

**Operable Unit 3  
Site Evaluation Report  
Naval Industrial Reserve  
Ordnance Plant  
Fridley, Minnesota**



**Southern Division  
Naval Facilities Engineering Command  
Contract Number N62467-94-D-0888  
Contract Task Order 0003**

September 1995



**Brown & Root Environmental**

**SITE EVALUATION REPORT  
FOR  
OPERABLE UNIT 3  
NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT  
FRIDLEY, MINNESOTA**

**COMPREHENSIVE LONG-TERM  
ENVIRONMENTAL ACTION-NAVY (CLEAN) CONTRACT**

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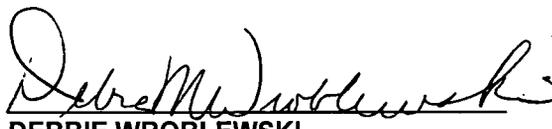
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## 1.0 INTRODUCTION

The Naval Industrial Reserve Ordnance Plant (NIROP) Fridley is located in the city of Fridley in Anoka County, Minnesota. NIROP Fridley was placed on the United States Environmental Protection Agency's (EPA's) Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) National Priorities List (NPL) as a result of the release of trichloroethene (TCE) from past operations at the plant. The United States Department of the Navy (Navy) has entered into a Federal Facilities Agreement (FFA) with EPA and the Minnesota Pollution Control Agency.

To facilitate the investigation and clean-up efforts, the site was divided into three CERCLA operable units. Operable Unit 1 (OU1) consists of the groundwater beneath the NIROP; Operable Unit 2 (OU2) consists of the vadose zone soils outside the main industrial plant building; Operable Unit 3 (OU3) consists of the vadose zone soils beneath the main industrial plant building.

Investigations and clean-up operations at NIROP Fridley are underway. A CERCLA Record of Decision (ROD) was signed for OU1, groundwater remediation at the NIROP, in September 1990 and a pump and treat remedy was implemented in September 1992. The OU2 work is currently in the FS stage.

Contaminants which were identified in OU2 include: toluene, polycyclic aromatic hydrocarbons (PAHs), ethylbenzene, tetrachloroethene (PCE), 1,2-dichloroethene (1,2-DCE), 1,1-dichloroethane (1,1-DCE), 1,1,1-trichloroethane (TCA), and 1,1-dichloroethane (1,1-DCA).

In August 1995, efforts began to address OU3. Brown & Root Environmental (B&R Environmental) is under contract with the United States Department of the Navy (Navy) to prepare planning documents, conduct field activities, prepare remedial investigation (RI) and feasibility study (FS) reports and complete the decision documents associated with OU3 under the Comprehensive Long-Term Environmental Action-Navy (CLEAN III) Contract Number N62467-94-D-0888, Contract Task Order (CTO 0003).

Several studies were completed prior to B&R Environmental's initiation of the OU3 work. These studies include the following:

- Initial Assessment Study (Envirodyne, 1983). Identified the sanitary sewer system as a potential source of contamination beneath the main industrial plant building
- East Plating Room Soil Sampling (Bay West, 1994). Identified elevated concentrations of several metals and cyanides.
- East Plating Shop Soil and Groundwater Investigation (Halliburton NUS, 1995). Identified soil and groundwater contamination under the East Plating Shop. TCE was the primary contaminant found. Other volatile organic compounds, including 1,1,1-tetrachloroethane (TCA), acetone, styrene, and metals such as chromium, lead, and cyanide were detected at slightly elevated levels.
- Former Solid Waste Management Unit (SWMU) Location Drawings (United Defense, LP, 1995). Identified thirty former SWMUs, 23 of which were located within the main industrial plant building.

These studies were not designed to initiate the work for OU3, although data gathered during these studies will be used as part of the OU3 investigation.

## 1.1 REPORT PURPOSE

Due to the size of the plant and limited understanding of past operations that could have resulted in the release of TCE into the environment, a site evaluation was conducted by B&R Environmental. The site evaluation consisted of a site visit, records search and personnel interview survey at the NIROP. This report presents the findings of the site evaluation. The primary objective of the site evaluation is to identify sites that could have been sources of TCE contamination to the soil beneath the main industrial plant building.

## 1.2 SITE EVALUATION SCOPE

The site evaluation scope is limited to soils beneath the Navy owned portion of the main industrial plant building. A small portion of the main industrial plant building located at the southern end is owned by United Defense, LP, formerly FMC Corporation (see Drawing 4-2). The OU3 work does not include the United Defense, LP property. United Defense, LP's portion is a separate hazardous waste site and is being cleaned up by United Defense, LP under a separate Consent Order between United Defense, LP and MPCA.

Although this OU3 work does not include <sup>cont.</sup> TCE sources outside the main industrial plant building, it is acknowledged that potential ~~TCE~~ sources were identified during the OU2 investigation. This includes locations in an area north of the main industrial plant building where barrels of spent degreaser solvents were removed. <sub>cont.</sub>

## 1.3 REPORT FORMAT

This Site Evaluation Report is organized into this introduction plus the following sections:

- **Section 2.0, Background** - Included in this section is a general facility description and information on the use of TCE at NIROP, Fridley. Also included is information on vapor degreaser operation and cleaning.
- **Section 3.0, Site Evaluation** - This section focuses on the site evaluation activities conducted at NIROP, Fridley. It includes information on the site visit, records search, and interviews conducted.
- **Section 4.0, Significant Findings** - Included in this section is a discussion of the potential areas of concern identified during the site evaluation within the NIROP, Fridley.
- **Section 5.0, Conclusions** - This section presents the rationale for choosing potential areas of concern. It includes discussions on drywells, pits and sumps, sewer systems, and storage tanks.

The records that were reviewed are listed in the bibliography. Specific records cited in this report are included in a reference list.

## 2.0 BACKGROUND

### 2.1 INSTALLATION DESCRIPTION

NIROP, Fridley was constructed in the early 1940s for heavy manufacturing operations. The NIROP is a government-owned and contractor-operated (GOCO) facility. The contracted operator is currently United Defense, LP. The Northern Pump Company and FMC Corporation were previous operators. The government-owned and contractor-operated portion of the plant is 82.61 acres in size and is currently active. Plant operations consist of processing, assembly, and manufacturing operations associated with the production of advanced weapons systems. The plant layout consists of avenues that run west to east and north to south. First through 29th Avenues extend from the southernmost portion of the plant to the northernmost portion. Broadway is the main avenue, it is located in the center of the plant and extends north to south. East of Broadway, building columns are numbered from 1E to 21E, to the west columns are numbered 1W to 29W.

### 2.2 HISTORICAL TCE USAGE

Trichloroethene (TCE) was used as a solvent at the NIROP facility from 1940 until 1987 to clean and degrease metal parts. In 1987, TCE was replaced with 1,1,1-trichloroethane (TCA). The storage, transfer, use, and disposal of TCE are described below.

The TCE storage tank was moved to its location on the east side of the building outside near 14th Avenue in May 1983 (RMT, 1987). The TCE was transported to points of use within the plant in "tote tanks" hauled on trucks. Prior to May 1983, a steel TCE storage tank was located on the western side of the building near 11th Avenue. TCE distribution to the plating shop at that time was by piping laid in a covered concrete trench (RMT, 1987). This TCE storage tank and distribution system are shown on Figure 4-2 as AOC 38.

The TCE is used in vapor degreasing units. In 1981, it was reported that there were nine vapor degreasers; eight were operational (FMC Corporation, 1981). Five of these units were located in the plating shop, one was in the paint shop, two were in the non-destructive test area, and one was in the foundry. Trichloroethene is placed in the vapor degreasing unit where it is heated to produce vapors. The

parts to be cleaned are then suspended in the vapor. The TCE condenses on the parts to dissolve the contaminant. As the condensed solvent drains from the part, it carries off the contaminant and returns to the boiling liquid (FMC Corporation, 1981). In 1983 it was reported that the six operational vapor degreasing units were cleaned about every third month and generated a total of approximately forty 55-gallon drums per year of waste solvent. The waste solvent was sold to a reclaimer for reuse (Envirodyne, 1983). This generation rate equals an annual production of 8,800 gallons of waste TCE.

Each vapor degreasing unit contained approximately 200 gallons of TCE (Envirodyne, 1983). The average usage of TCE in 1980 for all operational degreasers was 2,146 gallons per month (FMC Corporation, 1981). This consumption rate equals an annual TCE use of 25,752 gallons.

The TCE usage and disposal quantities listed above cannot be subtracted to determine the amount of TCE which may have been discharged inappropriately because the quantities are for different years. TCE usage may have differed between these years. In addition waste TCE may have been collected from areas other than the vapor degreasers, such as the portable TCE storage tanks.

*other potential cont. sources including — — —  
which identified during this investigation.*

### 3.0 SITE EVALUATION METHODOLOGY APPROACH

The site evaluation consisted of an initial and follow-up site visit to obtain plant records and interview personnel familiar with current and past plant operations. The goal of the site evaluation was to identify areas where TCE was stored, used, disposed, leaked, or spilled, including vapor degreaser pits, transfer pipes, and spill areas.

The initial site visit was made by B&R Environmental personnel from August 7 to August 10, 1995. During this initial visit, B&R Environmental was given access to OU1 (groundwater) and OU2 (vadose zone soils outside the main industrial plant building) Administrative Record documents covering the period from 1983 to 1995; facility drawings covering the period of beginning construction (1940) to 1995; miscellaneous plant files such as spill reports, tank inventories, vapor degreaser inventories, and waste disposal records; and aerial photographs covering the life of the facility. Pertinent records were selected and reviewed in further detail. Lists of the selected pertinent records are included in the bibliography.

B&R Environmental personnel toured the plant to familiarize themselves with plant operations and viewed 30 potential areas of concern identified by United Defense, LP as former SWMUs. A photographic log was prepared for each location.

B&R Environmental personnel returned to the facility on August 23 and 24, 1995 to research identified data gaps and interview additional personnel. Interviews were conducted with thirteen people of which nine are current United Defense, LP employees; one is a retired United Defense, LP employee; two are Minnesota Pollution Control Agency (MPCA) staff; and one is a contractor who performed work at the facility. Current and retired employees were asked to locate sites of TCE use during their employment and asked to describe operational procedures at those sites.

## 4.0 SIGNIFICANT FINDINGS

The following sections describe areas that are considered potential sources of TCE contamination beneath the main industrial plant building (referred to as potential areas of concern). The RI will focus on these areas to confirm if they are sources of contamination. These potential areas of concern (AOCs) include specific industrial operation locations within production areas, the sanitary sewer system, and the storm sewer system.

### 4.1 SPECIFIC INDUSTRIAL OPERATION LOCATIONS

There were no major functional changes in the industrial operations at NIROP since the plant was constructed in 1941 although some of the operations were modernized or relocated. The processing, assembly, and manufacturing operations associated with the facility include plating, welding, heat treating, machining, and foundry. Each of these areas (referred to as production areas) are shown on Figure 4-1. Testing facilities include an electronics laboratory, a metallurgical laboratory, hydraulic test bays, and shock/vibration test equipment (Envirodyne, June 1983).

Hazardous materials were used in the industrial operations within these production areas. One of the most common hazardous materials used was trichloroethene (TCE), which was used as a solvent to degrease parts for various activities such as welding, etc. TCE was used at NIROP until 1987 when 1,1,1-trichloroethane (TCA) was substituted for TCE as a solvent for degreasing activities. Spills of TCE have been documented throughout the plant in the 1980s and are likely to have occurred during the entire period of plant operation. Sumps, pits, and drywells were included below as potential areas of concern because these are areas where TCE spills may collect and be discharged to the soils.

The potential AOCs at specific industrial operations locations are listed in Table 4-1. The location of each of these AOCs is shown on Figure 4-2. A description and basis for designating each specific industrial operations location as an AOC are included in the following paragraphs.

#### 4.1.1 AOCs 1, 2, 4, 6, 7, 9 through 14, 24, and 25 - TCA Tanks

AOCs 1, 2, 4, 6, 7, 9 through 14, 24, and 25 are the former locations of TCA tanks. These tanks were listed on a TCA tank inventory (United Defense, LP, January 1990).

TABLE 4-1

**AREAS OF CONCERN  
NIROP, FRIDLEY, MINNESOTA**

<b>AOC</b>	<b>Description</b>	<b>Reference</b>
1	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
2	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
3	Sump in Receiving Area	Drawing A-7, 1947
4	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
5	1,1,1-Trichloroethane Degreaser	TCA Tank Inventory, United Defense, LP January 1990
6	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
7	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
8	1,1,1-Trichloroethane Degreaser	TCA Tank Inventory, United Defense, LP January 1990
9	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
10	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
11	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
12	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
13	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
14	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
15	Holding Tanks	Interview with current employees, August 10, 1995
16	Vapor Degreaser and Sump	United Defense SWMU Map, June 23, 1995
17	Wash Rack Sump	United Defense SWMU Map, June 23, 1995
18	Vapor Degreaser and Sump	Drawing PE 898, 1984
19	1,1,1-Trichloroethane Degreaser	TCA Tank Inventory, United Defense, LP January 1990
20	Machine Oil Sump	Interview with current employee, August 24, 1995
21	Vapor Degreaser and Sump	Drawing PE 898, 1984
22	1,1,1-Trichloroethane Degreaser	TCA Tank Inventory, United Defense, LP January 1990
23	Vapor Degreaser and Sump	United Defense SWMU Map, June 23, 1995
24	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990

**TABLE 4-1  
AREAS OF CONCERN  
NIROP, FRIDLEY, MINNESOTA  
PAGE 2 of 3**

<b>AOC</b>	<b>Description</b>	<b>Reference</b>
25	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
26	Solvent Booth Pit and Trench	Drawing PE 144, 1965
27	Sump for Gun Assembly	Interview with retired employee, August 23, 1995
28	Drywell in Diesel Room	Drawing C-31, 1947
29	Pit and Drywell in Foundry	Drawing PE 150, number 2373-F, 1965
30	Drywell in Machine Shop	Drawing PE 43, 1963
31	1,1,1-Trichloroethane Degreaser	TCA Tank Inventory, United Defense, LP January 1990
32	Oil/Water Separator Sump	United Defense SWMU Map, June 23, 1995
33	Degreaser Pit in Foundry	Drawings PE 150, number 2373-F, 1965 and PE 351, number 2860-F, 1968
34	Sump in Maintenance	Drawing C-20, 1948
35	Paint Storage, Mixing and Spray and Drywell	Drawings A-3 and C-20, 1947
36	Paint Spray Pit	Drawing A-7, 1947
37	Methanol Sump	Interview with retired employee, August 23, 1995
38	Trichloroethene Tank and Distribution System	Drawings A-3, 1947 and PE 221, 1966
39	Vapor Degreaser Pit	Drawing PE 546.2, 1975
40	Vapor Degreaser Pit	Drawings PE 1002 Sheet 1, 1986 and PE 546.2, 1975, and FMC Interoffice Trichloroethene Survey, March 1981
41	Vapor Degreaser Pit and Sump	Drawings PE 1002 Sheet 1, 1986 and PE 546.2, 1975, and FMC Interoffice Trichloroethene Survey, March 1981
42	Degreaser Pit	Drawing B-20, 1947
43	Vapor Degreaser	FMC Interoffice Trichloroethene Survey, March 1981; and Drawing B-20, 1947 and PE 444.7 Sheet 14, 1973
44	Sump Pit in Plating	Drawings A-7 and B-20, 1947 and PE 1125.5, 1991
45	Drywell in Heat Treating	Drawing C-20, 1947
46	Drywell in Heat Treating	Drawing C-20, 1947
47	Degreaser Still	Drawing PE 303, 1968
48	Degreaser and Parcolube Pit	Drawings PE 303, 1968 and A-3, B-7, and B-14, 1947
49	Degreaser Still	Drawing B-20, 1947
50	Drywell in Plating	Drawings A-3 and A-7, 1947, and PE 546.2 sheet 2, 1975

**TABLE 4-1 (Continued)**  
**AREAS OF CONCERN**  
**NIROP, FRIDLEY, MINNESOTA**  
**PAGE 3 OF 3**

<b>AOC</b>	<b>Description</b>	<b>Reference</b>
51	Vapor Degreaser	FMC Interoffice Trichloroethene Survey, March 1981, and Drawings B-20, 1947 and PE 444.7 Sheet 14, 1973
52	Sumps in Plating	Drawing PE 1125.5, 1991
53	Pit and Sump in Heat Treating	Drawing A-7, 1947
54	Sludge Pit	Drawings A-7, B-15, and C-20, 1947
55	Drywell in Paved Court	Drawing C-20, 1947
56	1,1,1-Trichloroethane Degreaser	TCA Tank Inventory, United Defense, LP January 1990
57	1,1,1-Trichloroethane Degreaser	TCA Tank Inventory, United Defense, LP January 1990
58	Vapor Degreaser	FMC Interoffice Trichloroethene Survey, March 1981, and Drawings PE 170, 1965 and PE 334, 1968
59	Machine Oil Sump	Interview with current employee, January 1990

#### **4.1.2 AOC 3 - Sump in Receiving Area**

AOC 3 is a sump located in the shipping and receiving department at 27th Avenue, on the western side of Column 17W. The sump is located at the end of the truck vestibule, which consisted of a ramp into the receiving department. It is not known what types of materials were handled in this area. The sump is approximately 4 feet long by 2 feet wide. The sump receives runoff from the pit ramp and discharges to the storm sewer (Drawing A-7, 1947). A typical cross section for a sump is shown on Figure 4-5. The sump was full of water with a green tint at the time of the B&R Environmental visit on August 24, 1995.

