment (Zone A), extends approximately 300 feet from the NJPDES outfall to the extreme northwest corner of the MMC property. The average width of the stream in this segment is approximately 10 feet. Approximately 50 feet of the stream bed at the outfall is lined with rip-rap.

This part of the stream was included in the initial ECRA sample program and the Remedial Action Plan (4), in both of which it was identified as "Area E." No samples were collected from this area in the September 22, 1989 sample program, since it was already known to contain sediment with a concentration of silver above the NJDEP guideline, and since it received the greatest impact from the recent spill. The segment is generally accessible to excavation equipment.

Zone B extends from the end of the MMC property, approximately 200 feet to the culvert south of Wade Avenue. The width is approximately 10 feet. One sample was collected from the distal end of the segment. The segment is accessible to excavation equipment.

Zone C extends approximately 280 feet, from the railroad culvert to the end of the impact area. Eighteen samples were collected downstream from Zone C, all of which had silver concentrations less than the NJDEP guideline.

Working conditions for remediation in Zone C will be difficult for two major reasons:

- Sediment thickness
- Limited access

be added to the area as needed, and the entire area, excluding the baseline for the concrete vault, will be encapsulated with asphalt pavement. Appendix B discusses the proposed sample program and analytic methodology for determination of chloride concentration to be used to calculate the additional chloride requirement.

AREA B

As discussed in the Report of Analytic Results (RAR) (5), no further action is proposed for Area B.

AREA C

Approximately one-half of Area C has already been cleared of soil above ECRA guidelines, prior to pavement. A complete discussion of the remediation of this half of Area C is included in the RAR (5).

Silver and PHC concentrations detected in the remaining half of Area C are below the proposed cleanup levels. This portion of the area will be treated with sodium chloride and capped with asphalt (Figure 4-2). Appendix B discusses the proposed sample program and analytic methodology for determining the chloride concentration to be used to calculate the additional chloride requirement.

AREA D

Area D will be encapsulated with a vegetative cap following sodium chloride treatment (Appendix B). Selected locations of Area D will be excavated to achieve the proposed cleanup levels. Using the proposed cleanup levels discussed in Section 3 of this report, two sample locations (D-6 and DPS-1) will require additional excavation (Figure 4-3).

In the vicinity of sample D-6, silver was detected at a concentration above the proposed cleanup levels. Soil will be excavated to a depth of 1.0 foot at this area. One confirmatory sample will be collected from the base of the excavation and analyzed for silver only.

At sample location DPS-1, soil will be excavated to a depth of 2.0 feet. One confirmatory sample will be collected from the base of the excavation and analyzed for silver and cadmium.

All other concentrations of contaminants within Area D are below the proposed cleanup levels. Upon receipt of post-excavation sample results below the proposed cleanup levels, sodium chloride will be added to the entire area as needed, and the area will be encapsulated with a vegetative cap.

ATTACHMENT BBB-27

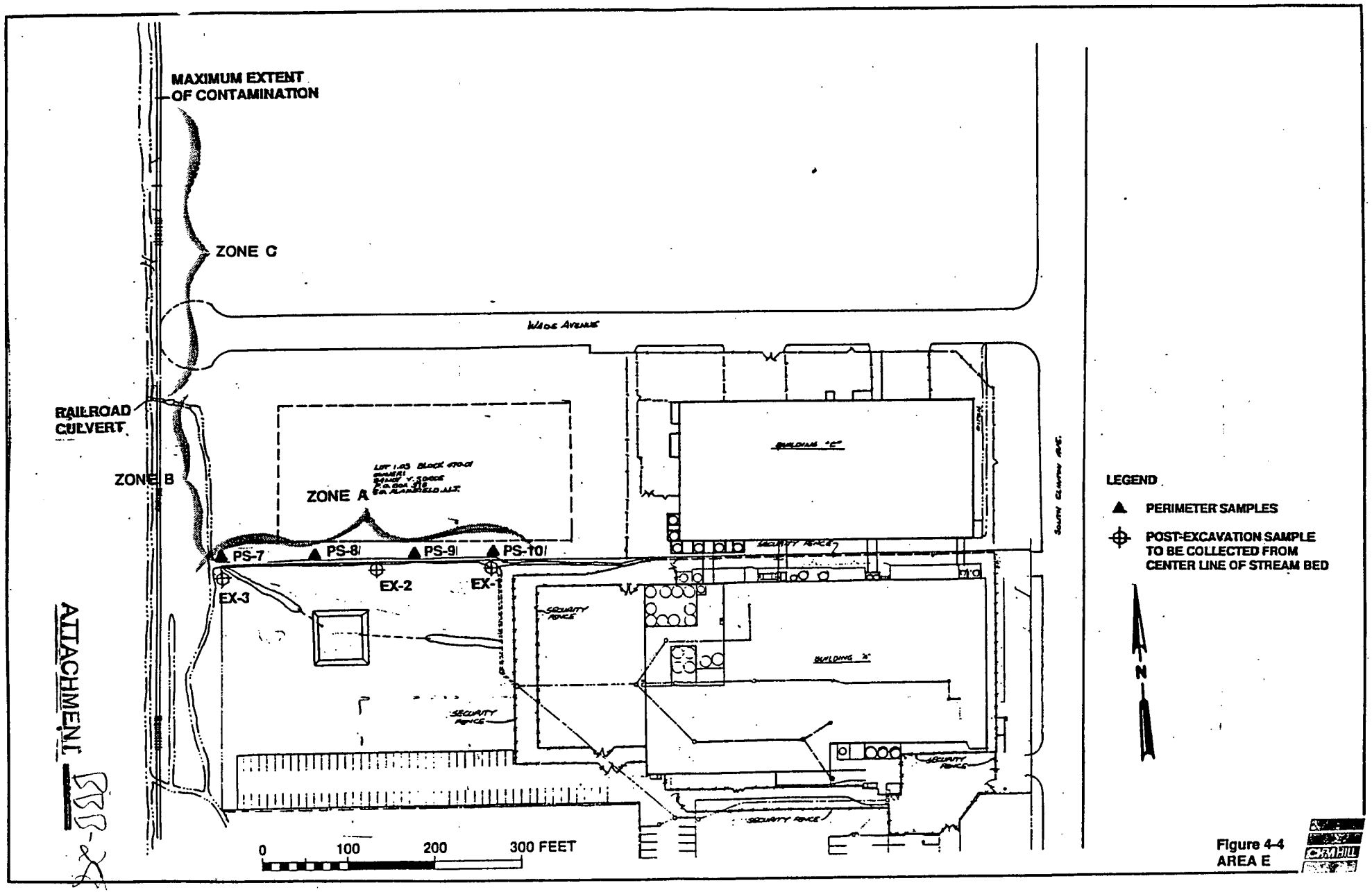
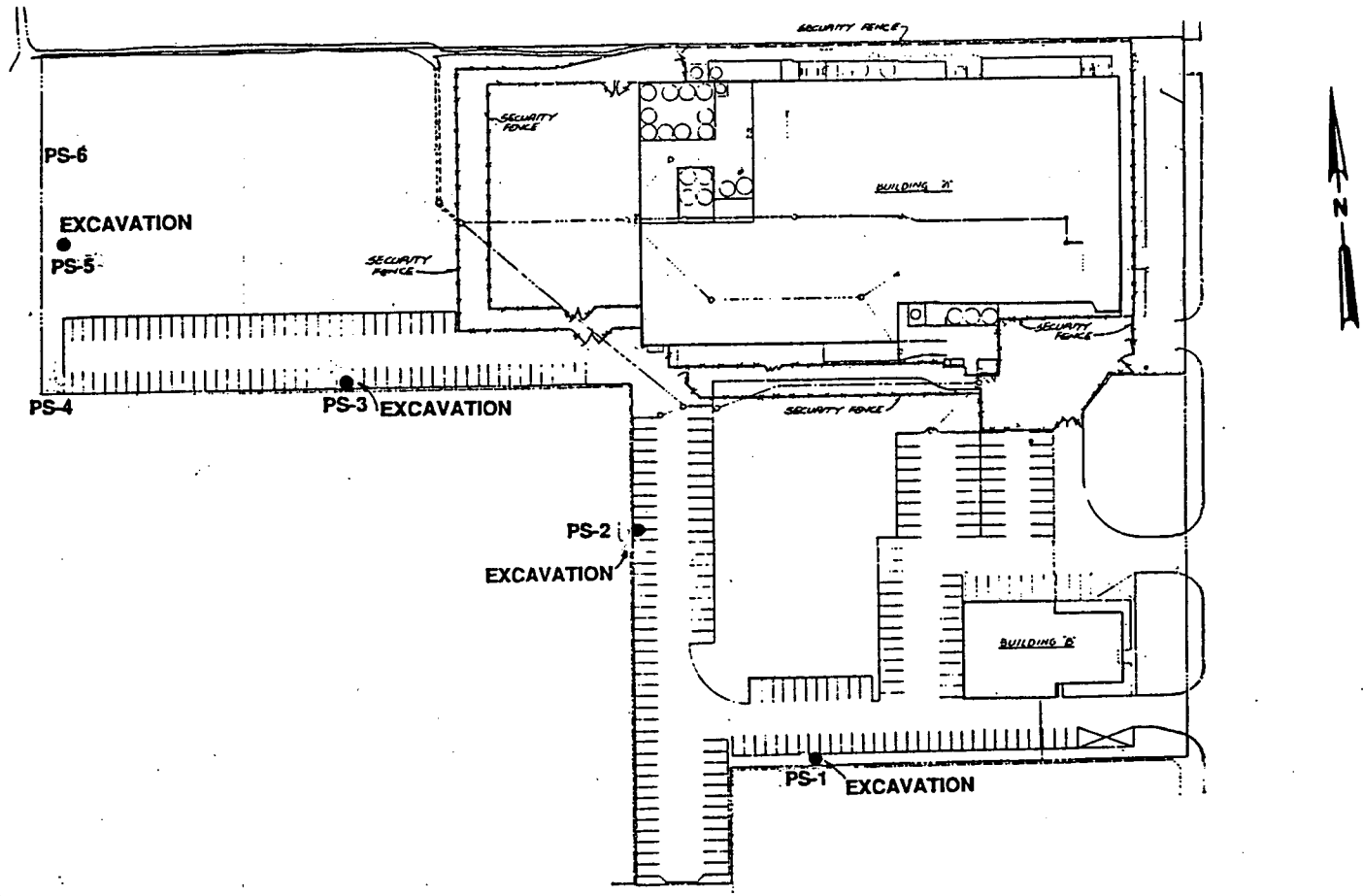


