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FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION SPILL PREVENTION CONTROL AND COUNTERMEASURE (SPCC) PLAN

04/30/93

OEPA/DOE
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REPORT

PL-2194
Effective Date: April 30, 1993
Revision No. 0

FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION

SPILL PREVENTION CONTROL AND COUNTERMEASURE (SPCC) PLAN

PL-2194

Effective Date: April 30, 1993

AUTHORIZED BY: _____ 4/15/93
N. C. Kaufman, President Date

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Fernald Environmental Restoration Management Corporation
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FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION

SPILL PREVENTION CONTROL AND COUNTERMEASURE (SPCC) PLAN

April 30, 1993

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
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CINCINNATI, OHIO 45239-8704

Prepared for the

U. S. DEPARTMENT OF ENERGY
FERNALD FIELD OFFICE

Approved: _____
Thomas J. Rowland, Manager
U. S. Department Of Energy

Approved: _____
N. C. Kaufman
President, FERMCO

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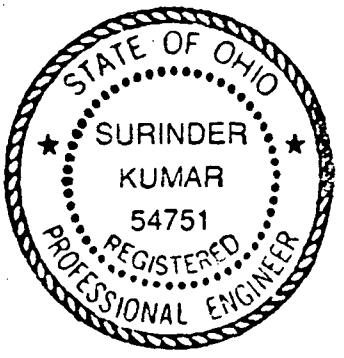
CERTIFICATION OF THE FEMP SPILL PREVENTION CONTROL AND COUNTERMEASURE (SPCC) PLAN FOR OIL

"I, having reviewed the FEMP Spill Prevention Control and Countermeasure Plan, Revision 0, having examined the subject facility, and being familiar with 40 CFR Part 112 certify that, to the best of my knowledge, the amended FEMP SPCC Plan for oil has been prepared in accordance with good engineering practices."

Surinder Kumar
Printed Name Of Registered Professional Engineer

SKumar
Signature Of Registered Professional Engineer
Registration Number E-54751
State OHIO
Date 4/15/93

(Seal)



Department of Energy approval at a level with authority to commit the necessary resources to implement the SPCC Plan as required under 40 CFR, Part 112.

Approved: _____
Thomas J. Rowland, Manager
U. S. Department of Energy

LIST OF EFFECTIVE PAGES

SECTION	PAGES	REV. NO	EFFECTIVE DATE
	i thru xiii	0	04-30-93
1	1-1 thru 1-2	0	04-30-93
2	2-1 thru 2-19	0	04-30-93
3	3-1 thru 3-21	0	04-30-93
4	4-1 thru 4-2	0	04-30-93
5	5-1 thru 5-6	0	04-30-93

SECTION	APPENDIX	REV. NO.	EFFECTIVE DATE
A	A-1 thru A-2	0	04-30-93
B	B-1	0	04-30-93
C	C-1 thru C-6	0	04-30-93
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E	E-1 thru E-7	0	04-30-93
F	F-1 thru F-16	0	04-30-93
G	G-1 thru G-5	0	04-30-93
H	H-1 thru H-3	0	04-30-93

RECORD OF ISSUE/REVISIONS

DATE	REV. NO	DESCRIPTION AND AUTHORITY
04-30-93	0	Plan required per Request No. S92-223, initiated by M. Mercadal, to replace FMPC-2194, dated 02-04-92 Rev. 1.

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ACRONYMS & ABBREVIATIONS

AEDO	Assistant Emergency Duty Officer
AST	Aboveground Storage Tank
BDN	Biodenitrification Facility
BMP	Best Management Practices
BSL	Biodenitrification Surge Lagoon
CB	Catch Basin
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CFS	Cubic Feet Per Second
CWA	Clean Water Act
DOE	Department of Energy
DOT	Department of Transportation
EC	Environmental Compliance
EDO	Emergency Duty Officer
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
ERT	Emergency Response Team
ES&H	Environmental Safety & Health
ETS	Effluent Treatment System
FML	Flexible Membrane Liner
FEMP	Fernald Environmental Management Project
FMPC	Feed Materials Production Center
FWPCA	Federal Water Pollution Control Act
GMR	Great Miami River
GPM	Gallons Per Minute
HNO_3	Nitric Acid
HNT	High Nitrate Holding Tank
H_3PO_4	Phosphoric Acid
JPIC	Joint Public Information Center
μg/L	Micrograms Per Liter
mg/L	Milligrams Per Liter
MGY	Million Gallons Per Year
MH	Manhole
MOS	Maintenance Operating System
MSDS	Material Safety Data Sheets
NA	Not Applicable
NaOH	Sodium Hydroxide
NFPA	National Fire Protection Association
NH_4OH	Ammonia Hydroxide
NPDES	National Pollutant Discharge Elimination System
NRC	National Response Center
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl

ACRONYMS & ABBREVIATIONS (cont.)

pCi/L	Picocuries Per Liter
RCRA	Resource Conservation and Recovery Act
RQ	Reportable Quantity
SOP	Standard Operating Procedure
SPCC	Spill Prevention Control and Countermeasure
SSLS	Storm Sewer Lift Station
STP	Sewage Treatment Plant
SWRB	Storm Water Retention Basin
TBP	Tributyl Phosphate
TSCA	Toxic Substances Control Act
UF_4	Uranium Tetrafluoride (Green Salt)
UNH	Uranyl Nitrate Hexahydrate [$UO_2(NO_3)_2 \cdot 6H_2O$]
UO_3	Uranium Oxide (Orange Oxide)
UST	Underground Storage Tank

Definitions

Some of the terms used or referred to in the Spill Prevention Control and Countermeasure Plan are defined below:

Assistant Emergency Duty Officer (AEDO) - Field commander of the FEMP emergency response activities.

Best Management Practices (BMP) - Schedules of activities, maintenance procedures, prohibitions of practices, and other management practices taken to prevent or reduce the pollution of U. S. Waters. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Container - Any portable device in which a material is stored, transported, treated, disposed of, or otherwise handled.

Contingency Plan - For the purposes of this document, a contingency plan is a written document that sets forth policies and procedures for responding to incidents which could threaten human health or the environment.

CWA Hazardous Substance - See "Hazardous Substance" definition.

Dike - An embankment or ridge of either natural or man-made materials used to prevent the movement of liquids, sludges, solids, or other materials.

Discharge - Means accidental or intentional spilling, leaking, pumping, pouring, emitting, emptying or dumping. This does not include any discharge of oil which is authorized by a permit issued pursuant to section 13 of the River and Harbor Act of 1899 (30 Stat. 1121, 33 U.S.C. 407), or sections 402 or 405 of the FWPCA Amendments of 1972 (86 Stat. 816 et seq., 33 U.S.C. 1251 et seq.).

Discharges Of Oil - Defined in 40 CFR Part 110.3 [in compliance with Statute Section 311(b) of the Clean Water Act], as discharges that: "(a) violate applicable water quality standards or (b) cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines." (40 CFR, Part 110)

Emergency Duty Officer (EDO) - Trained member of FEMP management responsible for the management and oversight of FEMP emergency response activities until the FEMP Emergency Operations Center (EOC) is declared operational.

Facility Owner - The person designated as building custodian or the senior supervisor on shift in a plant.

Flammable Liquid - A liquid having a flash point below 100° F (37.8° C) and a vapor pressure not exceeding 40 psia (absolute) at 100° F.

Hazard Label - A visual indicator consisting of easily recognized and understood markings which identify the tank and process equipment contents and indicates the degree of hazard.

Definitions (cont.)

Hazardous Substance - For the purposes of this document, a hazardous substance is designated as any toxic pollutant listed under Statute Section 307(a) of the Federal Water Pollution Control Act (FWPCA) or any hazardous substance listed in 40 CFR 116. All hazardous substances for purposes of this document are listed in Appendix C of this document.

Hazardous Waste - A waste material exhibiting the characteristics of ignitability, corrosivity, reactivity, or toxicity or listed in 40 CFR Part 261 (RCRA) or identified in applicable state regulations.

Manhole 175 - Monitoring of FEMP wastewater discharges to the Great Miami River occurs just downstream of Manhole 175 (MH 175). The term MH 175 is used synonymously to refer to the adjacent monitoring station.

Mixture - Any combination of two or more elements and/or compounds in solid, liquid, or gaseous form, except where such substances have undergone a chemical reaction so as to become inseparable by physical means.

Navigable Waters - Water as defined in Section 502 (7) of the Clean Water Act.

NPDES Permit - A National Pollution Discharge Elimination System permit, authorization, license, or equivalent control document, used by the Environmental Protection Agency (EPA) or an "approved State" to implement the requirements of 40 CFR Parts 122, 123, and 124.

Oil - Oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil. (40 CFR Part 110.1)

PCB Contaminated Electrical Equipment - Any electrical equipment including, but not limited to, transformers, capacitors, circuit breakers, reclosures, voltage regulators, switches, electromagnets, and cable that contains 50 ppm or greater PCBs, but less than 500 ppm PCBs. Oil filled electrical equipment other than circuit breakers, reclosures, and cable whose PCB concentration is unknown must be assumed to be PCB-contaminated electrical equipment. (40 CFR Part 761)

PCB Transformer - Any transformer that contains 500 ppm PCBs or greater. (40 CFR Part 761)

Primary Containment - The tank, container or other device used for holding hazardous substances, hazardous wastes, oils, PCBs.

Release - Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of closed containers in an unpermitted area).

Reportable Quantities - Quantities of hazardous substances that may be harmful as set forth in 40 CFR 117, Table 117.3, or toxic substances as set forth in 40 CFR 122.42. The discharge of a reportable quantity of a substance is a violation of the FWPCA and must be reported to EPA.

Definitions (cont.)

Secondary Containment - Any device or facility designed to capture the accidental release or discharge of a liquid material and maintain positive control of the substance.

Secondary Containment Volume - The actual volume sufficient to contain the capacity of the largest single container or tank which contains oil or a CWA hazardous substance in a drainage system. If the drainage area is subject to precipitation, a reasonable allowance for its accumulation, based on local weather conditions and plant operation, shall be provided over and above the volume necessary to contain the largest single tank or container.

Sheen - An iridescent appearance on the surface of the water (40 CFR Part 110).

Sludge - An aggregate of oil, or oil and other matter of any kind, in any form other than dredged spoil, having a combined specific gravity equivalent to or greater than water (40 CFR Part 110).

Tank - For the purposes of this document, a tank is a stationary device constructed of non-earthen materials which provides structural support, exceeds 85 gallons, and is designed to contain an accumulation of regulated substances. Tanks are classified as Above Ground Storage Tanks (AST) or Underground Storage Tanks (UST). A UST is one which has 10% or more of the storage volume below ground.

Spill - A specific type of release usually involving a liquid. However, the term is often used synonymously with "release."

Transfer Facility - Any transportation related facility including loading docks, parking areas, storage areas, and other similar areas where shipment of hazardous substances/wastes are held during the normal course of transportation.

1.0 SUMMARY

The Spill Prevention Control and Countermeasure (SPCC) Plan is specifically mandated by the Code of Federal Regulations (CFR) Title 40 Part 112 for owners or operators of facilities having a potential for discharge of harmful quantities of oils to navigable waters. Similar provisions mandated by 40 CFR Part 761 applies to the discharge of substances contaminated with polychlorinated biphenyls (PCBs). Although it is not required by 40 CFR Part 112, discussion of the preventative systems for hazardous substances as previously defined, hereinafter referred to as Clean Water Act (CWA) hazardous substances, has been included in this document because of good management practices and the similarity of these systems to those for oil. Only those tanks/containers storing a Reportable Quantity (RQ) or more of CWA hazardous substances are discussed in this document. CWA hazardous substances listed in Appendix C which are stored in quantities less than an RQ are addressed in the Fernald Environmental Management Project (FEMP) Best Management Practices (BMP) Plan (FMPC/SUB-011). This document does not discuss hazardous wastes.

The Spill Prevention Control and Countermeasure Plan consists of two parts: 1) owner/operator plans for preventing an unintentional discharge of oil, PCB or CWA hazardous substance RQ to any navigable water, and 2) owner/operator response in the event of an unintentional discharge of oil, PCB, or CWA hazardous substance from a primary or secondary containment system to prevent it from going to any navigable water. While both parts are discussed in this document, much of the Part 2 response information discussed herein refers to other FEMP documents.

40 CFR Part 112 requires that the Department of Energy (DOE) (owner/operator) complete a review and evaluation of the SPCC Plan at least once every three years. Also, owners/operators of facilities subject to 40 CFR Part 112.3(a), (b), or (c) shall amend the SPCC Plan for such a facility in accordance with 40 CFR Part 112.7 whenever there is a change in facility design, construction, operation or maintenance which materially affects the facility potential for a discharge into or upon navigable waters of the United States or adjoining shorelines. Such amendments shall be fully implemented as soon as possible, but not later than six months after such a change occurs. Accordingly, this document has been issued in a loose-leaf binder so that amendments can be inserted as appropriate.

Section 2 of this report provides background information on the Fernald Environmental Management Project (FEMP), located in Fernald, Ohio. Included are descriptions of production operations, site storage facilities, wastewater treatment facilities (process waste system, sanitary sewer system, storm sewer system) and an oil spill history. The subjects covered under site storage facilities include tank storage and container storage. Container storage is further subdivided into oils and CWA hazardous substances, PCB-contaminated oils, production wastes, and Resource Conservation and Recovery Act (RCRA) hazardous wastes. A site plan drawing of the FEMP indicates the location of tank and container storage areas containing oils, PCBs and CWA hazardous substances stored in RQs.

1.0 SUMMARY (cont.)

Section 3 covers the FEMP Spill Prevention Program. Subjects discussed in this section are personnel training, labeling of storage tanks and containers, operating procedures, inspection of storage areas and preventive maintenance (includes an inspection schedule of equipment and storage areas), security at the FEMP, Best Management Practices (BMP) Committee, containment systems and countermeasures, and inventory and level controls. FEMP site policy and procedures are listed in Table 3-1 and are referenced throughout this section. These documents are available at various locations throughout the FEMP including the facility owners' offices, security, training department, and Emergency Operations Center (EOC).

Section 4 presents the SPCC Contingency Plan. The document titled "FEMP Emergency Plan" details the procedures to be followed at the FEMP in the event of an accident (spill) or emergency and is the document which governs the spill response actions. However, a discussion of the subjects in the FEMP Emergency Plan is reiterated in Section 4 of the SPCC Plan. Also, included in this section are the procedures for reporting a spill or emergency at the FEMP. As in Section 3, several FEMP documents are referenced throughout Section 4 which are available at various locations throughout the FEMP.

The SPCC Plan also includes a prediction of the total quantity of a substance from a potential release, the flow path of a release, and an evaluation of the spill travel time. This Spill/Release Evaluation is presented in Section 5.

2.0 BACKGROUND INFORMATION

The FEMP was constructed and began operations in the early 1950s. Its main function was to produce purified uranium metal and uranium compounds for use at other Department of Energy (DOE) facilities. A small amount of thorium processing was conducted at the FEMP in the past. Associated with the production of uranium at the FEMP are numerous buildings and plants, each of which performed a specific function related to uranium processing. This facility had the capability of converting a variety of feeds to pure uranium metal and compounds. The facility was primarily engaged in the production of uranium materials in different physical forms through a variety of chemical, foundry and machining operations. The principal production operations during the years just prior to the cessation of production consisted of metal fabrication with periodic small campaigns to process accumulated plant residues and miscellaneous feed materials obtained from other DOE facilities. Environmental restoration, cleanup efforts and waste management comprise the work presently being conducted at the FEMP.

The FEMP is owned and operated by the DOE. It is located near the unincorporated town of Fernald, Ohio, approximately 20 miles (32 kilometers) northwest of Cincinnati. The production facilities cover approximately 136 acres in the center of a 1,050 acre site. The site is bounded on the south by Willey Road, on the west by Paddy's Run Road, on the north by farmland and State Route 126, and on the east by a dairy farm. Figure 2-1 shows a map of the area surrounding the FEMP. A FEMP Site Plan perspective is shown in Figure 2-2.

The FEMP stores and uses a variety of oil products and other organic and inorganic chemical constituents considered to be hazardous. Most of the oils and oil derivatives maintained at the site are used as lubricants, coolants, degreasing agents, hydraulic fluids, cutting oils, and fuels. Accordingly, the FEMP SPCC Plan has been prepared to meet the requirements of the regulations imposed by 40 CFR Part 112, Part 761, and hazardous substances as defined for purposes of this document. The FEMP is required by 40 CFR Part 112, to prepare a SPCC Plan since it has above ground storage tanks that have a combined capacity of over 100,000 gallons of oil and oil derivatives (petroleum products). The regulations require a SPCC Plan to be prepared for the site if it has a total above ground storage capacity exceeding 1,320 gallons (and any single above ground tank has a capacity greater than 660 gallons).

The FEMP is located in the Great Miami River Basin. Natural drainage from the site is south and westward towards Paddy's Run, a tributary of the Great Miami River. As shown in Figure 2-1, Paddy's Run originates north of the plant and flows southward on the west side of the plant. Flow in Paddy's Run is intermittent and is sustained primarily during the seasonally wet period from January to May. During the remainder of the year it can be considered a dry stream bed with the exception of occasional flash flows of a few hours duration during and following heavy rains.