#### **4.1.3 AOCs 5, 8, 19, 22, 31, 56, and 57 - TCA Vapor Degreasers**

AOCs 5, 8, 19, 22, 31, 56, and 57 are the locations of vapor degreasers that used TCA. The locations of these degreasers were obtained from a TCA vapor degreaser inventory list (United Defense, LP, 1990).

#### **4.1.4 AOC 15 - Holding Tanks**

AOC 15 is the location of holding tanks around 5th and 6th Avenues at Column 10E that allegedly were sites of leaks and dumping as described by current employees. It is not known if the tanks were above ground or underground, what was held in the tanks, or what chemicals were released from the tanks.

#### **4.1.5 AOC 16 - Vapor Degreaser and Sump in Painting Area**

AOC 16 is a former vapor degreaser and sump that were located within a painting area in the assembly department in the northern portion of the plant (United Defense SWMU Drawing, June 1995). During the B&R Environmental site visit, it was observed that the floor foundation was noticeably altered at 23rd Avenue between Columns 17W and 18W. The site is currently occupied by two paint booths. A current employee who works in the area as a painter indicated that the vapor degreaser was removed around 1983. This employee described that an underground sump below the degreaser had a capacity of approximately 200 gallons and was active from 1978 to 1983. Current employees indicated that many leaks, of an unknown substance, were reported in the current paint shop.

#### **4.1.6 AOC 17 - Wash Rack Sump**

AOC 17 is an active wash rack sump located on 23rd Avenue between Columns 13W and 14W. The site is currently used as a naphthalene spray booth for equipment. Naphthalene collected in the washrack discharges through a drain in the concrete floor to an underground sump. A current employee indicated

that the integrity of the sump was in question and that soil borings were drilled in the area during the mid-1980s. A typical cross section for a sump is shown on Figure 4-5.

#### **4.1.7 AOC 18 - Vapor Degreaser and Sump Pit**

AOC 18 is the location of a paint area vapor degreaser pit located on 22nd Avenue between Columns 13W and 14W. The pit is 9 feet long by 15 feet, 6 inches wide by 5 feet, 9-1/2 inches deep. The wall and floor of the degreaser pit are 8-inch-thick concrete. A sump located in the southeastern corner of the degreaser pit is 1 foot square and 3 feet deep (PE 898, 1984). A typical cross section for a degreaser pit is shown on Figure 4-4.

#### **4.1.8 AOC 21 - Vapor Degreaser and Sump Pit**

AOC 21 is the location of a vapor degreaser pit located on 21st Avenue between Columns 3W and 4W. The pit is 19 feet, 6-inches long by 10 feet wide by 9 feet, 10-1/2 inches deep. The wall and floor of the degreaser pit are 8-inch-thick concrete. A sump pit located in the northeastern corner of the degreaser pit is 1 foot square and 3 feet deep (PE 898, 1984). A typical degreaser pit is shown on Figure 4-4.

#### **4.1.9 AOC 23 - Vapor Degreaser and Sump**

AOC 23 is the location of a former degreaser on 19th Avenue between Columns 3NE and 3SE. Currently, it is the location of a non-destructive testing area. Previously, the vapor degreaser sat on timbers at floor grade with a sump below the ground surface. Discharge gravity drained from the degreaser into the sump, and the liquid in the sump was pumped through a 55-gallon drum filled with carbon into the sanitary sewer. The system was in operation from at least 1984 through 1988. The start-up date is unknown.

#### **4.1.10 AOC 26 - Solvent Booth Pit and Trench**

AOC 26 is the location of a solvent booth pit and trench on 18th and 19th Avenues between Columns 4W and 5W. The trench is 16 feet long and 1 foot deep, with 6 inches of concrete around the bottom and sides. A 2-inch drain pipe leads from the trench to the pit. The concrete pit is 4 feet long by 2 feet wide and 3 feet deep (PE 144, 1965). This location is of potential concern because of the possible use of TCE as a solvent in the area.

#### **4.1.11 AOC 27 - Sump for Gun Assembly**

AOC 27 is the location of a sump in the machine shop on the corner of Avenue and Broadway. A maintenance employee indicated that the sump was unlined and was used in the 1970s as a plating bath for gun assembly activities.

#### **4.1.12 AOC 28 - Drywell in Diesel Room**

AOC 28 is the location of a drywell in the diesel room located on 17th Avenue. The 3-foot-diameter, 5-foot-deep drywell is located on the western side of Column 2W (Drawings C-27 and C-31, 1947). A typical cross section for a drywell is shown on Figure 4-3.

#### **4.1.13 AOC 29 - Pit and Drywell in Foundry**

AOC 29 is the location of a pit north of 16th Avenue in the foundry at Columns 6E and 7E. A drywell is located in the pit with a depth of 5 feet, 6 inches below grade. The actual use of the pit is unknown but, based on drawings, it is probable that it was used for a sand hopper (PE 150, 1965). TCE was used in the foundry therefore possible spills of TCE could have collected and discharged in the drywell.

#### **4.1.14 AOC 30 - Drywell in Machine Shop**

AOC 30 is the location of a drywell on 16th Avenue between Columns 12E and 13E. The drywell is 3 feet deep and located in a pit that is 1 foot, 11-5/8 inches deep and holds a furnace and a multiconductor. The drywell is 10-inch-CI pipe. A new sanitary sewer line was added to the existing sanitary sewer line when the pit was constructed. It is unknown if the drywell was constructed to drain into this new branch of the sanitary sewer (PE 43, 1963). A typical cross section for a drywell is shown on Figure 4-3.

#### **4.1.15 AOC 32 - Oil/Water Separator Sump**

AOC 32 is the location of an active oil/water separator sump on the western end of 15th Avenue. It is located in a scrap shed that stores machine turnings (brass, steel, etc.) inside hoppers. Some of the hoppers may have coolant or oil in them. The hoppers are bordered on each side by a floor drain. The unit receives wastewater from leakage in the hoppers through a floor drain on the eastern side of the hoppers. A trap inside the sump ensures that the oil remains in the drain and is not pumped out. Approximately every 9 months, the sump is pumped out. The piping around the separator was removed approximately 4 years ago. The system was always used for the same function. The oil/water separator

sump has a capacity of approximately 800 gallons. Wastes inside the oil/water separator before 1991 were pumped into the sanitary sewer. Currently, the unit is pumped manually to a coolant recycling system. A typical sump cross section detail is shown on Figure 4-5.

#### **4.1.16 AOC 33 - Degreaser Pit in Foundry**

AOC 33 is the location of a degreaser pit in the foundry area. The pit was located on the northern side of 14th Avenue between Columns 7E and 8E. The pit was 7 feet long by 6 feet, 10 inches wide and 3 feet 6 inches deep below grade (PE 150, 1965). The pit was in use until at least 1968 (PE 351, 1968). A typical degreaser pit cross section detail is shown on Figure 4-4.

#### **4.1.17 AOC 34 - Sump in Maintenance**

AOC 34 is the location of a sump on the northern side of 14th Avenue between Columns 20E and 21E in the maintenance department. It is known that TCE was used in this area (Envirodyne, 1983). This sump may have been a collection point for any TCE spills. The sump was located in a sand-blast area and discharged to a storm sewer to the south (Drawing C-20, 1947). A typical sump cross section detail is shown on Figure 4-5.

#### **4.1.18 AOC 35 - Paint Storage, Mixing, and Spray and Drywell**

AOC 35 is the location of a paint mixing and storage area located on 13th Avenue between Columns 19E and 20E. A paint spray area is located between Columns 20 E and 22 E on 13th Avenue. A drywell that receives runoff from drains located in the paint storage and mixing area is located in the paved court to the north (Drawing C-20, 1947). The drywell was 6 feet long by 4 feet wide and 3 feet deep. The drywell has been filled in with sand and electrical wiring. There are two storm sewers in the vicinity of the drywell. A typical drywell cross section detail is shown on Figure 4-3.

#### **4.1.19 AOC 36 - Paint Spray Pit**

AOC 36 is the location of a paint spray pit on the southern side of 6th Avenue between Columns 21E and 22E (Drawing A-7, 1047). TCE was used to clean parts before they were painted, therefore, there is a potential that a TCE spill could have occurred in this area and collected in the pit.

#### **4.1.20 AOC 37 - Methanol Sump**

AOC 37 is the location of sump at the northeastern corner of 13th Avenue. A maintenance employee indicated that this unlined sump received methanol through underground lines.

#### **4.1.21 AOC 38 - Trichloroethene Tank and Distribution System**

AOC 38 is the former location of a 8,800-gallon-capacity above-ground TCE tank between Columns 31SW and 31NW on 12th Avenue (Envirodyne, 1983). The tank was mounted on an 11-foot-square, 7-5/8-inch-thick concrete pad in 1966 (PE 221, 1966). TCE was transported from the tank to locations within the plating department through underground lines.

#### **4.1.22 AOCs 39, 40 and 41 - Vapor Degreaser Pits**

AOCs 39, 40, and 41 are the locations of three vapor degreasers on 11th Avenue in the plating department. Originally, the plating shop had wooden catwalks and dirt floors without a filtering system. All the wastewater went through the sanitary sewer system. Prior to 1973, there was only one plating shop, and it encompassed an area that today consists of both east and west plating. The walls of the plating shop were approximately 12 feet north of their current position. AOC 39 is a degreaser that was within a pit on 11th Avenue between Columns 25W and 24W. The dimensions of this degreaser were 5 feet wide by 5 feet long by 8 feet tall. AOC 40 was a degreaser located at Columns 22W and 21W that was 8 feet long by 5 feet wide by 8 feet tall. A third degreaser, AOC 41, was located on 11th Avenue between Columns 20W and 19W; it was 12 feet wide by 4 feet long by 12 feet deep (PE 546.2, 1975).

#### **4.1.23 AOC 42 - Degreaser Pit**

AOC 42 is the former location of a degreaser pit on 11th Avenue North between Columns 17W and 16W in the plating department (Drawing B-20, 1947). A typical degreaser pit is shown on Figure 4-4.

#### **4.1.24 AOCs 43 and 51 - Vapor Degreasers**

AOCs 43 and 51 are the former locations of vapor degreasers in the plating department located on 11th Avenue. The degreasers were located in an 8-foot, 6-inch-wide by 50-foot, 6-inch-long pit located between Columns 9W and 12W. The degreasers were located on the western end of the pit, and pickle tanks were located between Columns 11W and 10 W (Drawing B-20, 1947). AOC 43 had dimensions of

11 feet, 2 inches long by 5 feet, 6 inches wide by 8 feet, 3 inches tall, and AOC 51 had dimensions of 8 feet long by 5 feet, 2 inches wide by 8 feet tall (PE 444.7, 1973).

#### **4.1.25 AOC 44 and 52 - Sump Pits in Plating**

AOCs 44 and 52 are the locations of sump pits in the plating department located on 11th Avenue. AOC 44 is a former sump that was located northeast of a degreaser and pickle tank pit on the west side of Column 9W (Drawing B-20, 1947). AOC 44 had a 36-inch manhole frame and cover. AOC 52 is the location of an existing set of sumps in the center of 11th Avenue at Column 7W (PE 1125.5, 1991)

#### **4.1.26 AOCs 45 and 46 - Drywells in Heat Treating**

AOCs 45 and 46 are drywells located in the heat treating department on 11th Avenue on Columns 3E and north 4E, respectively. AOC 45 was located on the western side of a pit furnace, and AOC 46 was located near quench tanks. The quench tanks held oil that was used to bathe red-hot parts that came out of the furnace. A typical cross section for a drywell is shown on Figure 4-3.

#### **4.1.27 AOC 47 - Degreaser Still**

AOC 47 is a degreaser still located on 11th Avenue next to Column 18E. The still is located next to a wax pot in the plating department (PE 303, 1968). The wax pot was used to cover parts of metal that were not going to be painted.

#### **4.1.28 AOC 48 - Degreaser and Parcolube Pit**

AOC 48 is the former location of a vapor degreaser and parcolube pit in the plating department. The pit was located on the southern wall of 11th Avenue between Columns 25W and 22W. The pit was 56 feet, 6 inches long, 8 feet, 9 inches wide, and 8 feet, 4 inches deep. The degreaser was used for the parcolube line and had an approximate 150-gallon capacity. A sump was located in the tank pit just west of column 23W. The sump was 8 feet deep, with a maximum width of 4 feet, 8 inches. The sump was concrete lined with an 8-inch-thick wall and had a 36-inch manhole frame and cover (Drawing B-20, 1947).

#### **4.1.29 AOC 49 - Degreaser Still**

AOC 49 is the location of a degreaser still in the plating department on 11th Avenue. The still was located next to tank pits on the southern wall directly west of Column 22W (Drawing B-20, 1947).

#### **4.1.30 AOC 50 - Drywell in Plating**

AOC 50 is the former location of a drywell in the plating department on 11th Avenue between Columns 18W and 19W. The drywell received runoff from drains located in the paint shop within the plating department. A paint spray booth located north of 11th Avenue on 12th Avenue near Column 18W south could also have drained through a drain located on the 11th Avenue North wall. This drain also discharges to the drywell (Drawing C-19, 1947). The drywell had a sand bottom and was 10 feet, 6 inches deep with an 8-inch-thick brick wall and 24-inch manhole cover and frame (Drawing B-14, 1947). A typical section for a drywell is shown on Figure 4-3.

#### **4.1.31 AOC 53 - Pit and Sump in Heat Treating**

AOC 53 is the location of a sump in a pit in the heat treating department on 11th Avenue between Columns 5E and 6E (Drawing A-7, 1947).

#### **4.1.32 AOC 54 - Sludge Pit**

AOC 54 is the former location of a sludge pit in the paved court off 11th Avenue between Columns 16E and 17E outside the heat treat department. The sludge pit discharged to the storm sewer located to its west (Drawing C-20, 1947). It is not known what kind of sludge was collected in this pit. The area is currently covered with asphalt. There are two storm sewers in the vicinity of the SWMU.

#### **4.1.33 AOC 55 - Drywell in Paved Court**

AOC 55 is a drywell located in the paved court outside 11th Avenue between Columns 17E and 18E (Drawing C-20, 1947). A typical section for a drywell is shown on Figure 4-3.

#### **4.1.34 AOC 58 - Vapor Degreaser**

AOC 58 is the location of a former vapor degreaser in the middle of 11th Avenue between Columns 4W and 3W North. The degreaser, which was located in the non-destructive testing area, was in a 9-foot-long by 7-foot, 6-inch-wide by 3-foot, 4-inch-deep pit. The degreaser, which was 4 feet, 2 inches wide, was located in the southwestern corner of the pit. The pit had a 6-inch-thick concrete wall and floor (PE 334, 1968). The location of the degreaser pit has been filled in with concrete. An above-ground aqueous cleaning system currently exists in the area.

#### **4.1.35 AOCs 20 and 59 - Machine Oil Sumps**

AOCs 20 and 59 are the present locations of two sumps that contain machine oil. The sumps are located on 6th Avenue 6NW and 6th Avenue 12 NE. The sumps are 3 feet long by 4 feet wide concrete vaults with a 1-inch-diameter, 60-inch-deep steel tub that contains the machine oil. A pump pulls the oil up into the machine, which is located directly above the sump, and then the oil drips from the machine back into the sump. A current employee indicated that the sumps are approximately 20 to 25 years old.

## **4.2 SEWER SYSTEMS**

### **4.2.1 Sanitary Sewer**

The sanitary sewer system at NIROP was installed during the original site development. The lines are 4 to 6 feet below ground surface on the northern end of the plant and 8 to 10 feet below ground surface on the southern end. The sewer system consists of various sizes of vitrified clay pipe that was installed in 3-foot sections. Reportedly, the joints were concrete grouted (Envirodyne, June 1983). The sewer system carried domestic and treated and untreated industrial wastes with a single 15-inch connection point to the Pig's Eye Plant. Figure 4-6 shows the location of the sanitary sewer system.

In 1974, 600 gallons of TCE were allegedly discharged into a floor drain around the plating department. An employee indicated that the floor drain led to the sanitary sewer, and that TCE was detected in an interceptor approximately 1 mile down the sewer line.

On August 11, 1984, approximately 200 gallons of TCE was released from a vapor degreaser in the plating department. The TCE flowed into a sump; a portion of the solvent was contained by the baffles, and some was pumped into the treatment system and possibly into the sanitary sewer (FMC, April 30, 1984).

The condition of the clay pipes that make up the sanitary sewer system for the plant is unknown. TCE discharged to the sanitary sewer system could have leaked to the soil if there were cracks in the pipe. Production areas within the NIROP facility discharged waste liquid directly to the sanitary sewer. These consisted of: wastewater containing cyanide and metals generated by plating operations; spent cooling solutions from the machine shop; spent alkaline cleaner and phosphating solution used to clean parts in the paint shop; wash water containing detergents for cleaning small quantities of parts in the assembly area; water-based oils generated in the heat treating department; and wastewater from the boilers in the

boiler plant (Envirodyne, June 1983). TCE discharge to the sanitary sewer was not specifically mentioned, but based on the amount of waste liquid discharged, the possibility exists that TCE was also intentionally discharged to the sanitary sewer through a manhole or drain. In addition, TCE spills have been documented in the assembly department, non-destructive testing area, and plating department for the 1980s. The only portion of the sanitary sewer system that is not of potential concern is the commissary located on the east side of 22nd and 23rd Avenues where there was no known TCE usage (see Figure 4-6).