Figure 4-4
AREA E

ATTACHMENT



0 100 200 300 FEET

Figure 4-5
PERIMETER SAMPLES

CH2M HILL

ATTACHMENT BBB29

WASTE PILES

As discussed in Section 3 of this report, all soil to be excavated from Area E will be mixed with sodium chloride and placed in the monolithic concrete vault constructed in Area A. The material already excavated from Area F will be placed in the Area A vault.

The soil excavated from Areas A, C, and D, including previously excavated soils, will be placed in the Area A vault if space permits, or will be disposed of offsite as a last resort.

ATTACHMENT BBB-30

Section 5
POST REMEDIATION MONITORING

MONITORING PROGRAM

Soil with contaminants in excess of the proposed cleanup levels will be excavated and placed in the newly proposed monolithic concrete vault located in Area A. Footings will be constructed on the bedrock surface, and poured concrete walls will be constructed to a height of approximately 5 feet above existing grade. The concrete cap for the vault will serve as the floor for a new building.

Post-remediation monitoring will be conducted to document that the contaminants are contained within the vault. Groundwater samples will be collected from the two production wells and monitor wells MW-103 and MW-104 (Figure 5-1). Analysis of the four groundwater samples will be performed quarterly for silver and cadmium. Sample collection and analytic methods will be conducted in accordance with the sample collection and analysis methods described in the QA/QC Program in Section 6. Analytic results will be submitted to the NJDEP upon receipt from the laboratory.

The proposed post-remediation monitoring program will provide confirmatory data on groundwater quality in the immediate vicinity of the proposed vault. The wells are located north, south, southeast and southwest of the proposed vault. They provide a perimeter network to check for any potential contaminant migration from the vault.

Groundwater flow direction has been established during previous sample events where water level measurements were recorded. Flow direction is from north to south and is influenced by drawdown pumping in production wells (PW-1 and PW-2). It has been demonstrated in the Groundwater Sample Report (GSR) (9) that the cone of depression surrounding PW-1 affects the entire Metz site. Therefore, if any contaminants were to migrate from the vault, they would be detected in downgradient wells MW-103, PW-1, and PW-2. Monitor well MW-104 is upgradient from the vault but is included as a precautionary measure to ensure that all sides of the vault are monitored for a potential discharge to groundwater.

In addition to being treated with chloride to preserve the contaminants in a chemical form with very low solubility, the soil contained within the vault will be protected from moisture. No impact on groundwater quality has been observed under existing conditions, and the potential for impact will decrease once the vault is sealed. Due to the influence on gradient that has been observed from the plant production wells, the locations of MW-103 and PW-2 are ideal for virtually immediate response to any potential impact from the vault. Therefore, we propose that the monitoring program presented here continue for a 2-year period following closure of the vault.

ATTACHMENT BBB-31

CONTINGENCIES

The proposed remediation for the MMC site includes encapsulation of soil with concentrations of contaminants above the ECRA guidelines. Three mechanisms for encapsulation will be used, which will provide levels of security appropriate to the materials and concentrations found at the different portions of the site. The soil with concentrations above the proposed cleanup levels will be excavated and placed in the newly proposed monolithic concrete vault. Soil with concentrations below the cleanup level but above the ECRA guidelines will be treated with sodium chloride and then covered with either asphalt or a vegetative cap. Routine visual inspections will be performed on the condition of the asphalt and vegetative caps. Routine maintenance and repair work will be conducted as needed to maintain the integrity of the caps.

The proposed concrete vault will provide the foundation for a new building. Routine visual inspections of the structural integrity of the foundation will be conducted. In the event of structural damage, the repair work plan will include provisions to contain the soil located within the vault. In the event of structural failure, the soil will be temporarily stockpiled on and under plastic linings while repair work is conducted.

Quarterly monitoring is proposed to assess groundwater quality. Should contamination be detected above background levels for two consecutive quarters, a plan will be submitted for additional investigation and evaluation.

ATTACHMENT BBB-32

ATTACHMENT CCC

Engineers
Planners
Economists
Scientists

APR 1 2 29 PM '91
BUREAU OF
INDUSTRIAL SITE
EVALUATION

March 27, 1991

NJO26404.A0

Mr. Michael McCann, Case Manager
Bureau of Environmental Evaluation and
Cleanup Responsibility Assessment
NJDEP/Division of Waste Management
401 East State Street
CN028
Trenton, New Jersey, 08625

Dear Mr. McCann:

Subject: Cleanup Plan Revision for Metz Metallurgical Corporation
ECRA Case Number 86108

On behalf of Metz Metallurgical Corporation (Metz), CH2M HILL submitted a Report of Analytic Results (RAR) and a Cleanup Plan (CP) to the NJDEP on July 31, 1990. The RAR presented a summary of environmental investigative activities at the site, and specifically documented areas of the facility in which one or more hazardous materials were identified in concentrations above the NJDEP action levels. The CP proposed remedial operations, based on a combination of excavation and encapsulation for those areas.