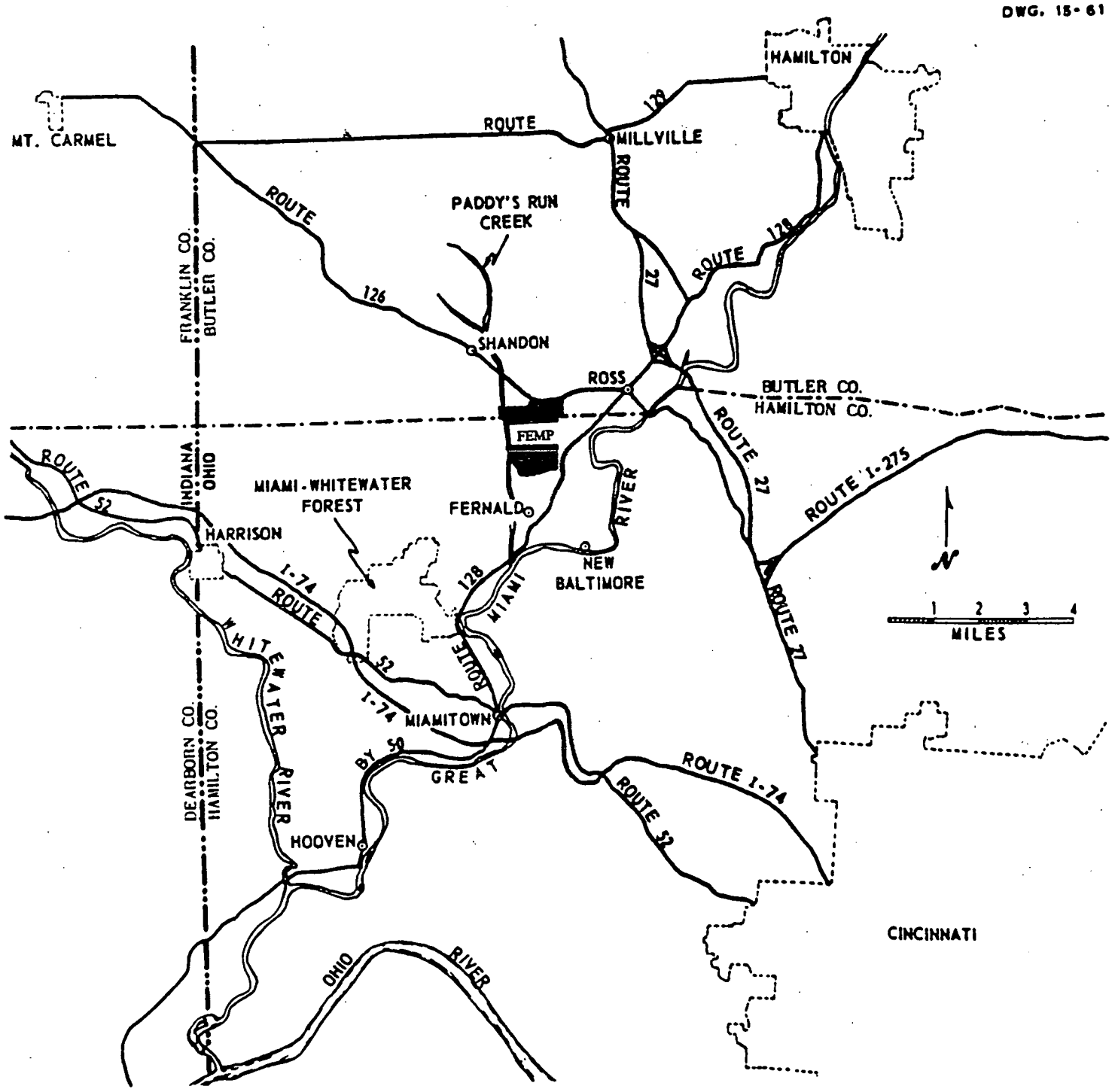
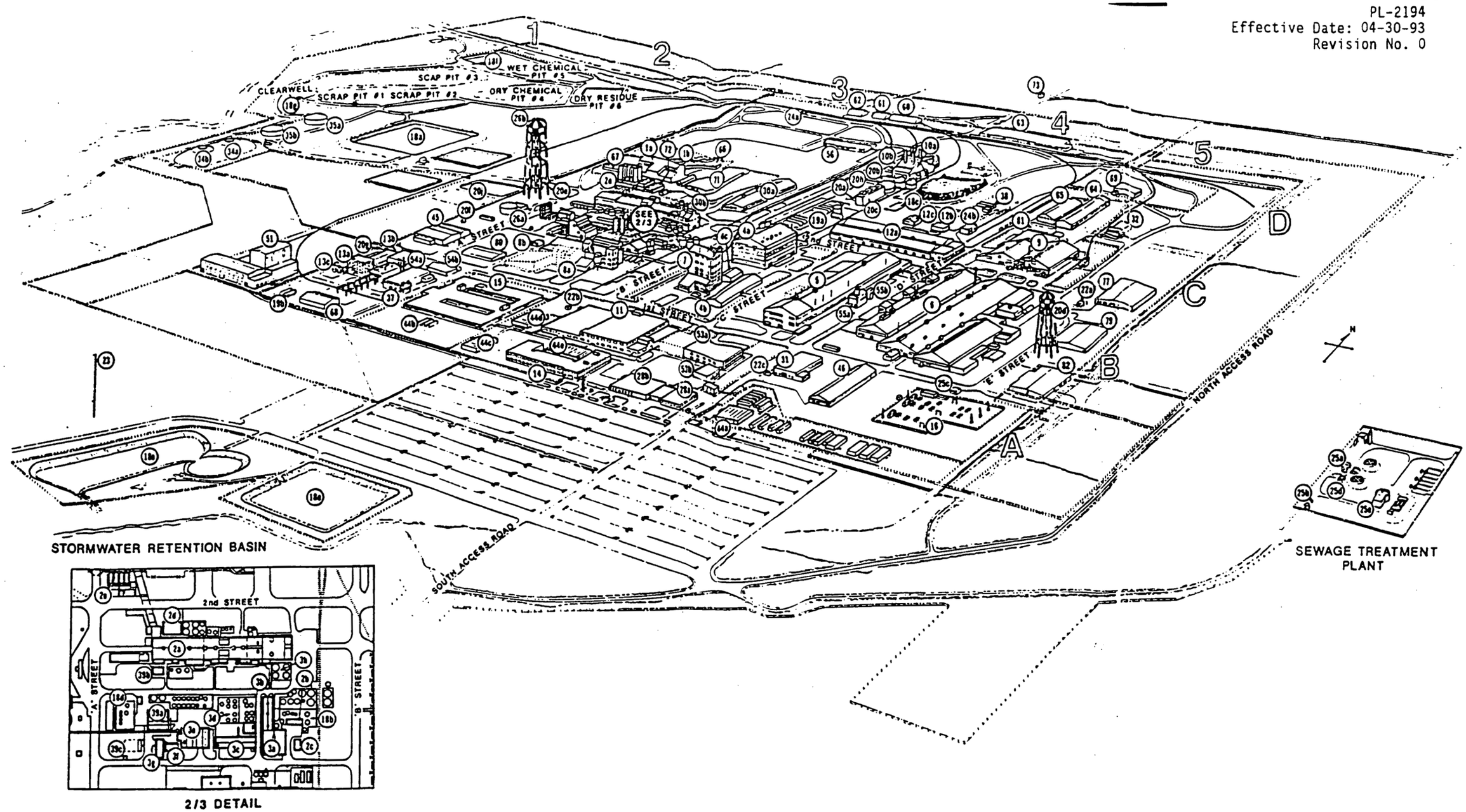


FIGURE 2-1 - FEMP AREA MAP



See Following Page For Building Identification

FIGURE 2-2: PERSPECTIVE OF FEMP

BUILDING IDENTIFICATION

Building No.	Grid Coordinates	Title
00	C-3	General
1a	C-3	Preparation Plant
1b	B-3	Plant 1 Storage Building
2a	B-3	Ore Refinery Plant
2b	B-3	Lime Handling Building
2c	B-3	Bulk Lime Handling Building
2d	C-3	Metal Dissolver Building
2e	C-3	NFS Storage and Pump House
3a	B-3	Maintenance Building
3b	B-3	Ozone Building
3c	B-3	Control House
3d	B-3	NAR Towers
3e	B-3	Hot Raffinate Building
3f	B-3	Digestion Fume Recovery
3g	B-3	Refrigeration Building
3h	B-3	Refinery Sump
4a	B-4	Green Salt Plant
4b	B-4	Plant 4 Warehouse
4c	B-4	Plant 4 Maintenance Building
5	B-4	Metals Production Plant
6	B-5	Metals Fabricating Plant
7	B-4	Plant 7
8a	B-3	Recovery Plant
8b	B-3	Maintenance Building
9	C-5	Special Products Plant
10a	D-4	Boiler Plant
10b	D-4	Boiler House Maintenance Building
11	A-4	Service Building
12a	C-4	Maintenance Building (Main)
12b	C-4	Cylinder Storage Building
12c	C-4	Lumber Storage Building
13a	A-3	Pilot Plant Wet Side
13b	A-3	Pilot Plant Maintenance Building
13c	A-3	Sump Pump House
14	A-4	Administration Building
15	A-3	Laboratories
16	A-5	Main Electrical Substation
18a	C-2	Surge Lagoon
18b	B-3	General Sump
18c	C-4	Coal Pile Runoff Basin
18d	B-3	Biodenitrification Towers
18e	*	Storm Water Retention Basin
18f	D-1	Pit 5 Sluice Gate
18g	C-1	Clearwell Pump House
19a	C-4	Metal Tank Farm
19b	A-3	Pilot Plant Ammonia Tank Farm
20a	C-4	Valve/Control Building
20b	D-4	Filter/Chemical Building
20c	C-4	Cooling Towers
20d	B-5	Elevated Storage Tank (Potable H_2O)
20e	B-3	Well House
20f	B-3	Well House
20g	A-3	Well House
20h	D-4	Process Water Storage Tank
20j	B-2	Lime Slurry Pits
22a	B-5	Gas Meter Building
22b	A-3	Sewer Lift Station
22c	A-5	Truck Scale
23	*	Meteorological Tower
24a	D-3	Railroad Scale House
24b	C-4	Railroad Engine Building
24c	*	Chlorination House
25b	*	MH #175
25c	A-5	Sewage Lift Station Building
25d	*	U.V. Disinfection Building
25e	*	Digester Control House
26a	B-3	Pump House - H.P. Fire Protection
26b	B-3	Fire Protection Storage Tank
28a	A-4	Security Building
28b	A-4	Human Resources Building
30a	C-3	Chemical Warehouse
30b	C-3	Drum Storage Warehouse
31	A-5	Engine House - Garage
32	D-5	Magnesium Storage
34a	B-1	K-65 Storage Tank - North
34b	B-1	K-65 Storage Tank - South
35a	C-1	Metal Oxide Storage Tank - North
35b	B-1	Metal Oxide Storage Tank - South
37	A-3	Pilot Plant Annex
38	D-4	Propane Storage
39a	B-3	Incinerator Building
39b	B-3	Warehouse
39c	B-3	Incinerator Bulding Sprinkler Riser House
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44b	A-4	Trailer Complex - 3-Plex
44c	A-3	Trailer Complex - 7-Plex - South
44d	A-3	Trailer Complex - 7-Plex - North
44e	A-4	Trailer Complex - 10-Plex
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53a	A-4	Health, Safety & Production Control Building
53b	A-4	In-Vivo Building
54a	A-3	UF_6 to UF_4 Reduction Facility I
54b	A-3	Warehouse/Weather Shelter
55a	B-4	Slag Recycling Plant
55b	B-4	Slag Recycling Pit/Elevator
56	D-3	CP Storage Warehouse
60	D-3	Quonset Number 1
61	D-3	Quonset Number 2
62	D-3	Quonset Number 3
63	D-4	KC-2 Warehouse
64	D-5	Plant 9 Warehouse
65	D-5	Plant 5 Warehouse
66	C-3	Drum Reconditioning Building
67	C-3	Plant 1 Storage Building
68	A-3	Pilot Plant Warehouse
69	D-5	Decontamination Building
71	C-3	General In-Process Storage Warehouse
72	C-3	Drum Storage Building
73	*	Fire Brigade Training Center Building
77	C-5	Finished Products Warehouse
78	*	New D&D Facility (On Hold)
79	B-5	Plant 6 Warehouse
80	B-3	Plant 8 Warehouse
81	C-5	Plant 9 Warehouse
82	B-5	Receiving & Incoming Materials Inspection Area

* Outside of Perimeter Security Fence

NOTE: Any Unidentified Area is Referred to as 00 General

2.0 BACKGROUND INFORMATION (cont.)

The FEMP has a fully integrated water treatment system capable of collecting and processing sanitary sewage, process wastewaters, and stormwater runoff prior to their discharge to the Great Miami River via Manhole 175 (MH 175). The process wastewater system is designed to collect and treat liquid process waste streams prior to discharge. The sanitary sewer system collects raw sewage from the FEMP buildings and transports it to the Sewage Treatment Plant for processing before being discharged to the river. The storm sewer system is designed to collect stormwater runoff and transfer it to the Storm Water Retention Basin (SWRB) for settling of solids before it is discharged to the river.

The following sections describe the FEMP production operations, storage facilities, wastewater treatment facilities (including site drainage system), and oil spill history. This should provide the reader with enough insight into plant operations to enable a better understanding of the Spill Prevention Control and Countermeasure Plan.

2.1 PRODUCTION OPERATIONS DESCRIPTION

A wide variety of chemical and metallurgical processes were employed at the FEMP in the conversion of recycled materials to either uranium metal derbies or uranium ingots.

Uranium oxides were produced by dissolving recycled materials in nitric acid to produce a Uranyl Nitrate (UNH) feed solution for solvent extraction purification. Purified UNH solution was concentrated by evaporation and then thermally denitrated to orange oxide (UO_3). Nitrogen oxides released during the dissolution and denitration steps were captured, converted to nitric acid and reused in the process. UO_3 was converted to uranium tetrafluoride (UF_4) (commonly referred to as green salt) for reduction to metal at the FEMP. Recoverable scrap materials generated in FEMP operations were reclaimed for reuse by either furnacing or wet chemical hydrometallurgical processing.

Uranium metal derbies were produced by the reduction of UF_4 with magnesium metal. Some derbies were shipped directly to customers and others were vacuum induction melted along with scrap uranium metal to produce uranium ingots in a variety of sizes and shapes. Most ingots or billets were surface machined before being shipped to an offsite location. Round ingots were surface machined then center-bored for subsequent extrusion at an offsite location. Certain extrusions were returned to the FEMP to undergo heat treatment and fabrication into target elements for DOE reactors at the Savannah River Site.

As with any large manufacturing plant, proper handling of the wastes produced by these processes was necessary. The following sections describe storage areas and disposal/treatment methods for these wastes and the plans for spill prevention control and countermeasures in the event of a spill.

2.0 BACKGROUND INFORMATION (cont.)

2.2 Site Storage Facilities Description

Sections 307(a) of the Clean Water Act and 40 CFR 116 are the statutory sources for the listing of CWA hazardous substances shown in Appendix C. Inventories of some of these various CWA hazardous substances are maintained at the FEMP in amounts greater than their respective reportable quantities (RQs) as specified in Sections 307 and 311 of the CWA.

Appendix D is a listing of the primary containments (tanks, equipment or containers) for the CWA hazardous substances stored in quantities ≥ RQs, along with the primary containments for oil and oil derivatives (petroleum products), PCB-contaminated equipment and PCB-contaminated wastes. Appendix D is subdivided into categories of storage tanks for (or equipment containing) oil and oil derivatives (40 CFR, Part 112 tanks), storage tanks for CWA hazardous substances with quantities ≥ RQs, and containers for oil and PCB materials (40 CFR, Parts 112 and 761 containers). Note that no tanks exist for PCB materials and, to the best of our knowledge, no containers of CWA hazardous substances exist which have individual capacities exceeding their respective RQ as specified in Appendix C. Included in Appendix D is information regarding the substance stored in each primary containment, its capacity, location identification number, material of construction, and other pertinent information.

Secondary containment systems consisting of concrete dikes or curbs surround 84% of the primary containments. In addition, many of these containment areas are lined with a material such as acid brick or stainless steel, that is resistant to the oils or CWA hazardous substances stored in the primary container(s) for that area. Additional secondary containment systems consist of steel tanks.

Appendix E is a listing of the secondary containments at the FEMP. Appendix E is also subdivided into groupings for CWA hazardous substance tanks, oil and oil derivative tanks, and PCB containers. Note that some secondary containment areas contain tanks for both CWA hazardous substances and oil or oil derivatives. Also, a separate grouping is provided for the remaining underground storage tanks. Included in Appendix E is information regarding the diked area secondary containment capacity, construction, location, the capacity of the largest primary containment within the diking, and other pertinent information.

Appendix E also provides a listing of the loading/unloading stations at the FEMP where SPCC substances are handled. Included in this listing is information regarding the capacity of the secondary containment provided at each station, the capacity of the largest tanker or compartment of a tanker using the station, the location of the station and other pertinent information.

2.0 BACKGROUND INFORMATION (cont.)

Figure 2-3 shows the general location of primary and secondary containment systems and the loading/unloading stations at the FEMP. Figure 2-3 also serves as a key plan to detailed enlargement of specific area grid plates which can be found in Appendix F. The first column of Appendices D and E lists the building number associated with each primary or secondary containment and each loading/unloading station. The second column lists the locator file number corresponding to a location indicated on Figure 2-3 and the specific enlarged grid plate in Appendix F where each item can be viewed more clearly.

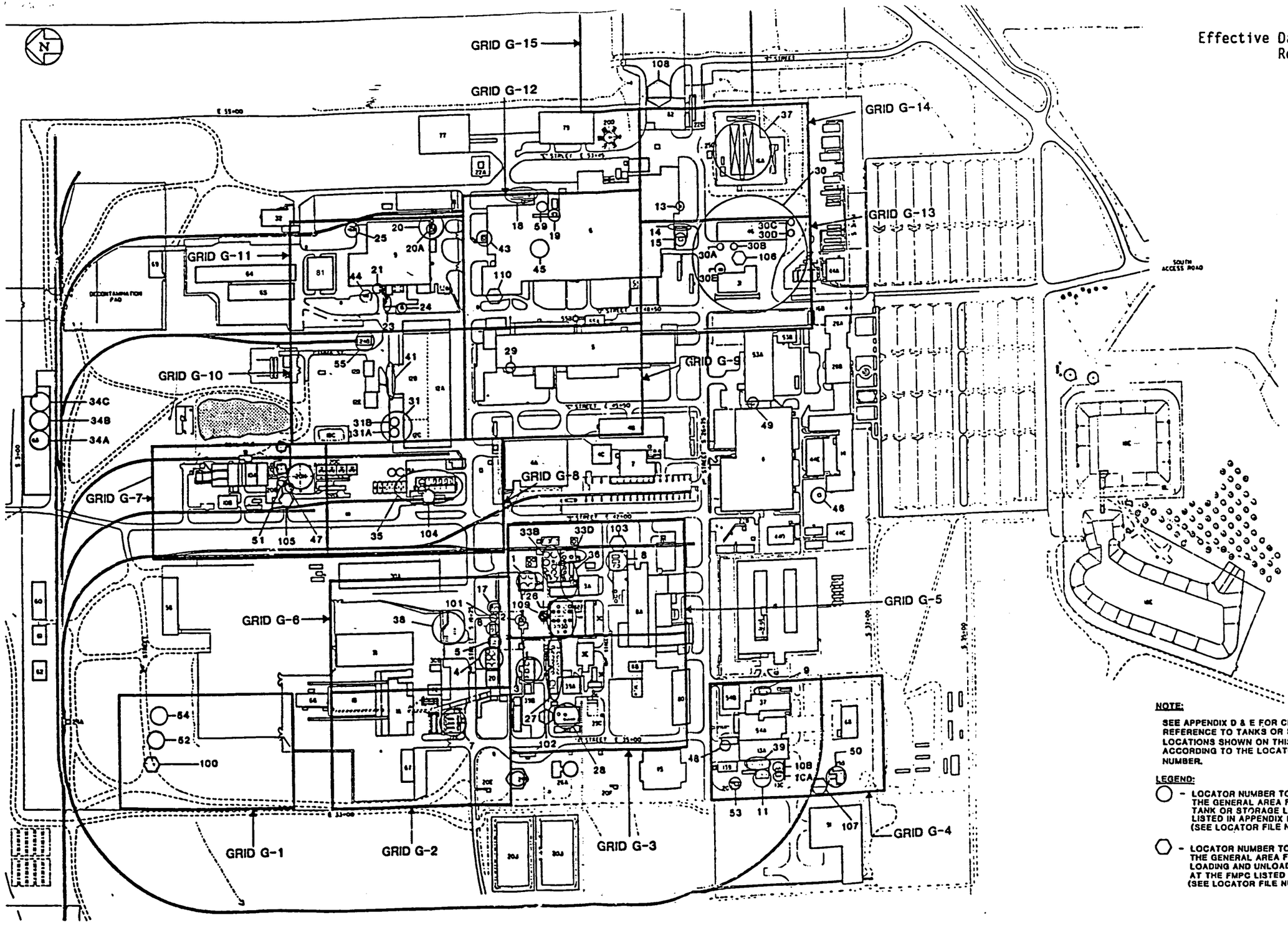
2.2.1 Tank Storage

Storage tanks are located throughout the FEMP facility. Identified in this SPCC Plan are those tanks or equipment capable of containing petroleum products for plant operation, oil cooled equipment, residual raw materials previously used in production operations, by-products of the production operations, and waste streams. Design parameters for these tanks are presented in Appendix D. These parameters include tank identification (and location); service (material stored); capacity of the tank in gallons; presence of level control; material of tank construction; evaluation of tank construction; presence/absence of inventory control; visual inspection; heating coil information; and year of tank installation. Many of the CWA hazardous substances and oils that are stored in the various storage tanks located throughout the FEMP are transferred by process lines from one of the few storage tanks that receive these substances or oils at one of the eleven (11) main loading/unloading areas.

Petroleum products, such as gasoline, diesel fuel, and No. 2 heating fuel, are stored at several locations throughout the FEMP. Gasoline and diesel fuel used in FEMP vehicles (i.e., cars, fire engines, lawn mowers, etc.) are supplied from these storage tanks. Lubricating oil is also used in many of these vehicles. Three (3) No. 2 heating fuel tanks that supply oil for the emergency standby generators are also located at the FEMP. These tanks are located at the northwest corner of the Administration Building, the northwest corner of the Health and Safety Building and the Number 3 Groundwater Well Pumphouse located by the Pilot Plant.

Electrical power is delivered to the FEMP plant via a loop feed by Cincinnati Gas and Electric Company at 132,000 volts. This power is transformed to 13,200 volts by three 10,000 kilovolt-ampere (kVA) forced-air-cooled transformers in the main substation for distribution to the plant users. Each of these transformers is filled with oil and is therefore within the scope of this SPCC Plan. Also, an oil-filled circuit breaker is associated with each of the three transformers at the main electrical substation. These units are included in Appendix D and Appendix E with the subsection addressing Storage Tanks (40 CFR, Part 112 tanks).

Raw material tanks contain CWA hazardous substances such as nitric acid (HNO_3), sodium hydroxide (NaOH), barium carbonate, sulfuric acid, aluminum sulfate, 1-1-1 trichloroethane, potassium carbonate, magnesium oxide, calcium oxide, hydrated alumina, and lithium carbonate. Nitric acid was used at the FEMP to digest uranium bearing residues to allow separation of the uranium from any impurities.



NOTE:

SEE APPENDIX D & E FOR CROSS-REFERENCE TO TANKS OR STORAGE LOCATIONS SHOWN ON THIS MAP ACCORDING TO THE LOCATOR FILE NUMBER.