#### **4.2.2 Storm Sewer**

The storm sewer system for NIROP is shown on Figure 4-7. Similar to the sanitary sewer, manholes and catch basins are located throughout the plant as shown on Figure 4-7.

Current employees told indicated that portable wash tanks that contained TCE were used throughout the plant. A crew cleaned and collected the sludge that settled in the bottom of these tanks. The tanks were 4-1/2 feet long by 2 feet wide and could store 30 to 50 gallons of TCE. Approximately 38 to 45 smaller degreasing tanks scattered throughout the assembly area contained Stoddard Solvent. Also, approximately 12 larger degreasing units (75-gallon capacity) were located in the assembly area. Six of the larger units contained TCA, and the remaining contained Stoddard Solvent (Envirodyne, 1983). Possible spillage of these tanks could drain to the storm sewer system through manholes and drains located throughout the plant.

Several documented spills occurred in the NIROP facility between 1984 and 1986 that may have resulted in discharge of chemicals to the storm sewer system. Among these spills were a spill of 15 gallons of TCE from a tank in the assembly department; 200 gallons of TCE in the plating department; 15 gallons of TCE in the assembly department; 7 gallons of TCA from a ruptured hose in the assembly department; and 2 gallons of TCE from a loose filter in the assembly department in 1984. In 1985, 520 gallons of TCE were discharged during a steam valve leak in the non-destructive testing area. In 1986, 1 gallon of TCE was spilled when a portable tank was overfilled, 2 gallons of TCE were spilled in the non-destructive testing area when a maintenance hose fell out of a drum upon cleanout, and 25 gallons of TCE were lost to the floor in the plating department when a large vapor degreaser still float valve malfunctioned. Appendix A contains a copy of the NIROP spill history for 1984, 1985, and 1986 and several spill reports from 1984 and one from 1981.

The condition of the storm sewer system is unknown. Contaminants which entered the storm sewer could have leaked to the soil if there were cracks in the sewer pipe. The potential areas of concern discussed above encompass most of the NIROP facility. Spills have been documented in the assembly department, non-destructive testing area, and plating department for the 1980s. Spills are likely to have occurred at NIROP from the 1940s through 1970s in similar production areas where TCE was transported or used.

## 5.0 CONCLUSIONS

The following sections describe the rationale for choosing specific features of operations such as drywells, pits and sumps, storage tanks, and sewer systems.

### 5.1 DRYWELLS

Drywells are the main feature of concern located at NIROP, Fridley. As shown on Figure 4-3, drywells were installed with a sand bottom so liquid would discharge through the drywell directly to the soil below. Drywells are identified throughout the main plant building, including the plating department, diesel room, foundry, heat treating, machine shop, and paint spray areas. Possible contamination from these areas includes solvents, diesel fuel, oil, paint sludge and cleaners. Potential locations of TCE usage and possible discharge through these drywells are in the plating, assembly, heat treating, foundry and paint shop.

### 5.2 PITS AND SUMPS

Pits and sumps are two features of concern that were used to hold and handle degreasers, plating baths, waste liquids, and possible spillage. Sumps were located in pits and also on the floor of operations departments to collect and sometimes discharge spills to the sanitary sewer. The sumps were sometimes unlined, and possible contaminants collected by the sumps, and potentially discharged to the soil below, include solvents, methanol, naphthalene, coolant, machine oil, and paint. Sumps were located in degreaser pits that used TCE and also on the floor in departments that used and transported TCE, including the plating, assembly, heat treating, and painting departments.

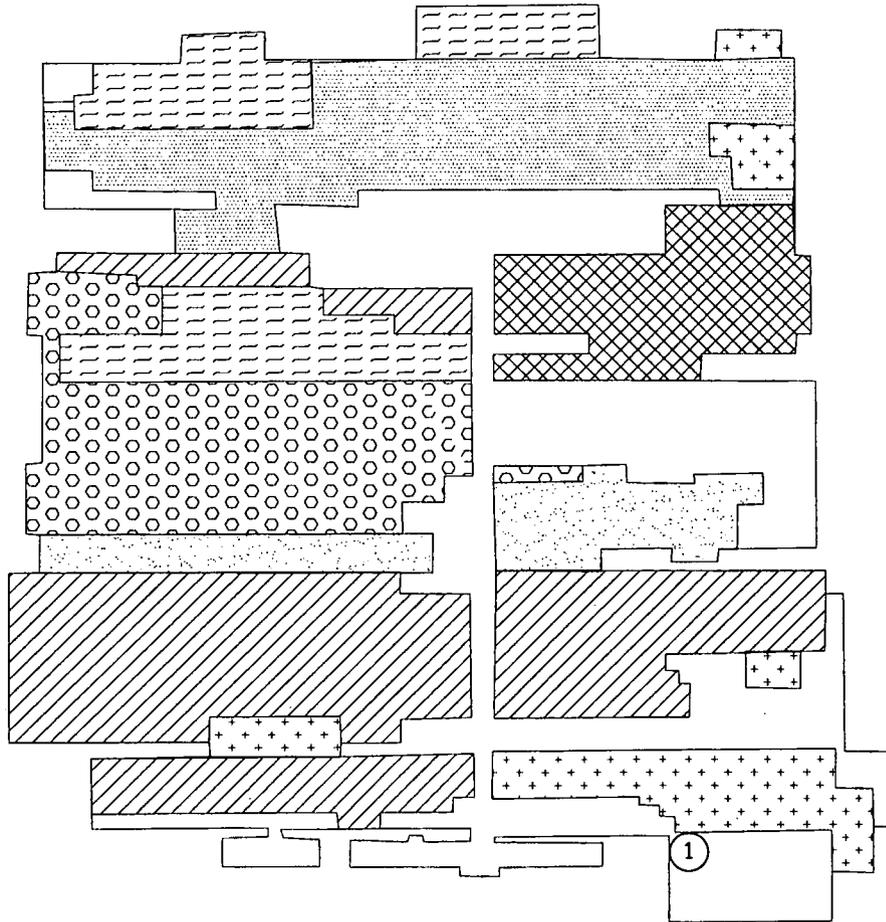
A soil investigation conducted in the east plating shop detected TCE as the primary contaminant in the soil. TCA, acetone, styrene, and metals such as chromium, lead, and cyanide were detected at slightly elevated levels in the soil. Metals results in soil were highest in the vicinity of a previously existing sump (Halliburton NUS Corporation, May 1995). Based on the contamination found in the east plating shop, contamination is likely to have occurred through existing sumps located throughout NIROP.

### **5.3 SEWER SYSTEMS**

The sanitary and storm sewer systems at NIROP, Fridley were installed during the original site development. Operations departments discharged waste liquids directly to the sanitary sewer. Manholes and catch basins for the storm sewer are located throughout the plant building within the operations departments. Documented spills of hazardous materials may have reached the storm sewer. The condition of the pipes underlying the plant is unknown, because no testing has been done. However, a section of the 15-inch sanitary line just south of the plant on United Defense, LP property was inspected by video scan. One part of the pipe was deteriorated and required slip lining. The fractures in the pipe were believed to have been caused by excavation in the area (Envirodyne, June 1983). The soil underneath the sewer systems is of potential concern if the lines were broken and allowed contamination to enter the soil.

### **5.4 STORAGE TANKS**

Both underground and above-ground tanks were used at NIROP, Fridley to store TCE and TCA used in plant operations. An above-ground TCE tank was located on the western side of the plant, and TCA tanks were located throughout the plant as shown on Figure 4-2. The tank locations are of concern if the tanks leaked and contaminated the surrounding soil. More information is necessary to determine if these tanks warrant additional investigation.



LEGEND

-  ASSEMBLY & PAINTING
-  FOUNDRY
-  WELDING
-  HEAT TREAT & PLATING
-  MACHINE SHOP
-  TEST & INSPECTION & QA
-  SHIPPING, RECEIVING & STORAGE
-  PHOTO LAB



NOTE: LOCATIONS OF THE PRODUCTION AREAS HAVE VARIED OVER TIME. THE DATE OF THE PROCESS AREA LAYOUT SHOWN IS NOT KNOWN.

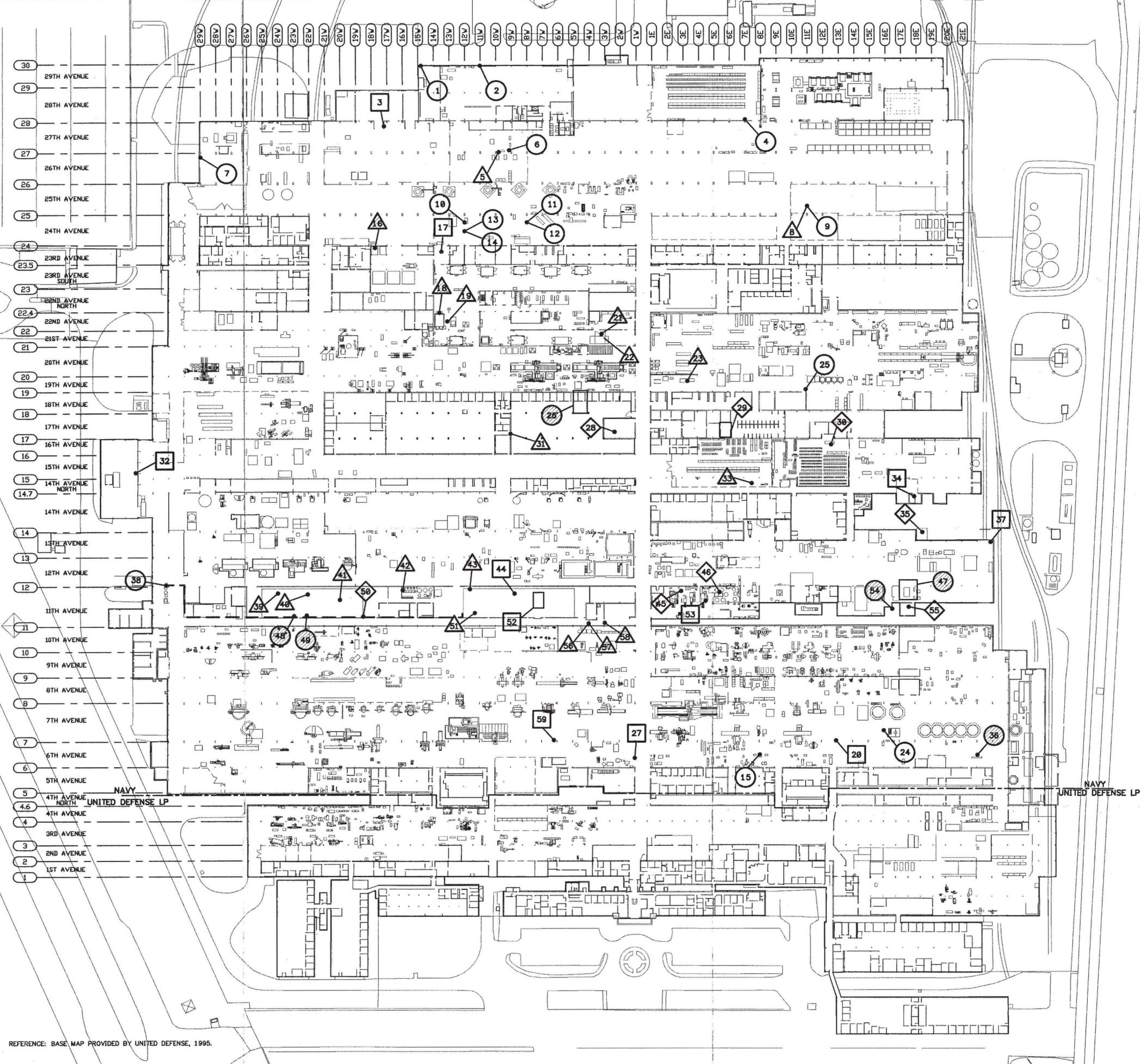
REFERENCE: REMEDIAL INVESTIGATION REPORT,  
RMT, JUNE 1987

**INDUSTRIAL PROCESS AREAS**  
**WITHIN THE MAIN INDUSTRIAL PLANT BUILDING**  
**NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT**  
**FRIDLEY, MINNESOTA**

**FIGURE 4-1**

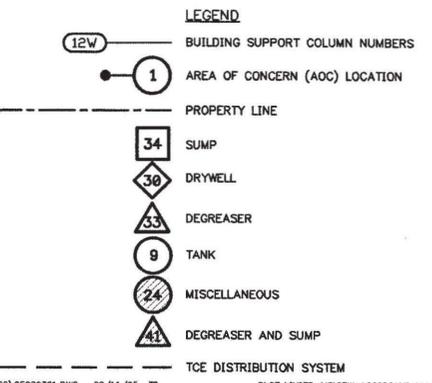


**Brown & Root Environmental**



AOC	Description	Reference
1.	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
2.	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
3.	Sump in Receiving Area	Drawing A-7, 1947
4.	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
5.	1,1,1-Trichloroethane Degreaser	TCA Tank Inventory, United Defense, LP January 1990
6.	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
7.	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
8.	1,1,1-Trichloroethane Degreaser	TCA Tank Inventory, United Defense, LP January 1990
9.	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
10.	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
11.	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
12.	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
13.	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
14.	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
15.	Holding Tanks	Interview with current employees, August 10, 1995
16.	Vapor Degreaser and Sump	United Defense SWMU Map, June 23, 1995
17.	Wash Rack Sump	United Defense SWMU Map, June 23, 1995
18.	Vapor Degreaser and Sump	Drawing PE 898, 1984
19.	1,1,1-Trichloroethane Degreaser	TCA Tank Inventory, United Defense, LP January 1990
20.	Machine Oil Sump	Interview with current employee, August 24, 1995
21.	Vapor Degreaser and Sump	Drawing PE 898, 1984
22.	1,1,1-Trichloroethane Degreaser	TCA Tank Inventory, United Defense, LP January 1990
23.	Vapor Degreaser and Sump	United Defense SWMU Map, June 23, 1995
24.	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
25.	1,1,1-Trichloroethane Tank	TCA Tank Inventory, United Defense, LP January 1990
26.	Solvent Booth Pit and Trench	Drawing PE 144, 1965
27.	Sump for Gun Assembly	Interview with retired employee, August 23, 1995
28.	Drywell in Diesel Room	Drawing C-31, 1947
29.	Pit and Drywell in Foundry	Drawing PE 150, number 2373-F, 1965
30.	Drywell in Machine Shop	Drawing PE 43, 1963
31.	1,1,1-Trichloroethane Degreaser	TCA Tank Inventory, United Defense, LP January 1990
32.	Oil/Water Separator Sump	United Defense SWMU Map, June 23, 1995
33.	Degreaser Pit in Foundry	Drawing PE 150, number 2373-F, 1965 and PE 351, number 2860-F, 1968
34.	Sump in Maintenance	Drawing C-20, 1947
35.	Paint Storage, Mixing and Spray and Drywell	Drawing A-3 and C-20, 1947
36.	Paint Spray Pit	Drawing A-7, 1947
37.	Methanol Sump	Interview with retired employee, August 23, 1995
38.	Trichloroethane Tank and Distribution System	Drawing A-3, 1947 and PE 221, 1966
39.	Vapor Degreaser Pit	Drawing PE 546.2, 1975
40.	Vapor Degreaser Pit	Drawing PE 1002 Sheet 1, 1986 and PE 546.2, 1975, and FMC Interoffice Trichloroethane Survey, March 1981
41.	Vapor Degreaser Pit and Sump	Drawing PE 1002 Sheet 1, 1986 and PE 546.2, 1975, and FMC Interoffice Trichloroethane Survey, March 1981
42.	Degreaser Pit	Drawing B-20, 1947
43.	Vapor Degreaser	FMC Interoffice Trichloroethane Survey, March 1981; and Drawing B-20, 1947 and PE 444.7 Sheet 14, 1973
44.	Sump Pit in Plating	Drawing A-7 and B-20, 1947 and PE 546.2 sheet 2, 1975
45.	Drywell in Heat Treating	Drawing C-20, 1947 and PE 1125.5, 1991
46.	Drywell in Heat Treating	Drawing C-20, 1947
47.	Degreaser Still	Drawing PE 303, 1968
48.	Degreaser and Parcolube Pit	Drawing PE 303, 1968 and A-3, B-7 and B-14, 1947
49.	Degreaser Still	Drawing B-20, 1947
50.	Drywell in Plating	Drawing A-3 and A-7, 1947, and PE 546.2 sheet 2, 1975
51.	Vapor Degreaser	FMC Interoffice Trichloroethane Survey, March 1981, and Drawing B-20; 1947 and PE 444.7 Sheet 14, 1973
52.	Sumps in Plating	Drawing PE 1125.5, 1991
53.	Pit and Sump in Heat Treating	Drawing A-7, 1947
54.	Sludge Pit	Drawing A-7, B-15, and C-20, 1947
55.	Drywell in Paved Court	Drawing C-20, 1947
56.	1,1,1-Trichloroethane Degreaser	TCA Tank Inventory, United Defense, LP January 1990
57.	1,1,1-Trichloroethane Degreaser	TCA Tank Inventory, United Defense, LP January 1990
58.	Vapor Degreaser	FMC Interoffice Trichloroethane Survey, March 1981, and Drawing PE 178, 1965 and PE 334, 1968
59.	Machine Oil Sump	Interview with current employee, August 24, 1995

NOTES:  
 1. Typical sump, drywell, and degreaser pit sections are shown on Drawing 4-3, 4-4, and 4-5.  
 2. The sanitary sewer system and storm sewer system are additional areas of concern. See Drawings 4-6 and 4-7.