On February 14, 1991, a meeting was held in the office of the NJDEP, in Trenton, New Jersey. In attendance were representatives of BEECRA, BEERA, BGWDC, Metz and CH2M HILL. During the meeting, the NJDEP presented to Metz and CH2M HILL new cleanup concentrations for soils. Subsequently, on March 7, 1991, the NJDEP transmitted a Draft Conditional Cleanup Plan Approval (DCCPA), in which the major points discussed at the meeting were reiterated.

Based on the cleanup levels and the other items discussed in the February 14, 1991 meeting with the NJDEP and the DCCPA, CH2M HILL is submitting this revision to the Cleanup Plan on behalf of Metz.

ATTACHMENT CCC-1

CLEANUP LEVELS

The NJDEP provided Metz with separate onsite and offsite cleanup levels for silver and cadmium:

Contaminant	Onsite (ppm)	Offsite (ppm)
Cadmium (Cd)	110	3
Silver (Ag)	200	5

Cleanup levels for nickel and chromium were both presented in the DCCPA at 100 ppm. A cleanup level for Petroleum Hydrocarbon (PHC) was presented as 15,000 ppm, if it is free of Volatile Organics and carcinogenic polycyclic aromatic hydrocarbons (Ca(PAH)) in excess of 1 ppm and 10 ppm, respectively. Also, a cleanup level for Base Neutral Compounds (BN) was presented for petroleum based contamination. If Ca(PAH) is greater than 10 ppm, the soil cleanup level is 10 ppm. If Ca(PAH) is less than 10 ppm, the BN cleanup level is 100 ppm.

No revised cleanup level was provided for copper. The Technical Coordinator for this case has advised Metz and CH2M HILL in telephone conversations that the NJDEP has not yet established a new action level for copper, but when it does so, the new level is likely to be significantly higher than 170 ppm.

In this revision to the CP, we propose a cleanup level of 1000 ppm for copper, onsite and offsite. We consider this number appropriate, due to the low toxicity of copper. In addition, copper background concentrations in central New Jersey may be expected at this magnitude, since copper ore deposits are well known in the Triassic formations of New Jersey (Kümmel, 1940)[1].

AREAS IN NEED OF REMEDIATION

Based on the results of previously submitted sampling and analysis programs and the newly revised cleanup levels, remedial activity will be required in some portions of the site. The general remedial approach will be excavation and offsite disposal for soil with

[1] Kümmel, H.B. 1940, Revision of Lewis, J. V. and Kümmel, H.B., 1914, The Geology of New Jersey: N.J. Dept. Conserv. and Devel. Bull. 50, Geologic Series.

ATTACHMENT CCC-2

concentrations above onsite cleanup levels. Post excavation samples will be collected for confirmation of the completeness of the remedial excavation. Sampling and analysis will be by conducted in accordance with procedures discussed in the CP.

Area A - Based on delineation sampling presented in the RAR, metals exist above cleanup levels at two locations in Area A. Silver, cadmium, chromium and nickel were detected above cleanup levels in the vicinity of Sample A-10. Also, silver was detected above cleanup level in Samples A-7 and A-8. Part of the latter area is inaccessible due to the presence of a concrete pad constructed at grade for a trash compactor. Accessible soil will be excavated and stockpiled for offsite disposal, and confirmation samples will be collected.

In the DCCPA, the NJDEP requested that two soil samples be collected for BN analysis at the locations of the highest PHC concentrations. Analysis for BN has already been conducted at six locations within Area A, as reported in Section 2 of the RAR. Two of these were collected at the locations of highest PHC concentration detected during the April 1990 delineation sampling (Samples A-10-a and A-10-b). Two were collected at former drum storage areas (A-DS-1 and A-DS-2), and two were collected from the vicinity of a corrosive liquid spill (A-CS-1 and A-CS-2). The results of these samples were either non detect, or were below NJDEP action levels. We believe that these samples are adequate to characterize the PHCs present in Area A as not of concern.

Area AWT Stockpile - Characterization samples collected from the AWT stockpile and presented in the RAR showed that CaPAH compounds exist at levels of concern in part of the pile. Sample AWT-SP-6 contained CaPAH above the cleanup level.

The section of the pile from which Sample AWT-SP-6 was collected will be excavated and stockpiled separately for offsite disposal. Post excavation samples will be collected from the side walls of the pile, and from the soil below the removed portion. Three samples will be collected from each side wall and the bottom for PHC analysis. A split of the sample with the highest PHC value from each cluster will be analyzed for BN.

Area E - The initial phase of the remediation of Area E was initiated in November and December 1990. Approximately 400 yd^3 of sediment was excavated from the onsite and offsite portions of the channel. This material was stockpiled on the Metz site to await disposal classification. Post excavation samples collected approximately every 30 linear

ATTACHMENT CCC-3

feet were analyzed in the Metz laboratory. These samples demonstrated that silver concentrations remain above the onsite and offsite cleanup levels.

Additional remediation in the onsite swale and the offsite stream channel cannot be conducted efficiently until the existing stockpile is disposed of offsite. After the stockpile has been removed, the Phase II Area E remediation will begin. Additional sediment will be excavated and returned to the Metz site, until analysis performed in the Metz laboratory shows that the onsite or offsite cleanup levels have been achieved for the appropriate portions of Area E. At that time, duplicate samples will be sent for analysis in a New Jersey Certified Laboratory.

Sediment excavated in the Phase II portion of the remediation in which the silver concentration exceeds the onsite cleanup level will be disposed of offsite in an appropriate manner. Sediment with a silver concentration below the onsite cleanup level will be used for onsite grading. Appropriate measures will be taken to prevent erosion and migration.

Perimeter Samples - Delineation will be completed to a maximum spacing of 30 feet around contaminated perimeter borings. The Metz laboratory will be used as an aid in delineation. Offsite soil with silver above the offsite cleanup level will be excavated and returned to the Metz site. Post excavation samples will be analyzed in the Metz laboratory. After delineation and excavation are complete, sample splits will be sent to a New Jersey Certified Laboratory for confirmation. Any soil found with a concentration in excess of onsite cleanup levels will be stockpiled for classification and offsite disposal. Other soil will be used for onsite grading.

GROUNDWATER

Monitor Well Abandonment - The NJDEP has advised Metz and CH2M HILL in the DCCPA that the onsite monitor wells should be sealed by a New Jersey licensed Well Driller, certified to seal wells. However, it is our understanding that the necessity for sealing wells as stated in NJSA 58:4A-4.1 is based upon abandonment of the well. As defined in the statute,

> "A well not in operation for three (3) or more years or improperly maintained to prevent contamination may be deemed to have been abandoned."

ATTACHMENT CCC-4

Date?

The Metz monitoring wells are maintained in good condition, and are used in a voluntary biannual groundwater monitoring program. Therefore, they do not meet the definition of abandoned wells. Since the new owners of the facility, Degussa Corporation, would like to continue the monitoring program as a safety precaution for protection of the environment, we respectfully request that the requirement for sealing of the wells be waived. Degussa Corporation, will accept the responsibility for sealing the wells in accordance with NJAC 7:9-9.1 *et seq* when they are no longer needed for the monitoring program.

NJPDES Permit for Basin - The existing basin was installed as a temporary structure, to provide spill containment. A larger basin may be required to achieve compliance with State and local requirements for runoff control. In order to avoid duplication of the permit application, we request an extension for submission of the application until final runoff analysis and engineering design for the final basin can be completed. This process will require an estimated four months.