LEGEND:

○ - LOCATOR NUMBER TO IDENTIFY THE GENERAL AREA FOR VARIOUS TANK OR STORAGE LOCATIONS LISTED IN APPENDIX D & E (SEE LOCATOR FILE NUMBER).

⬡ - LOCATOR NUMBER TO IDENTIFY THE GENERAL AREA FOR VARIOUS LOADING AND UNLOADING FACILITIES AT THE FMPC LISTED IN APPENDIX E (SEE LOCATOR FILE NUMBER).

FIGURE 2-3: FMPC STORAGE TANK LOCATIONS AND SPCC MASTER GRID

2.0 BACKGROUND INFORMATION (cont.)

Byproduct tanks contain substances such as dilute Nitric Acid. Dilute nitric acid is a by-product of the Nitric Acid Recovery System, which was used to recover NOx from the digestion and denitration operations of the Refinery (Plant 2/3). A mixture of kerosene and tributyl phosphate (TBP) was used in the Refinery for the organic extraction of uranium. Sodium hydroxide was used in the neutralization of liquids before filtering in Plant 6 and Plant 8.

In-process tanks contain substances such as uranyl nitrate (a mixture of nitric acid and uranium). A substantial quantity of uranyl nitrate is in storage at the Refinery waiting for further purification to be produced as uranium oxide (UO_3).

Waste streams produced from various processes are in storage tanks located throughout the FEMP. The Zirnlo process in Plant 9 produced such waste streams as dilute hydrofluoric acid and nitric acid, and lime slurry. These byproducts are the result of the chemical removal of the zirconium, aluminum, and copper cladding of the uranium core elements. Other waste streams are the result of such operations as nitric acid pickling of uranium, derbies, ingots, etc., in Plants 6 and 9.

2.2.2 Container Storage

In addition to containers of oils and CWA hazardous substances used in FEMP plant production activities, in-process materials and wastes considered to be hazardous by the various federal regulations such as Resource Recovery Conservation Act (RCRA), Toxic Substances Control Act (TSCA), CWA, etc., are stored (usually in drums) at many locations throughout the FEMP. The contents of the drums are identified using the FEMP Lot Marking and Color Coding System. This marking system identifies the stored material (e.g., fines, chips, briquettes, scrap metal, etc.), the FEMP plant that the material came from, and the enrichment of uranium and thorium materials. Drummed CWA hazardous substances and process wastes stored at the facility are also identified using Department of Transportation (DOT), Occupational Safety and Health Administration (OSHA), and Environmental Protection Agency (EPA) guidelines. The following paragraphs describe the drummed substances stored at the FEMP.

2.2.2.1 Oils and CWA Hazardous Substance Containers

Drummed oils and CWA hazardous substances for use in plant processes are received, stored, transferred, and used at various operations throughout the FEMP facility. The drums are received at the main shipping area, (Loading/ Unloading Station 108, as shown at the top of Figure 2-3). These substances are then transferred to various designated storage areas according to their physical, chemical, and fire hazard properties in accordance with accepted National Fire Protection Association (NFPA) and DOE standards as referenced in NFPA 30, 49, 321, and 325M. The substance is then distributed to the end-user facilities in quantities sufficient to maintain operations. Note that only drums containing oil or oil derivatives appear in Appendix D and Appendix E. All CWA hazardous substances received in drums are purchased in a quantity less than RQs. Therefore, these drums are under the jurisdiction of the FEMP BMP Plan and are not a part of this SPCC Plan.

2.0 BACKGROUND INFORMATION (cont.)

2.2.2.2 PCB-Contaminated Oil Containers

PCB-contaminated electrical equipment which has been removed from service, and PCB-contaminated waste oils which were previously stored in the KC-2 Warehouse are now stored in Building 81 (refer to Figure 2-3). There are currently 48 drums of PCB-contaminated material currently stored within a diked area in the southwest corner of Building 81.

2.2.2.3 Production Waste Containers

Some production wastes generated at the FEMP were also drummed. This includes low-level radioactive wastes such as raffinate, slag leach filter cake, and magnesium fluoride. Many of these substances were temporarily stored before being processed and shipped for final disposal at an approved offsite disposal facility; still other drums of these substances remain on site. Various forms of production materials and recoverable residues are temporarily stored in drums while awaiting further processing at the FEMP. Other materials in the drum inventory include: clothing, gloves, and other solid wastes with a low uranium content awaiting disposal, degreasing solvents, asbestos-containing wastes generated from maintenance and restoration activities, waste machine oils and oil sludges with low-level radioactive contamination, and wastes containing PCBs, some of which also contain uranium and degreasing solvents.

Drums containing waste oils contaminated with RCRA regulated constituents, as described above for PCB-contaminated oil containers, are handled as RCRA wastes at the FEMP (see 2.2.2.4). Note that no container of production waste is presented in Appendix D or Appendix E. To the best of our knowledge, all other production waste containers have a quantity of substance which is less than the RQs listed in Appendix C and are, therefore, addressed in the FEMP Best Management Practices (BMP) Plan.

2.2.2.4 RCRA Hazardous Waste Containers

There are currently seven warehouses used for the storage of hazardous wastes: Pilot Plant Warehouse, Building 79, Building 80, Building 81, Building 56, and Tension Support Structure TS-5, and the KC-2 Warehouse. Building 81 contains PCB-contaminated oil and waste oils contaminated with RCRA regulated constituents; these are presently covered by the SPCC Plan (regulations proposed would identify these materials as hazardous wastes). These PCB and RCRA contaminated oils are handled as hazardous wastes at the FEMP and are, therefore, stored in conditions which meet or exceed SPCC guidelines and will not be further addressed in this SPCC Plan. Since the substances that are stored in the Pilot Plant Warehouse, the KC-2 Warehouse, Building 56, TS-5, and Building 80 are not oils or PCB-contaminated oils, they are not regulated by 40 CFR 112 and are not a part of this SPCC Plan. Drums containing hazardous wastes are addressed in the FEMP RCRA Contingency Plan.

2.0 BACKGROUND INFORMATION (cont.)

2.3 Wastewater Treatment Facilities

Figure 2-4 presents a schematic diagram of the overall FEMP wastewater flow. Major wastewater handling and treatment facilities are shown on Figure 2-2. The FEMP has systems in place for collecting, processing, and discharging process liquids, sanitary sewage, and stormwater runoff. Each of these systems has a monitoring system and a set of National Pollutant Discharge Elimination System (NPDES) discharge limitations as described in each of the following subsections. Furthermore, all streams, except for occasional overflows of stormwater runoff collected in the Storm Water Retention Basin (SWRB), NPDES Discharge Point 002, as discussed below, are monitored again at Manhole 175 (MH 175), NPDES Discharge Point 001, prior to discharge to the Great Miami River. NPDES monitoring at MH 175 includes flowrate, dissolved oxygen, oil and grease, pH, total nonfilterable residue, nitrogen, nitrate, fluoride, carbonaceous Biochemical Oxygen Demand, and several heavy metals. Table 2-1 provides a summary of the NPDES plant effluent limits. In addition to the NPDES monitoring requirements, DOE has placed guidelines on the quantities of radionuclides discharged at MH 175. Table 2-2 provides a summary of DOE plant effluent guidelines for discharges to MH 175 and overflows from the SWRB.

2.3.1 Process Waste System

The General Sump receives both uranium and non-uranium contaminated wastewater. Here the effluent is combined with similar effluent streams. For uranium contaminated wastewaters, the General Sump acts primarily as a transfer facility. Initial treatment is provided and then the effluent is routed to the necessary treatment systems in Plant 8 or the BDN facility. The filtrate from the Plant 8 filter system is transferred back to the General Sump. The solid residues are placed in 55-gallon drums. These drums are currently stored on the Plant 1 pad. It is anticipated that the drums will be stored there until the rotary kiln becomes operational in September 1993. At that time they will be dried in the kiln and prepared for offsite disposal.

From the General Sump, the treated process effluent is segregated on the basis of nitrate concentration and routed to either the 8 million gallon low nitrate Biodenitrification Surge Lagoon (BSL) or the 500,000 gallon High Nitrate Holding Tank (HNT). The effluents from the BSL and HNT are blended and fed to the Biodenitrification Facility (BDN). The BDN is a biological process utilizing fluidized bed reactors to remove nitrates from the wastewater. A recycle line from the BDN treatment facility to the BSL is provided to prevent a discharge of inadequately treated wastes. A new BDN Effluent Treatment System (ETS) was placed on line in September 1990. Wastewater discharged from the BDN is now further treated independently from sanitary sewage. The ETS discharges directly to MH 175.

The non-uranium contaminated wastewater streams produced onsite are permitted to be discharged directly from the General Sump. Water Plant blowdown, Boiler Plant blowdown, and coal pile runoff are collected in Tanks 6 and 7 in the General Sump. After a coagulation and settling treatment, the wastewater is discharged to Tank 9 in the General Sump where it is monitored for NPDES permit limitations of hexavalent chromium, total chromium, copper, nickel, pH and flow when discharged from the General Sump to MH 175.

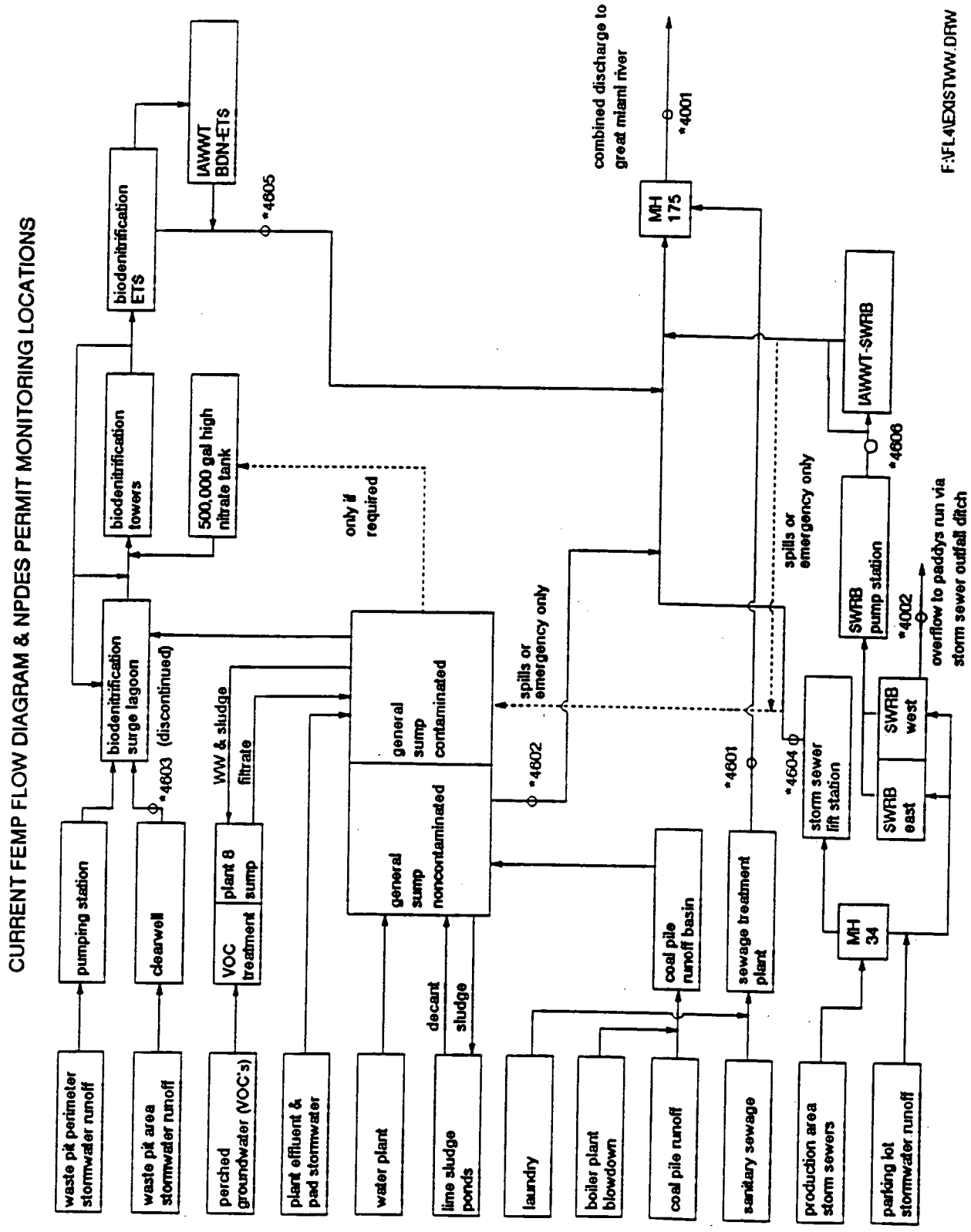


FIGURE 2-4 - WASTEWATER FLOW DIAGRAM

Table 2-1

NPDES Effluent Discharge Limitations

OUTFALL *4001 MANHOLE 175

DISCHARGE LIMITATIONS

PARAMETER	CONCENTRATION UNITS	30 DAY	DAILY	LOADINGS UNITS	30 DAY	DAILY
DISSOLVED OXYGEN	mg/L	–	(5.0 MIN)	Kg/DAY	–	–
RESIDUE, TOTAL NONFILTERABLE	mg/L	30	45	Kg/DAY	99	149
OIL AND GREASE, TOTAL	mg/L	15	15	Kg/DAY	50	50
NITROGEN, AMMONIA (NH_3)	mg/L	–	–	Kg/DAY	–	–
NITRATE AS NITROGEN	mg/L	–	–	Kg/DAY	–	–
CYANIDE, TOTAL	mg/L	0.036	0.076	Kg/DAY	0.120	0.251
FLUORIDE, TOTAL (F)	mg/L	–	–	Kg/DAY	–	–
CHROMIUM, TOTAL (Cr)	µg/L	–	–	Kg/DAY	–	–
COPPER, TOTAL (Cu)	µg/L	23	94	Kg/DAY	0.077	0.310
LEAD, TOTAL (Pb)	µg/L	60	776	Kg/DAY	0.199	2.562
NICKEL, TOTAL (Ni)	µg/L	–	–	Kg/DAY	–	–
SILVER, TOTAL (Ag)	µg/L	12	26	Kg/DAY	0.040	0.086
CHROMIUM, DISSOLVED HEXAVALENT	µg/L	–	–	Kg/DAY	–	–
FLOW RATE, DAILY	MGD	–	–	–	–	
BIOCHEMICAL OXYGEN DEMAND, C.	mg/L	20	30	Kg/DAY	66	99
pH, CONTINUOUSLY MONITORED		(6.5 TO 9.0)				

OUTFALL *4002 STORMWATER RETENTION BASIN OVERFLOW

DISCHARGE LIMITATIONS

PARAMETER	CONCENTRATION UNITS	30 DAY	DAILY	LOADINGS UNITS	30 DAY	DAILY
RESIDUE, TOTAL NONFILTERABLE	mg/L	–	100	Kg/DAY	–	–
OIL AND GREASE, TOTAL	mg/L	–	15	Kg/DAY	–	–
NITROGEN, AMMONIA (NH_3)	mg/L	–	–	Kg/DAY	–	–
NITRATE AS NITROGEN	mg/L	–	–	Kg/DAY	–	–
FLUORIDE, TOTAL (F)	mg/L	–	–	Kg/DAY	–	–
CHROMIUM, TOTAL (Cr)	µg/L	–	3986	Kg/DAY	–	–
COPPER, TOTAL (Cu)	µg/L	–	45	Kg/DAY	–	–
NICKEL, TOTAL (Ni)	µg/L	–	3137	Kg/DAY	–	–
SILVER, TOTAL (Ag)	µg/L	–	11.6	Kg/DAY	–	–
CHROMIUM, DISSOLVED HEXAVALENT	µg/L	–	19	Kg/DAY	–	–
FLOW RATE, DAILY	MGD	–	–		–	–
pH, MONITORED DAILY WHEN DISCHARGING		(6.5 TO 9.0)				

Table 2-1 (cont.)

NPDES Effluent Discharge Limitations

OUTFALL *4601 SEWAGE TREATMENT PLANT

DISCHARGE LIMITATIONS

PARAMETER	CONCENTRATION UNITS	30 DAY	DAILY	LOADINGS UNITS	30 DAY	DAILY
BIOCHEMICAL OXYGEN DEMAND, 5-D	mg/L	20	40	Kg/DAY	9.5	9
RESIDUE, TOTAL NONFILTERABLE	mg/L	20	40	Kg/DAY	9.5	19
NITROGEN, AMMONIA (NH_3)	mg/L	–	–	Kg/DAY	–	–
FLUORIDE, TOTAL (F)	mg/L	2.3	5.1	Kg/DAY	1.08	2.43
CHROMIUM, TOTAL (Cr)	µg/L	13	32	Kg/DAY	0.006	0.015
COPPER, TOTAL (Cu)	µg/L	53	112	Kg/DAY	0.025	0.053
NICKEL, TOTAL (Ni)	µg/L	32	49	Kg/DAY	0.015	0.023
FECAL COLIFORM (SUMMER ONLY)	#/100ml	1000	2000	Kg/DAY	–	–
FLOW RATE, DAILY	MGD	–	–		–	–
pH, CONTINUOUSLY MONITORED		(6.5 TO 9.0)				

OUTFALL *4602 GENERAL SUMP

DISCHARGE LIMITATIONS

PARAMETER	CONCENTRATION UNITS	30 DAY	DAILY	LOADINGS UNITS	30 DAY	DAILY
CHROMIUM, TOTAL (Cr)	µg/L	41	54	Kg/DAY	0.010	0.013
COPPER, TOTAL (Cu)	µg/L	66	111	Kg/DAY	0.016	0.027
NICKEL, TOTAL (Ni)	µg/L	91	165	Kg/DAY	0.022	0.040
CHROMIUM, DISSOLVED HEXAVALENT	µg/L	12	17	Kg/DAY	0.003	0.004
FLOW RATE, DAILY	MGD	–	–		–	–
pH, WEEKLY GRAB SAMPLE		(6.5 TO 9.0)				

OUTFALL *4603 CLEARWELL

STORMWATER FROM THE CLEARWELL SHALL BE PUMPED ONLY TO THE BIO-SURGE LAGOON.

OUTFALL *4604 STORM SEWER LIFT STATION

DISCHARGE LIMITATIONS

PARAMETER	CONCENTRATION UNITS	30 DAY	DAILY	LOADINGS UNITS	30 DAY	DAILY
RESIDUE, TOTAL NONFILTERABLE	mg/L	30	100	Kg/DAY	–	–
OIL AND GREASE, TOTAL	mg/L	15	15	Kg/DAY	–	–
NITRATE AS NITROGEN	mg/L	–	–	Kg/DAY	–	–
FLUORIDE, TOTAL (F)	mg/L	–	–	Kg/DAY	–	–
FLOW RATE, DAILY	MGD	–	–		–	–
pH, CONTINUOUSLY MONITORED		(6.5 TO 9.0)				

TABLE 2-1 (cont.)

OUTFALL *4605 BIODENITRIFICATION EFFLUENT TREATMENT SYSTEM

DISCHARGE LIMITATIONS

PARAMETER	CONCENTRATION UNITS	30 DAY	DAILY	LOADINGS UNITS	30 DAY	DAILY
BIOCHEMICAL OXYGEN DEMAND, 5-D	mg/L	30	45	Kg/DAY	26	38
RESIDUE, TOTAL NONFILTERABLE	mg/L	30	45	Kg/DAY	26	38
NITROGEN, AMMONIA (NH3)	mg/L	--	--	Kg/DAY	--	--
NITRATE AS NITROGEN	mg/L	72.7	145	Kg/DAY	62	124
CHROMIUM, TOTAL (Cr)	µg/L	12	27	Kg/DAY	0.0101	0.0226
COPPER, TOTAL (Cu)	µg/L	45	90	Kg/DAY	0.0387	0.0770
NICKEL, TOTAL (Ni)	µg/L	29	42	Kg/DAY	0.0251	0.0361
CHROMIUM, DISSOLVED HEXAVALENT	µg/L	--	--	Kg/DAY	--	--
FLOW RATE, DAILY	MGD	--	--		--	--
pH, CONTINUOUSLY MONITORED	(6.5 TO 9.0)					

OUTFALL *4606 STORMWATER RETENTION BASIN TO MANHOLE 175

DISCHARGE LIMITATIONS

PARAMETER	CONCENTRATION UNITS	30 DAY	DAILY	LOADINGS UNITS	30 DAY	DAILY
RESIDUE, TOTAL NONFILTERABLE	mg/L	--	--	Kg/DAY	--	--
OIL AND GREASE, TOTAL	mg/L	--	--	Kg/DAY	--	--
FLOW RATE, DAILY	MGD	--	--		--	--
pH, CONTINUOUSLY MONITORED	(6.5 TO 9.0)					

-- MONITORED ONLY

NOTE: **OUTFALL *4606 MONITORED DAILY WHEN DISCHARGING**

Table 2-2

DOE Guidelines for Radionuclide Discharge (1)

Radionuclide	Guideline pCi/l	Radionuclide	Guideline pCi/l
227 Actinium	10	99 Technetium	100,000
137 Cesium	3,000	228 Thorium	400
210 Lead	30	230 Thorium	300
237 Neptunium	30	232 Thorium	50
238 Plutonium	40	234 Thorium	10,000
239 240 Plutonium	30	233 Uranium	500
40 Potassium	7,000	234 Uranium	500
226 Radium	100	235 Uranium	600
228 Radium	100	236 Uranium	500
106 Ruthenium	6,000	238 Uranium	600
90 Strontium	1,000	Sum Of Fractions	(2)

(1) As stated in DOE Order 5400.5, February 8, 1990. Only radionuclides suspected of being in FEMP wastewater are listed.