REFERENCE: BASE MAP PROVIDED BY UNITED DEFENSE, 1995.

DEPARTMENT OF THE NAVY  
 SOUTHERN DIVISION  
 NAVAL FACILITIES ENGINEERING COMMAND  
 CHARLESTON, SC

ISSUED DATE

PREP BY DATE APPRVD

REV. DESCRIPTION

NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT  
 FRIDLEY, MINNESOTA

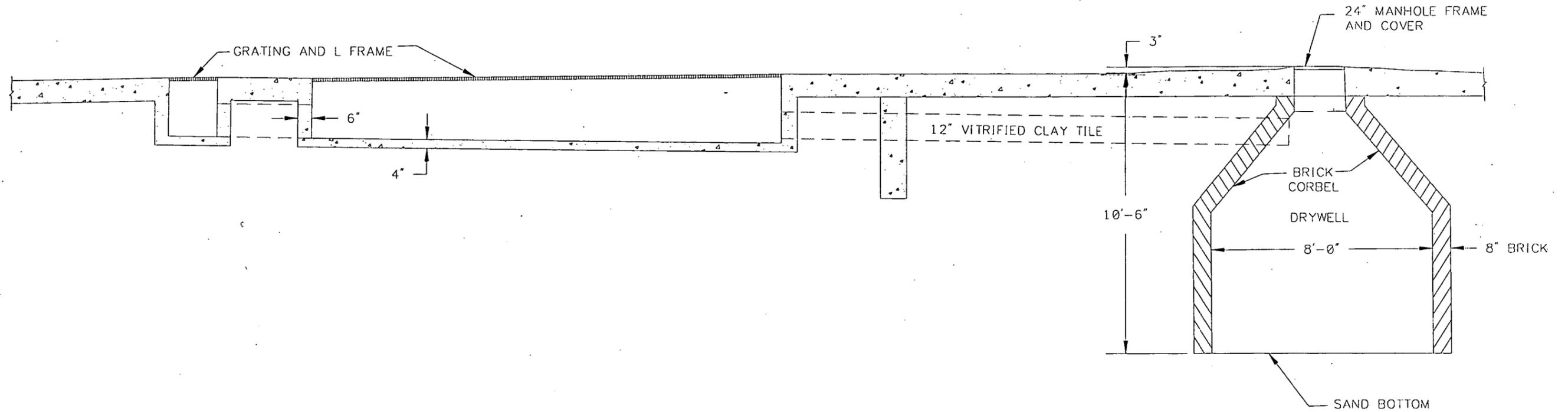
SEAL AREA

SAT TO DATE

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 NAVFAC DRAWING NO. NA

SHEET 1 OF 1  
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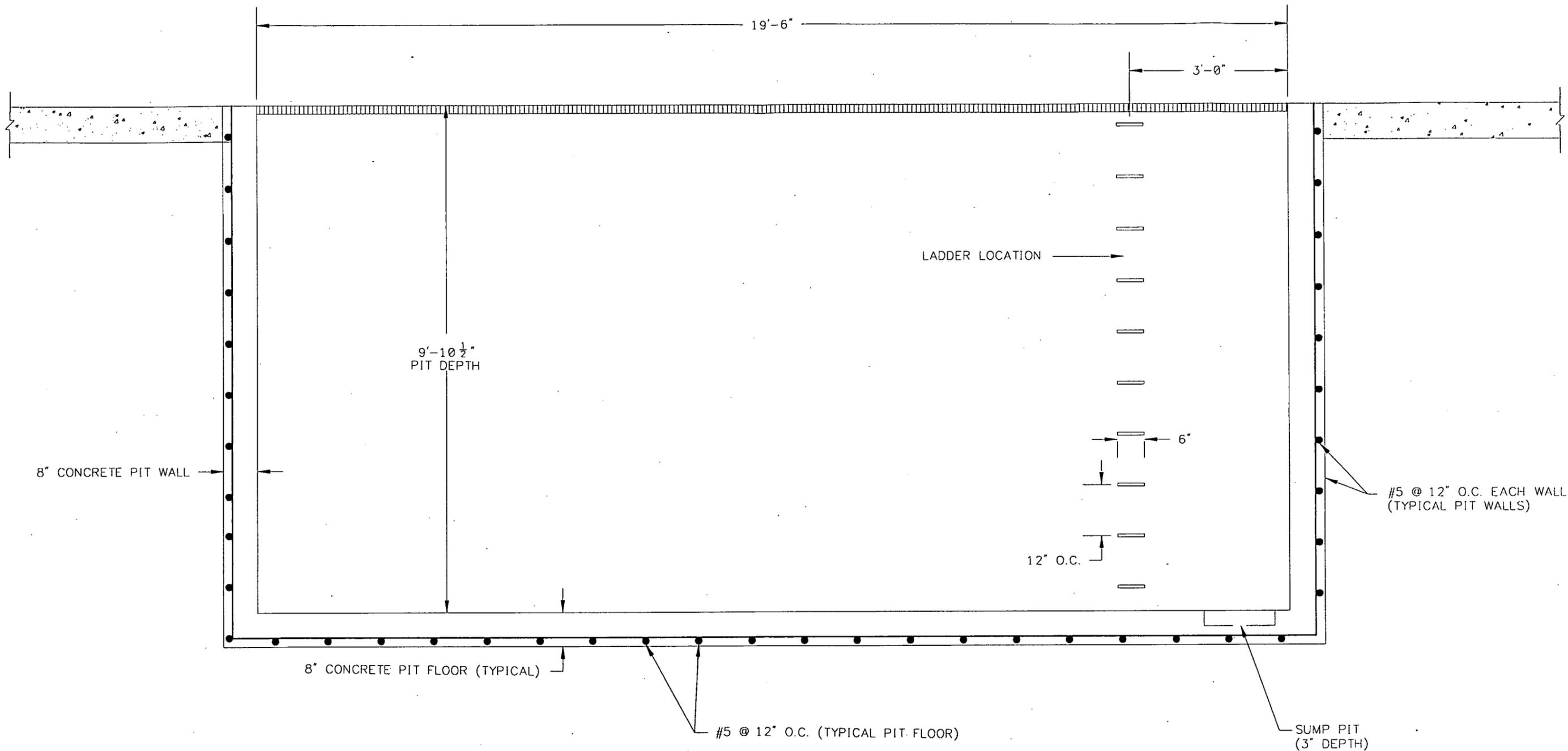
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REFERENCE: U.S. NAVY DRAWING B-20 DATED 1947

TYPICAL DRYWELL SECTION  
NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT  
FRIDLEY, MINNESOTA  
SCALE: 1/4" = 1'-0"

DRAWING 4-3



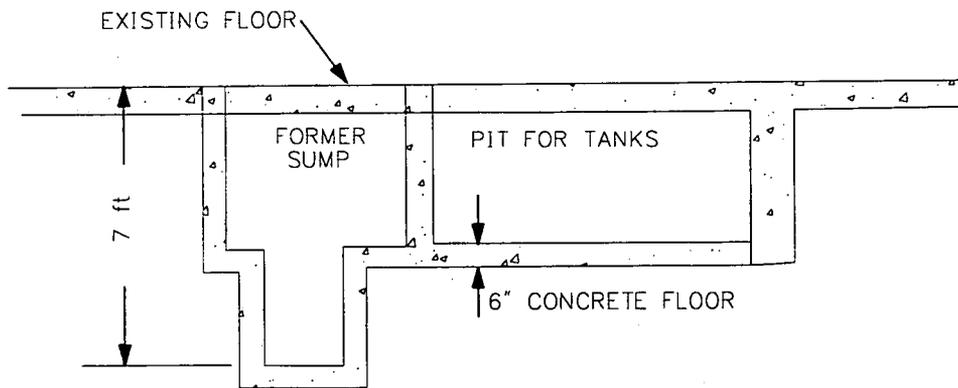
REFERENCE: FMC CORPORATION DRAWING PE-898 DATED 8/16/84, REVISED 8/24/84

TYPICAL VAPOR DEGREASER PIT SECTION  
 NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT  
 FRIDLEY, MINNESOTA  
 SCALE: 1/2" = 1'-0"

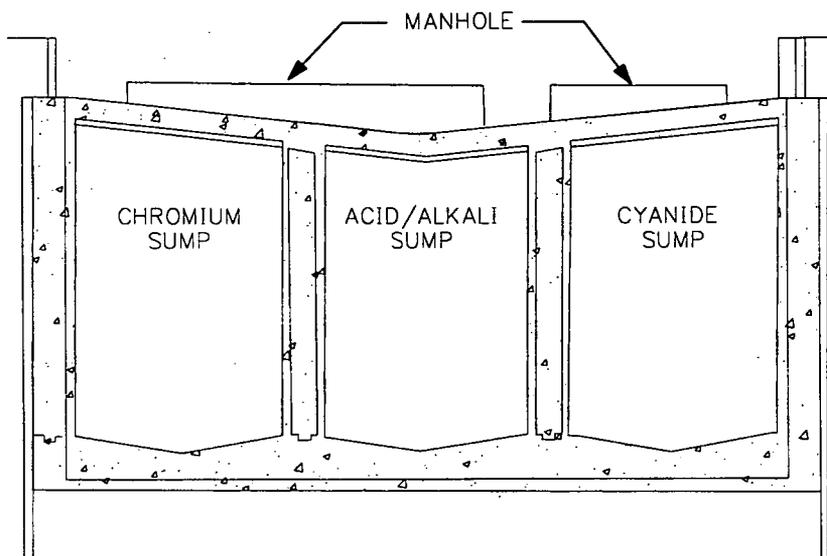
DRAWING 4-4



Brown & Root Environmental



TYPICAL SECTION: FORMER SUMPS (PRE-1973)



TYPICAL SECTION: EXISTING SUMPS (POST-1973)

REFERENCE: HALLIBURTON NUS CORPORATION, DRAFT FIELD INVESTIGATION  
SUMMARY REPORT FOR EAST PLATING SHOP SOIL AND GROUNDWATER  
INVESTIGATION, FIGURE 2-2, DATED 5/8/95

TYPICAL SUMP SECTION

NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT

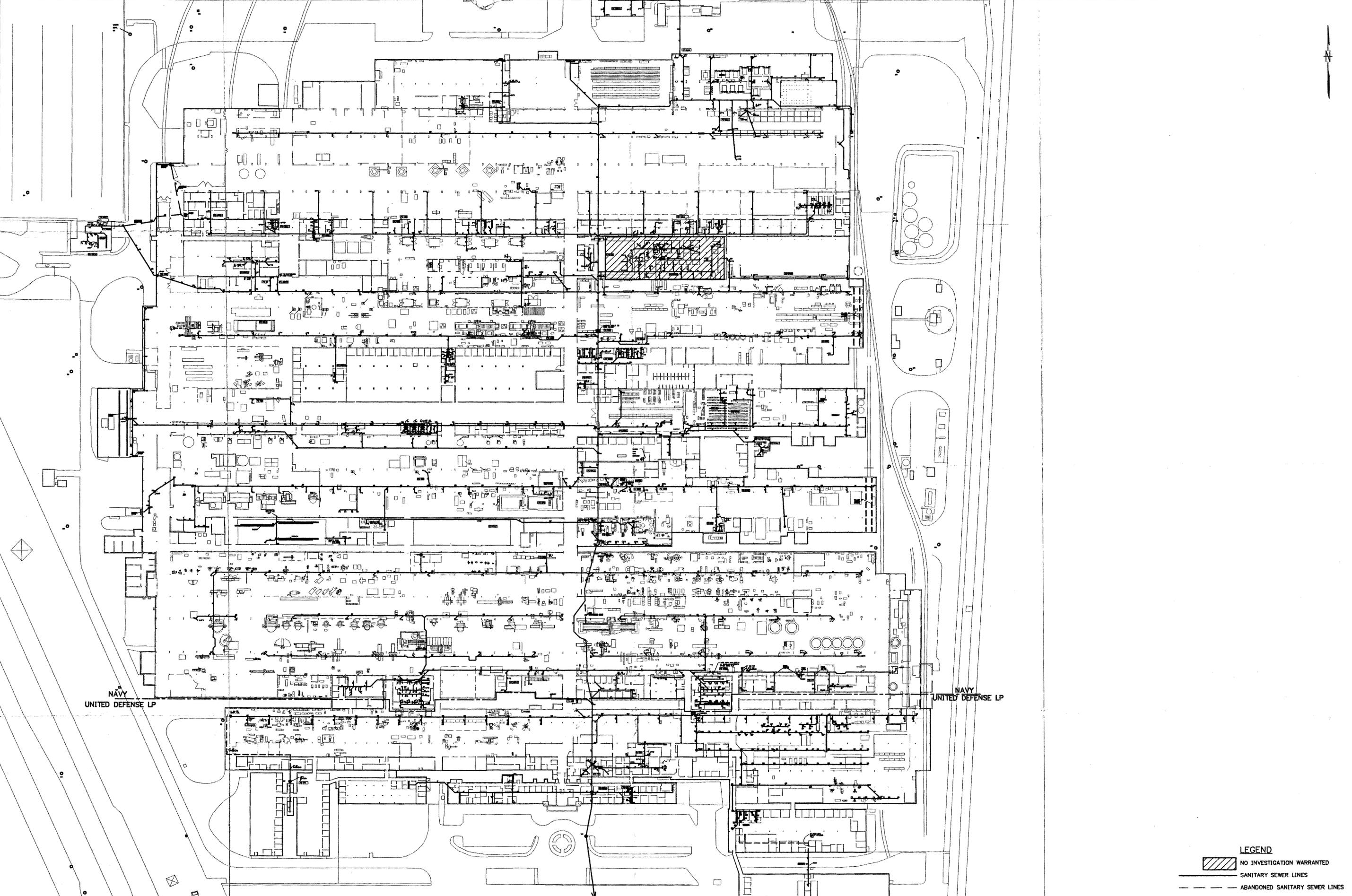
FRIDLEY, MINNESOTA

SCALE: 1" = 5'

DRAWING 4-5



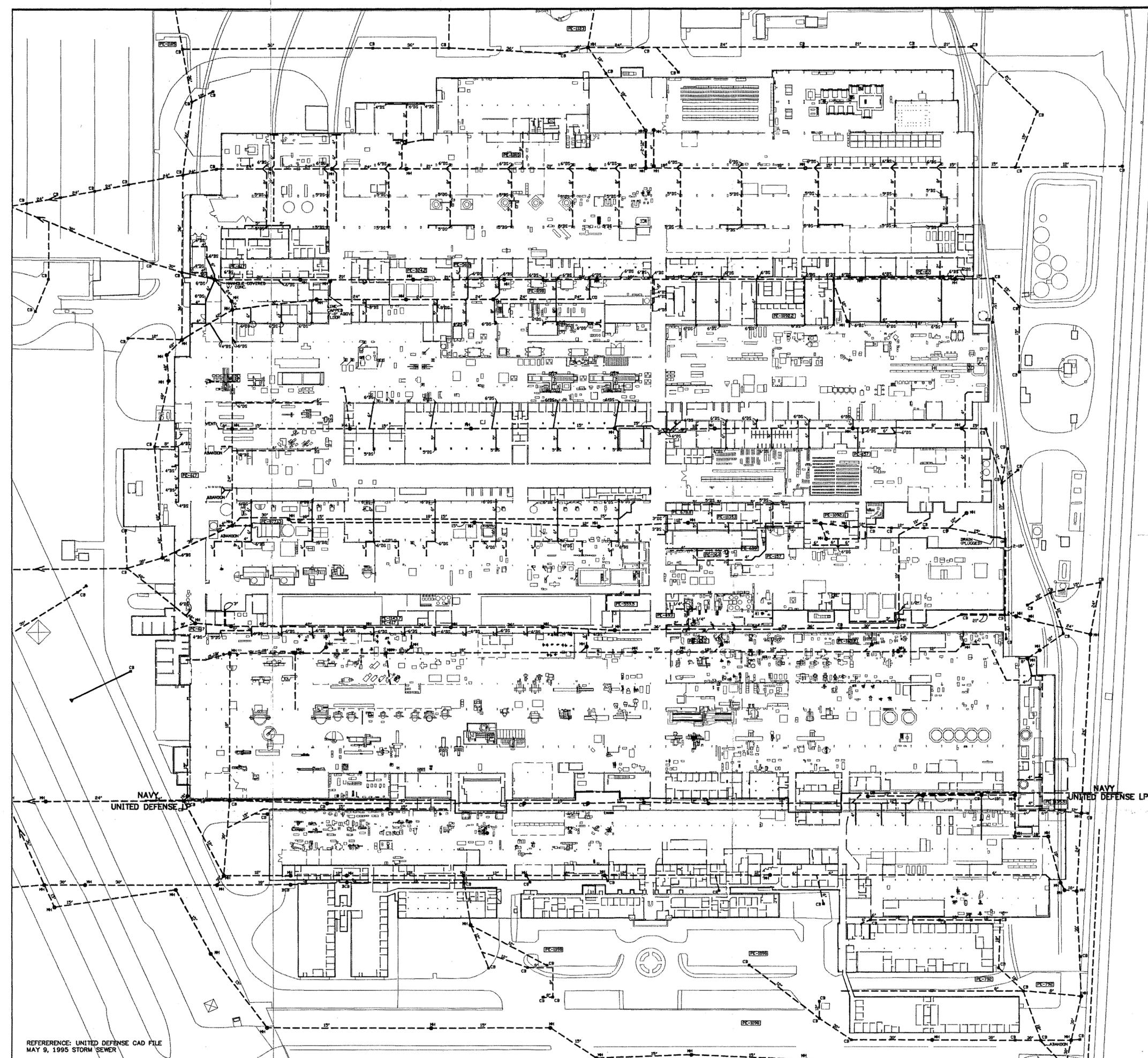
**Brown & Root Environmental**



REFERENCE: UNITED DEFENSE CAD FILE  
 JANUARY 24, 1984 SANITARY SEWER

- LEGEND**
-  NO INVESTIGATION WARRANTED
  -  SANITARY SEWER LINES
  -  ABANDONED SANITARY SEWER LINES
  -  FLOW DIRECTION
  -  PROPERTY LINE