ASBESTOS CONTAINING MATERIALS (ACM)

In the DCCPA, the NJDEP requested that a survey of potential ACM areas be conducted by a Certified Industrial Hygienist or Certified Asbestos Safety Technician. The survey will be conducted by a Certified Industrial Hygienist employed by the Degussa Corporation.

SCHEDULE AND COST

The following is an estimate of the schedule and cost for completion of the Metz remediation as outlined above. Some of the activities have already been initiated. The times presented are in months, based on the approval of the cleanup plan.

ATTACHMENT CCC-5

Item	Schedule	Cost
1) **Area A** - Excavate Ag contaminated soil, collect and analyze post excavation samples, and back fill.	3	$5,000
2) **AWT Stockpile** - Excavate BN contaminated soil, collect and analyze post excavation samples.	3	$4,000
3) **Area E, Phase I** - Excavate Ag contaminated sediment, stockpile onsite, collect and analyze post excavation samples.	*	$32,000
4) **Area E, Phase II** - Excavate Ag contaminated sediment, stockpile onsite, collect and analyze post excavation samples.	6	$32,000
5) **Perimeter** - Delineate Ag contamination, excavate offsite soil above cleanup level, collect and analyze post excavation samples.	3	$5,000
6) **Disposal** - Classification, transportation and disposal of soil contaminated above onsite cleanup levels. (Estimate based on 800 yd^3 of non-hazardous waste)	9	$178,000
7) **Basin Permit** - Prepare and submit application for NJPDES-DGW permit	4	$3,000
8) **Asbestos Survey** - Survey Metz plant, and prepare map of asbestos containing material.	4	$5,000
9) **Reporting** - Prepare and submit Quarterly Progress Reports and Final Cleanup Report.	12	$17,800
	Cleanup Total:	$281,800
	Contingency (20 %):	$56,400
	Total:	$338,200

* Completed December 1990

ATTACHMENT CCC-6

Metz and CH2M HILL look forward to completing the remediation on this site as soon as possible. Please feel free to call me if you have any questions with this cleanup plan revision.

Sincerely,

CH2M HILL

Paul B Dahlgren

Paul B. Dahlgren
Project Manager

NJC1/006C1.51
cc: Mr. W. Peter Metz
Mr. C. Scott Eves
Mr. Keith Lynott

ATTACHMENT CCC-7

ATTACHMENT DDD

Let's protect our earth

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS WASTE MANAGEMENT
CN 028
Trenton, N.J. 08625-0028
(609) 633-7141
Fax # (609) 633-1454

APR 2 6 1991

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
Mr. Paul B. Dahlgren
CH2M Hill
99 Cherry Hill Road
Parsippany, New Jersey 07054-1102

Dear Mr. Dahlgren:

RE: Industrial Establishment: Metz Metallurgical Corporation
Location: 3900 South Clinton Avenue
South Plainfield Borough, Middlesex County
Block: 467-01 Lots: 29.01, 30
Transaction: Sale of Property and Business Assets, Transfer of Stock
ECRA Case # 86108
Cleanup Plan Dated: 31 July 1990
Response to Draft Cleanup Plan Approval/Revised Cleanup Plan
Dated: 27 March 1991

Pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (NJDEP) by the Environmental Cleanup Responsibility Act (ECRA, N.J.S.A. 13:1K-6 et seq.) and duly delegated to the Assistant Director of the Industrial Site Evaluation Element, the referenced Cleanup Plan submitted in behalf of Metz Metallurgical Corporation (Metz) is hereby approved as conditioned herein:

I. CLEANUP LEVELS.

1. Soils. The cleanup concentration for soils at this industrial establishment shall be as follows:

Contaminant	Onsite[a]	Offsite
Cadmium (Cd)	110 ppm	3 ppm
Copper (Cu)	1,000 ppm	170 ppm
Silver (Ag)	200 ppm	5 ppm
Nickel	100 ppm	100 ppm
Chromium	100 ppm	100 ppm
Petroleum Hydrocarbons (PHC)	15,000 ppm *	n/a
Base Neutral Compounds (BN)	**	n/a

[a] Onsite cleanup concentrations were established for the contaminants at the subject site based on representation of continuing industrial use of this site. Please be advised that any change in the future use of the site will likely result in more conservative cleanup levels being established at that time. If industrial operations cease, the site must either be remediated to cleanup levels appropriate for the next use or formal restrictions of use will be imposed to ensure adequate protection of public health and the environment.

ATTACHMENT DDD-1

* The cleanup concentration for PHC applies to PHC contamination that is demonstrated to be free of Volatile Organics (specifically Benzene) and Ca(PAH) contamination in excess of 1 ppm and 10 ppm, respectively.

** For petroleum based contamination. If carcinogenic polycyclic aromatic hydrocarbons (Ca(PAHs)) are present in excess of 10 ppm, the Soil Cleanup Level for BN and Ca(PAH) shall be 10 ppm. If Ca(PAH) are not present or are present at concentrations below 10 ppm, BN cleanup shall be to 100 ppm. The CaPAHs are as follows:

benzo(a)anthracene	dibenz(a,h)anthracene
benzo(b)fluoranthene	dibenzo(a,e)pyrene
benzo(j)fluoranthene	dibenzo(a,h)pyrene
benzo(k)fluoranthene	dibenzo(a,i)pyrene
benzo(a)pyrene	dibenzo(a,l)pyrene
chrysene	indeno(1,2,3-cd)pyrene

II. AREAS FOR WHICH NO FURTHER ACTION IS REQUIRED.

1. **Area B. Historical Drum Storage Area.** PHC contamination below the approved industrial cleanup concentration exists to a depth of 2.5 feet. No further action is required.

2. **Area C. Historical Drum and Equipment Storage Area.** Ag concentrations below the approved industrial cleanup levels were left behind prior to paving. The remaining levels reported are insignificant. No further action is required.

3. **Area D. Equipment Storage Area.** Low level Ag, Cd, Cu and PHC contamination is present below the approved industrial cleanup levels. No further action is required.

4. **Area F. Former Underground Storage Tank (UST).** This UST was reportedly removed in 1981. Soil sampling indicates that this area is not of concern. No further action is required.

5. **Area G. Soils in the Vicinity of MW-105.** Soil sampling was required in this area to confirm that VOs identified in ground water samples from MW-105 were not emanating from an onsite source. The data verifies that no VOs are present in the soils. No further action is required.

6. **Waste Piles.** No further action is required with regard to the retention basin soil stockpile. With regard to the Area C stockpiles, stockpiled soil may be reused onsite provided that proper controls are employed that will prevent offsite transport of residual contamination. Due to contaminant concentrations in excess of the approved offsite cleanup levels, should Metz wish to remove soils from the site it shall do so under the appropriate waste manifests and/or bills of lading. Metz shall provide copies of all waste manifests, if offsite disposal is undertaken.

III. SOIL CLEANUP APPROVED WITH CONDITIONS.

1. **Area A.** The proposal to excavate Ag contaminated soils and to properly dispose of said soils offsite is generally acceptable. Metz shall collect post-ex samples at a frequency of 1 sample per 900 square feet of excavated surface area. This requirement may be met by incorporating existing "clean" samples with those collected as post-ex. Analysis shall be for area target

ATTACHMENT DDD-2

parameters only.

2. **Area AWT Stockpile.** Soil stockpile sampling data indicate BN compounds, specifically CaPAHs, to be of concern. Metz shall properly dispose of this soil stockpile offsite. Copies of all waste manifests shall be submitted to BEECRA.