(2) The DOE guideline values are given for individual radionuclides. For mixtures of radionuclides, the sum of the ratios of the observed concentration of each radionuclide to its corresponding guideline shall not exceed 1.0.

2.0 BACKGROUND INFORMATION (cont.)

2.3.2 Sanitary Sewer System

Sanitary sewage generated at the FEMP is collected by the sanitary sewer system. A sanitary lift station pumps the collected sewage to a Sewage Treatment Plant (STP) located east of the production area (see Figure 2-2). The treated discharge from the STP is monitored for the flow rate, pH, total nonfilterable residue, nitrogen, fluoride, chromium, copper, nickel, and fecal coliform prior to release to MH 175.

2.3.3 Storm Sewer System

The storm sewer system collects stormwater runoff from building roof drains, uncontrolled storage pads, roadways, open ground areas, and railroad underdrains. The stormwater runoff from the production area flows by gravity to MH 34. A 14-inch high dam in the 60-inch diameter storm sewer downstream of MH 34 diverts normal sewer flow into the wetwell of the Storm Sewer Lift Station (SSLS). Area Code Number (area location) 22B on Figure 2-2 is the location of the Lift Station Pumphouse. Prior to reaching the SSLS, contamination of the storm sewer system by uranium or other compounds may be indicated by pH-triggered alarms in the FEMP Communications Center, the Water Treatment Plant, and at the control panel boards located in Plant 2/3 and Plant 8. These alarms are actuated by abnormal pH readings (< 6.5 or > 8.5 pH units) from meters located at the Storm Sewer Lift Station and Manholes 12, 14, 22, and 23 (see Figure 5-1 for location of these manholes) as described in FEMP Standard Operating Procedure (SOP) 43-C-308.

The SSLS pumps the normal dry weather flow in the storm sewer system to MH 175. The two SSLS pumps are activated by two float control switches and have a combined maximum design capacity of approximately 500-gpm. The lift station houses instruments that record the flow, pH, suspended solids, and temperature. Two composite samplers sample the discharge to MH 175 and the flow that spills over the 14-inch dam. Alarms from the instruments are transmitted to the Water Plant where unusual events at MH 34 can be monitored.

During periods of heavy precipitation, the flow collected in the storm sewer system will overflow the 14-inch high dam in the 60-inch storm sewer and flow to the Stormwater Retention Basin (SWRB). The overflow is directed by sluice gates into one of the two chambers of the basin. The SWRB is designed to retain a 10-year 24-hour storm event (approximately 10.2 million gallons). The basin is lined with dual liners, a minimum 30-mil oil and solvent resistant Flexible Membrane Liner (FML) underlined with a soil bentonite liner. An underdrain system is provided beneath the FML which drains to a sump. A sump pump allows the FEMP to pump any stormwater that leaks through the FML back into the basin. Monitoring of the sump pump discharge allows the FEMP to detect how much stormwater leaks from the SWRB. After settling, manually operated pumps transfer the stormwater collected within the basin to MH 175. The water level in the basin is kept as low as practical at all times. In the event of precipitation in excess of the design capacity of the SWRB, stormwater will overflow into Paddy's Run via the Storm Sewer Overflow Structure (NPDES Discharge Point 002).

2.0 BACKGROUND INFORMATION (cont.)

In the event that a spill of a CWA hazardous substance or oil defeats a secondary containment system or occurs in an unprotected location, the substance could potentially migrate to the storm sewer system. Once the spilled substance enters the storm sewer system, containment measures can be taken to prevent the substance from being discharged to the Great Miami River. Immediately upon identification that a spill has occurred, the lift station pumps at MH 34 are shut down. After some valve changes, the SSLS pumps are restarted, and the flow is diverted to the General Sump for treatment or to the Biodenitrification Surge Lagoon if the problem can be addressed in this part of the wastewater system (i.e., pH adjustment, etc.). Should the General Sump be unable to contain the flow, the SSLS can remain shut down and the spill will automatically be diverted to the Stormwater Retention Basin for storage until the General Sump can accept it. The discharge from the Stormwater Retention Basin can then be diverted to the General Sump by aligning the valves and activating the pumps located at the Stormwater Retention Basin. A spill occurring during a period of high precipitation, when the capacity of the SWRB is exceeded, represents the greatest probability of uncontrolled discharge to a navigable waterway. A topographic map of the site and the surrounding area is shown in Figure 2-5.

2.4 Oil Spill History

The FEMP logs and reports spills or emergency events to the DOE through the use of ORPS (Occurrence Reporting and Processing System), DOE Order 5000.3B. If a spill event is reportable to a regulatory agency, which is determined by FEMP management, this system also provides the DOE-FN (Fernald Office) with recommendations and the appropriate information for making verbal regulatory reports. A log of these reports is available to the DOE-FN, contractor management, and any outside government agency for trend analysis and review as a part of the functional appraisal process through the ORPS database. Minor spills of oil or petroleum products that are immediately cleaned up and are not reportable to regulatory agencies are also documented at the FEMP.

According to FEMP records, no regulatory reportable oil spills have occurred since the issuance of the FMPC Oil And Hazardous Substance Spill Prevention Control And Countermeasure Plan (NLCO-1111, Revision 2), April 1985.

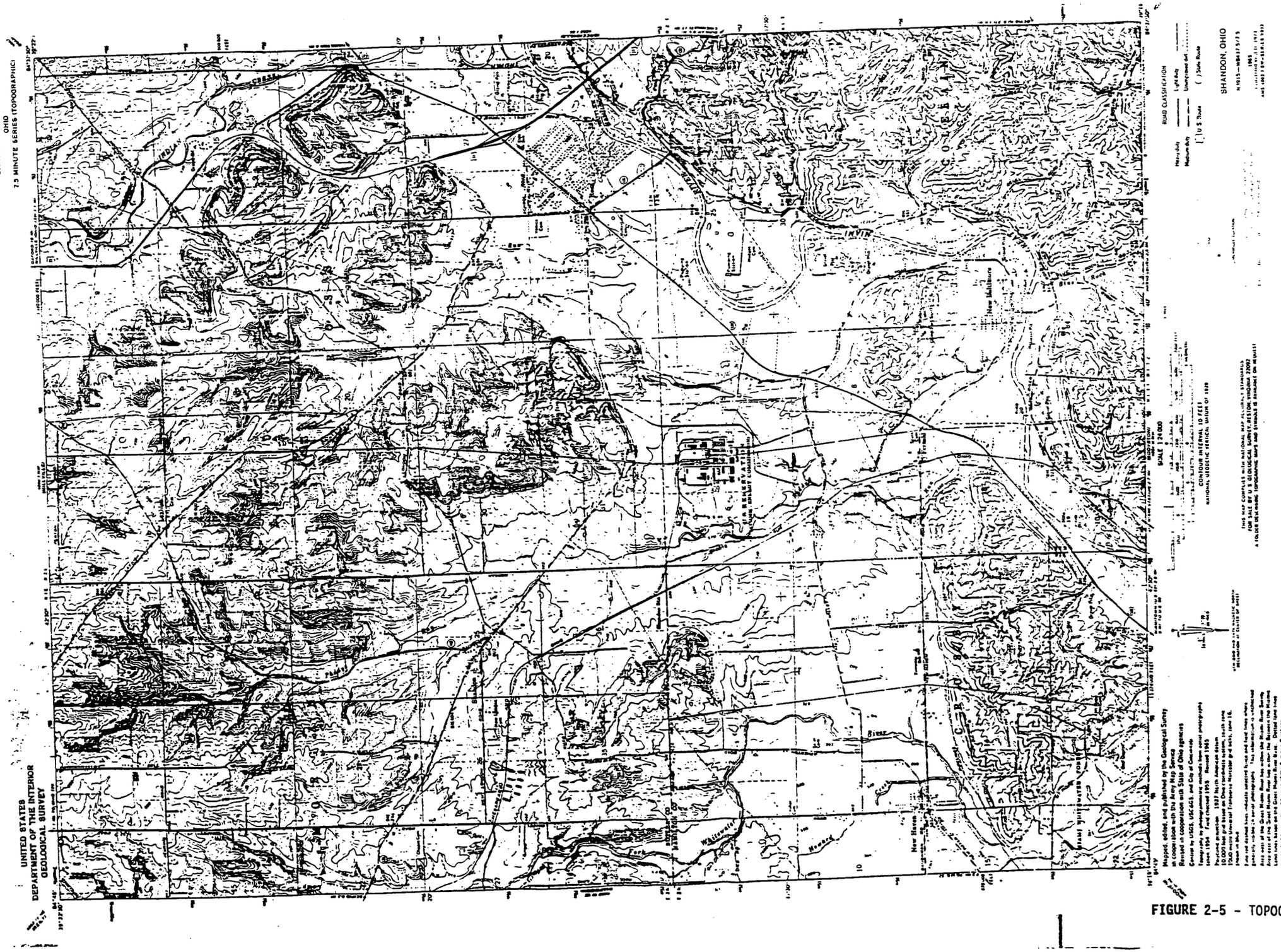


FIGURE 2-5 - TOPOGRAPHIC MAP OF THE AREA

3.0 SPILL PREVENTION

At the FEMP, an active program has been adopted through which spill occurrences are minimized by concentrating on eliminating or minimizing the likelihood of spills through the use of nationally recognized codes for the design, construction (secondary containment systems), installation, and operation of the plant equipment. Plant personnel training and the availability of Standard Operating Procedures (SOPs) for respective jobs are integral parts of this program. The overall intent of spill prevention at the FEMP is to provide personnel with training, basic information, and proper equipment to perform their duties in an efficient, correct, and safe manner. According to 40 CFR, Part 112.7.10, "Owners or operators are responsible for properly instructing their personnel in the operation and maintenance of equipment to prevent the discharges of oil and applicable pollution control laws, rules, and regulations." To meet this requirement the programs which have been adopted through which spill occurrences are prevented or minimized are the following:

- Personnel Training
- Labeling of Storage Tanks and Containers
- Operating Procedures
- Inspection of Storage Areas & Preventive Maintenance
- Security
- Best Management Practices (BMP) Committee
- Containment Systems & Countermeasures
- Inventory & Level Controls
- RCRA Training

3.1 Training

Plant personnel are trained in CWA hazardous substances handling, identification of CWA hazardous substances through the labeling system, use of personal protective equipment, and response to emergency procedures. The training material is prepared and conducted by the Industrial, Radiological, Safety, and Training Department (IRS&T) with input from area supervisors and technical staff such as engineers, chemists, technicians, etc.

The training in these courses is designed to encourage employee awareness and an understanding of the types of hazards to which they are routinely exposed. The following are some of the points among the major subjects emphasized during the various training programs:

- Training to inform employees of the potential harmful effects of the CWA hazardous substances in the workplace, including routes of entry, acute and chronic effects, and symptoms of overexposure.

- Location and availability of Material Safety Data Sheets (MSDS) and a detailed review of the use and understanding of a MSDS.

3.0 SPILL PREVENTION (cont.)

- Explanation of the labeling systems and the various symbols which may be used to identify the various CWA hazardous substances. This includes an understanding of the National Fire Protection Association (NFPA), Department of Transportation (DOT), and any other in-plant labeling system that might be used.

- Detailed information in the selection and use of personal protective equipment (gloves, aprons, goggles, etc.).

- Instruction in the location and use of emergency eyewash stations and showers.

- Instruction in the proper procedure for reporting a spill, evacuating an area, and any first line containment measures which may be taken.

- Instruction in the nature of respiratory hazards, the limitations of the different types of respirators, the use of a respirator, and the requirements to ensure a good fit.

- Instruction in the implementation of emergency preparedness procedures and the corrective actions required to contain a CWA hazardous substance or oil spill. Included is a discussion of the selection and use of containment equipment, dependent upon the physical characteristics of the substance.

A comprehensive detailed training program has also been developed for the Emergency Response Team (ERT) personnel to familiarize them with the types of hazards possible within the facilities, the corrective actions to mitigate the consequences of a spill or other emergency, and the use of personal protective equipment. Emergency Response Team personnel at the FEMP receive general training similar to that received by other plant personnel which is described above. The FEMP also conducts ERT, Emergency Operations Center (EOC) staff, and security drills as needed, at least quarterly. These include ERT and Security drills for each shift at least once a quarter and at least one EOC Staff drill each year on an off-shift. One comprehensive onsite exercise is conducted each year. A joint exercise every two years includes both onsite and offsite response personnel and equipment.

3.2 Training Programs

All non-remediation oriented employees at the FEMP, including the office staff and security personnel receive regular training and refresher training through quarterly safety meetings. All remediation oriented employees at the FEMP receive regular training and refresher training through monthly safety meetings. Documentation of this training, which includes job title, job description, name of the employee, and completed training program information, is maintained by the Environmental Safety and Health (ES&H) department.

1) Basic Orientation - All employees receive basic orientation as required by FMPC-0106, "Employment and Indoctrination of New Personnel."

3.0 **SPILL PREVENTION** (cont.)

2) Site Remediation Related Training - All Remediation oriented employees receive training as required by FMPC-0102 "Training", and DOE-Prescribed OSHA Standards.

3) Non-Remediation Related Training - All non-remediation oriented employees receive training as required by FMPC-0102, "Training", and DOE-Prescribed OSHA Standards.

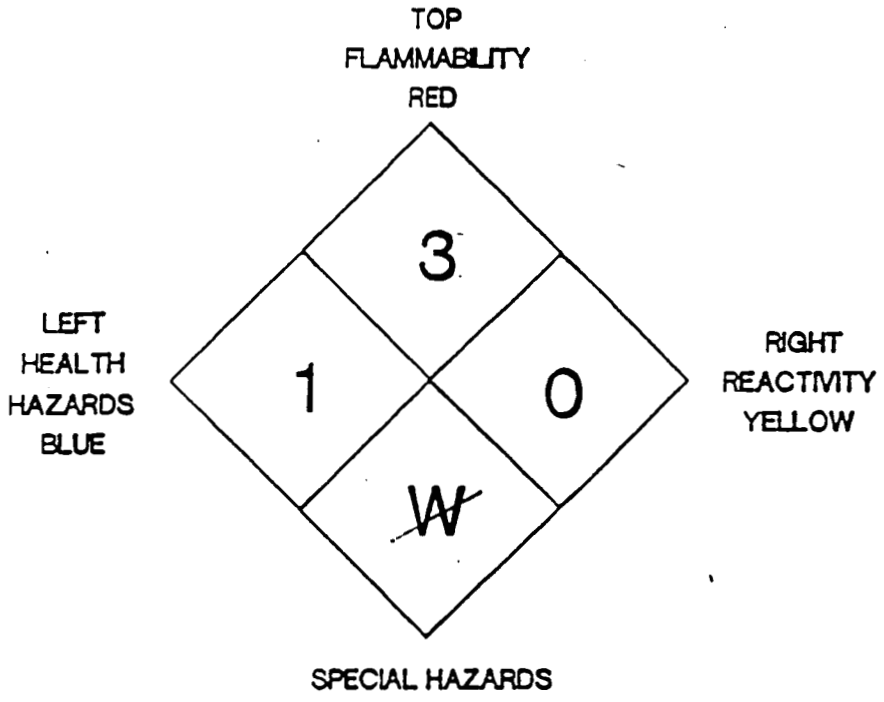
4) Job and/or Department Specific Training - All employees receive training as required by job and/or department specific Site Standard Operating Procedures (SSOPs).

5) RCRA Training - All employees receive basic orientation as required by various EPA rules and regulations. The object of this training is to provide employees with the information needed to respond to an emergency such as a CWA hazardous substance or oil spill at the FEMP.

3.3 Labeling of Storage Tanks and Containers

FEMP employees receive instructions in the identification of the health and safety hazards of a CWA hazardous substance through use of a standardized labeling system. A labeling system is required by the DOE-Prescribed OSHA Hazard Communication Program. The FEMP has adopted the NFPA Standard System for Identification of Fire Hazards of Materials (NFPA-704). The NFPA numerical hazard rating scheme is used to provide general hazard information. These ratings are shown on a four-part label, which is color-coded to represent the different hazard categories. The diamond segments represent flammability, reactivity, health, and other unusual hazards. Each class of hazard is rated on a scale of 0 to 4, with four being the most serious hazard rating. The general criteria for rating chemicals and an example of the diamond are provided in Figure 3-1. In general, the requirement that labels be visible during normal operations and also visible to emergency personnel during a fire or other emergency dictates the number and size of labels placed on production and storage tanks. The size of the labels used is dependent on the size of the storage tank. The number of labels on an individual storage container is kept to a minimum, consistent with instant recognition. The number of labels varies with the diameter of the tank and direction from which visibility is desired. Inspections by the Safety and Fire Inspector and/or Industrial Hygiene and Safety personnel are performed for verification that storage tanks and container storage areas are adequately labeled.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM



DEGREE OF HAZARD

4 Severe
3 Special
2 Moderate
1 Minor
0 No Hazard

SPECIAL HAZARDS

W - Water Reactive
OX - Oxidizer
☢ - Radioactive

FIGURE 3-1 Hazard Labeling Scheme

3.0 SPILL PREVENTION (cont.)

3.4 Operating Procedures

Existing job and/or department specific Site Standard Operating Procedures (SSOPs) for activities at the FEMP dictate how an employee will perform such tasks as the inspection of a bulk storage tank, filling a bulk storage tank, operation of a truck loading/unloading facility, facility transfer operations, etc. The information in the SSOP includes guidance for environmental considerations, industrial hygiene concerns, radiological safety concerns, safety requirements and equipment, and the steps for actual performance of the job function. Table 3-1 provides a summary of some of the supporting documents and procedures for containing and responding to a spill at the FEMP. The FEMP trains employees according to the information contained in individual SSOPs. These individual SSOPs and other supporting documents are available at various locations throughout the FEMP including the facility owners' offices, security, training department, and Emergency Operations Center (EOC). Below is a brief description for each of the supporting documents and procedures for SPCC listed in Table 3-1.

FEMP Emergency Plan

The FEMP Emergency Plan describes the emergency preparedness program that complements the engineered safety features of the FEMP Facility. An analysis of potential credible emergencies (such as spills) forms the basis for emergency planning. The incident classification of the specific hazards communicates the hazard potential for organizations responding to a spill (including offsite organizations). The facilities and equipment section describes the tools used to respond to and manage emergencies. Simulated emergency conditions (drills and exercises) allow onsite departments and offsite organizations to practice and test response capabilities. This plan also has information on how plant evacuations from the FEMP will be handled and coordinated with onsite and offsite organizations during a spill incident or other emergency. Also, this plan is distributed to local organizations such as local fire departments, hospitals, etc., in the general vicinity of the FEMP.

Table 3-1

Supporting Documents And Procedures

Number	Title
(1)	PL-3020-FEMP Emergency Plan
(2)	Job Specific SOPs
(3)	FEMP Maintenance Operating Systems Manual
(4)	FEMP Best Management Practices Plan
(5)	OSHA Standards
(6)	FMPC-0106 - Employment and Indoctrination of New Personnel
(7)	FMPC-0102 - Training
(8)	SSOP-0067 - Spill Incident Reporting and Cleanup
(9)	FEMP 20-C-606 Hazardous Material Spill Cleanup
(10)	EPA Regulations
(11)	Section G: RCRA Contingency Plan
(12)	FEMP 2-C-910 - Inspecting Refinery Control Floor Areas and Sumps and Operating Manual Sumps

3.0 SPILL PREVENTION (cont.)

Job Specific SOPs

These documents are written by various departments for specific jobs within that department. They establish the actions to be taken by FEMP personnel to perform the job described in the SOP. Responsibilities for FEMP personnel associated with various jobs are listed in various SOPs. Industrial health and safety requirements associated with performing a job or task are defined for each SOP along with the required permits to perform the job. Finally, each employee is tested according to the information contained in these SOPs before they are allowed to operate that piece of equipment or perform that task.