DEPARTMENT OF THE NAVY <b>SOUTHERN DIVISION</b> NAVAL FACILITIES ENGINEERING COMMAND CHARLESTON, SC		DRAWN BY: CH. ENG. CHECKED BY: CH. ENG. DATE: _____ (FIRM MEMBER) (TITLE) (FIRM MEMBER) (TITLE) (FIRM MEMBER) (TITLE)
<b>SANITARY SEWER SYSTEM</b> <b>NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT</b> <b>FRIDLEY, MINNESOTA</b>		DATE: _____ OFFICER IN CHARGE: _____ APPROVED: _____
SEAL AREA		DATE: _____ ISSUED: _____ SOUTH DIV FOR COMMANDER, NAVFAC
SAT TO: _____ DATE: _____ CODE I.D. NO. NA SCALE: 1"=1000' SPEC. NO. 04 - CONSTR. CONTR. NO. NA NAVFAC DRAWING NO. NA		SHEET 1 OF 1 SIZE: DIS. SH. NO. <b>D 4-6</b>



REFERENCE: UNITED DEFENSE CAD FILE  
MAY 9, 1995 STORM SEWER

- LEGEND**
- 18" PIPING RUNS, NUMBER INDICATES PIPE SIZE
  - 12" PIPING BELOW GRADE IN TUNNEL, OR ABOVE ROOF
  - MH MANHOLE LOCATION
  - CB CATCH BASIN
  - DS DOWNSPOUT
  - PROPERTY LINE
  - ← FLOW DIRECTION

<p>NAVAL FACILITIES ENGINEERING COMMAND CHARLESTON, SC</p> <p><b>SOUTHERN DIVISION</b></p> <p><b>STORM SEWER SYSTEM</b></p> <p><b>NAVAL INDUSTRIAL RESERVE ORDNANCE PLANT</b></p> <p><b>FRIDLEY, MINNESOTA</b></p>	<p>DATE: _____</p> <p>ISSUED: _____</p> <p>SAT TO: _____ DATE: _____</p> <p>CODE I.D. NO. NA</p> <p>SCALE: 1"=1000'</p> <p>SPEC. NO. 04 -</p> <p>CONSTRN. CONTR. NO. NA</p> <p>NAVFAC DRAWING NO. NA</p> <p>SHEET 1 OF 1</p> <p>SIZE: D DIS. SH. NO. 4-7</p>
<p>APPROVED BY: _____</p> <p>DR: CH. ENG.</p> <p>DESIGN: _____</p> <p>SUBJ: _____</p> <p>DATE: _____</p> <p>APPROVED BY: _____</p> <p>DR: _____</p> <p>DESIGN: _____</p> <p>SUBJ: _____</p> <p>DATE: _____</p>	<p>OFFICER IN CHARGE: _____</p> <p>APPROVED: _____</p> <p>DATE: _____</p>

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Drawing A-3, 1947. Plot Plan, Detail of South Property Line.

Drawing A-7, 1947. Plot Plan of Underground Services.

Drawing B-1, 1947. Floor Plan, West End Building 1.

Drawing B-2, 1947. Floor Plan, East End of Building 1.

Drawing B-10, 1947. Tunnels, Oil Tanks and Shavings Loading Stations.

Drawing B-12, 1947. Foundation and General Plan, Building 3.

Drawing B-14, 1947. Floor Plan, West End - Buildings 2 and 6.

Drawing B-15, 1947. Floor Plan, East End - Buildings 2 and 6.

Drawing B-20, 1947. Plating Department and Paint Room - Building 2.

Drawing C-19, 1947. Plumbing Plan, West End Building 286.

Drawing C-20, 1947. Plumbing Plan, East End Building 286.

Drawing C-27, 1947. Plans and Details, Substation, Building 28, Emergency Diesel Station 6E.

Drawing C-31, 1947. Plumbing Plan, West End Building 7.

PE 43, 1963. Pit for Ajax Furnaces and Multiduct - Plans and Sections, 16th Avenue between Columns 12E and 13E, Building 6.

PE 144, 1965. Solvent Booth Pit and Trench - Plans and Sections, Columns 4W to 5W, 19th and 18th Avenues, Building 7.

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**Aerial Photographs:**

Number 2079 dated October 28, 1940. View from the southeast showing initial construction.

Number 2423 dated May 8, 1941. View from the southeast.

Number 2474 dated June 5, 1941. View from the southwest.

Number 2746 dated October 9, 1941. View from the northwest.

Number 2747 dated October 9, 1941. View from the west.

Number 2853 not dated. View from the southwest.

Number 5824 dated September 26, 1943. View from the east.

Number 5825 dated September 26, 1943. View from the northeast.

Number 5826 dated September 26, 1943. View from the south.

Number 5829 dated September 23, 1943. View from directly above.

Number 10754 dated November 25, 1949. View from the southwest.

Number 18287 not dated. View from the southeast.

Number 24066 not dated. View from the southeast.

Number 30693 not dated. View from directly above.

Number 79975 not dated. View from directly above.

Number 55449 not dated. View from directly above.

Number 64977 not dated. View from the north.

**Drawings:**

- A-1 Plot Plan, Detail of South Property Line. December 15, 1947. Revised November 1970.
- A-1 Plot Plan, Detail of South Property Line. December 12, 1947. Revised November 1970.
- A-2 Plot Plan. October 31, 1947. Revised November 1970.
- A-2 Plot Plan. October 31, 1947. Revised November 1970.
- A-3 Plot Plan. October 31, 1947. Revised November 1970.
- A-4 Plot Plan, Overhead Sprinkler System. October 31, 1947. Revised November 1970.
- A-6 Plot Plan, (Underground Air), Gas, Oxygen, Acetylene. October 21, 1947. Revised November 1970.
- A-7 Plot Plan of Underground Services - Fire Mains, Storm & Sanitary Sewers. October 22, 1947. Revised November 1970.
- A-8 Plot Plan, Underground Services - Fire Lines, Domestic Water, Steam and Return Lines. September 29, 1947. Revised November 1970.
- A-8 Plot Plan, Underground Services - Fire Lines, Domestic Water, Steam and Return Lines. September 29, 1947. Revised November 1970.
- A-9 Plot Plan, Overhead Steam Distribution.
- A-9 Plot Plan, Overhead Steam Distribution. October 22, 1947. Revised November 1970.
- A-15 Plot Plan, Fire Protection. November 7, 1947. Revised November 1970.
- A-18 Diesel Emergency Power. February 17, 1964. Revised September 1970.
- B-1 Floor Plan, West End Building 1. September 16, 1947. Revised July 1971.
- B-2 Floor Plan, East End of Building No. 1. September 16, 1947. Revised August 1971.
- B-7 Shop Office 1st and 2nd Floors and Section - Building 1. September 16, 1947. Revised August 1971.
- B-8 Toilet and Locker Room - Plans and Sections Building 1A. October 20, 1947. Revised September 1971.
- B-9 Toilet and Locker Room - Plans & Sections Building 1B. September 15, 1947.
- B-10 Tunnels, Oil Tanks and Shavings Loading Stations. October 20, 1947. Revised July 1971.
- B-12 Foundation & General Plan, Building 3. October 30, 1947, Marked Print Dated March 15, 1965 for 1965 Boiler Repair Program.
- B-12 Foundation and General Plan, Building 3. October 30, 1947.
- B-13 Elevations, Sections and Details Building 3. October 30, 1947. Revised October 1965.

- B-13A Flue Gas System Modifications - Plans and Sectional Elevations - Boiler Room Building #3. December 26, 1963.
- B-14 Floor Plan, West End - Buildings 2 and 6. September 16, 1947. Revised November 1963.
- B-15 Floor Plan, East End - Buildings 2 and 6. September 16, 1947. Revised October 1965.
- B-16 Structural Details - Buildings 2 and 6. October 31, 1947. Revised October 1965.
- B-17 Elevations & Wall Details - Buildings 2 and 6. October 21, 1947. Revised October 1965.
- B-20 Plating Department and Paint Room - Building 2. September 16, 1947. Revised May 1960.
- B-20 Plating Department and Paint Room - Building 2. September 16, 1947. Revised December 1960.
- B-21 Toilets 2F, 6A, and 6F - Plans and Sections. February 15, 1948.
- B-22 Floor Plan - West End Building 7. October 22, 1947. Revision June 1960.
- B-23 Floor Plan - East End Building 7. September 16, 1947. Revision August 1954.
- B-24 Structural Framing Building 7. October 31, 1947. Revision September 1965.
- B-26 Plans and Sections - Toilets 7B & 7F Well Houses and Elevated Tank. October 30, 1947. Revised July 25, 1950.
- B-27 Floor Plan - West End Building #14. October 14, 1947. Revised March 1960.
- B-28 Floor Plan - East End Building #14. October 14, 1947. Revised September 1963.
- B-31 Plans and Sections - Toilets, Building #14. October 20, 1947. Revised May 1954.
- B-32 Commissary Plan and Sections, Building #15. October 20, 1947.
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- C-4 Plumbing Plan, East End Building 1. October 13, 1947, Revised October 1965.
- C-13 Electrical Plan, Building 3. December 1, 1947, Revised May 1960.
- C-14 Piping Plan - Lower Level, Building 3. October 27, 1947, Revised February 11, 1954.
- C-15 Piping Plan - Upper Level, Building 3. October 30, 1947, Revised May 1960.
- C-19 Plumbing Plan, West End Building 286. October 14, 1947, Revised November 1960.
- C-20 Plumbing Plan, East End Building 286. October 13, 1947, Revised October 1965.
- C-27 Plans and Details, Substation, Building 28 Emergency Diesel Station 6E. December 1, 1947, Revised May 1960.
- C-31 Plumbing Plan, West End Building 7. October 2, 1947, Revised October 1965.
- C-32 Plumbing Plan, East End Building 7. October 10, 1947, Revised March 1960.
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**APPENDIX A**

**SPILL REPORTS**

## SPILLS84

DATE	SHIFT	SPILL MATERIAL	QUANTITY	LOCATION	SOURCE	CLEANUP METHOD	SPILL LETTER	REPORT COMPLETED	CORRECTIVE ACTION	ACTION COMPLETED
1-9-84	2	TRICHLORO-ETHYLENE	15 GAL	ASSEMBLY	TANK ?	FLOOR DRY	NO			
1-9-84	2	SODIUM CYANIDE	30 GAL	PLATING	TANK CLEANING OUTSIDE WITH LEAK	DIKE & SUMP BUILT, AREA STEAM CLEANED, & SOLN. VACUUMED	YES	1 FEB	DISCONTINUE FREEZING CYANIDE SOLUTION	1 FEB
1-20-84	1	PHOSPHORIC ACID	2 GAL	INSPECTION	MISSING LID ON JUG	NO DATA	NO			
1-21-84	3	TRIM SOL	2 GAL	MACHINE SHOP	NO DATA	SUMP SUCKER THEN FLOOR DRY	NO			
1-23-84	3	ETHYLENE GLYCOL	5 GAL	MACHINE SHOP	PIPE FITTING NEAR PUMP LEAK	NO DATA	NO		REPAIR FITTING	23 JAN.
1-23-84	3	NITRIC ACID/BENCHMARK ENS	20 GAL	PLATING	NO DATA	NO DATA	NO			
1-24-85	1	PEPSET 2600	5 GAL	FOUNDRY	NO DATA	NO DATA	NO			
1-24-84	2	NITRIC ACID	2 PT	RECEIVING	LEAKY CONTAINER	WATER ADDED, SOLN. METRALIZED	NO			
1-25-84	1	LUBRICATING OIL	5 GAL	MAINT. SUB 4	COMPRESSO DIL LEAK	NO DATA	NO			
1-26-84	1	KURE-N-SEAL (XYLOL)	3 GAL	LATERAL TRANS. SYSTEM	DRUM KNOCKED OVER BY CONTRACTOR	BY CONTRACTOR	NO			
2-14-84	3	MACHINE OIL	2 GAL	SHIPPING	MACHINE LEAK	FLOOR DRY	NO			
2-15-84	2	PEPSET 3500	1 PT	FOUNDRY	DRUM SEAM LEAK	FLOOR DRY	NO			

SPILLS84

2-17-84 1	ZINC CHROMATE PRIMER/ BC 100	25 GAL	PAINT SHOP	VALVE LEFT OPEN & CHECK VALVE MALFUNCTION ALLOWED SOLN. TO BACKFLOW THRU LINE	FLOOR DRY	NO		FII CHECKVALVE	17 FEB.
2-20-84 1	HYDRALIC FLUID	NO DATA	TEST HIGH BAY	LEAK FROM MACHINE UNDER TESTING	NO DATA	NO			
2-28-84 1	STODDARD SOLVENT	3 GAL	WASTE OIL HOLD TANK	CHECK VALVE FAILURE DRAINED OIL FROM TANK	FLOOR DRY	NO		REPAIR CHECK VALVE	28 FEB.
3-3-84 3	BC 100/STODDARD SOLVENT	50 GAL	PAINT SHOP	SHUT OFF VALVE LEFT OPEN	FLOOR DRY	NO			
3-11-84 3	HYDRALIC OIL	20 GAL	MACHINE SHOP		NO DATA VACUUM THEN FLOOR DRY	NO			
3-21-84 3	GASOLINE	6 GAL	HOUSE-KEEPING STORAGE	CUSHMAN CART FUEL TANK PUNCTURE	CATCH CAN & EMPTY TANK	NO			
3-11-84 2	TRICHLOROETHYLENE	200 GAL	PLATING	CLOGGED RETURN LINE ALLOWED TRIC. TO DRAIN THROUGH WATER STOPCOCK TO SUMP & SANITARY SEWER	SOLN. PUMPED TO DRUMS	YES	12 APR	REPLACE RETURN LINE, PR PLAN ON RETURN LINES	23 APR. 23 APR.
4-18-84 3	CYANIDE SOLN.	15 GAL	CYANIDE STORAGE ROOM	CONTAINER LEAK	SOLN. TRANSFERRED TO CYANIDE HOLD TANK	NO			

*Sanitary*

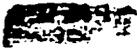
SPILLS84

4-28	1	MACHINE OIL	1 PT	MACHINE SHOP	MACHINE OIL LEAK	FLOOR DRY	NO		
5-22-84	2	OIL	1 QT	MACHINE SHOP	NO DATA	FLOOR DRY	NO		
5-26-84	1	ISOCURE CATYLYST	MINIMAL	FOUNDRY	DRUM LEAKED INSIDE STORAGE CABINET	FLOOR DRY	NO		
6-4-84	?	CUTMAX 570/WAYLUBE 68	2 GAL	OIL STORAGE ROOM	DRUM LEAKS	FLOOR DRY	NO		
6-12-84	1	HYDRALIC FLUID	15 GAL	ROAD SOUTH OF SCRAP SHED	NO DATA	FLOOR DRY	NO		
6-12-84	2	111 TRICHLORO-ETHANE	7 GAL	ASSEMBLY	HOSE RUPTURE ON PARTS WASH TANK	FLOOR DRY, FAN USED TO VENT AREA	NO	REPAIR HOSE	12 JUNE
6-14-84	2	CINCOOL 400	20 GAL	MACHINE SHOP	PLUGGED FILTER IN COOLANT RESERVOIR LEAKED SOLN. TO FLOOR, EMPLOYEE OPEN STORMED DRAIN	NONE	YES	18 JUNE SEWAR MANHOLES SEALED & PAINTED YELLOW, PH PROG. ON FILTERS, EMPLOYEE REPRIMANDED	JULY 1984
					<i>5 form</i>				
6-25-84	1	CINCOOL 400	40 GAL	MACHINE SHOP	WATER HOSE ON OVER-FLOWING COOLANT RECYCLING TANK	SUMP LEFT SUCKER	NO		
6-26-84	1	PAINT	1 GAL	MACHINE SHOP	NO DATA	FLOOR DRY	NO		
7-6-84	3	CUTMAX 570	3 GAL	MACHINE SHOP	MACHINE HOSE LEAK	FLOOR DRY	NO		
7-11-84	1	QUENCH OIL	3 GAL	NORTH FORTY	OLD HEAT TREAT	SOLN. VACUUMED	YES	14 AUG. PROPERTY CONTROL WILL	14 AUG.