   Metz may re-sample the stockpile to segregate out that portion of the soil that is contaminated in excess of the approved clean up concentrations. Refer to the NJDEP Remedial Investigation Guide for appropriate waste soil sampling frequency. Soil exhibiting contaminants below the approved cleanup levels may be re-used onsite, provided that proper controls are employed that will prevent offsite transport of residual contamination; soil exhibiting contaminants in excess of the approved cleanup levels shall be properly disposed offsite and the waste manifests submitted to BEECRA.

3. **Area E. Former NJPDES Outfall and Stream.** The proposed excavation and offsite disposal of Ag and Cu contaminated sediments and soils in this area is generally acceptable. Post-ex samples shall be collected every 30 linear feet, alternating between the bed of the stream and the bank of the stream.

   Metz shall contact the Division of Coastal Resources to obtain applications for any required permits. Contact:

   Bureau of Inland Regulation, Raritan Region
   CN 401
   501 East State Street
   Trenton, N.J. 08609
   (609) 633-6449

   In addition, Metz shall contact the Freehold Soil Conservation District, to obtain any required Soil Erosion and Sediment Control Plan certifications:

   Freehold Soil Conservation District
   211 Freehold Road
   Manalapan, New Jersey 07726
   (201) 462-1079

4. **Perimeter Samples.** The proposal to excavate Ag contaminated soils for re-use onsite is generally acceptable provided that proper controls are employed that will prevent offsite transport of residual contamination; prior to implementing the proposal, Metz shall complete the delineation (30 foot maximum) of offsite contamination to current NJDEP Action Levels around all contaminated perimeter borings. It is recommended that Metz employ a field survey X-Ray Fluorescence (XRF) instrument (with 10% of the samples laboratory confirmed) as an aid in the delineation effort. Please refer to the attached guidance document Field Screening Using a Field Survey XRF Instrument, to ensure that acceptable QA/QC is maintained.

   The levels found in on-site perimeter samples will not require remediation; however, soil erosion control measures shall be employed to minimize wind/water transport of soil residuals.

   Metz shall remediate offsite perimeter contamination to the "offsite cleanup concentration" as stated in Section I.

ATTACHMENT DDD-3

III. GROUND WATER.

1. **Offsite Contamination.** The investigation of groundwater contamination has concluded to the Department's satisfaction. The data indicate an offsite, upgradient source for the VO groundwater contamination identified in Metz' monitoring wells. No further action is required at this time.

2. **Monitoring Wells.** Metz' proposal to leave open the onsite monitoring wells for the purposes of ground water monitoring as a safety precaution is acceptable. If, however, the wells will not be used they shall be sealed by a New Jersey licensed Well Driller, certified to seal wells, in accordance with NJDEP Well Sealing Specifications. To obtain said specifications, contact:

   Bureau of Water Allocation
   CN 029
   401 East State Street
   Trenton, N.J. 08625-0029
   (609) 292-2957

3. **Area D. Retention Basin.** Metz shall obtain the required NJPDES Permit for this basin, which has replaced the previous NJPDES permitted outfall.

VI. OTHER MEDIA.

Asbestos Containing Material (ACM). Metz reports the existence of areas that "...contain some chrysotile asbestos", according to an environmental audit performed by BCM.

1. Potential ACM areas shall be identified by a systematic asbestos inspection/survey. It is recommended that the inspection be conducted by a Certified Industrial Hygienist or Certified Asbestos Safety Technician.

2. Metz shall submit a map showing the location of any asbestos containing insulation. Areas of friable insulation shall be highlighted. Estimated quantities of asbestos insulation shall be noted on the map. Metz shall have the suspected ACM sampled and analyzed for asbestos in accordance with USEPA method 600/4-82-020.

3. Metz shall remediate all friable (containing by weight more than 1% asbestos, which when dry, may be crumbled, pulverized or reduced to a powder by hand pressure) and/or damaged ACM. Metz shall comply with all applicable federal, state and local regulations, codes and ordinances including but not limited to the following:

   - USEPA Asbestos Abatement Project Rule 40 CFR 762;
   - USEPA Regulation for Asbestos 40 CFR 61, Subpart A;
   - USEPA National Emission Standard for Asbestos 40 CFR 61 Subpart M;
   - N.J. Asbestos Control and Licensing Act, N.J.S.A. 34:5A-32 et seq.;
   - NJDOL and NJDOH Regulations on Asbestos Licenses and Permit Regulations, N.J.A.C. 8:60 and N.J.A.C. 12:120;
   - NJDEP Disposal Regulations N.J.A.C. 7:26.

4. All asbestos remediation activities shall be conducted in compliance with U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) regulations 29 CFR 1910 and 29 CFR 1926.

ATTACHMENT BDD-4

5. Metz shall submit to BEECRA copies of all permits and disposal manifests and, upon completion of remediation, provide specific details concerning achievement of final clearance.

   a. The final clearance standard for visual inspection shall be the absence of ACM. The final visual inspection shall be performed by a Certified Industrial Hygienist (CIH), Certified Asbestos Safety Technician (AST) or similarly qualified person.

   b. The final clearance standard for air monitoring results shall be 0.01 fibers per cubic centimeter, which shall be demonstrated by aggressive air sampling for airborne fibers, utilizing a manometer or similar sampling device.

V. GENERAL CONDITIONS.

1. Metz shall comply with all federal, state, and local laws, regulations, and ordinances in implementing the approved Cleanup Plan.

2. Metz shall obtain all federal, state, and local permits prior to implementation of the approved Cleanup Plan. Should any condition or limitation of said permits be more stringent than those in the approved Cleanup Plan, then said permit requirements shall supersede the terms of this approval.

3. Upon the written request of NJDEP, Metz shall submit for NJDEP review and approval any additional sampling plans deemed necessary by NJDEP during the implementation of a Cleanup Plan to fully delineate the nature and extent of environmental contamination on or from the Metz facility. Metz shall implement and complete any such additional Sampling Plans, and submit the results thereof, in accordance with the timeframes set forth in the approved additional Sampling Plan. Furthermore, Metz shall prepare and submit to NJDEP for approval any revisions to the Cleanup Plan necessary to remediate any additional environmental contamination on or from Metz as identified during the cleanup plan implementation, by any additional sampling, or from any other source. Metz shall revise and submit the required information within a reasonable time not to exceed 30 calendar days from receipt of written notification from NJDEP.

4. The ECRA Requirement for remediation of all environmental contamination on or from the Metz facility and the terms and conditions of the approved Cleanup Plan shall be binding upon Metz, and its officers, management officials, successors in interest, assigns, tenants, and any trustee in bankruptcy or receiver appointed pursuant to a proceeding in law or equity.

5. Metz shall prepare and submit to NJDEP monthly written progress reports detailing the implementation of the Cleanup Plan.

6. Metz shall prepare and submit a final written report detailing the actual cleanup actions performed and final cleanup costs including overhead, compared to the cleanup actions, schedule and costs approved in the Cleanup Plan. The report should also include the dates of cleanup activities, additional sampling results, and other pertinent information.

ATTACHMENT DDD-5

7. Metz shall amend the amount of posted financial assurance specified in paragraph 11. A of the Metz Metallurgical Corporation Administrative Consent Order to equal the amount of $338,200, the estimated cost of implementation of the Cleanup Plan, or shall provide alternative financial assurance in accordance with the regulatory requirements of N.J.A.C. 7:26B-6, in the amount specified above, within fourteen (14) days of receipt of this Cleanup Plan approval. Furthermore, Metz shall maintain the required financial assurance until NJDEP issues a written notification that the Cleanup Plan had been fully implemented to NJDEP's satisfaction.

8. Metz shall provide, within fourteen (14) calendar days of receipt of this Cleanup Plan approval, oversight fees in the amount of $7,000, based on the cost of the cleanup, in accordance with the regulatory requirements of N.J.A.C. 7:26B-1.10.