FEMP Maintenance Operating Systems Manual

The Maintenance Operating System (MOS) detailed in this manual is a Maintenance Management System designed to integrate with, and to enhance, the operating procedures at the FEMP. The controls and procedures contained in the manual have been developed to perform a specific function within the scheduling principles of planning, assignment, follow-up, and reporting. The MOS provides management and supervision with the means to monitor the accomplishment of established goals utilizing available manpower. The system identifies and corrects off-schedule conditions and increases productivity throughout all levels of the operation.

FEMP Best Management Practices Plan

Sections 304 and 402 of the Clean Water Act (CWA) allow the incorporation of Best Management Practices (BMP) into the conditions of the FEMP NPDES permit. Best Management Practices are defined by the Environmental Protection Agency (EPA) as "actions or procedures to prevent or minimize the potential for the release of toxic pollutants or hazardous substances in significant amounts to surface waters". The plan addresses the specific BMP requirements imposed through applications of the CWA and the Ohio Water Pollution Control Act.

DOE-Prescribed Occupational Safety and Health Act (OSHA) Standards

The DOE-Prescribed OSHA standards are any established Federal standards that result in improved safety or health conditions for designated employees under a specific regulation. These Federal standards require the conditions, the adoption or use of one or more practices, means, methods, operations, or processes, by reasonably necessary or appropriate means to provide a safe or healthful employment and place of employment.

FMPC 106 - Employment and Indoctrination of New Personnel

This procedure identifies the responsibilities of FEMP personnel and describes the actions required for requesting and accomplishing increases or replacements in the FEMP workforce and for assuring proper indoctrination of new employees to the FEMP. Also, the procedure indoctrinates new employees on health and safety rules and responsibilities applicable to those employees working in the production area or other appropriate areas.

3.0 SPILL PREVENTION (cont.)

FMPC-0102 - Training

This procedure assigns responsibilities for assuring that needed training activity programs for employees are identified, developed, implemented, properly documented, evaluated, and revised, as necessary. This procedure also outlines methods for the development of qualified instructors.

SSOP-0067 - Spill Incident Reporting and Cleanup

This procedure describes actions and responsibilities for initial reporting, cleanup operations, and follow-up actions for spill incidents at the FEMP. Also, this procedure along with the FEMP Emergency Plan provide the mechanism by which public information will be released to public, local fire departments, etc. The Environmental Compliance Spill Reporting Advisor is the designated person at the FEMP accountable for spill prevention reports that go to management at the FEMP.

FEMP 20-C-606 - Hazardous Material Spill Cleanup

The purpose of this document is to define the requirements for containing, controlling, and cleaning up CWA hazardous substance leaks and spills. This procedure applies to any CWA hazardous substance leak and other spill events (such as oil) which occur in Waste Operations and Operations Department areas.

EPA Regulations

The Environmental Protection Agency (EPA) is a federal agency that was established in 1970. The purpose of EPA regulations is to establish standards that will prevent air or effluent pollution or other damage to the environment. The only EPA regulations relevant to this document are 40 CFR, Part 112, which addresses prevention of oil pollution of the navigable waters of the United States or adjoining shorelines, and Part 761 which deals with PCB pollution prevention.

Section G: RCRA Contingency Plan

The RCRA Contingency Plan was developed for the Fernald Environmental Management Project (FEMP) to satisfy the requirements of 40 CFR, Part 264.50. The Contingency Plan is designed to minimize hazards to human health or the environment from fires, explosions, or any unplanned sudden or non-sudden releases of hazardous waste constituents to the air, soil, or surface water. Also, the RCRA Contingency Plan addresses the actions to be taken if such an event occurs.

FEMP 2-C-910 Inspecting Refinery Control Floor Areas and Sumps and Operating Manual Sump Pumps

This document was written by Production Operations to instruct employees in that department to inspect floor areas and how to operate manual sump pumps including sump pumps for secondary containment areas (dikes) in the Refinery Area. Employees are also responsible for inspecting storage tanks and secondary containment dikes for leaks, cracks, or other types of failure. Inspection records are filled out for each of these inspections and maintained by the supervisor in that area. Industrial health and safety requirements associated with performing this job or task are defined in this SOP along with the required permits to perform the job. Similar SOPs for other areas at the FEMP have also been written for inspecting secondary containment areas and storage tanks.

3.5 Inspection of Storage Areas and Preventive Maintenance

Visual inspection of outside storage tanks is performed weekly to check the condition of the tank, any ancillary equipment and the secondary containment diking. Check sheets are maintained by the facility owner in each plant and retained for at least 3 years. Checks include documenting the date of the inspection, problems identified, and any remedial action needed or taken following the inspection. The inspections of primary and secondary containment systems are performed according to RCAW4. Information regarding the chemical analysis results of any substance in a container within a diked area is maintained by the facility owner. Table 3-1 provides a list of the supporting documents and procedures pertinent to the inspection and the containment of leaked substances within controlled, diked or curbed pads. All primary containments holding CWA hazardous substances at the FEMP are inspected and maintained as required by the "FEMP Best Management Practices Plan." Table 3-2 represents the inspection schedule for the security equipment, safety and emergency equipment, loading and unloading areas, and tank and container storage areas at the FEMP.

A computerized preventive maintenance program is used at the FEMP to conduct scheduled maintenance and inspections and to maintain appropriate records of all activities conducted as part of the preventive maintenance program. This system is called the Maintenance Management and Inventory Control System (MMICS). The MMICS Number for each piece of equipment is typed into the computer and a printout is then obtained that describes the preventive maintenance and inspection required for that piece of equipment.

Table 3-2
Inspection Schedule

Area/Equipment	Specific Item	Inspection Frequency
Security	Facility fence w/entrance gates	Daily
	Turnstile gates	Upon failure
	TV cameras	Upon failure
	Radios	Upon failure
	Beeper system	Weekly
	Locking devices	Upon failure
Safety and Emergency Equipment	Emergency alarm system (red pull boxes)	Per NFPA - Bi-monthly
	Phone system	Daily use
	Sprinkler alarm system (emerg. alarm system)	Per NFPA - Bi-monthly
	Emergency Message System	As used, daily
	Portable radio system	Daily use
	Automatic sprinkling systems (buildings)	Per NFPA - annually
	Automatic emergency lighting systems	Weekly
	Fire engines and ambulances	Daily - visual Semi-weekly - operation Weekly - on board equipment
	Fire extinguishers	Monthly/after each use
	Fire blankets	As used/annually
	First aid equipment and supplies	As used/weekly
	Portable floodlights	Weekly
	Portable generators	Weekly/as used
	Breathing equipment; atmosphere supplying respirators, air-purifying respirators filter masks	Weekly/after each use
	Self Contained Breathing Apparatus	Monthly/after each use
	Face shields, protective eyeglasses	Weekly/after each use

Table 3-2
Inspection Schedule

Area/Equipment	Specific Item	Inspection Frequency
Safety and Emergency Equipment (cont.)	Protective clothing (impermeable full body coveralls, wet suits, gloves, and foot coverings of rubber, neoprene, and vinyl)	Monthly/after each use
	Lifeline Rescue Equipment	Prior to being placed in service, discarded after each use
	Harnesses with line, wristlets with line, hard-hats	Weekly/after each use
	pH meters	Weekly
	Explosion meters, oxygen monitors	Weekly
	Standard industrial absorbents	Weekly/as needed
	Sandbags, straw, pads	Weekly/as needed
	Absorbent booms, sheets, and pillows	Weekly/as needed
	Oil skimmers	Weekly/as used
	Sewer and process line plugs	As used
	Storm drain rubber mat covers	Weekly/as used
	Emergency showers and eyewash stations	Weekly
	Medical aid station	Weekly
Container Storage Areas	Container placement	Weekly
	Sealing of containers	Weekly
	Labeling of containers	Weekly
	Containers	Weekly
	Pallets	Weekly
	Floor and curbs	Weekly
	Debris and refuse	Weekly
	Warning signs	Weekly

Table 3-2
Inspection Schedule

Area/Equipment	Specific Item	Inspection Frequency
Container Storage Areas (cont.)	Tanks	Weekly
	Dike area, floor and walls	Weekly
	Labeling of tanks	Weekly
	Debris and refuse	Weekly
	Warning signs	Weekly
	Level Control	Weekly
Loading/ Unloading Areas	Dike area, floor and walls	Weekly
	Debris and refuse	Weekly
	Warning signs	Weekly
	Tanker trucks lowermost drain	After each use
	Terminal connection for loading and unloading	Weekly, after each use
	Floor and curb	Weekly
	Labeling of transfer lines	Weekly
	Tanker transfer lines	After each use

3.0 SPILL PREVENTION (cont.)

3.6 Security

All storage tanks containing significant quantities of oil and/or CWA hazardous substances are located within the FEMP production area, service area, or waste storage area. Due to the nature of the work performed at the facility, a heightened security posture is maintained year round at the FEMP. A security guard force is maintained 24 hours a day with constant visual inspections of possible intruder access points. A line of 10-foot high fencing encircles the production area, service area, and waste storage area with the gates either locked or manned at all times. Warning signs are posted at all entrances to the facility. An extensive security lighting system illuminates the site from dusk to dawn. Thus, the possibility of a spill occurring due to vandalism or sabotage is extremely remote.

In addition, locked security fencing and padlocked access doors prevent inadvertent access to the five RCRA warehouses (Pilot Plant Warehouse, Building 79, Building 80, Building 81, and the KC-2 Warehouse).

3.7 Best Management Practices (BMP) Committee

The Best Management Practices (BMP) Committee periodically reviews the site Spill Report which is a log of the spill incidents or events at the FEMP. After a review and evaluation of the report, the BMP Committee then formulates recommendations to prevent a recurrence of a similar incident or event.

3.8 Containment Systems and Countermeasures

3.8.1 Primary Containment Systems

Primary containment systems consist of the tanks or containers in which the PCBs, oils or CWA hazardous substances are stored. A summary of the primary containment systems covered by the SPCC Plan at the FEMP is presented in Appendix D. Also presented in Appendix D is a tabular analysis of the primary containment systems in comparison with appropriate guidelines in 40 CFR, Part 112.7. As stated in these guidelines, new and old tank installations should, as far as practical, be fail-safe engineered or updated into fail-safe engineered installations to avoid spills. This includes providing one or more types of level controls listed in Appendix D. If no type of level control listed in Appendix D exists for a tank, an "X" appears in the appropriate column. An explanation of the comparison guidelines, along with the notations used to quantify conformance to the respective guidelines, is also contained in Appendix D.

3.0 SPILL PREVENTION (cont.)

3.8.2 Secondary Containment Systems

Secondary containment systems, consisting of diking or controlled pads, surround most of the tank and container storage areas and loading/unloading areas to prevent the release of a CWA hazardous substance or oil to the environment. In addition, some of these secondary containment areas are lined with a material such as acid brick or stainless steel that is resistant to the stored oils or CWA hazardous substances. An analysis of existing secondary containment systems in comparison with the appropriate guidelines as stated in 40 CFR, Part 112.7 is presented in Appendix E. An explanation of the comparison guidelines, along with the notations used to quantify conformance to the respective guidelines, is also contained in Appendix E.

In addition to the above secondary containments, Satellite Accumulation Areas have been established in various areas throughout the FEMP where permanent secondary containment is unfeasible or impossible. The purpose of these Satellite Accumulation Areas is to provide a temporary secondary containment system for small tanks and/or drums of CWA hazardous substances or oils by means of a plastic secondary containment system that will contain the entire quantity of a tank and/or drum that is not ready to be shipped to a permanent storage area or recovery and treatment area.

The guidelines in 40 CFR, Part 112 indicate that storage facilities should be constructed so that a secondary means of containment is provided for the contents of the largest single tank containing SPCC regulated materials within a common area, plus sufficient freeboard to allow for precipitation. The volume of stormwater (precipitation) resulting from a 25-year, 24-hour rainfall in the Cincinnati area (4.9 inches) is assumed for freeboard design. The 25-year, 24-hour criterion was taken from 40 CFR, Part 264.193(e)(i)(ii) (Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities) and was judged to be appropriate for application to the SPCC Plan. For loading/unloading facilities, the containment system should be designed to hold at least the maximum capacity of any single compartment of a tank car or tank truck loaded or unloaded at the facility.

The stormwater collected and contained within each containment dike can, with supervisory authorization, be drained to the storm sewer through manually controlled valves after inspection/analysis to determine that no contamination is present. However, if required by the results of the analysis, the substance from a diked area or controlled pad can be pumped to a portable tank or dumpster, and transferred to a suitable treatment facility. Provisions also exist in some areas to transfer the contained contaminated substance via a sump pump to a treatment facility (such as Plant 6 Water Treatment or the General Sump). The destination for water being pumped from diked areas is listed in Appendix E.

3.0 SPILL PREVENTION (cont.)

3.8.3 Immediate Countermeasures

While every effort is made to contain an oil or CWA hazardous substance by employing the above procedures, if a spill does escape from a secondary containment system or occurs in an unprotected location within the production area, the spilled substance could flow to the storm sewer system.

A general description of these countermeasures described in the FEMP Emergency Plan that are to be followed in case of a spill event is provided herein. Any employee who detects an actual or potential spill of a CWA hazardous substance or oil shall be responsible for reporting the spill. Then, the employee should immediately alert nearby workers and leave the area of the spill. The supervisor is then notified of the spill. If a supervisor is not available, the employee should pull the nearest fire alarm or notify the Communications Center. If possible, when reporting the spill, the employee should report the location of the spill, the substance spilled (if known), any personnel injuries or unusual conditions, the source of the spill, whether or not the flow has stopped, and approximately how much material was spilled.

If the employee that discovered the spill has not already done so, the supervisor should report the spill to the Communications Center and the Assistant Emergency Duty Officer (AEDO), detailing the pertinent information known. The supervisor should also notify the plant or area manager of the event. The appropriate division manager at the FEMP will be notified by the plant or area manager.

If the AEDO determines that the safety of the employee will not be impaired by the spill or release, the employee can fight or control the spill using the procedures described below. Otherwise, the employee should wait until the Emergency Response Team (ERT) arrives to fight or control the spill or release. The supervisor or ERT should place barricades with restrictive signs around the affected area to prevent personnel not associated with cleanup from entering the area. Before attempting to contain the leaking substance, one should ensure that the necessary spill cleanup supplies are readily available. Table 3-3 lists an inventory of spill response supplies for the FEMP Emergency Response Unit.

The flow of the leak should be stopped by turning the container so that the leaking area is above the substance level. Steps should then be taken to patch the leak, if possible, using one or more of the methods described in Operating Procedure 20-C-606. Then, dikes should be created at the edges of the spill, utilizing chemically inert sorbent materials such as vermiculite, diatomaceous earth, sand, sorbent pigs, or equivalent, to contain the spilled substance to the immediate area. Drains and manholes should be covered with plastic, rubber sheet, plywood, or equivalent, and absorbent diking materials placed around the edges and top of the covering to prevent the oil or CWA hazardous substance from entering the storm sewer system.

Table 3-3

Spill Response Supplies for the FEMP Emergency Response Unit

VEHICLE

Box 1
SARENEX Full-Encapsulating Suits - 2
Viton/Butyl Gloves - 2
Neoprene Gloves - 2
Latex Glove Liners - 2
Yellow Shoe Covers - 2
Roll Yellow Tape - 1

Box 2
SARENEX Full-Encapsulating Suits - 2
Viton/Butyl Gloves -2
Neoprene Gloves - 2
Latex Glove Liners - 2
Roll Yellow Tape - 1

Box 3
SARENEX Suits - 4
Nitrile Gloves - 4
Neoprene Gloves - 4
Latex Glove Liners - 4
Yellow Shoe Covers - 4
Roll Yellow Tape - 1

Box 4
COATED TYVEK Suite - 4
Nitrile Gloves - 4
Neoprene Gloves - 4
Latex Glove Liners - 4
Yellow Shoe Covers - 4
Roll Yellow Tape - 1

Box 5
Extra TYVEK Suits - 6

Box 6
TYVEK Suits - 4
TYVEK booties - 4
Leather Palm Gloves - 4
Cotton Gloves - 4
Latex Glove Liners - 4
Yellow Shoe Covers - 4
Roll Yellow Tape - 1

Box 7
TYVEK Suits - 4
TYVEK booties - 4
Leather Palm Gloves - 4
Cotton Gloves - 4
Latex Glove Liners - 4
Yellow Shoe Covers - 4
Roll Yellow Tape - 1

Box 8
Acid Splasn Jackets - 4
Acid Splash Pants - 4

Box 9
Future Use - 0

Box 10
Future Use - 0

Box 11
Absorbent Pillows - 12

Box 12
Pigs Absorbent Socks - 10

Box 13
Pigs Absorbent Socks - 10

Box 14
Future Use - 0

Box 15
Future Use - 0

Box 16
CRYOGENIC Cover Suits - 4

Box 17
PROXIMITY/FLASH Cover Suits - 2

Box 18
PROXIMITY/FLASH Cover Suits - 2

Box 19
PROXIMITY/FLASH Cover Suits - 2

Box 20
PROXIMITY/FLASH Cover Suits - 2

Box 21
Future Use - 0

Box 22
Future Use - 0

Box 23
Leather Palm Gloves - 8
Cotton Gloves - 8
Monkey Grip Gloves - 6
"Hot" Mitten Gloves - 1

Table 3-3 (cont.)

Spill Response Supplies for the FEMP Emergency Response Unit

Box 24
Large Yellow Shoe Covers - 10
Medium Yellow Shoe Covers - 10

Box 25
Powdered Latex Glove Liners - 1 box
Cotton Glove Liners - 1 box

Box 26
Acid Suit Glove Rings - 20

Box 27
NITRILE Gloves - 20

Box 28
NEOPRENE Gloves (black) - 12
LATEX Gloves (blue) - 12

Box 29
CAUTION Tape - 2
DUCT Tape - 3
STRAPPING Tape - 2
YELLOW VINYL Tape - 5

Box 30
Future Use - 0

Box 31
Future Use - 0

Box 32
BONE-MIC Radio System - 2

Box 33
Full-Body Harnesses - 4
Wrist Straps - 1

Reference Cabinet
Reference Books
ACGIH TLV Book
NIOSH Pocket Guide
Office Supplies (pens, clips, etc.)
Legal Pads
Weather Station

Computer Desk
Computer - 1
Fax Machine - 1
Printer - 1
Acoustic coupler (for fax) - 1
Cellular Phone - 1
Compact Disks - 2
Adequate printer paper

Miscellaneous Cabinet
Water Cooler - 1
Water (5 gal.) - 1
Cups (sleeves) - 1
Garbage Bags - 1 box
ChemWipes - 2 boxes
Squencner drink - 1 box

Sampling Cabinet
CGM #14 with charger - 1
CGM - test unit - 1
Ivory Soap - 1
Box A
25 mm cassettes - 24
37 mm cassettes - 24

Box B
Sample Jars - 12

Box C
Mercury Tubes - 1 pack
Charcoal tubes - 1 pack
pH meters and paper - 1
Filterpaper and glassine envelopes - 1

Box D
Flashlights - check operation - 4
Trauma Bag - 1
Sanitizer - 1 box

Confined Space Supply Shelf
Tripod - 1
Winch - 1
Roglis (150 ft.) - 1
Roglis (300 ft.) - 1
Wooden Plugs - 1 bag
Spool of Wire - 1
Tarp - 1
Spill Stoppers - 3
Plastic - 1 roll

Acid Suit Compartment
Chemrel acid suits - 4

SCBA Compartment
1 hour SCBA's - 4
Radio Facepieces - 4
Radio Interfaces - 4
Portable Radios - 2
PASS devices - 4
PASS device test
Rechargeable lights - check operation - 2
Boots (above scba's) - 4 pr.

Table 3-3 (cont.)