SPILLS84

				FURNANCE OFF OF SPILLED GROUND SOLN. TO AND OUT GROUND OF TANK DURING REMOVAL ACTIVITY			COVER MACHINES BETTER. MAINT. TO PUMP OIL OUT OF MACHINES		
7-15-84 2	METRO CLEAN AWAY 100 (ACID)	3 GAL	FUEL OIL UNLOADING HOUSE	ACID ATE THROUGH METAL SPIGOT	DRUM REMOVED TO ACID STORAGE, SPILL SOLN. VACUUMED	YES	19 JULY	STORE ACID DRUMS IN ACID STORAGE, USE PLASTIC SPIGOTS	13 AUG.
7-19-84 2	MOBILMET ALPHA	40 GAL	MACHINE SHOP	NO DATA	FLOOR DRY DIKE, SOLN. VACUUMED	NO			
7-29-84 1	CYANIDE SOLN. (ENDOX)	NO DATA	PLATING	TANK OVERFLOW TO SUMP PLUGGED DRAIN DRAIN IN HOLD RINSEWATER TANK, BACKED WATER INTO ENDOX TANK	SUMP SOLN. PUMPED INTO CYANIDE TANK	YES	7 AUG.	INSTALL T IN RINSEWATER DRAIN LINE, PH PROGRAM ON CYANIDE TANK DRAINS	7 AUG.
8-9-84 1	OIL FROM LIGHTING BALLAST	1 OZ	MRB ENGIN- ERING	LEAKING BALLAST CASING OVERHEATED ALLOWING LEAK, OIL TO FLOW FROM OIL/ SAND PACKING MATERIAL	WIPED UP, CAPACITOR CHECKED	NO		BALLAST REPLACED	9 AUG.
8-14-84 2	TRICHLORO- ETHYLENE	15 GAL	ASSEMBLY	NO DATA	SOLN. VACUUMED	NO			
8-16-84 3	GASOLINE	2 BT	BROADWAY BY SAFETY CENTER	CUSHMAN CART TANK LEAK THRU FILL PIPE	FLOOR DRY	NO			
8-17-84 1	TRICHLORO-	3 GAL	PLATING	LEAK AT	FLOOR	NO			

SPILLS94

	ETHYLENE			GASKET, DRY SOLN. TO FLOOR				
8-20-84 1	HYDRALIC FLUID	4 GAL	ROAD NORTH OF PLANT	BACKHOE HOSE RUPTURE	SAND ADDED TO ABSORB OIL	NO		
8-23-84 1	NICKEL SULFAMATE SOLN.	25 LBS IN SOLN.	PLATING	TANK LEAK WHEN LOW SOLN. LEVEL ALLOWED ELECTRIC HEATER TO MELT PLASTIC TANK LINER	NONE	YES	31 AUG. REPLACE ELECTRIC HEATERS	31 AUG.
	TRICHLORO- ETHYLENE	2 GAL	ASSEMBLY	LOOSE FILTER CAUSED LEAK	SOLN. VACUUMED	NO	FILTER SCREW TIGHTENED	27 AUG.
8-29-84 1	STODDARD SOLVENT	2 GAL	WELDING	SOLN. SLOSHED OUT OF PORTABLE TANK IN TRANSPORT	FLOOR DRY	YES	10 SEPT. REPLACE TANK LID, TRAINING FOR LIFT DRIVERS, TANKS LABELLED, CHEMICAL ROUTES FOR OILERS	30 SEPT. 30 OCT. 30 SEPT. 30 SEPT.
8-31-84 1	TRIMSOL	10 GAL	MACHINE SHOP	MACHINE BEING MOVED TILTED CAUSING SPILL FROM SOLN. RESERVOIR	SUMP SUCKER	NO		
9-2-84 3	TRIMSOL	35 GAL	MAINT. AT	TANK OIL/WATER LEAK SEPARATOR	SOLN. VACUUMED	NO		
9-5-84 1	KEROSENE	2 GAL	NOT	HOSE LEAK FROM TANK	FLOOR DRY	NO		
9-12-84 1	HYDRALIC FLUID	1 PT	TEST	MILITARY TEST PIT	NO DATA	NO		

SPILLS84

							LEAK		
9-13-84	3	ANTIFREEZE	2 GAL	TEST	PUMP LEAK	FLOOR DRY	NO		
9-14-84	1	ISOPROPANOL	5 GAL	ASSEMBLY	PARTS WASH TANK FELL OFF OF MOVING FORKLIFT	SOLN.	NO		
9-20-84	1	PAINT THINNER	5 GAL	PAINT SHOP	KNOCKED OVER PAINT CAN	SOLN. VACUUMED	NO		
9-20-84	1	MOBILMET ALPHA	15 GAL	MACHINE SHOP	CLOGGED LINE OIL THRU INTAKE	FLOOR DRY THEN STODDARD SOLVENT/ FLOOR DRY	YES	24 OCT. FIX OIL FILTRATION SYSTEM	24 OCT.
9-21-84	3	NICKEL SULFANATE SOLN.	1 QT	PLATING	DRUM LEAK	DRUM PUMPED TO ANOTHER DRUM	NO		
10-13-84	2	PETROFLUID 171	3 GAL	TEST	NO DATA	FLOOR DRY	NO		
10-18-84	3	PETROFLUID 171	1 QT	TEST	HOSE FROM DRUM	NO DATA NO LEAK	NO		
10-18-84	2	SULFURIC ACID	1 PT	RECEIVING	DRUM BUNG LEAD	SOLN. NEUTRALIZED	NO		
11-14-84	3	CHROME/ NITRIC ACID SOLN.	200 GAL	PLATING	ACID SOLN ATE THRU MILD STEEL VALVE & TO FLOOR & CLARIFYER	TANK TRUCK ACQUIRED TO PUMP OUT CLARIFYER, SUMP, & NEUTRALIZER TANK; SOLNS. BATCH TREATED	YES	30 NOV. REPLACE ALL MILD STEEL NIPPLES W/ STAINLESS STEEL, TRAINING FOR PLATING STAFF ON SPILL CONTROL	30 NOV. 29 NOV.
11-22-84	2	WASTE OIL	1 PT	TEST	PIT AREA	NO DATA	FLOOR DRY	NO	
11-23-84	3	CHROME ACID	4 GAL	PLATING	NO DATA	SORBENT	NO		

## SPILLS84

SOLN.			PILLOWS							
11-26-84	3	ELECTRO STRIPPER SOLN.	2 QT	PLATING	NO DATA	NO DATA	NO			
11-27-84	1	PEPSET	4 GAL	FOUNDRY MAINT.	PEPSET	YES	17 DEC.	ALL MACHINE DISPOSITION REQUEST TO BE REVIEWED BY HMC	10 DEC.	
				CUT PIPES TO DISCONNECT MACHINE & SOLN. DRAINED TO FLOOR	CHIPPED FROM FLOOR					
11-?-84	2	CUTMAX 570	2 QT	MACHINE SHOP	SOLN. FROM DRUM	FLOOR DRY	NO			
				SATELITE STORAGE TO FLOOR						
12-5-84	1	STODDARD SOLVENT	10 GAL	MACHINE SHOP	DRUM SIPHONED BY WASH BOOTH SPRAY HOSE	FLOOR DRY	YES	22 JAN	CHECK VALVE INSTALLED IN HOSE	22 JAN.
12-6-84	1	NICKEL/ NITRIC ACID SOLN.	1 PT	PLATING	RESIDUAL IN PIPE DRAINED ONTO PLUMBER	NONE	NO			
12-20-84	1	NICKEL SULFAMATE SOLN.	SMALL	PLATING	NO DATA	NO DATA	NO			
12-21-84	2	NO DATA	NO DATA	PLATING	BLUE LIQUID ON FLOOR	PUMPED TO WEST SUMP	NO			
12-23-84	2	HYDRALIC FLUID	2 PT	TEST	NO DATA	FLOOR DRY, PAIL UNDER LEAK	NO			

DATE	SHIFT	SPILL MATERIAL	QUANTITY	LOCATION	SOURCE	CLEANUP METHOD	SPILL LETTER	REPORT COMPLETED	CORRECTIVE ACTION	ACTION COMPLETED
1-2-85	2	COPPER CYANIDE	25 GAL	PLATING	FILTER HOSE LEAK TO FLOOR	PUMP LIQUID TO EMPTY TANK	YES	16 JAN	SEGREGATE AND DISE CYANIDE TANKS	
1-16-85	2	CHROME SOLN.	200 GAL	PLATING	TANK OVERFLOW TO FLOOR	PUMP LIQUID TO EMPTY TANK	NO			
1-17-85	1	HYDRALIC OIL	5 GAL	WELDING	TRACTOR HOSE RUPTURE	FLOOR DRY	NO		REPLACE HYDRALIC HOSE	17 JAN.
1-20-85	3	NICKLE SOLN.	30 GAL	PLATING	PUMP LEAK TO FLOOR	PUMP LIQUID TO EMPTY TANK	NO		FIX PUMP	20 JAN.
1-21-85	2	SULFURIC ACID	1 PT	ACID STORAGE	DRUM BUNG LEAK	NEUTRALIZED	NO			
1-21-85	1	DIESEL OIL	10 GAL	LATERAL TRANS. SYSTEM	CABOOSE FUEL IN TANK EXPANSION	FLOOR DRY	NO			
1-22-85	3	AQUAQUENCH 251	4000 GAL	FOUNDRY	DRAIN VALVE STUCK OPEN	NONE	YES	1 FEB	DISCONNECT PIPE FROM SANITRAY SEWAR	11 FEB
1-24-85	3	ENSTRIP S	50 GAL	PLATING	PIN HOLE IN STEAM COIL SIPHONED TANK TO SUMP	NONE	YES	7 MAR	REPLACE HEATING COILS WITH TEFLON COATED HEATING COILS	7 MAR
2-5-85	3	NICKEL ACETATE	50 GAL	PLATING	TANK OVERFLOW TO FLOOR	PUMP LIQUID TO EMPTY TANK	NO			
2-5-85	1	CHROME SOLN.	NO DATA	PLATING	TANK LEAK TO FLOOR	PUMP LIQUID TO EMPTY TANK	NO			
2-5-85	2	TRIM SOL	5 GAL	MACHINE SHOP	TANK OVERFLOW TO FLOOR	SUMP SUCKER	NO			

Facility Department

SPILLS85

2-7-85	1	PETROFLUID 111	5 GAL	TEST	HOSE SIPHONED TANK TO FLOOR & SANITARY SEWER	NONE	YES	28 FEB.	CAF ALL STORM SEWER DRAINS & SEAL ALL SANITARY SEWER DRAINS	1 APRIL
<i>Sanitary</i>										
2-7-85	3	APCO 467	5 GAL	NDT	TANK LEAK	FLOOR	NO			
2-8-85	3	CHROME SLUDGE SDLN.	5 GAL	PLATING	ACID ATE THROUGH DRUM	NEUTRAL- IZED	NO			
										IN NEW DRUM
2-8-85	1	NICKEL SULFAMATE SOLN.	20 GAL	PLATING	STUCK VALVE	NO DATA	NO		FIX VALVE	8 FEB.
2-11-85	1	OIL FROM LIGHTING BALLAST	1 OZ	ADMIN. BLDG.	LEAK IN BALLAST CASING	OIL ON METAL GUARD & BALLAST REMOVED TO ELEC. CRIB, CAP. EMPTY, OIL ON GUARD WIPED OFF & PENTONE WASHED, ALL DEBRIS PLACED IN PCB DRUM, 3 DROPS OF OIL ON RUG CLEANED BY HSKF.	NO	BALLAST REPLACED	11 FEB.	
2-13-85	1	FUEL OIL #6	1 GAL	STORAGE TANK #5	PIPELINE LEAK	PHYSICAL	NO		COMPRESSION BANDAGE PLACED AROUND PIPE LEAK. FITTING TIGHTENED UPON EMPTYING TANK IN SEPTEMBER	20 FEB. PIPE REPA COMPLETE OCTOBER 1985
2-15-85	1	FUEL OIL #6	1 QT	BOILER ROOM	PIPELINE LEAK	RAG WIPE	NO		TANKS DRAINED PIPELINE REPLACED	OCTOBER 1
2-20-85	1	NAPHTA	1 PT	RECEIVING DRUM	LEAK	FLOOR	NO			DRY

## Facilit. Department

## SPILLS85

2-10-85 2	DIESEL FUEL	1 FT	LATERAL TRANS. SYSTEM	RAILROAD PUMP EXTRA ENGINE FUEL FROM FUEL TANK TANK EXPANSION				
2-21-85 1	COOLING FLUID	1 GAL	NORTH FORTY BY DRUM RACKS	UNKNOWN SUMP NO SUCKER				
2-22-85 2	NICKEL SULFAMATE SOLN.	5 OZ	PLATING	FILTER # 14705 LEAK INTO PAIL	NONE	NO	REPAIR FILTER	25 FEB.
2-23-85 1	HYDRALIC FLUID	5 GAL	TEST	EMPLOYEE WIPED UP SAT ON SAWHORSE WHICH DISCONNECTED HYDRALIC HOSES				
3-1-85 2	NICKEL SULFAMATE SOLN.	5 GAL	PLATING	FILTER # USN006356 LEAKED TO FLOOR	SOLN. PUMPED TO ACID HOLD TANK		REPAIR FILTER	2 MARCH
3-7-85 3	CYANIDE SOLN.	NONE	PLATING	CYANIDE SUMP PUMP FAILURE	NONE	NO	REPAIR PUMP	
3-12-85 1	CUTMAX 570	15 GAL	MACHINE SHOP	RETURN LINE PUSHED OUT OF TANK BY PRESSURE	VACUUMED, YES SUMPSUCKER THEN FLOOR		13 MAR EXTEND PIPE, CLAMP PIPE	19 MARCH
3-21-85 1	GRINDING MUD	40 LBS	WELDING	MAINT. DUMPING MATERIAL INTO HOPPER SFILL	SHOVELED INTO HOPPER	NO		
4-10-85 2	ELECTROLESS NICKEL	2 GAL	PLATING	HOSE KNOCKED OUT OF TANK. SOLN. IN HOSE TO FLOOR	SOLN. PUMPED INTO DRUM	NO		
4-15-85 2	DIESEL FUEL	1 FT	MAINT.	HOSE LEAK DUE TO	NONE	NO	REPAIR HOSE	16 APRIL

Date	Material	Quantity	Location	Incident Description	Resolution	Date
4-17-85 1	MANGANESE PHOSPHATE SOLN.	5 GAL	PLATING TANK	RUN OVER HOSE OVERFLOW PUMPED INTO DRUM THEN ACID HOLD TANK		
4-24-85 1	DIELECTRIC CAPACITOR	1 GAL	FOUNDRY	HOLE IN CAPACITOR DRAINED FLUID, ABSORBED WITH RAGS	REPLACE CAPACITOR	24 APRIL
4-25-85 2	HYDRALIC FLUID	10 GAL	MACHINE SHOP	OIL RAN FROM DIS-ASSEMBLED PIPING, SOLN. VACUUMED & PUT IN BOILER OIL SYSTEM		
4-25-85 2	BATTERY ACID	2 GAL	MACHINE SHOP	MERCURY ACID MALFUNC-TIONED & DROVE INTO OPEN PIT, NEUTRALIZED & SHOVELED INTO DRUM		
4-26-85 3	CUTMAX 570	1 GAL	MACHINE SHOP	OIL LEAK FROM MACHINE LEFT ON FLOOR, ABSORBED WITH FLOOR DRY		
5-21-85 3	EBONAL C	UNKNOWN	PLATING	OVERFLOW VALVE MALFUNC-TION PLATING SHUTDOWN LIQUID BLEED INTO SUMP	REPAIR VALVE	21 MAY
5-27-85 1	LUBRICATING OIL	1 GAL	MACHINE SHOP	LEAK ABSORBED WITH FLOOR DRY		
5-29-85 2	AMMONIA VAPORS	UNKNOWN	PLATING	EXPERI-MENTAL WASTE TREAT-MENT EMPLOYEES NO EVACUATED, PLASTIC SHEET COVERED TANK UNTIL VENT FIXED	VENTILATION FIXED	30 MAY
5-29-85 3	CHROMATE SEALER	UNKNOWN	PLATING	VALVE PLATING NO	VALVE	