9. Metz shall initiate the Cleanup Plan as conditioned in this letter within two (2) weeks of receipt of this letter, and in accordance with N.J.A.C. 7:26B-5.5(c), begin implementation of this Cleanup Plan according to the proposed time schedule. If any delay or anticipated delay had been or will be caused by events beyond the control of Metz, Metz shall notify NJDEP in writing within ten (10) days of the delay, describing the delay and precise cause or causes and requesting an extension. Increases in the costs or expenses incurred in fulfilling the requirements contained in this letter shall not be a basis for an extension and such extension requests will not be granted. If Metz fails to implement the Cleanup Plan in accordance with the proposed schedule, the NJDEP reserves the right to implement full enforcement measures and assess penalties pursuant to N.J.A.C. 7:26B-9.

10. Metz shall notify the BEECRA Cleanup Oversight Section at least five (5) days prior to the initiation of remedial actions at the site so that the case manager may be present. Contact:

Ms. Tessie Fields, Section Chief
BEECRA Cleanup Oversight Section
401 East State Street
Trenton, N.J. 08625
(609) 633-7141

NJDEP's approval, as conditioned above, is limited to the above referenced Cleanup Plan only. This Cleanup Plan approval shall not limit, restrict, or prohibit NJDEP from directing on-site or off-site cleanup, if deemed necessary by NJDEP, under any other statute, rule, or regulation. Metz is hereby required to fully implement the referenced Cleanup Plan, as conditioned above, in accordance with the time schedule as set forth therein.

ATTACHMENT PDD-6

By issuing this Cleanup Plan approval, NJDEP continues to reserve all rights to pursue any penalties allowable under the law for violations of the ECRA statute or regulations associated with this transaction.

Sincerely,

Kenneth T. Hart, Acting Assistant Director
Industrial Site Evaluation Element

attachment

c: Tina Layre, BEAC
Fred Cornell, BEERA
Rob Lux, BGWDC
Freehold Soil Conservation District
Andrew Simpf, South Plainfield Health Dept.

ATTACHMENT DDD-7

ATTACHMENT EEE

CH2M HILL Engineers Planners Economists Scientists

Post-It™ brand fax transmittal memo 7671	# of pages ▸ 5
To Andrew Cyr	From Scott Eves
Co. NJDEPE	Co. Degussa/Metz
Dept.	Phone # (908) 561-1100
Fax # (609) 584-4298	Fax # (908) 561-0537

September 13, 1991

NJO26404.A0

Mr. John Kosher, Case Manager,
Cleanup Oversight
Bureau of Environmental Evaluation and
Cleanup Responsibility Assessment
NJDEPE/Division of Responsible Party Site Remediation
401 East State Street
CN028
Trenton, New Jersey 08625

Dear Mr. Kosher:

Subject: Monthly Progress Report for Metz Metallurgical Corporation,
South Plainfield, New Jersey
ECRA Case # 86108

On the behalf of Metz Metallurgical Corporation, CH2M HILL respectfully submits the attached Monthly Progress Report.

We are in receipt of a letter from the NJDEPE dated September 9, 1991, which presents review comments on previously submitted Monthly Progress Reports. We wish to correct a minor misunderstanding in Paragraph 2 of that letter related to the location of stockpiled soil. There is currently no soil stockpiled in former Area AWT. Soil from the Phase II remediation of Area E (onsite and offsite stream sediment) and the recently completed north perimeter (PS-7..PS-10 area) is stockpiled on asphalt pavement at the southwest corner of the site, south of former area of concern, Area D. I apologize if the Monthly Progress Reports were not clear on this location.

ATTACHMENT EEE-1

Please feel free to call me at (201) 316-9300, if you have any questions on the report, or the facility.

Sincerely,

CH2M HILL

Paul B Dahlgren

Paul B. Dahlgren
Project Manager

NJC9/029C9.51
Enclosures
cc: Peter Metz
Scott Eves

ATTACHMENT EEF-2

MONTHLY PROGRESS REPORT

METZ METALLURGICAL CORPORATION
SOUTH PLAINFIELD, NEW JERSEY

ECRA CASE # 86108

Report No. 04
September 16, 1991

1. PROJECT SCHEDULE

Cleanup operations are proceeding on schedule. Details of operations completed since submission of Monthly Progress Report No. 03 are discussed in Item 3 below.

2. COSTS INCURRED TO DATE

A detailed accounting of cleanup costs is not available at this time. It is estimated that approximately $159,000 has been expended.

3. WORK COMPLETED TO DATE

Field operations in the north perimeter (PS-7..PS-10) were completed since submission of Monthly Progress Report No. 03. Post-remediation samples analyzed in the Metz onsite laboratory indicate that cleanup goals were achieved. Confirmation results from a New Jersey Certified laboratory are anticipated prior to the end of September. A detailed discussion of north perimeter operations will be submitted when confirmatory analysis with Tier II data is received.

Concurrent with the north perimeter operations, samples were collected for disposal analysis. A request for ID # 27 will be submitted when the analytic results are available.

4. PERCENT OF CLEANUP WORK COMPLETED

Approximately 98 percent of the cleanup operation is complete at this time.

5. CLEANUP WORK REMAINING

The following is a summary of the status of remaining areas of concern:

AWT Stockpile - Disposal documentation will be submitted with the Final Report.

Area E - Disposal documentation for the Phase I sediment will be submitted with the Final Report. Classification and disposal of the Phase II sediment is required.

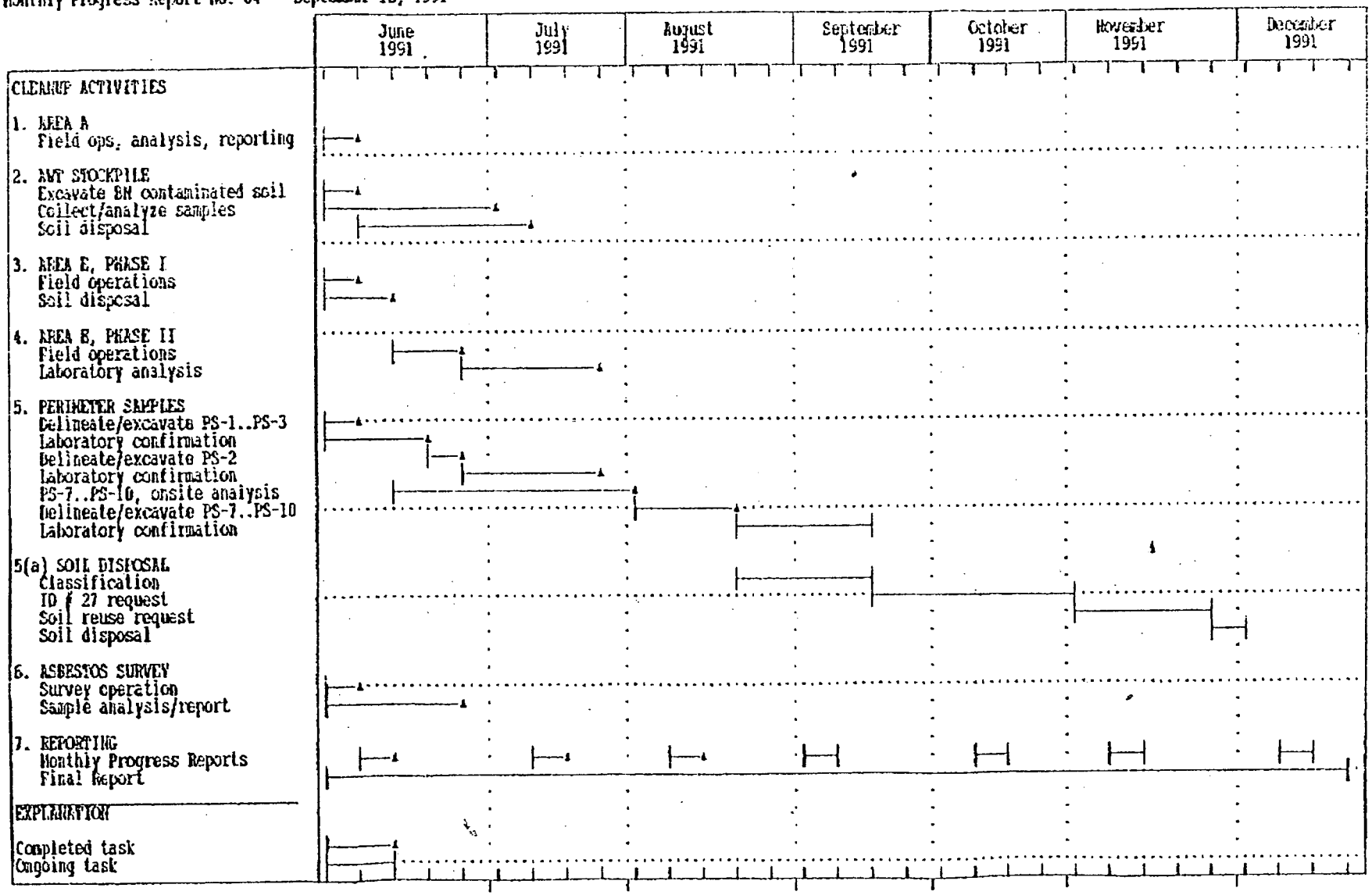
North Perimeter (PS-7..PS10) - Remedial operations are complete, pending analytic confirmation. Remaining activities include reporting, soil disposal classification and soil disposal.