Spill Response Supplies for the FEMP Emergency Response Unit

Respirator Cabinet
Large Ultra-Twin - 4
Large ultra-Vue - 4
Medium Ultra-Twin - 4
Medium ultra-Vue - 4
Small Ultra-Twin - 1
Small Ultra-Vue - 1
HF Canisters - 6
Ammonia Canisters - 6
Mercury Cartridges - 2 boxes
Ultra-Vue HEPA Cartridges - 4
Combination Cartridges - 6 boxes
Ammonia & Amines Cartridges - 4 boxes
Acid Gas Cartridges - 4 boxes
Hard Hats - 4
Goggles - 6
Ear Plugs - 1 box
Sanitizer Wipes - 1 box
Lens Cleaner - 2

Spill-X Area
Spill-X acid spill-gun - 1
Spill-X caustic spill-gun - 1
Spill-X solvent spill-gun - 1
Hazmat emergency kit "A" = 1
Pig "pipe patch" kit - 1
Traffic cones - 8
Trailer hitch - 1

Bulk Storage Area
Wet vacuum - 1
Absorb-all - 10 gal.
35 gal. drum - 1
Absorbent Pads - 2 bags

Air Bottle Rack
Spare 1 hr. bottles - 8
Draeger Kit - 1
Small Tool Kit
  Wire Brush - 2
  Rubber Mallet - 1
  Ballpeen Hammer - 1
  Channel-Lock Pliers - 1
  Adjustable wrench - 2
  Large Flat-head Screwdriver - 2
  Medium Phillips Screwdriver - 1
  Wire Cutters - 1
  Tape Measure (50 ft.) - 1
  Tape Measure (10 ft.) - 1
  Master Lock - 1
  Pocket Knife - 1
  Center Punch - 1

Air Bottle Rack Continued
Skinner Clamp Kit - 1
Binoculars - 1
ELSA Units - 2

Command Desk
Micromax Pump - 2
Extension Cords - 2

Cab
Mobile Radio (radio check) - 1
Fire Extinguisher - 1
Preplan Book - 1
Clipboard - 1
Siren/lights (test both)

Outside Compartments
Drivers side front
  Ventilation System - 1
Drivers side rear
  Wheel Chock - 1
  Cord Reel - 2
  Light - 2
Passenger Side rear
  Wheel chock - 1
  Vermiculite - 5 gal. - 3

Table 3-3 (cont.)

Spill Response Supplies for the FEMP Emergency Response Unit

TRAILER

Rear Doors
Brooms - 4
Broom Handles - 6
Squee-gees - 2
Long Handle Brush - 1
Short Handle Shovels - 2
Long Handle Shovels - 2
Long Pry-bar - 1
Mops - 2

Floor
Chlorine "A" Kit - 1
Come-a-long (1.5 ton) - 2
Come-a-long Leak Sealing Pad - 1
Drum Lifter - 1
Sand (10 gal.) - 1
Absorb-all (40 lb.) - 8
Vetter Air Bag leak Sealing Kit - 1
Decon Pools - 2
Metal Chairs - 4
Vermiculite (5 gal.) - 1
Pylons - 7

Shelf 1
Empty Buckets (5 gal.) - 4
Small Mop Buckets (2 gal.) - 4
Sponges - 4
Large Mop Bucket & Wringer - 1
Sanitizer Solution - 1 box
Transfer Pumps - 2

Shelf 2
Bag Assorted Leak Plugs - 1
Spill Stoppers - 6
Decon Stanchions - 6

Shelf 3
Plug-n-dike (5 gal.) - 1
Spill-X-Caustic (5 gal.) - 1
Spill-X-Acid (5 gal.) - 1
Spill-X-Solvent (5 gal.) - 1
Pigs (5 gal.) - 1
Absorb-o-sox - 2 boxes
Cobra Socks - 4 boxes

Shelf 4
Absorbent pads - 2 bags
Decon Showers - 2

Shelf 5
Hard Hats - 10
Utility Straps - 5
Shower Sandles - 6
Decon Shower Hose - 2
Garden Hose "Y' Gate - 1
Gate Valve (2-1/2 inch) - 1
Adapter (2-1/2 to 4-3/4) - 1
Spray nozzles - 2
Large Skinner Clamps - 2
Hydrant Wrench - 1

Front End
Plastic Overpack Drums w/lids - 2
55 gal. drum inside plastic overpack - 1
Absorbent Pads (inside 55 gal.) - 2 bags
85 gal. overpack drum - 1
55 gal. drum (inside 85 gal.) - 1
Absorbent pads (inside 55 gal.) - 2 bags
Drum Cart - 1

An Unusual Event form including as much information as is available will be completed by the Communications operator. The AEDO will log and classify the event following the "Duty Officer Guideline Procedure," and the FEMP Emergency Plan. The Emergency Duty Officer (EDO) will be notified of a reportable non-routine or an unusual event by the AEDO. Necessary information concerning a spill will be provided by the AEDO to the EDO and designated Environmental Compliance (EC) Spill Reporting Adviser to determine if a potentially reportable event must be reported to off-site agencies and regulatory agencies.

The EDO will advise the AEDO and oversee the spill response. The EDO will direct Environmental Safety and Health (ES&H) to assign a Radiological Safety technician to perform further monitoring and analysis of the spill, as necessary. Also, the EDO will activate the Emergency Response Team (ERT), if necessary, by contacting the Emergency Chief. The Emergency Chief will assemble and direct the Emergency Response Team to the incident based on information provided by the Communications Operator or the AEDO. He will direct and coordinate the field response, reporting to the AEDO.

3.8.4 Secondary Countermeasures

The secondary countermeasures described in the following paragraphs can be employed to prevent the spilled substance from reaching a navigable water. As explained in Section 2.3.3, the stormwater from the production area flows by gravity to Manhole 34. A low flow dam in the 60-in. diameter storm sewer downstream of MH 34 diverts normal drainage into the wetwell of the Storm Sewer Lift Station (SSLS). Area Code Number (area location) 22B on Figure 2-2 is the location of the Lift Station Pumphouse. Upon detection of a spill event, the shift supervisor would immediately notify the Water Treatment Plant, the Utility Engineer, Assistant Emergency Duty Officer (AEDO) and the Emergency Duty Officer (EDO). The Water Treatment Plant operator and the on-duty Utility Engineer would take the necessary steps to divert the discharge of the SSLS to the General Sump for proper treatment before discharge to MH 175.

During high precipitation periods, or if the General Sump does not have the tank capacity, the SSLS pumps can be shut down and the oil or CWA hazardous substance will overflow the dam to the Stormwater Retention Basin (SWRB). The runoff from a spill would be retained in the SWRB until the General Sump could accept it for proper treatment, thus preventing a release to the Great Miami River via MH 175. Figure 2-4 shows a schematic of the FEMP waste stream flows.

3.0 SPILL PREVENTION (cont.)

3.9 Inventory and Level Controls

Inventory control involves the operator tallying the contents of the tank at least once a month to assure the FEMP that the tank is not leaking. In some cases this is done more than once a month. This involves comparing a quantity (gallons) of a substance used for operation during the month against the quantity of substance remaining in the tank at the end of that month.

Level controls are present in many of the FEMP tanks to prevent overfilling by an operator. Some of the various types of level controls employed at the FEMP are gage board level indicators, sight glasses, high level sensors that generate and transmit an alarm signal to a production control system, Varec level indicator with a float, etc. Overflow equalizing lines between tanks so that a full tank can overflow to an adjacent tank (that is either empty or not full) is also an acceptable form of level control according to the regulatory guidelines in 40 CFR, Part 112.7. Appendix D has a column which indicates the type of existing level control that is present, if any, to prevent each listed tank from being overfilled by an operator.

4.0 CONTINGENCY PLAN

The FEMP response to a release of a CWA hazardous substance or oil to minimize the effect on plant or off-site personnel and the environment consists of two basic steps:

- Reporting the spill to FEMP response authorities
- Spill corrective actions

4.1 Reporting The Spill To FEMP Response Authorities

Any FEMP employee who discovers a spill shall report it as required by SSOP-0067 "Spill Incident Reporting and Cleanup." Emergency evacuation from particular buildings or areas can be initiated by the activation of local evacuation alarms from one or more locations in the production area.

4.2 Spill Corrective Actions

It is the policy of the FEMP to ensure that every reasonable precaution is taken to protect employees and offsite personnel. The corrective actions to be taken by specially trained FEMP employees in the event of a spill are listed in PL-3020 "FEMP Emergency Plan," site procedure SSOP-0067 "Spill Incident Reporting and Cleanup," and plant specific SOPs. For a brief summary of the corrective actions to be taken in event of a spill incident contained in the above referenced supporting documents, see Sections 3.8.3 and 3.8.4 of this plan.

This summary briefly describes the spill reporting chart based on site procedure SSOP-0067 "Spill Incident Reporting and Cleanup." The phone number for the AEDO is listed in this procedure. In the event of a spill, the AEDO will determine if a spill incident requires the activation of the Emergency Operation Center (EOC) and the Joint Public Information Center (JPIC). If the JPIC is activated, public information spokespersons representing the FEMP, Butler and Hamilton counties, the State of Ohio and DOE will assemble at the JPIC location in Fairfield, Ohio, as stated in the FEMP Emergency Plan. These organizations will be informed of a spill incident at the FEMP. The SSOPs and site procedures mentioned above identify the various departments, agencies, groups, and personnel onsite and offsite necessary to contain the CWA hazardous substance or oil and minimize the environmental insult and risk to plant personnel and the public. A "FEMP Emergency Response Unit" is available with the emergency response supplies listed in Table 5-2 and responds to all potential chemical releases at the FEMP. Some of the emergency response supplies stored in various plant locations at the FEMP are patches, plugs, large plastic bags, diking materials, sorbents, plastic shovels, pails, pigs, absorbent pads, vermiculite, and other miscellaneous tools. Radiological Safety personnel also respond to all spills to address potential contamination concerns. Also, a Supersucker Industrial Vacuum Loader is now available at the FEMP and can be used in the cleanup of a spill if necessary.

4.0 CONTINGENCY PLAN (cont.)

Specific subjects that are discussed in the FEMP Emergency Plan are briefly described in the following paragraphs. The FEMP Emergency Plan defines the methods used to respond to an emergency, and specifies (through text and charts) the criteria for assigning a particular classification level to an event or spill and the spectrum of indicated responses. It also identifies those persons responsible for classifying an event.

As described in the FEMP Emergency Plan, emergency response requires an organization with specific emergency responsibilities that are separate from those of the normal operational organization. A specific number of emergency personnel are required on site for all shifts. An Emergency Response Team with command posts, firefighting, search and rescue, emergency medical, radiological and CWA hazardous substance monitoring, and response capability is mobilized from shift employees when required. A management organization in the Emergency Operations Center (EOC) is also mobilized when necessary. The emergency organization employs the one person/one job philosophy. Events may require the activation of offsite organizations (such as EPA and other state and local government agencies) by the DOE. Interfaces with offsite support agencies are specified. As indicated above, this Plan describes: 1) those organizations and people with responsibilities for emergency response; 2) the FEMP emergency organization; and 3) specific responsibilities of the FEMP personnel.

The Concept of Operations in this Plan provides an overview of emergency response activities (including field response and EOC activities). Logic diagrams illustrate the flow of information, actions, decisions, and assessments for general emergency response. The narrative explains this information in greater detail. Departmental emergency procedures expand on this "general emergency response procedure." The logical sequence of events during an emergency includes 1) event discovery and response initiation, 2) event classification, 3) emergency response (principally from the field), 4) emergency management (principally from EOC), and 5) event termination, close-out, and recovery.

The Facilities and Equipment section of the FEMP Emergency Plan describes some of the tools used to respond to and manage emergencies. For emergency response to be successful, the components (people, tools, and procedures) must be tested and improved. Emergency Preparedness brings the components together in simulated emergency conditions (drills and exercise) to allow practice and to test these capabilities. These simulated tests also involve outside agencies.

The Emergency Plan Review Committee and the Emergency Preparedness staff ensure the readiness and continual enhancement of the essential components of emergency preparedness. Emergency management documents, including emergency analyses, plans, and procedures, are reviewed and revised according to established schedules. Appraisals and audits are provided by DOE Headquarters, the DOE Oak Ridge Operations Office, and the FEMP Emergency Planning Review Committee to assure the proper and immediate response in the event of an emergency.

5.0 SPILL/RELEASE EVALUATION

According to 40 CFR 112, the SPCC Plan must include predictions of the total quantity of CWA hazardous substances, oils, or PCBs that could be released to the environment in the event of a major spill. The travel direction of the spill, and the rate of spill flow must also be provided.

5.1 Quantity of CWA Hazardous Substance, Oil, or PCB That Could Be Released

The total quantity of a CWA hazardous substance (volume greater than RQ), oil, or PCB that could be released is that which is contained in the individual primary containments. A summary of the contained quantity of CWA hazardous substance (volume greater than an RQ), oil, or PCB in each primary containment is provided in Appendix D.

5.2 Direction of Spills

During normal plant operation, a major spill occurring in the production area will be directed through the storm sewer system to the Storm Sewer Lift Station at Manhole 34 (see Figure 5-1). If a CWA hazardous substance, oil, or PCB spill is not diverted or controlled at MH 34, it will be pumped by the SSLS through a 12 inch force main approximately 2400 feet to MH 175. Note that the 12-inch force main is a common discharge line for several other flows besides the SSLS (see Figure 2-4). These other flows include the General Sump, the Storm Water Retention Basin (SWRB) and the BDN-ETS.

Once the spill flow reached MH 175, it would be combined with the discharge from the Sewage Treatment Plant. The combined flow would then be discharged by gravity through a 16-inch sewer line approximately 4,150 feet to the Great Miami River.

During a storm event (see Figure 5-2), the spilled substance would likely overflow the diversion dam in the 60-inch storm sewer downstream of MH 34. The spilled substance would flow to, and be contained in, the SWRB until remedial actions to recover and treat the substance are initiated. The spill is capable of being isolated in one of the two chambers until it can be treated in place or pumped back to the General Sump for treatment.

A project scheduled to begin in August 1993 would discontinue the discharge of the SSLS to MH 175 so that any future spill would automatically be contained in the SWRB. However, for this analysis, the SSLS is assumed to operate as it does at this time. At the present time, all active areas of the production area (shown in Figure 5-1) drain to the storm sewer system. A project scheduled to begin soon will expand the area draining to the SWRB to include all of the fenced-in production area.

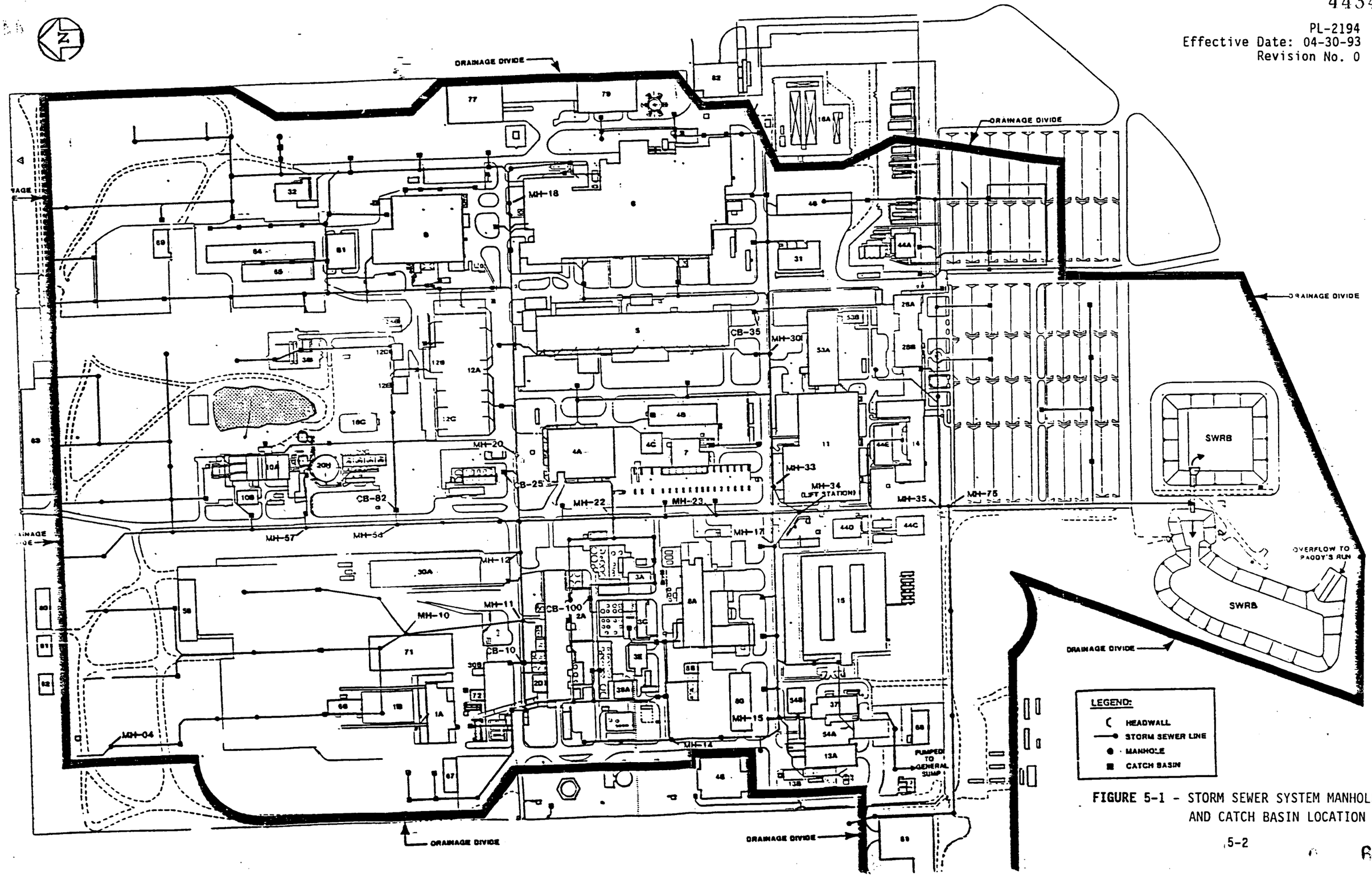


FIGURE 5-1 - STORM SEWER SYSTEM MANHOLE AND CATCH BASIN LOCATION PLAN

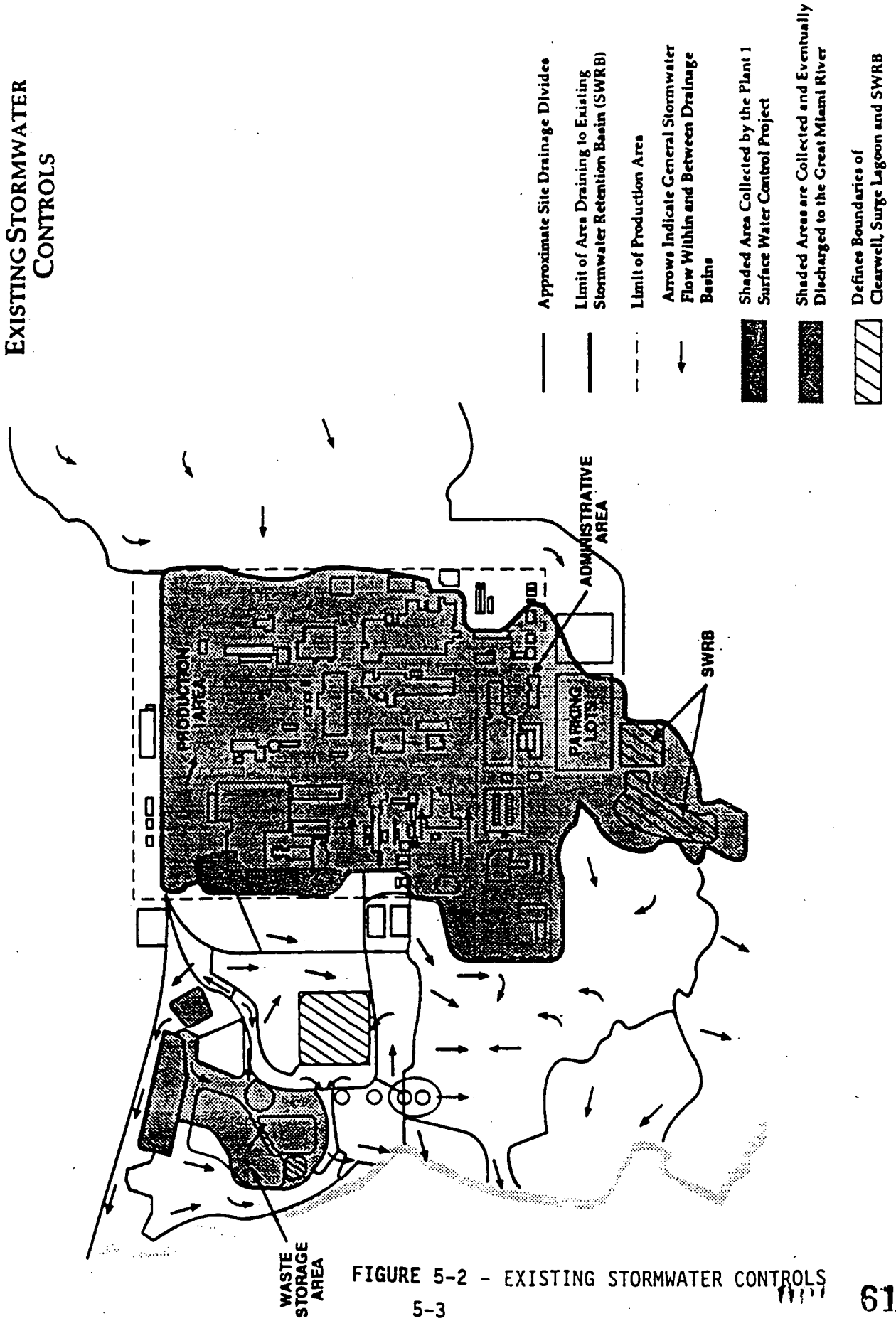


FIGURE 5-2 - EXISTING STORMWATER CONTROLS

5.0 SPILL/RELEASE EVALUATION (cont.)

5.3 Rate of Spill Flow

Below is an assessment of the occurrence of a spill event during the following scenarios: 1) low flow: the spill occurs during a nonprecipitation period in which dilution of the spilled substance with stormwater is minimized and response time is maximized; and 2) high-flow: the spill occurs during a major rainfall event and, although the spilled substance is diluted with stormwater, the response time is reduced. The analysis does not include discharges to the SWRB. In the event that a spill reaches the SWRB during a period when the capacity of the basin is exceeded, the spill would mix with the 10.2 million gallons of water in the SWRB. After mixing with the basin contents, it is possible that some of the diluted spill would discharge from the SWRB to Paddy's Run via the SWRB overflow structure.