Facility Department

SPILLS/BS

Date	Quantity	Material	Location	Incident Description	Actions Taken	Result	Date
				MALFUNCTION - SHUTDOWN, TANK LIQ. PUMPED INTO ANOTHER TANK		REPAIRED	30 MAY
5-30-85 1	2 GAL	HYDRALIC OIL	SOUTH OF SCRAP SHED	HYDRALIC HOSE RUPTURE	ABSORBED WITH FLOOR DRY & SHOVELED INTO HOPPER	HOSE REPLACED	30 MAY
6-1-85 3	2 GAL	HYDRALIC OIL	TEST AREA IN ASSB.	OILY RAGS LEAKING FROM BAGS	ABSORBED WITH FLOOR DRY		
6-6-85 2	10 GAL	ALKALI SOAK SOLUTION	PLATING	HOSE BROKE LIQUID TO PIT	LIQUID VACUUMED TO ALKALI HOLDING TANK	HOSE REPLACED	6 JUNE
6-10-85 1	1 GAL	ANTIFREEZE	MAINT.	JUG LAID ON SIDE IN STOR. CABINET	DIL WIPED UP		
6-24-85 1	30 GAL	NICKEL SULFAMATE	PLATING	AUTOFILL VALVE STUCK OPEN OVERFILLING TANK	LIQUID VACUUMED TO EMPTY TANK	VALVE FIXED	24 JUNE
6-27-85 1	30 GAL	ZINC CHROMATE PRIMER/ BC 100	OIL STOCK-ROOM	PRIMER VALVE LEFT OPEN & CHECK VALVE FAILURE	LIQUID SQUEEGED ONTO & CHECK SHOVEL TO DRUM	CHECK VALVE REPLACED	
6-28-85 3	1 GAL	SOLVENT PROBABLY XYLOL	LTS TRASH COMPACTOR	TRASH BAG FROM 14TH AVE. EAS	FLOOR DRY INTO TRASH CART, SOLVENT IN COMPACTOR LET EVAPORATE		
6-28-85 1	5 GAL	ZINC CHROMATE/	OIL	SAME AS	SAME AS SAME AS	CHECK VALVE	

Facility Department

SPILLS85

	RC 100		STOCK- ROOM	SPILL YESTER- DAY	SPILL YESTER- DAY	SPILL YESTER- DAY	REPLACED	
7-1-85	1	XYLOL/ BC100	5 GAL	OIL STOCK- ROOM	SAME AS 6-28-85	SAME AS 6-28-85	SAME AS 6-28-84	CHECK VALVE REPLACED
7-2-85	1	TRIMSOL/ WATER	5 GAL	MACHINE SHOP	LIF ON MACHINE DRIP GUARD NOT TO OIL/ LONG ENOUGH	VACUUMED WITH SUMP SUCKER, WATER SEPARATOR	NO	WORK ORDER TO FIX DRIP FAN LIF, STORM SEWAR MANHOLE COVER RESEALED
7-2-85	1	ZINC CHROMATE/ 837 GRAY PAINT	5 GAL	OIL STOCK- ROOM	SAME AS 6-28-85	SAME AS 6-28-85	NO	CHECK VALVE REPLACED
7-11-85	1	RANDOLPH ENAMEL	1 GAL	RECEIVING	LOOSE SID ON CAN CAME WITH OFF WHEN SHOVEL BOX LEFT INTO WASTE ON SIDE	ENAMEL SCOOPED	NO	
7-12-85	3	TRIMSOL	3 GAL	MACHINE SHOP	HOSE FROM FLOOR BARREL SIPHONING HOSE BARREL	DRY, RAISED ABOVE LID	NO	
7-23-85	2	KEROSENE	4 GAL	NDT	WASTE DRUM OVER FILLED	VACUUMED LIQUID & NOPPED RESIDUE	NO	
7-31-85	1	TRIMSOL	7 GAL	VLS	SUMP SUCKER FELL OFF MERCURY	VACUUMED WITH SUMP SUCKER	NO	
8-1-85	1	WATER SOLUABLE WASTE	1 GAL	VLS	RELEASE FROM INGERSOL	FLOOR DRY AND VACUUMED WITH SUMP SUCKER	NO	
8-14-85	3	HYDRALIC FLUID	5 GAL	TEST	MACHINE MAINT.	VACUUMED WITH SUMP SUCKER	NO	

Facility Department

SPILLS85

8-17-85 3	ENFLATE 419 ELECTROLESS NICKEL	75 GAL	PLATING	PUMP LEAK D'YER 3 DAYS	PUMPED LIQUID INTO TANK	NO	REPAIR FUME
8-19-85 3	ENDOX 576 ALKALINE CLEANER	50 GAL	PLATING	TANK OVERFLOW	WASTE TREATMENT	NO	
9-5-85 1	CHROMIC ACID	200 GAL	PLATING	TANK LEAK	TANK PUMPED, WASTE TO TREATMENT	NO	TANK REPAIRED
9-12-85 1	TRICHLORO- ETHYLENE	520 GAL	NOT FOUNDRY	STEAM LEAK	NONE	15	STEAM VALVES REPAIRED.

DATE	SHIFT	SPILL MATERIAL	QUANTITY	LOCATION	SOURCE	CLEANUP METHOD	SPILL LETTER	REPORT COMPLETED	CORRECTIVE ACTION	ACTION COMPLETED
1-4-86	1	SLUDGE INSIDE PLATING DUCTS	2 LBS	COURTYARD EAST OF PLATING	REMOVED DUCTWORK	SLUDGE & SNOW SHOVELED INTO DRUM, & THEN INTO HOT WATER BATH	NO			
1-6-86	1	WATER	15 GAL	NC ROOM	WATER TANK BY GLYCOL TANK	VACUUMED OFF OF FLOOR	NO			
1-17-86	1	TRICHLORO ETHYLENE	1 GAL	OUTSIDE BY TANK	OVERFILL PORTABLE TANK	VACUUMED W/ WET DRY VAC	NO			
1-19-86	3	LUBE OIL	2 GAL	ASSEMBLY TEST AREA	OIL LEAK FROM MACHINE	ABSORBED W/FLOOR DRY	NO			
1-20-86	3	CHROMATE-SULFURIC DIP	30 GAL	PLATING TANK	TANK AUTOPUMPED WATER SHUTOFF FAILURE, TANK OVERFLOW		NO			
1-21-86	2	ALKALINE CLEANER	100 GAL	PLATING TANK	FLOAT CONTROL FAILURE, TANK OVERFLOW	PUMPED INTO ALKALI HOLD TANK	NO			
1-23-86	3	ALKALINE CLEANER	150 GAL	PLATING TANK	TANK OVERFLOW	PUMPED INTO ALKALI HOLDING TANK	NO			
1-23-86	2	CUTTING OIL	12 GAL	MACHINE SHOP	CHIP HOPPER	CLEANUP BY OVERFLOW MAINT.	NO			
1-23-86	2	WATER	30 GAL	COPY CENTER	LOSE H2O BY HOSE	BY HOUSE-KEEPING	NO			
1-24-86	1	ALKALINE CLEANER	3 GAL	PLATING TANK	TANK OVERFLOW	LEFT IN SUMP FOR TREATMENT	NO			
1-27-85	1	TRIMSOL	2 GAL	MACHINE SHOP	RESERVOIR OVERFLOW	LIQUID ABSORBED	NO			

			(SPARES CELL)		W/ FLOOR DRY		
1-26-86 3	HYDROCHLORIC ACID 50 %	20 GAL	PLATING	TANK OVER FLOW DUE TO VALVE MALFUNC- TION	PUMPED INTO ACID HOLDING TANK		
1-28-86 1	UNKNOWN	1 GAL	OUTSIDE NORTH OF PLANT	DRUM LEAK	ABSORBED W/ FLOOR DRY		
1-28-86 3	ALKALINE CLEANER	50 GAL	PLATING	TANK #24 OVERFLOW	PUMPED INTO ALKALI HOLDING TANK	NO, HOWEVER BRUCE WAS CALLED ABOUT THE NUMEROUS TANK OVERFLOWS	BRUCE THINKS THAT OVER FLOWS MAYBE DUE TO DI WATER SYSTEM PROBLEMS
2-6-86 1	TRICHLORO- ETHYLENE	2 GAL	NDT	MAINT. HOSE FELL OUT OF DRUM UPON CLEANOUT	SOLVENT EVAPORATED	NO	
2-7-86 3	TRICHLORO- ETHYLENE	25 GAL	PLATING	LARGE VAP. DEG STILL FLOAT VALVE MALFUNCTION SENDING TCE TO FLOOR	SOLVENT PUMPED INTO DRUM	NO	PLUMBERS FIXING VAP. DEG. ON 1ST SHIFT
2-9-86 1	BLACK OXIDE DYE	2 GAL	PLATING		DYE WASH INTO SUMP	NO	
2-26-86 1	GREASOFF 3	25 GAL	PLATING	TANK OVERFLOW	LIQUID PUMPED INTO SUMP	NO	
3-22-86 1	HYDRALIC OIL	3 GAL	RECEIVING	HOSE LEAK	ABSORBED W/ FLOOR DRY	NO	
4-3-86 1	TRIMSOL	10 GAL	MACHINE SHOP	NOT KNOWN	ABSORBED S/ FLOOR DRY	NO	
4-3-86 1	MOBILMET ALPHA	1 GAL	MACHINE SHOP	HOSE RUPTURE	ABSORBED W/ FLOOR DRY	NO	HOSE REPLACED, MOBILMET ALPHA OIL REMOVED DUE TO

HYDRAULIC OIL  
CONTAMINATION

4-16-86 3 NITRIC ACID W/ 40 GAL PLATING INTERNAL LIQUID NO  
NICKEL & WATER PUMP PUMPED INTO  
CORROSION BRUT  
CONTAINER  
& TRANSFERRED  
TO WASTE  
TREATMENT PUMP REPLACED

5-29-86 3 ALKALINE CLEANER 15 GAL PLATING TANK LIQUID NO  
OVERFLOW PUMPED  
INTO TANK

5-29-86 2 AMMONIA 10 LBS HEAT TREAT INTERNAL SOLENOID YES  
SOLENOID REPLACED,  
LEAK INTO AREA  
NITROGEN VENTILATED  
PIPELINE PIPELINE SYSTEM  
STUDIED TO  
MINIMIZE FUTURE  
OCCURRANCE

6-8-86 3 MANGANESE 200 GALS PLATING VALVE LIQUID NO  
PHOSPHATE MALFUNC- PUMPED  
TION & INTO TANK  
TANK  
OVERFLOW

6-19-86 1 HYDRAULIC OIL 6 GAL MAINTENANCE RESIDUAL DIRT DIKE NO  
& WATER OIL & BUILT IN  
RAINWATER FRONT OF  
IN DRUM DRAIN,  
SPILLED LIQUID  
WHEN VACUUMED  
MOVED W/SUMP-  
SUCKER

6-22-86 3 WATER & 1 GAL CONTRAC- TARP BLEW MOST NO  
CUTTING OIL TOR (COUR OFF PIPE CAUGHT  
YARD NEXT CUTTING IN NATURAL  
TO PLAT- MACHINE DEPRESSION  
ING DURING IN CONCRETE  
RAINSTORM LIQUID  
FLOODING SCOOPED UP,  
MACHINE SOME TO  
RESERVOIR STORM  
SEWER (1 PT)

*Storm*

7-30-86 1 CHROME SOLUTION UNKNOWN PLATING CHROME SOLUTION NO  
RINSE BATCH  
WATER TREATED  
TO ACID/  
ALKALI  
SUMP

8-12-86 1 MERCURY 8 OZ TEST METAL DROPS NO

PUSHED SUCKED OFF  
 OUT U- OF TABLES  
 TUBE END & TOOLS W/  
 DUE TO ASPIRATOR,  
 VACUUM MERCURY  
 PRESSURE ABSORBENT  
 TEST USED TO  
 DECONTAMINATE  
 AREA, IN  
 TEST SHOW  
 BELOW OSHA  
 LIMITS

9-9-86 1	GASOLINE	1 GAL	MAINT GARAGE	TANK OVER FLOW BY BERG OIL DURING TANK FILLING	FLOODRY NO PUT ON LIQUID WITHIN 30 SECONDS	
9-11-86 1	HYDRALIC OIL	2 QTS	MAINT 5TH AVE WEST	HOSE BREAK ON FMC TRACTOR	SPILLSTOPPER NO DRAIN COVERS PLACED ON 2 STORM DRAINS WATER & OIL VACUUMED W/ SUMPSUCKER	HOSE REPLACED DURING SPILL CLEANUP
9-30-86 1	BATTERY ACID	1 QT	SWORD FACILITY	ACID BOIL OVER WHEN CHARGING BATTERY	ACID WHEN NEUTRALIZED AND PLACED IN TRASH CAN	NO FORKLIFT SENT TO MAINTAINENCE TOBE WASHED OFF
10-1-86 2	HYDRALIC OIL	30 GAL	WELDING	HOSE RUP- TURE ON LAKE ERIE METAL PRESS	OIL VACUUMED OIL FILM & ABSORBED W/ ABSORBENT	NO
10-5-86 1	HYDRALIC OIL	10 GAL	WELDING	HOSE LEAK ON LAKE ERIE META PRESS	OIL VACUUMED & OIL FILM ABSORBED W/ ABSORBENT	NO
10 20 86 1	OILY SUBSTANCE	1 GAL	OUTSIDE ON WATER PUDDLE	UNKNOWN YELLOW- GREEN OILY LIQUID	OIL ON WATER PUDDLE VACUUMED W/ SUNF-SUCKER, RESIDUAL ABSORBED W/ PILLOWS	NO

11-10-86 1	HYDRALIC OIL MIL-H-17111	2 GAL	TEST	REFILL DRUM OVERFLOW	OIL ON CONCRETE VACUUMED W/ SUMP- SUCTION & MOPPED W/ STODDARD SOLVENT	NO
11-16 1	GREASE	1 QT	ASSEMBLY	GREASE IN PAINT CAN KNOCKED OVER TO FLOOR	GREASE WIPED UP W/ RAGS, RAGS TO RECYCLE DRUM	NO

Richard Clearman

10 September 1984

Don Hartman

D. L. Hilde  
W. A. Patterson  
H. E. Anderson

Stoddard Solvent Spill  
In Welding Area

In response to your memo dated 31 August 1984, regarding the subject Solvent Spill in the Welding Area, a thorough investigation was conducted regarding this incident. The results of this investigation are as follows:

- o The steel tank holding the flammable Stoddard solvent is approximately 65" in length by 29" in width by 34" in height with a capacity of approximately 55 gallons. A wooden board inside the tank floats; it acts as a baffle plate to avoid spillage. It has two (2) wooden top covers with a pump mounted on one (1) cover. The tank sits on a metal flat which has two (2) stops welded on each side and on one (1) end. The other end, which has no stops is used to pick up the flat and tank with a forklift truck; therefore, the tank is abutted directly to the mast of the truck for rigidity.
- o On Wednesday, 29 August 1984, the maintenance forklift truck picked up the flat and solvent tank which was stored on 11th Avenue NW 28. The operator of the truck picked up the flat on the wrong end (the end with the safety stops) leaving the opposite end without any protection from sliding off the flat. As he was traveling with the flat and tank on 12th Avenue West, he hit a bump in the floor which caused the flat to slide off the tank and to the floor with such impact that approximately four to five gallons of the solvent was spilled from the tank.
- o The incident happened when a welding foreman (Don Ingman) was in the area. He immediately (approximately 12:30 p.m.) called the Spill Control Team and Dave Trott, Health Services. The spill Control Team arrived at approximately 12:35 p.m. The spill team waited ten minutes for the maintenance crew to bring floor dry to cover the spillage of solvent. Dave Trott and Richard Clearman appeared at the scene at approximately 12:50 p.m. The Spill Control Team and Maintenance Crew completed the clean up and left the area at approximately 1:10 p.m.
- o Based on the aforementioned, this accident was caused by the forklift truck operator. All the operators and/or maintenance people that handle hazardous material have had special training and should be aware of all conditions. Also, the tank was stencil solvent, but no other markings and the stencil is faded out.
- o To prevent any reoccurrence of this incident, the following precautions and/or steps will be taken.

**FMC** Northern Ordnance Division  
Minneapolis

*Env. Spill*

E055-5.3.2

Interoffice

To: W. A. Patterson  
From: D. L. Hildre *DH*  
Subject: Coolant Discharge to Storm Sewer

Date: 19 June 1984  
cc: R. W. Weaver  
J. Y. Longfield  
N. S. Hansen  
A. E. Wittrock

The release involved the intentional discharge of spilled grinding coolant to a storm sewer manhole. The following provides information on the incident.

**MATERIAL RELEASED:**

Cincool 400 grinding fluid and water (synthetic lubricant containing no mineral oil, phenols, mercurials, phosphates, chlorine, sulfur compound or other hazardous ingredients). Ratio coolant to water - 40:1.

**QUANTITY RELEASED:**

Approximately 20 gallons

**RELEASED TO:**

Storm Sewer Manhole (10th Avenue 16 NW)

**TIME OF INCIDENT:**

Thursday, 14 June at 7:40 p.m.

**CAUSE OF INCIDENT:**

Approximately 20 gallons of coolant was spilled onto the Grinding Department floor by overflowing the departments central coolant system (10th Avenue 18 NW). The reason for the overflow was caused when the system's reservoir filter screen became plugged with sludge and metal chips.

As a result of the coolant on the floor, Fred Brown, (Foreman - Grinding) instructed that it be swept into the storm sewer in Dave Nelson's (Foreman - Spare Cell) area. In order to gain access to the sewer, a storm sewer manhole which had been sealed shut with an epoxy was opened.

FMC Corporation

Northern Ordnance Division  
4500 East River Road  
Minneapolis, Minnesota 55421  
(612) 571-9201 Telex 29 0432

18 May 1984  
E004-3.3.2 & 5.3.2

**FMC**

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

Metropolitan Waste Control Commission  
350 Metro Square Building  
Seventh and Robert Streets  
St. Paul, MN 55101

Attention: Donald A. Stulc

Subject:  
Accidental Release of Trichloroethylene  
(TCE) to the Sanitary Sewer

Reference:

(a) Letter to D. J. Fullen (FMC) from  
D. A. Stulc (MWCC) dated 24 April 1984

The intent of this letter is to follow up and document our 1 May 1984 discussion in which the questions raised in reference (a) were addressed in addition to that information provided in the notification of the subject incident dated 19 April 1984.