ATTACHMENT EEE-4

Metz Metallurgical Corporation
South Plainfield, New Jersey

ECRA Case No. 86108

Monthly Progress Report No. 04 September 16, 1991



ATTACHMENT EEE-5

ATTACHMENT FFF

MEMO
TO: FILE
FROM: ANDREW CYR HSMS III NJDEPE/BUREAU OF SITE ASSESSMENT
SUBJECT: PSA METZ(DEGUSSA CORPORATION) SOUTH PLAINFIELD, MIDDLESEX COUNTY
SEPTEMBER 25, 1991

BOB RAISCH AND THE WRITER OF THE NJDEPE ARRIVED ON SITE AT 1010 HOURS. THE WEATHER WAS CLOUDY AND WARM, TEMP. APPROX. 75 DEGREES. THE AREA WAS WET FOR IT HAD RAINED DURING THE PAST 12 HOURS. WE ARE MET BY SCOTT EVES, ENVIRONMENTAL CONTROL MANAGER FOR DEGUSSA. PRIOR TO TOURING THE FACILITY I EXPLAINED THE INSPECTION AND ASKED SOME QUESTIONS.

MR. EVES STATED THAT ALL THE AREAS OF CONCERN HAVE BEEN REMDIATED UNDER ECRA EXCEPT FOR AREA E (THE DISCHARGE STREAM AND SILVER SPILL AREA). APPROX. 1000 TONS OF SOIL AND SEDIMENTS HAVE BEEN EXCAVATED AND STOCKED PILED IN A PAVED AREA JUST SOUTH OF AREA D. I ASKED MR. EVES ABOUT THE RADIATION PERMIT HELD WITH THE NJDEPE/DEQ HE STATED THAT IT IS FOR REGISTRATION OF X-RAY FLOURESENCE ANALYTICAL EQUIPMENT AND AN X-RAY MACHINE USED FOR SECURITY PURPOSES. I ALSO ASKED MR. EVES ABOUT THE FACILITY'S REGISTERED USTS HE STATED THAT THEY INCLUDE PROCESS SUMPS AND CONTAINMENT VESSELS THAT ARE USED ONLY IF A REACTION VESSEL LEAKS. HE STATED THAT HE SENT A LETTER TO THE NJDEPE/BUST IN ORDER TO ELIMINATE THE NEED FOR UST REGISTRATION. TWO USTS ARE LOCATED WITHIN BLD. C WHILE 29 ARE LOCATED WITHIN BLD. A.

THE MONITORING WELLS ARE STILL BEING SAMPLED BY DEGUSSA AND ANALYZED FOR METALS ONLY. THE PRODUCTION WELLS PUMP APPROX. 20 -25 THOUSAND GALLONS PER DAY. HOWEVER, THE RATE IS NOT MEASURED. CURRENTLY ONE OF THE PRODUCTION WELLS IS DOWN. I ASKED MR. EVES ABOUT THE OPERATIONS CONDUCTED IN BLD. C. HE STATED THAT OPERATIONS INCLUDE SILVER SALT PRODUCTION, AND METAL ROLLING. ALSO LOCATED IN THE BUILDING ARE ENGINEERING, MAINTANENCE DEPARTMENTS, RAW MATERIAL STORAGE, AND A PORTION OF THR WASTE WATER TREATMENT PLANT. THE FACILITY'S HAZARDOUS WASTE STORAGE AREA IS ALSO LOCATED WITHIN A CONCRETE LINED AND BERMED AREA WITHIN BLD. C.

RAW MATERIALS ARE STORED IN DRUMS AND SMALL VESSELS. FLAMMABLES ARE STORED OUTSIDE OF BUILDING A ON A CONCRETE PLATFORM LOCATED ALONG THE SOUTHWESTERN CORNER OF BLD. A. NO SECONDARY CONTAINMENT SOUROUNDED THE STORAGE VESSELS. HOWEVER ANY SPILLS WOULD EITHER BE CONTAINED IN A CONCRETE TRUCK LOAD AREA OR FLOW ONTO THE PAVEMENT AND ENTER THE FACILITY'S STORMDRAINS AND INTO THE RETENTION BASIN. MATERIALS OBSERVED AT THIS LOCATION INCLUDED METHANOL, CUPRIC NITRATE AND AMMONIA.

WHILE TOURING THE FACILITY ALL THE ABOVE GROUND TANKS WERE OBSERVED TO HAVE CONCRETE/ OR CINDER BLOCK DIKING. I ASKED MR. EVES FOR INFORMATION ON THE ABOVE GROUND TANKS AT THE SITE. MUCH STANDING WATER WAS OBSERVED IN A RAW MATERIAL STORAGE AREA LOCATED JUST SOUTH OF AREA AWT. MR. EVES STATED THAT STORMWATERS ARE TESTED PRIOR TO DISCHARGE. THE MWS APPEARED TO BE UNDAMAGED AND WERE LOCKED.

AREA C IS LOCATED BETWEEN BLD. A AND BLD. B. HALF OF THIS AREA HAS BEEN PAVED AND IS USED FOR EMPLOYEE PARKING, WHILE THE OTHER HALF IS AN OPEN GRASS AREA. AREA F WAS THE LOCATION OF A FORMER UST WHICH HAD BEEN REMOVED PRIOR TO DEGUSSA'S PURCHASE OF THE PROPERTY. DURING THE ECRA INVESTIGATION PHC CONTAMINATED SOILS WERE REMOVED AND THE AREA PAVED.