Full flow/pipe calculations are based on Manning's equation. Partial flow calculations were performed using the methods derived from approved standards for hydraulics and hydrology found in the Soil Conservation Services National Engineers Handbook (SCS-NEH, 1972, Section 4). Flow restrictions due to elbows, bends, manholes and any other restrictions have been neglected. For the purpose of this analysis, it was assumed that: 1) the storm sewer system piping is constructed of concrete and the Manning's roughness factor "n" is applied accordingly; 2) the rate at which a spill enters the storm drain system is controlled by the size of the pipe that first received the spill, and this rate is the maximum this size pipe can carry at full flow; 3) the overland flow travel time from the location of the spill to the catch basin (CB) or manhole was assumed to be negligible.

For the low-flow analysis, the minimum flow in the storm sewer was assumed to be an average flow of 110 million gallons per year (MGY) or 0.47 cubic feet per second (cfs) from infiltration and inflow (Dames & Moore, 1986). It is unknown how much of the infiltration and inflow originates at the point where a spill may occur. It is assumed that the pipe that first receives the spill has no inflow or infiltration. Therefore, at the point of spill entry, the storm drain is filled to capacity with the spill effluent. As the flow travels through the storm drain system, the pipes increase in size and pick up infiltration and inflow from other areas. These low-flow travel times assume that the total 0.47 cfs is not added to the spill substance until the storm drain pipe is large enough to carry the volume of the flow from the spill plus the 0.47 cfs from infiltration and inflow.

High-flow travel times are calculated based upon the maximum velocity which could occur in each sewer section based on the slope of the section. The maximum pipe velocity occurs at approximately 83% total depth of flow and is approximately 110% full flow velocity (Daugherty, 1977).

5.0 SPILL/RELEASE EVALUATION (cont.)

While travel times from individual tanks to MH 34 have not been addressed, estimates of travel time from six manholes or catch basins to MH 34 have been calculated. The locations of the identified manholes and catch basins are shown on Figure 5-1. The manholes and catch basins chosen are located centrally to the drainage provided for the Plant 1 Storage Pad, the Tank Farm, Plant 2/3, Plant 8, the General Sump, and Buildings 5 and 6. A summary of the travel time estimates from the selected manholes and catch basins to MH 34 during low-flow and high-flow conditions is shown in Table 5-1. The travel time estimates represent the range of time plant personnel have to respond to and contain the spill within the storm sewer system and reroute the flow to the General Sump or divert it to the SWRB.

Once the spill reaches MH 34, it will be pumped into the 12-inch force main and combined with other flows as explained previously (see Figure 2-4). The low flow in the 12-inch main is assumed to be 500 gallons per minute (gpm) from the SSLS. This assumes that the intermittent discharges from the General Sump and SWRB are not operating. Peak stormwater flow to MH 175 was assumed to be 1000 gpm. This consists of 500 gpm from the SSLS, plus 300 gpm from the SWRB, plus 200 gpm from the General Sump. Low-flow and high-flow conditions at MH 175 are based on best professional judgment and knowledge of the system.

The low-flow travel time from MH 34 to MH 175 would be 28.4 minutes and the high-flow time would be 14.1 minutes.

Assuming that an additional 150 gpm of flow is added to MH 175 from the STP during both low- and high-flow conditions, the travel time from MH 175 to the Great Miami River (GMR) would be 23 minutes and 20 minutes, respectively. A summary of the calculations representing travel times to the Great Miami River is provided in Appendix G. The combination of the three travel time estimates (individual CB or MH to MH 34; plus MH 34 to MH 175; plus MH 175 to the GMR) represents an approximation of the amount of time to take appropriate response actions and notify the proper authorities and develop contingency plans to contain and/or treat a spill at the Great Miami River, if the spill cannot be caught before it reaches MH 175. Because of storage capacity available in the BSL, the General Sump and the SWRB, it is reasonable to assume that all pumping could be stopped and a spill could be controlled on site up to the time required for the spill to reach MH 175.

Table 5-1

Summary of Travel Time Estimates

From To	Low Flow Time (min.)	High Flow Time (min.)
MH 10 - MH 34	5 min.	4 min.
CB 10 - MH 34	7 min.	3 min.
CB 25 - MH 34	7 min.	2 min.
CB 35 - MH 34	3 min.	2 min.
CB 82 - MH 34	6 min.	3 min.
CB 100 - MH 34	8 min.	3 min.
MH 34 - MH 175	28 min.	14 min.
MH 175 - GMR	23 min.	20 min.

NOTE: A summary of the calculations to determine the above travel time estimates is provided in Appendix G.

6.0 REFERENCES

(CFR, 1984) 40 CFR Part 260.10, 1984

(CFR, 1984a) 40 CFR Part 116, 1984

(Dames & Moore, 1986) Dames and Moore, "Support Services Conceptual Design Report for Lockwood Greene Engineers", August 1986

(Daugherty, 1977) R. L. Daugherty and J. B. Franzini, "Fluid Mechanics with Engineering Applications," New York: McGraw-Hill Book Company, 1977

(FR, 1978) Federal Register Volume 43, Number 171, September 1, 1978

(FR, 1985) Federal Register Volume 50, Number 130, November 29, 1985

(FR, 1986) Federal Register Volume 51, Number 221, November 17, 1986

(SCS-NEH, 1972) "Soil Conservation Services National Engineers Handbook", Section 4, Hydrology, August 1972

(A. M. Kinney, 1988) A. M. Kinney, Inc. Planners Engineers, "Environmental, Health and Safety Improvements Design Criteria Phase II - Volume 2", Final Issue, February, 1988

(Roy F. Weston, Inc., 1988) "Feed Materials Production Center Best Management Practices Plan Report," Cincinnati, Ohio, FEMP/SUB - 011, February, 1988

(H&R Technical Associates, Inc., 1987) "Feed Materials Production Center Spill Prevention Control And Countermeasure Plan," Cincinnati, Ohio, FEMP - 2065, January 26, 1987

PL-3020, "FEMP Emergency Plan", March 22, 1993

APPENDIX A

REGULATORY BACKGROUND

REGULATORY BACKGROUND

Discharges of oils and CWA hazardous substances into the navigable waters of the United States are expressly prohibited by Section 311 (b) (3) of the Federal Water Pollution Control Act (FWPCA), as amended by the Clean Water Act (CWA). Section 311 (j) (1) of the FWPCA mandated the issuance of regulations establishing "procedures, methods, and equipment and other requirements for equipment to prevent discharges of oil and CWA hazardous substances from primary containment systems." The Environmental Protection Agency (EPA) subsequently promulgated Federal regulations defining harmful discharges of oils and PCBs and spill prevention control of oils and PCBs in 40 CFR, Parts 110, 112, and 761. Regulations addressing discharges of CWA hazardous substances other than oils or PCBs were proposed in 1978 (40 CFR Part 151), but were not promulgated. The following chapters of Title 40 of the CFR reference SPCC Plan cover preparation and implementation of SPCC-related issues.

A.1 40 CFR Part 110 - Discharge of Oil

40 CFR Part 110 provides the primary definition of harmful discharges of oils and prohibits the release of oils into the navigable waters of the United States. Discharges determined to be harmful include those which violate applicable water quality standards and those which "cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines."

A.2 40 CFR Part 112 - Oil Pollution Prevention

These regulations provide for the preparation and implementation of spill prevention control plans and are intended to complement other laws, regulations, rules, standards, and policies pertaining to safety standards and fire prevention. The regulations seek to achieve "fail-safe" engineering and installation procedures for tanks and other storage containers at facilities that reasonably can be expected to discharge oils. However, significant emphasis is placed on prevention of a spill occurrence through the evaluation of past spill history from facilities that have experienced a spill throughout the United States.

A.3 40 CFR Part 116 - Designation of Hazardous Substances

40 CFR, Part 116 designates CWA hazardous substances under authority of Section 311(b)(2)(A) of the Federal Water Pollution Control Act (FWPCA), as amended by the CWA.

A.4 40 CFR Part 117 - Determination of Reportable Quantities for Hazardous Substances

These regulations designate specific RQs for the CWA hazardous substances listed in 40 CFR Part 116. Any discharge of a CWA hazardous substance over a 24-hour period in excess of the RQ of the constituent must be reported to the National Response Center. The RQs referenced in 40 CFR Part 117 are listed as either 1, 10, 100, 1000, or 5000 pounds.

A.5 40 CFR Part 125, Subpart K - Criteria and Standards for Best Management Practices

These regulations require incorporation of Best Management Practices (BMPs) into industrial operations conducted in accordance with a NPDES permit. A facility should specifically incorporate SPCC Plans designed to prevent discharges of oils, PCBs, and designated CWA hazardous substances into its BMP program.

A.6 Proposed 40 CFR 151 - Hazardous Substances Pollution Prevention

The EPA issued proposed rules on September 1, 1976 requiring preparation of SPCC Plans to prevent discharges of CWA hazardous substances other than oil from facilities subject to NPDES permitting requirements. These proposed regulations parallel the EPA's oil pollution prevention regulations established in 40 CFR Part 112. To date, the EPA has not promulgated these regulations. Furthermore, it is not clear whether the EPA will finalize or revise the 40 CFR Part 112 oil pollution regulations to include other CWA hazardous substances.

A.7 40 CFR Part 761, Subpart D - PCB Storage and Disposal

This regulation requires the operator or owner of a facility storing liquid PCBs for future disposal to prepare SPCC Plans in accordance with 40 CFR Part 112.

APPENDIX B

REGULATORY CROSS-REFERENCE

REGULATION	TEXT SECTION
40 CFR 112.7 (a)	
40 CFR 112.7 (b)	Section 5.0 and Appendix D
40 CFR 112.7 (c)	Section 3.8
40 CFR 112.7 (d)	Section 4.2
40 CFR 112.7 (e) (1) (i)	Section 3.4
40 CFR 112.7 (e) (1) (ii)	N/A
40 CFR 112.7 (e) (1) (iii)	Section 5.0
40 CFR 112.7 (e) (1) (iv)	Section 5.0
40 CFR 112.7 (e) (1) (v)	Section 5.0
40 CFR 112.7 (e) (2) (i)	Section 3.4 and 3.5
40 CFR 112.7 (e) (2) (ii)	Section 3.4 and 3.5
40 CFR 112.7 (e) (2) (iii)	Section 3.4 and 3.8
40 CFR 112.7 (e) (2) (iv)	N/A
40 CFR 112.7 (e) (2) (v)	N/A
40 CFR 112.7 (e) (2) (vi)	Section 3.4 and 3.5
40 CFR 112.7 (e) (2) (vii)	N/A
40 CFR 112.7 (e) (2) (viii)	N/A
40 CFR 112.7 (e) (2) (ix)	Section 5.0
40 CFR 112.7 (e) (2) (x)	Section 5.0
40 CFR 112.7 (e) (2) (xi)	Section 5.0
40 CFR 112.7 (e) (3) (i)	N/A
40 CFR 112.7 (e) (3) (ii)	N/A
40 CFR 112.7 (e) (3) (iii)	N/A
40 CFR 112.7 (e) (3) (iv)	N/A
40 CFR 112.7 (e) (3) (v)	Section 3.6
40 CFR 112.7 (e) (4) (i)	Section 3.8
40 CFR 112.7 (e) (4) (ii)	Section 3.8
40 CFR 112.7 (e) (4) (iii)	Section 3.8
40 CFR 112.7 (e) (4) (iv)	Section 3.8
40 CFR 112.7 (e) (5)	N/A
40 CFR 112.7 (e) (6)	N/A
40 CFR 112.7 (e) (7)	N/A
40 CFR 112.7 (e) (8)	Section 3.4 and 3.5
40 CFR 112.7 (e) (9) (i)	Section 3.6
40 CFR 112.7 (e) (9) (ii)	N/A
40 CFR 112.7 (e) (9) (iii)	N/A
40 CFR 112.7 (e) (9) (iv)	N/A
40 CFR 112.7 (e) (9) (v)	N/A
40 CFR 112.7 (e) (10) (i)	Section 4.1
40 CFR 112.7 (e) (10) (ii)	Section 4.0
40 CFR 112.7 (e) (10) (iii)	Section 4.1
40 CFR 761.65 (c) (1) (iv)	Section 2.2.2.2

APPENDIX C

REGULATORY REPORTABLE QUANTITIES

UNDER THE CLEAN WATER ACT (CWA)

APPENDIX C

RQ SUBSTANCE (CAS REGISTRY NO.)	CATEGORY*	RQ POUNDS (KILOGRAMS)	40 CFR 117
Acetaldehyde (75-07-0)	C	1,000 (454)	X
Acenaphthylene (208-96-8)	D	5,000 (2,270)	
Acenaphthene (83-32-9)	B	100 (45.4)	
Acetic acid (64-19-7)	D	5,000 (2,270)	X
Acetic anhydride (108-24-7)	D	5,000 (2,270)	X
Acetone cyanohydrin (75-86-5)	A	10 (4.54)	
Acetyl bromide (506-96-7)	D	5,000 (2,270)	X
Acetyl chloride (79-36-7	D	5,000 (2,270)	X
Acrolein (107-02-8)	X	1 (0.454)	X
Acrylonitrile (107-13-1)	B	100 (45.4)	X
Adipic acid (124-04-9)	D	5,000 (2,270)	X
Aldrin (309-00-2)	X	1 (0.454)	X
Allyl alcohol (107-18-6	B	100 (45.4)	X
Allyl chloride (107-05-1)	C	1,000 (454)	X
Aluminum sulfate (10043-01-3)	D	5,000 (2,270)	X
Ammonia (7664-41-7)	B	100 (45.4)	X
Ammonium acetate (631-61-8)	D	5,000 (2,270)	X
Ammonium benzoate (1863-63-4)	D	5,000 (2,270)	X
Ammonium bicarbonate (1066-33-7)	D	5,000 (2,270)	X
Ammonium bichromate (7789-09-5)	A	10 (4.54)	X
Ammonium bifluoride (1341-49-7)	B	100 (45.4)	X
Ammonium bisulfite (10192-30-0)	D	5,000 (2,270)	
Ammonium carbamate (1111-78-0)	D	5,000 (2,270)	X
Ammonium carbonate (506-87-6)	D	5,000 (2,270)	X
Ammonium chloride (12125-02-9)	D	5,000 (2,270)	X
Ammonium chromate (7788-98-9)	A	10 (4.54)	X
Ammonium citrate dibasic (3012-65-5)	D	5,000 (2,270)	X
Ammonium fluoborate (13826-83-0)	D	5,000 (2,270)	X
Ammonium fluoride (12125-01-8)	B	100 (45.4)	X
Ammonium hydroxide (1336-21-6)	C	1,000 (454)	X
Ammonium oxalate (6009-70-7)	D	5,000 (2,270)	X
Ammonium silicofluoride (16919-19-0)	C	1,000 (454)	X
Ammonium sulfamate (7773-06-0)	D	5,000 (2,270)	X
Ammonium sulfide (12135-76-1)	B	100 (45.4)	X
Ammonium sulfite (10196-04-0)	D	5,000 (2,270)	X
Ammonium tartrate (3164-29-2)	D	5,000 (2,270)	X
Ammonium thiocyanate (1762-95-4)	D	5,000 (2,270)	X
Amyl acetate (628-63-7)	D	5,000 (2,270)	X
Aniline (62-53-3)	D	5,000 (2,270)	X
Anthracene (120-12-7)	D	5,000 (2,270)	
Antimony (7440-36-0)	D	5,000 (2,270)	
Antimony pentachloride (7647-18-9)	C	1,000 (454)	X
Antimony potassium tartrate (28300-74-5)	B	100 (45.4)	X
Antimony tribromide (7789-61-9)	C	1,000 (454)	X
Antimony trichloride (10025-91-9)	C	1,000 (454)	X
Antimony trifluoride (7783-56-4)	C	1,000 (454)	X
Antimony trioxide (1309-64-4)	C	1,000 (454)	X
Aroclor 1016 (12674-11-2)	A	10 (4.54)	
Aroclor 1221 (11104-28-2)	A	10 (4.54)	
Aroclor 1232 (11141-16-5)	A	10 (4.54)	
Aroclor 1242 (53469-21-9)	A	10 (4.54)	
Aroclor 1248 (12672-29-6)	A	10 (4.54)	
Aroclor 1254 (11097-69-1)	A	10 (4.54)	
Arsenic (7440-38-2)	X	1 (0.454)	
Arsenic disulfide (1303-32-8)	X	1 (0.454)	X
Arsenic pentoxide (1303-28-2)	X	1 (0.454)	X
Arsenic trichloride (7784-34-1)	X	1 (0.454)	X

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RQ SUBSTANCE (CAS REGISTRY NO.)	CATEGORY*	RQ POUNDS (KILOGRAMS)	40 CFR 117
Arsenic trioxide (1327-53-3)	X	1 (0.454)	X
Arsenic trisulfide (1303-33-9)	X	1 (0.454)	X
Asbestos (1332-21-4)	X	1 (0.454)	
Barium cyanide (542-62-1)	A	10 (4.54)	X
Benz[a]anthracene (56-55-3)	X	1 (0.454)	
Benzene (71-43-2)	A	10 (4.54)	X
Benzidine (92-87-5)	X	1 (0.454)	
Benzo[b]fluoranthene (205-99-2)	X	1 (0.454)	
Benzo[k]fluoranthene (207-08-9)	X	1 (0.454)	
Benzo[ghi]perylene (191-24-2)	D	5,000 (2,270)	
Benzo[a]pyrene (50-32-8)	X	1 (0.454)	
Benzoic acid (65-85-0)	D	5,000 (2,270)	X
Benzonitrile (100-47-0)	D	5,000 (2,270)	X
Benzoyl chloride (98-88-4)	C	1,000 (454)	X
Benzyl chloride (100-44-7)	B	100 (45.4)	X
Beryllium (7440-41-7)	X	1 (0.454)	
Beryllium chloride (7787-47-5)	X	1 (0.454)	X
Beryllium fluoride (7787-49-7)	X	1 (0.454)	X
Beryllium nitrate (7787-55-5)	X	1 (0.454)	X
BHC (alpha isomer) (319-84-6)	X	1 (0.454)	
BHC (beta isomer) (319-85-7)	X	1 (0.454)	
BHC (delta isomer) (319-86-8)	X	1 (0.454)	
Bis(2-chloroethoxy) methane (111-91-1)	C	1,000 (454)	
Bis(2-chloroethyl) ether (111-44-4)	X	1 (0.454)	
Bis(2-chloroisopropyl) ether (108-60-1)	C	1,000 (454)	
Bis(2-ethylhexyl) phthalate (117-81-7)	X	1 (0.454)	
Bromomethane (74-83-9)	C	1,000 (454)	
4-Bromophenyl phenyl ether(101-55-3)	B	100 (45.4)	
Butyl acetate (123-86-4)	D	5,000 (2,270)	X
Butyl benzyl phthalate (85-68-7)	B	100 (45.4)	
n-Butyl phthalate (84-74-2)	A	10 (4.54)	
Butylamaine (109-73-9)	C	1,000 (454)	X
Butyric acid (107-92-6)	D	5,000 (2,270)	X
Cadmium (7440-43-9)	X	1 (0.454)	
Cadmium acetate (543-90-8)	A	10 (4.54)	X
Cadmium bromide (7789-42-6)	A	10 (4.54)	X
Cadmium chloride (10108-64-2)	A	10 (4.54)	X
Calcium arsenate (7778-44-1)	X	1 (0.454)	X
Calcium arsenite (52740-16-6)	X	1 (0.454)	X
Calcium carbide (75-20-7)	A	10 (4.54)	
Calcium chromate (13765-19-0)	A	10 (4.54)	X
Calcium cyanide (592-01-8)	A	10 (4.54)	X
Calcium dodocylbenzenesulfonate (26264-06-2)	C	1,000 (454)	X
Calcium hypochlorite (7778-54-3)	A	10 (4.54)	X
Captan (133-06-2)	A	10 (4.54)	X
Carbaryl (63-25-2)	B	100 (45.4)	X
Carbofuran (1563-66-2)	A	10 (4.54)	X
Carbon disulfide (75-15-0)	B	100 (45.4)	X
Carbon tetrachloride (56-23-5)	A	10 (4.54)	X
Chlordane (57-74-9)	X	1 (0.454)	X
Chlorine (75-00-3)	A	10 (4.54)	X
Chlorobenzene (108-90-7)	B	100 (45.4)	X
p-Chloro-m-cresol (59-50-7)	D	5,000 (2,270)	
2-Chloroethyl vinyl ether (110-75-8)	C	1,000 (454)	
Chloroethane (75-00-3)	B	100 (45.4)	