The questions raised in reference (a) will each be addressed separately below:

1. Question: How many solvent degreaser separator units are presently in operation at FMC?  
Response: Presently, there are thirteen (13) vapor degreasers operating in the plant each equipped with a solvent-water separator.
2. Question: Has the plugging problems occurred in prior instances, i.e. is it a reoccurring problem?  
Response: To the knowledge of plant operating personnel, the plugging of the line from the separator to the return reservoir has never occurred prior to the recent TCE release and is therefore not a reoccurring problem.
3. Question: What is the frequency of inspection of these units?  
Response: The degreaser is inspected each time spent solvent is collected and replenished with virgin solvent. Also, the operator observes the solvent level in the degreaser during operation.

2  
Release of TCE  
E004-3.3.2 & 5.3.2  
18 May 1984

4. Question: Will the preventative maintenance program eliminate or greatly reduce the possibility of TCE discharges to the MDS?

Response: The preventative maintenance (PM) program is designed to eliminate the reoccurrence of a similar incident and also to prevent any other release of solvent from the vapor degreasers.

If you have any questions regarding the contents of this letter, please contact me at 571-9201, extension 2419.

FMC CORPORATION  
Northern Ordnance Division



D. J. Fullen  
Environmental Engineer

ds

cc: W. A. Patterson  
R. W. Weaver  
D. L. Hildre  
J. Y. Longfield

**FMC** Northern Ordnance Division  
Minneapolis

Interoffice

M22114-FNV 3.3.2 & 5.3.2

To: W. A. Patterson  
From: D. L. Hildre *DH*  
Subject: Accidental Release of  
Trichloroethylene (TCE)  
- Plating Department

Date: 30 April 1984

cc: R. W. Weaver  
J. Y. Longfield  
D. J. Fullen

The spill involved an accidental loss of trichloroethylene (TCE) some of which discharged to the sanitary sewer. The following provides the pertinent information on the TCE spill incident.

**MATERIAL RELEASED:** Trichloroethylene (TCE)

**QUANTITY RELEASED:**

Less than 200 gallons was released from the vapor degreaser. The degreaser was filled with 520 gallons on 11 April 1984 at approximately 3:00 p.m. It was estimated that there were 150 gallons remaining in the degreaser and 150 gallons in the reservoir attached to the degreaser unit. Efforts to recover the TCE from the west side plating pit sump and the wastewater treatment sump tank reduces the quantity to less than 100 gallons accountable (i.e. in clarifier sludge hoppers and discharged to sanitary sewer).

**RELEASED TO:** Sanitary Sewer

**TIME OF INCIDENT:**

Sometime between the end of the first shift (9:00 p.m.) to 9:45 p.m. on 11 April 1984.

**CAUSE OF INCIDENT:**

Approximately 200 gallons of TCE was spilled onto the west side Plating Department pit floor by overflowing a water separator attached as part of the degreaser. The water separator is used to separate the water and TCE that may condense off the degreaser's cooling coils with the water discharged to the pit floor through an overflow stopcock whereas the TCE is piped to a holding reservoir. It has been determined that the pipe that directs the TCE to the reservoir became clogged with a fine residue which resulted in the TCE and water to overflow through the stopcock and also over the top of the water separator.

The pit floor is graded to a baffled sump which is piped to the Plating Department wastewater treatment system. The TCE flowed into the sump where a portion of the solvent was contained by the baffles while some was pumped into the treatment system and which could eventually discharge into the sanitary sewer and ultimately to the municipal wastewater treatment plant in St. Paul (Pig's Eye Plant).

2  
TCE Spill in Plating  
M22114-ENV 3.3.2 & 5.3.2  
30 April 1984

**CORRECTIVE ACTION:**

Following discovery that the level of TCE in the degreaser was very low, water usage in the department was shutdown thereby reducing the opportunity for the TCE from being discharged from the sump and the treatment system and into the sanitary sewer. The pit sump and a sump tank in the treatment system were pumped into barrels. It is considered that the majority of the TCE would still be contained within the pit sump and sump tank due to it being heavier than water. Samples were collected from the following:

- o barrels containing the pit sump/sump tank water
- o discharge off the treatment system clarifier every half hour from 3:25 a.m. to 5:55 a.m.
- o the clarifier sludge holding tank
- o the total plant sanitary sewer discharge every half hour from 3:25 a.m. to 4:25 a.m.

Based on the possibility of a TCE discharge to the sanitary and reporting thereof, a decision was made by D. Hildre to analyze the samples collected at the plant discharge. The other samples taken were placed in storage for future analysis; however, analysis of these samples was not deemed necessary to fulfill the reporting requirements. The analytical results from the total plant discharge are 150 mg/l, 250 mg/l, and 78 mg/l at 3:25 a.m., 3:55 a.m., and 4:25 a.m. respectively. Additionally, the sludge contained in the clarifier hoppers has been removed to prevent the TCE from solubilizing into the treated wastewater and discharging to the sanitary sewer.

In order to insure that proper regulatory authorities were made aware of the possible release, D. Hildre first contacted the EPD Hotline where he was instructed to at least notify the MPCA even though it was felt that this release was not a direct release to the environment. Attempts were also made by Hildre to contact the Metropolitan Waste Control Commission offices (regulator body with control of the discharge to the sanitary sewer) with no answer.

**FMC** Northern Ordnance Division  
Minneapolis

Interoffice

MI-710-ENV 4.1.15.1

To J. Y. Longfield

Date 5 October 1981

From E. C. Lindahl

cc T. E. Epley  
R. P. Puncoschar  
E. R. Wigand  
R. N. Mesian (EPD)  
D. L. Hildre

Subject: Hazardous Substance Release: 5 October 1981

In response to a hazardous substance release to the environment occurring at Northern Ordnance Division of FMC Corporation, the following was reported to the National Response Center:

At 6:00 a.m. this morning, 5 October 1981, a 55 gallon drum containing hazardous waste paint thinner was punctured by a fork lift truck. The contents of the drum (70% Methylene Ketone) spilled on the concrete floor inside the plant facility. The majority of the release was contained with absorbent; however, an estimated 5 to 10 gallons of the liquid did enter an adjacent storm sewer. This storm sewer discharges into the Mississippi River (approximately one half mile west of the plant) at one of three outfalls. The resulting contaminated absorbent used to contain the majority of the spill was placed in drums for disposal. There were no injuries and no damage to the facilities.

Additionally, through telephone communications with the Coast Guard and the Minnesota Pollution Control Agency that followed the above report, it was determined that no further action was required by FMC and that the case was effectively closed.

*Eric C Lindahl*

sp  
encl.

332-5.3.2

Richard Clearman

10 September 1984

Don Hartman

D. L. Hildre  
W. A. Patterson  
H. E. Anderson

Stoddard Solvent Spill  
In Welding Area

In response to your memo dated 31 August 1984, regarding the subject Solvent Spill in the Welding Area, a thorough investigation was conducted regarding this incident. The results of this investigation are as follows:

- o The steel tank holding the flammable Stoddard solvent is approximately 65" in length by 29" in width by 34" in height with a capacity of approximately 55 gallons. A wooden board inside the tank floats; it acts as a baffle plate to avoid spillage. It has two (2) wooden top covers with a pump mounted on one (1) cover. The tank sits on a metal flat which has two (2) stops welded on each side and on one (1) end. The other end, which has no stops is used to pick up the flat and tank with a forklift truck; therefore, the tank is abutted directly to the mast of the truck for rigidity.
- o On Wednesday, 29 August 1984, the maintenance forklift truck picked up the flat and solvent tank which was stored on 11th Avenue NW 28. The operator of the truck picked up the flat on the wrong end (the end with the safety stops) leaving the opposite end without any protection from sliding off the flat. As he was traveling with the flat and tank on 12th Avenue West, he hit a bump in the floor which caused the flat to slide off the flat and to the floor with such impact that approximately four to five gallons of the solvent was spilled from the tank.
- o The incident happened when a welding foreman (Don Ingman) was in the area. He immediately (approximately 12:30 p.m.) called the Spill Control Team and Dave Trott, Health Services. The spill Control Team arrived at approximately 12:35 p.m. The spill team waited ten minutes for the maintenance crew to bring floor dry to cover the spillage of solvent. Dave Trott and Richard Clearman appeared at the scene at approximately 12:50 p.m. The Spill Control Team and Maintenance Crew completed the clean up and left the area at approximately 1:10 p.m.
- o Based on the aforementioned, this accident was caused by the forklift truck operator. All the operators and/or maintenance people that handle hazardous material have had special training and should be aware of all conditions. Also, the tank was stencil solvent, but no other markings and the stencil is faded out.
- o To prevent any reoccurrence of this incident, the following precautions and/or steps will be taken.

**FMC** Northern Ordnance Division  
Minneapolis

*Env. Spill*

E055-5.3.2

Interoffice

To: W. A. Patterson  
From: D. L. Hildre *DH*  
Subject: Coolant Discharge to Storm Sewer

Date: 19 June 1984  
cc: R. W. Weaver  
J. Y. Longfield  
N. S. Hansen  
A. E. Wittrock

The release involved the intentional discharge of spilled grinding coolant to a storm sewer manhole. The following provides information on the incident.

**MATERIAL RELEASED:**

Cincool 400 grinding fluid and water (synthetic lubricant containing no mineral oil, phenols, mercurials, phosphates, chlorine, sulfur compound or other hazardous ingredients). Ratio coolant to water - 40:1.

**QUANTITY RELEASED:**

Approximately 20 gallons

**RELEASED TO:**

Storm Sewer Manhole (10th Avenue 16 NW)

**TIME OF INCIDENT:**

Thursday, 14 June at 7:40 p.m.

**CAUSE OF INCIDENT:**

Approximately 20 gallons of coolant was spilled onto the Grinding Department floor by overflowing the departments central coolant system (10th Avenue 18 NW). The reason for the overflow was caused when the system's reservoir filter screen became plugged with sludge and metal chips.

As a result of the coolant on the floor, Fred Brown, (Foreman - Grinding) instructed that it be swept into the storm sewer in Dave Nelson's (Foreman - Spare Cell) area. In order to gain access to the sewer, a storm sewer manhole which had been sealed shut with an epoxy was opened.

FMC Corporation

Northern Operations Division  
4500 East River Road  
Minneapolis, Minnesota 55421  
(612) 571-9201 Tele: 29-0432

18 May 1984  
E004-3.3.2 & 5.3.2

**FMC**

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

Metropolitan Waste Control Commission  
350 Metro Square Building  
Seventh and Robert Streets  
St. Paul, MN 55101

Attention: Donald A. Stulc

Subject:  
Accidental Release of Trichloroethylene  
(TCE) to the Sanitary Sewer-

Reference:

(a) Letter to D. J. Fullen (FMC) from  
D. A. Stulc (MWCC) dated 24 April 1984

The intent of this letter is to follow up and document our 1 May 1984 discussion in which the questions raised in reference (a) were addressed in addition to that information provided in the notification of the subject incident dated 19 April 1984.

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1. Question: How many solvent degreaser separator units are presently in operation at FMC?  
Response: Presently, there are thirteen (13) vapor degreasers operating in the plant each equipped with a solvent-water separator.
2. Question: Has the plugging problems occurred in prior instances, i.e. is it a reoccurring problem?  
Response: To the knowledge of plant operating personnel, the plugging of the line from the separator to the return reservoir has never occurred prior to the recent TCE release and is therefore not a reoccurring problem.
3. Question: What is the frequency of inspection of these units?  
Response: The degreaser is inspected each time spent solvent is collected and replenished with virgin solvent. Also, the operator observes the solvent level in the degreaser during operation.

2  
Release of TCE  
E004-3.3.2 & 5.3.2  
18 May 1984

4. Question: Will the preventative maintenance program eliminate or greatly reduce the possibility of TCE discharges to the MDS?

Response: The preventative maintenance (PM) program is designed to eliminate the reoccurrence of a similar incident and also to prevent any other release of solvent from the vapor degreasers.

If you have any questions regarding the contents of this letter, please contact me at 571-9201, extension 2419.

FMC CORPORATION  
Northern Ordnance Division



D. J. Fullen  
Environmental Engineer

ds

cc: W. A. Patterson  
R. W. Weaver  
D. L. Hildre  
J. Y. Longfield

**FMC** Northern Ordnance Division  
Minneapolis

Interoffice

M22114-FNV 3.3.2 & 5.3.2

To: W. A. Patterson  
From: D. L. Hildre *DH*  
Subject: Accidental Release of  
Trichloroethylene (TCE)  
- Plating Department

Date: 30 April 1984

cc: R. W. Weaver  
J. Y. Longfield  
D. J. Fullen

The spill involved an accidental loss of trichloroethylene (TCE) some of which discharged to the sanitary sewer. The following provides the pertinent information on the TCE spill incident.

MATERIAL RELEASED: Trichloroethylene (TCE)

QUANTITY RELEASED:

Less than 200 gallons was released from the vapor degreaser. The degreaser was filled with 520 gallons on 11 April 1984 at approximately 3:00 p.m. It was estimated that there were 150 gallons remaining in the degreaser and 150 gallons in the reservoir attached to the degreaser unit. Efforts to recover the TCE from the west side plating pit sump and the wastewater treatment sump tank reduces the quantity to less than 100 gallons accountable (i.e. in clarifier sludge hoppers and discharged to sanitary sewer).

RELEASED TO: Sanitary Sewer

TIME OF INCIDENT:

Sometime between the end of the first shift ( ) p.m.) to 9:45 p.m. on 11 April 1984.

CAUSE OF INCIDENT:

Approximately 200 gallons of TCE was spilled onto the west side Plating Department pit floor by overflowing a water separator attached as part of the degreaser. The water separator is used to separate the water and TCE that may condense off the degreaser's cooling coils with the water discharged to the pit floor through an overflow stopcock whereas the TCE is piped to a holding reservoir. It has been determined that the pipe that directs the TCE to the reservoir became clogged with a fine residue which resulted in the TCE and water to overflow through the stopcock and also over the top of the water separator.

The pit floor is graded to a baffled sump which is piped to the Plating Department wastewater treatment system. The TCE flowed into the sump where a portion of the solvent was contained by the baffles while some was pumped into the treatment system and which could eventually discharge into the sanitary sewer and ultimately to the municipal wastewater treatment plant in St. Paul (Pig's Eye Plant).

2  
TCE Spill in Plating  
M22114-ENV 3.3.2 & 5.3.2  
30 April 1984

**CORRECTIVE ACTION:**

Following discovery that the level of TCE in the degreaser was very low, water usage in the department was shutdown thereby reducing the opportunity for the TCE from being discharged from the sump and the treatment system and into the sanitary sewer. The pit sump and a sump tank in the treatment system were pumped into barrels. It is considered that the majority of the TCE would still be contained within the pit sump and sump tank due to it being heavier than water. Samples were collected from the following:

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- o the clarifier sludge holding tank
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Based on the possibility of a TCE discharge to the sanitary and reporting thereof, a decision was made by D. Hildre to analyze the samples collected at the plant discharge. The other samples taken were placed in storage for future analysis; however, analysis of these samples was not deemed necessary to fulfill the reporting requirements. The analytical results from the total plant discharge are 150 mg/l, 250 mg/l, and 78 mg/l at 3:25 a.m., 3:55 a.m., and 4:25 a.m. respectively. Additionally, the sludge contained in the clarifier hoppers has been removed to prevent the TCE from solubilizing into the treated wastewater and discharging to the sanitary sewer.

In order to insure that proper regulatory authorities were made aware of the possible release, D. Hildre first contacted the EPD Hotline where he was instructed to at least notify the MPCA even though it was felt that this release was not a direct release to the environment. Attempts were also made by Hildre to contact the Metropolitan Waste Control Commission offices (regulator body with control of the discharge to the sanitary sewer) with no answer.

**FMC** Northern Ordnance Division  
Minneapolis

Interoffice

MI8710-ENV 4.1.15.1

To: J. Y. Longfield  
Date: 5 October 1981

From: E. C. Lindahl  
cc: T. E. Epley  
R. P. Puncoschar  
E. R. Wigand

Subject: Hazardous Substance Release: 5 October 1981  
R. N. Mesian (EPD)  
D. L. Hildre

In response to a hazardous substance release to the environment occurring at Northern Ordnance Division of FMC Corporation, the following was reported to the National Response Center:

At 6:00 a.m. this morning, 5 October 1981, a 55 gallon drum containing hazardous waste paint thinner was punctured by a fork lift truck. The contents of the drum (70% Methyleneethyl Ketone) spilled on the concrete floor inside the plant facility. The majority of the release was contained with absorbent; however, an estimated 5 to 10 gallons of the liquid did enter an adjacent storm sewer. This storm sewer discharges into the Mississippi River (approximately one half mile west of the plant) at one of three outfalls. The resulting contaminated absorbent used to contain the majority of the spill was placed in drums for disposal. There were no injuries and no damage to the facilities.

Additionally, through telephone communications with the Coast Guard and the Minnesota Pollution Control Agency that followed the above report, it was determined that no further action was required by FMC and that the case was effectively closed.

*Eric C Lindahl*

sp

encl.