AREA D, LOCATED WEST OF BLD. A CONTAINS A SMALL EARTHEN RETENTION BASIN WHICH HOLDS STORM WATER AND COOLING WATER DICHARGES PRIOR TO DISCHARGE TO THE STREAM. MR. EVES STATED THAT THIS BASIN WILL BE REPLACED BY ANOTHER WHICH WILL BE BUILT JUST SOUTHWEST OF ITS CURRENT LOCATION. ALSO WITHIN AREA D IS

ATTACHMENT FFF-1

THE FUTURE SITE OF A 450,000 GALLON SURGE TANK WHICH WILL CONTAIN TREATED WASTE WATERS PRIOR TO DISCHARGE TO THE MCMUA.

AREA E INCLUDES THE DISCHARGE DITCH LOCATED ON THE PROPERTY AND APPROX. 500 FEET OF THE OFFSITE STREAM. DURING THE PSA SURFACE WATER RUNOFF WAS OBSERVED ENTERING THE DITCH FROM THE FACILITY AND ANOTHER BUILDING LOCATED JUST TO THE NORTH. WATER WAS PONDED ON SITE DUE TO ITS LOWER ELEVATION THEN THE STREAM.

PRIOR TO DEPARTING THE SITE I ASKED MR. EVES FOR INFOMATION REGARDING THE USTS, AGSTS AS WELL AS DETAILS ON BLD. C. I STATED THAT I WILL PROVIDE HIM WITH A COPY OF THE SITE INSPECTION REPORT WHEN COMPLETED. ROBERT RAISCH AND THE WRITER DEPARTED THE SITE AT 1132 HOURS.

ATTACHMENT EEF-2

ATTACHMENT GGG

Degussa

Degussa
Corporation

OCT 25 1991

Metz Division

October 7, 1991

Mr. Andrew Cyr
Site Assessment Section
New Jersey Department of Environmental Protection
and Energy
300 Horizon Center
Robbinsville, NJ

RE: Information requested during site visit
of September 25, 1991

Dear Mr. Cyr:

The following information was requested by either yourself or Mr. Robert Raisch during your site visit.

1) The first lease for Building "C" started on July 16, 1987.

2) The list of above ground storage tanks, their capacity and materials of construction is attached.

3) A copy of the letter to B.U.S.T. requesting deregistration is attached.

I believe this addresses all your request, but if not, please let me know. As we discussed, please send me a copy of your report when it is complete.

Cordially,

C. Scott Eves
Manager
Environmental Control
Metal Group

CSE:jn
CYR1007

ATTACHMENT GGG-1

3900 South Clinton Avenue South Plainfield, NJ 07080 908-561-1100 FAX 908-769-9456 TWX 710-997-9524

Degussa

Degussa
Corporation

Metz Division

LIST OF ABOVE GROUND TANKS

HNO3 1	5828 Gals.	Stainless Steel
HNO3 2	3222 Gals.	Stainless Steel
NAOH 1	5921 Gals.	Mild Steel
NAOH 2	10978 Gals.	Mild Steel
Reagent HCl	4994 Gals.	Fiberglass
Low Grade HCl	6933 Gals.	Fiberglass
HCHO	6142 Gals.	Mild Steel
O_2	7179 Gals.	Mild Steel
N_2 Rear TK	11000 Gals.	Mild Steel
NH_3	400 Gals.	Mild Steel
N_2 Front TK	530 Gals.	Mild Steel
Brine	1200 Gals.	Fiberglass

LIST1007

ATTACHMENT 666-2

Degussa

Degussa
Corporation

February 12, 1991

NJDEP
Division of Water Resources
Bureau of Underground Storage Tanks
CN-029
Trenton, NJ 08625

RE: UST No. 0099525

Dear Sir or Madam:

At the time of the initial registration of our underground storage tanks, the final definition of an underground storage tank had not been issued. The result was, to be on the safe side, we registered everything we thought could conceivably be considered an underground storage tank. After review of the final definition and the use of each of the structures we request that the changes on the attached list be made in our file. If this request is not sufficient or if you require further information, please call me.

Cordially,

C. Scott Eves
Manager
Environmental Control
Metal Group

CSE:jn
NJDEP3.212

ATTACHMENT 666-3

3900 South Clinton Avenue South Plainfield NJ 07080 201-561-1100 Telex 244072

Degussa

Degussa
Corporation

TANK NO.	CHANGE REQUESTED	REASON FOR CHANGE
ECS1	Change to sump	Only used in emergency situations. Normally empty.
ECS2	Change to sump	Only used in emergency situations. Normally empty.
ESC3	Remove from inventory	Used as containment for Deionized water system.
ESC4	Change to sump	Only used in emergency situations. Normally empty.
ESC5	Remove from inventory	Never contains liquid. Has drain that goes to wastewater treatment system.
ESC6	Remove from inventory	Used as containment for process tanks.
ESC7	Change to sump	Only used in emergency situations. Normally empty.
ESC8	Change to sump	Only used in emergency situations. Normally empty.
ESC9	Change to sump	Only used in emergency situations. Normally empty.
ESC10	Change to sump	Only used in emergency situations. Normally empty.

ATTACHMENT 66-6-4

3900 South Clinton Avenue South Plainfield NJ 07080 201-561-1100 Telex 244072

Degussa

Degussa
Corporation

TANK NO.	CHANGE REQUESTED	REASON FOR CHANGE
ESC11	Change to sump	Only used in emergency situations. Normally empty.
EPS1	Change to sump	Only used in emergency situations. Normally empty.
EPS2	Change to sump	Only used in emergency situations. Normally empty.
EPS3	Change to sump	Only used in emergency situations. Normally empty.
EPS4	Remove from Inventory	Used as part of waste water treatment system.
EPS5	Remove from Inventory	Used as part of waste water treatment system.
EPS6	Change to sump	Only used in emergency situations. Normally empty.
EPS7	Remove from Inventory	Used as part of waste water treatment system.
EPS8	Remove from Inventory	Used as part of waste water treatment system.
EPS9	Remove from Inventory	Used as part of waste water treatment system.
EXTL	Change to sump	Only used in emergency situations. Normally empty.

ATTACHMENT 6-6-5

3900 South Clinton Avenue South Plainfield NJ 07080 201-561-1100 Telex 244072

Degussa

Degussa
Corporation

TANK NO.	CHANGE REQUESTED	REASON FOR CHANGE
E-P1	Remove from Inventory	Used as part of waste water treatment system.
E-P2	Remove from Inventory	Used as part of waste water treatment system.
E-P3	Remove from Inventory	Used as part of waste water treatment system.
E-P4	Remove from Inventory	Used as part of waste water treatment system
ERS1	Change to sump	Only used in emergency situations. Normally empty.
E-CU1	Change to sump	Only used in emergency situations. Normally empty.
E-CU2	Change to sump	Only used in emergency situations. Normally empty.
EQS1	Remove from Inventory	Used as part of waste water treatment system.
EQS2	Remove from Inventory	Used as part of waste water treatment system.
EQS3	Remove from Inventory	Used as part of waste water treatment system.
EQS4	Remove from Inventory	Used as part of waste water treatment system.
EQS5	Remove from Inventory	Used as part of waste water treatment system.

ATTACHMENT 666-6

3900 South Clinton Avenue South Plainfield NJ 07080 201-561-1100 Telex 244072

Degussa
Degussa
Corporation

TANK NO.	CHANGE REQUESTED	REASON FOR CHANGE
E-D	Remove from Inventory	Used as part of waste water treatment system.
E-E	Remove from Inventory	Used as part of waste water treatment system.
E-2	Remove from Inventory	Used as part of waste water treatment system.
SC	Change to sump	Only used in emergency situations. Normally empty.
EFP1	Change to sump	Only used in emergency situations. Normally empty.
E-DRI	Change to sump	Only used in emergency situations. Normally empty.

NJDEP3.212

ATTACHMENT 666-7

3900 South Clinton Avenue South Plainfield NJ 07080 201-561-1100 Telex 244072