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RQ SUBSTANCE (CAS REGISTRY NO.)	CATEGORY*	RQ POUNDS (KILOGRAMS)	40 CFR 117
Chloroform (67-66-3)	A	10 (4.54)	X
Chloromethane (74-87-3)	X	1 (0.454)	
2-Chloronaphthalene (91-58-7)	D	5,000 (2,270)	
2-Chlorophenol (95-57-8)	B	100 (45.4)	
4-Chlorophenyl phenyl ether (7005-72-3)	D	5,000 (2,270)	
Chlorosulfonic acid (7790-94-5)	C	1,000 (454)	X
Chlorpyrifos (2921-88-2)	X	1 (0.454)	X
Chromium (7440-47-3)	X	1 (0.454)	
Chromic acetate (1066-30-4)	C	1,000 (454)	X
Chromic acid (1111-57-45)	A	10 (4.54)	X
Chromic sulfate (10101-53-8)	C	1,000 (454)	X
Chromous chloride (10049-05-5)	C	1,000 (454)	X
Chrysene (218-01-9)	X	1 (0.454)	
Cobaltous bromide (7789-43-7)	C	1,000 (454)	X
Cobaltous formate (544-18-3)	C	1,000 (454)	X
Cobaltous sulfamate (14017-41-5)	C	1,000 (454)	X
Copper (7440-50-8)	D	5,000 (2,270)	
Coumaphos (56-72-4)	A	10 (4.54)	X
Cresol (1319-77-3)	C	1,000 (454)	X
Crotonaldehyde (4170-30-3)	X	1 (0.454)	X
Cupric acetate (142-71-2)	B	100 (45.4)	X
Cupric acetoarsenite (12002-03-8)	X	1 (0.454)	X
Cupric chloride (7447-39-4)	A	10 (4.54)	X
Cupric nitrate (3251-23-8)	B	100 (45.4)	X
Cupric oxalate (5893-66-3)	B	100 (45.4)	X
Cupric sulfate (7758-98-7)	A	10 (4.54)	X
Cupric sulfate ammoniated (10380-29-7)	B	100 (45.4)	X
Cupric tartrate (815-82-7)	B	100 (45.4)	X
Cyanogen chloride (506-77-4)	A	10 (4.54)	X
Cyclohexane (110-82-7)	C	1,000 (454)	X
2,4-D Acid (94-75-7)	B	100 (45.4)	X
2,4-D Esters (94-11-1)	B	100 (45.4)	X
DDT (50-29-3)	X	1 (0.454)	X
Diazinon (333-41-5)	X	1 (0.454)	X
Dibenz[a,h]anthracene (53-70-3)	X	1 (0.454)	
Dibutyl phthalate (84-74-2)	A	10 (4.54)	X
Dicamba (1918-00-9)	C	1,000 (454)	X
Dichlobenil (1194-65-6)	B	100 (45.4)	X
Dichlone (117-80-6)	X	1 (0.454)	X
Dichlorobenzene (all isomers) (25321-22-6)	B	100 (45.4)	X
1,2-Dichlorobenzene (95-50-1)	B	100 (45.4)	X
1,3-Dichlorobenzene (541-73-1)	B	100 (45.4)	
1,4-Dichlorobenzene (106-46-7)	B	100 (45.4)	X
3,3'-Dichlorobenzidine (91-94-1)	X	1 (0.454)	
Dichlorobromomethane (75-27-4)	D	5,000 (2,270)	
1,1-Dichloroethane (75-34-3)	C	1,000 (454)	
1,2-Dichloroethane (107-06-2)	D	5,000 (2,270)	
Dichloroethylene (all isomers) (25323-30-2)	D	5,000 (2,270)	
1,1-Dichloroethylene (75-35-4)	D	5,000 (2,270)	
1,2-trans-Dichloroethylene (156-60-5)	C	1,000 (454)	
Dichloromethane (75-09-2)	C	1,000 (454)	
2,4-Dichlorophenol (120-83-2)	B	100 (45.4)	
Dichloropropane (all isomers) (26638-19-7)	C	1,000 (454)	X
1,2-Dichloropropane (78-87-5)	C	1,000 (454)	X
Dichloropropene-Dichloropropane mixture (8003-19-8)	B	100 (45.4)	X

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RQ SUBSTANCE (CAS REGISTRY NO.)	CATEGORY*	RQ POUNDS (KILOGRAMS)	40 CFR 117
Dichloropropene(s) (all isomers) (26952-23-8)	B	100 (45.4)	X
1,3-Dichloropropene (542-75-6)	B	100 (45.4)	X
2,2-Dichloropropionic acid (75-99-0)	D	5,000 (2,270)	X
Dichlorvos (62-73-7)	A	10 (4.54)	X
Dicofol(115-32-2)	A	10 (4.54)	
Dieldrin (60-57-1)	X	1 (0.454)	X
Diethylamine (109-89-7)	B	100 (45.4)	X
Dimethylamine (124-40-3)	C	1,000 (454)	X
Diethyl phthalate (84-66-2)	C	1,000 (454)	
Dimethylnitrosamine (62-75-9)	X	1 (0.454)	
2,4-Dimethylphenol (105-67-9)	B	100 (45.4)	
Dimethyl phthalate (131-11-3)	D	5,000 (2,270)	
Dinitrobenzene (all isomers) (25154-54-5)	B	100 (45.4)	X
4,6-Dinitro-o-cresol (534-52-1)	A	10 (4.54)	
Dinitrophenol (25550-58-7)	A	10 (4.54)	X
2,4-Dinitrophenol (all isomers) (51-28-5)	A	10 (4.54)	X
Dinitrotoluene (all isomers) (25321-14-6)	A	10 (4.54)	X
2,4-Dinitrotoluene (121-14-2)	A	10 (4.54)	X
2,6-Dinitrotoluene (606-20-2)	A	10 (4.54)	X
Di-n-octyl phthalate (117-84-0)	D	5,000 (2,270)	
1,2-Diphenylhydrazine (122-66-7)	X	1 (0.454)	
Di-n-propylnitrosamine (621-64-7)	X	1 (0.454)	
Diquat (85-00-7)	C	1,000 (454)	X
Disulfoton (298-04-4)	X	1 (0.454)	X
Diuron (330-54-1)	B	100 (45.4)	X
Dodecybenzenesulfonic acid (27176-87-0)	C	1,000 (454)	X
Endosulfan (all isomers) (115-29-7)	X	1 (0.454)	X
Endosulfan sulfate (1031-07-8)	X	1 (0.454)	
Endrin and metabolites (72-20-8)	X	1 (0.454)	X
Endrin aldehyde (7421-93-4)	X	1 (0.454)	
Epichlorohydrin (106-89-8)	B	100 (45.4)	X
Ethion (563-12-2)	A	10 (4.54)	X
Ethylbenzene (100-41-4)	C	1,000 (454)	X
Ethylenediamine (107-15-3)	D	5,000 (2,270)	X
Ethylene dibromide (106-93-4)	X	1 (0.454)	X
Ethylene dichloride (107-06-2)	B	100 (45.4)	X
EDTA (60-00-4)	D	5,000 (2,270)	X
Ferric ammonium citrate (1185-57-5)	C	1,000 (454)	X
Ferric ammonium oxalate (2944-67-4)	C	1,000 (454)	X
Ferric chloride (7705-08-0)	C	1,000 (454)	X
Ferric fluoride (7783-50-8)	B	100 (45.4)	X
Ferric nitrate (10421-48-4)	C	1,000 (454)	X
Ferric sulfate (10028-22-5)	C	1,000 (454)	X
Ferrous ammonium sulfate (10045-89-3)	C	1,000 (454)	X
Ferrous chloride (7758-94-3)	B	100 (45.4)	X
Ferrous sulfate (7720-78-7)	C	1,000 (454)	X
Fluoranthene (206-44-0)	B	100 (45.4)	
Formaldehyde (50-00-0)	B	100 (45.4)	X
Formic acid (64-18-6)	D	5,000 (2,270)	X
Furmaric acid (110-17-8)	D	5,000 (2,270)	X
Furfural (98-01-1)	D	5,000 (2,270)	X
Guthion (86-50-0)	X	1 (0.454)	X
Heptachlor (76-44-8)	X	1 (0.454)	X
Heptachlor epoxide (1024-57-3)	X	1 (0.454)	
Hexachlorobutadiene (87-68-3)	X	1 (0.454)	
Hexachlorocyclohexane (gamma isomer) (58-89-9)	X	1 (0.454)	
Hexachlorocyclopentadiene (77-47-4)	A	10 (4.54)	X
Hexachloroethane (67-72-1)	X	1 (0.454)	

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RQ SUBSTANCE (CAS REGISTRY NO.)	CATEGORY*	RQ POUNDS (KILOGRAMS)	40 CFR 117
Hydrochloric acid (7647-01-0) (Hydrogen Chloride)	D	5000 (2,270)	X
Hydrofluoric acid (7664-39-3)(Liquid) (Hydrogen fluoride)	B	100 (45.4)	X
Hydrocyanic acid (74-90-8) (Hydrogen cyanide)	A	10 (4.54)	X
Hydrosulfuric acid (7783-06-4) (Hydrogen sulfide)	B	100 (45.4)	X
Indeno(1,2,3-cd)pyrene (193-39-5)	X	1 (0.454)	
Isophorone (78-59-1)	D	5,000 (2,270)	
Isoprene (78-79-5)	B	100 (45.4)	X
Isopropanolamine dodecylbenzenesulfonate (42504-46-1)	C	1,000 (454)	X
Kepone (143-50-0)	X	1 (0.454)	X
Lead (7439-92-1)	X	1 (0.454)	
Lead acetate (301-04-2)	D	5,000 (2,270)	X
Lead arsenate (77-84-409)	X	1 (0.454)	X
Lead chloride (7758-95-4)	B	100 (45.4)	X
Lead fluoborate (13814-96-5)	B	100 (45.4)	X
Lead fluoride (7783-46-2)	B	100 (45.4)	X
Lead iodide (10101-63-0)	B	100 (45.4)	X
Lead nitrate (10099-74-8)	B	100 (45.4)	X
Lead stearate (7428-48-0)	D	5,000 (2,270)	X
Lead sulfate (7446-14-2)	B	100 (45.4)	X
Lead sulfide (1314-87-0)	D	5,000 (2,270)	X
Lead thiocyanate (592-87-0)	B	100 (45.4)	X
Lindane (58-89-9)	X	1 (0.454)	X
Lithium chromate (14307-35-8)	A	10 (45.4)	X
Malathion (121-75-5)	B	100 (45.4)	X
Maleic acid (110-16-7)	D	5,000 (2,270)	X
Maleic anhydride (108-31-6)	D	5,000 (2,270)	X
Mercaptodimethur (203-65-7)	A	10 (4.54)	X
Mercuric cyanide (592-04-1)	X	1 (0.454)	X
Mercuric nitrate (10045-94-0)	A	10 (4.54)	X
Mercuric sulfate (7783-35-9)	A	10 (4.54)	X
Mercuric thiocyanate (592-85-8)	A	10 (4.54)	X
Mercurous nitrate (7782-86-7)	A	10 (4.54)	X
Mercury (7439-97-6)	X	1 (0.454)	
Methoxychlor (72-43-5)	X	1 (0.454)	X
Methylmercaptan (74-93-1)	B	100 (45.4)	X
Methyl methacrylate (80-62-6)	C	1,000 (454)	X
Methyl parathion (298-00-0)	B	100 (45.4)	X
Mevinphos (7786-34-7)	A	10 (4.54)	X
Mexacarbate (315-18-4)	B	100 (45.4)	X
Monoethylamine (75-04-7)	B	100 (45.4)	X
Monomethylamine (74-89-5)	B	100 (45.4)	X
Naled (300-76-5)	A	10 (4.54)	X
Naphthalene (91-20-3)	B	100 (45.4)	X
Naphthenic acid (1338-24-5)	B	100 (45.4)	X
Nickel (7440-02-0)	X	1 (0.454)	
Nickel ammonium sulfate (15699-18-0)	B	100 (45.4)	X
Nickel chloride (37211-05-5)	B	100 (45.4)	X
Nickel hydroxide (12054-48-7)	A	10 (4.54)	X
Nickel nitrate (14216-75-2)	B	100 (45.4)	X
Nickel sulfate (7786-81-4)	B	100 (45.4)	X
Nitric acid (7697-37-2)	C	1,000 (454)	X

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RQ SUBSTANCE (CAS REGISTRY NO.)	CATEGORY*	RQ POUNDS (KILOGRAMS)	40 CFR 117
Sulfur monochloride (12771-08-3)	C	1,000 (454)	X
2,4,5-T acid (93-76-5)	C	1,000 (454)	X
2,4,5-T amines (6369-96-6)	D	5,000 (2,270)	X
2,4,5-T esters (2545-59-7)	C	1,000 (454)	X
2,4,5-T salts (13560-99-1)	C	1,000 (454)	X
2,4,5-TP acid (93-72-1)	B	100 (45.4)	X
2,4,5-TP acid esters (32534-95-5)	B	100 (45.4)	X
Tetrachloromethane (56-23-5)	A	10 (4.54)	X
TDE (72-54-8)	X	1 (0.454)	X
Tetraethyl lead (78-00-2)	A	10 (4.54)	X
Tetraethyl pyrophosphate (107-49-3)	A	10 (4.54)	X
Thallium (I) sulfate (10031-59-1)	B	100 (45.4)	X
Toluene (108-88-3)	C	1,000 (454)	X
Toxaphene (8001-35-2)	X	1 (0.454)	X
Trichlorfon (52-68-6)	B	100 (45.4)	X
Trichloroethylene (79-01-6)	B	100 (45.4)	X
Trichlorophenol (isomers) (25167-82-2)	A	10 (4.54)	X
2,4,5-Trichlorophenol (95-95-4)	A	10 (4.54)	X
2,4,6-Trichlorophenol (88-06-2)	A	10 (4.54)	X
Triethanolamine dodecylbenzenesulfonate (27323-41-7)	C	1,000 (454)	X
Triethylamine (121-44-8)	D	5,000 (2,270)	X
Trimethylamine (75-50-3)	B	100 (45.4)	X
Uranyl acetate (541-09-3)	B	100 (45.4)	X
Uranyl nitrate (10102-06-4)	B	100 (45.4)	X
Vanadium pentoxide (1314-62-1)	C	1,000 (454)	X
Vanadyl sulfate (27774-13-6)	C	1,000 (454)	X
Vinyl acetate (108-05-4)	D	5,000 (2,270)	X
Vinylidene chloride (75-35-4)	B	100 (45.4)	X
Xylene (1330-20-7)	C	1,000 (454)	X
Xylenol (1300-71-6)	C	1,000 (454)	X
Zinc acetate (557-34-6)	C	1,000 (454)	X
Zinc ammonium chloride (14639-97-5)	C	1,000 (454)	X
Zinc borate (1332-07-6)	C	1,000 (454)	X
Zinc bromide (7699-45-8)	C	1,000 (454)	X
Zinc carbonate (3486-35-9)	C	1,000 (454)	X
Zinc chloride (7646-85-7)	C	1,000 (454)	X
Zinc cyanide (557-21-1)	A	10 (4.54)	X
Zinc fluoride (7783-49-5)	C	1,000 (454)	X
Zinc formate (557-41-5)	C	1,000 (454)	X
Zinc hydrosulfite (7779-86-4)	C	1,000 (454)	X
Zinc nitrate (7779-88-6)	C	1,000 (454)	X
Zinc phenolaulfonate (127-82-2)	D	5,000 (2,270)	X
Zinc phosphide (1314-84-7)	B	100 (45.4)	X
Zinc silicofluoride (16871-71-9)	D	5,000 (2,270)	X
Zinc sulfate (7733-02-0)	C	1,000 (454)	X
Zirconium nitrate (13746-89-9)	D	5,000 (2,270)	X
Zirconium potassium fluoride (16923-95-8)	C	1,000 (454)	X
Zirconium sulfate (14644-61-2)	D	5,000 (2,270)	X
Zirconium tetrachloride (10026-11-6)	D	5,000 (2,270)	X

* The codes "X", "A", "B", "C", and "D" used in the category column are associated with reportable quantities of 1, 10, 100, 1000, and 5000 pounds respectively.

APPENDIX D

ANALYSIS OF PRIMARY CONTAINMENTS

Appendix D

NOTATION:

++ Locate tanks according to Locator File Numbers shown on Figure 2-3 and Appendix F

(1) Best engineering judgment since no drawings for this tank were found in the FEMP Drafting Department

Level Control - Type of existing control to prevent overfill of tank:

A = Adequate tank capacity to assure that a tank will not overfill (Administrative Control (SOP) requires empty volume to be greater than tanker volume or largest upstream batch tank)
B = Overflow equalizing lines between tanks so that a full tank can overflow to an adjacent tank
C = High level sensors to generate and transmit an alarm signal to a production control system
D = Pressure tanks are equipped with a high pressure sensing device to activate an alarm
E = Varec level indicator with float
F = Overflow lines go to a sump
G = Gage Board level indicator
H = Level Indicator
X = No level control provided

Tank Material

CS = Carbon steel
FG = Fiberglass
SS = Stainless steel

Evaluation Of Tank Construction

P = Tank material and construction has fair to poor compatibility with the material stored
Q = Tank material and construction has good to excellent compatibility with the material stored
X = Tank material and construction are not compatible with the material stored

Inventory Control - The operators inventory the contents of the tank at least once a month

Heating Coil - The tank has an internal heating coil

General Abbreviations

Y = Yes
N = No
Ft^2 = Square Feet
NA = Not Applicable
RQ = Reportable Quantity (per Appendix C)
G-1 = The corresponding Grid Plate Number in Appendix F associated with this Locator File Number

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Appendix D-1 Storage Tanks (CWA Hazardous Substance Tanks)

Building Number	Locator++ File Number	Identification Number	Service	Tank Capacity (Gallons)	RQ	Level Control	Evaluation Of Tank Construction	Tank Material	Inventory Control	Tank Visual Inspection	Heating Coil	Year Of Installation
Plant 2/3 Refinery	1 (G-5)	Tank F3E-222	Uranyl Nitrate	25,000	Y	C	Q	SS 304L	Y	Y	N	1955
		Tank F3E-223	Uranyl Nitrate	25,000	Y	C	Q	SS 304L	Y	Y	N	1955
		Tank F3E-224	Uranyl Nitrate	25,000	Y	C	Q	SS 304L	Y	Y	N	1955
		Tank F3E-225	Uranyl Nitrate	60,000	Y	C	Q	SS 304L	Y	Y	N	1955
	2 (G-5)	Tank D1-118	Sulfuric Acid	1,100	Y	H	Q	CS Halar	Y	Y	N	1952
	3 (G-3)	Tank F1-8	HNO_3/H_3PO_4 Acid	5,120	Y	C	Q	SS 304L	Y	Y	N	1954
		Tank F1-23	Nitric Acid	30,500	Y	C/B	Q	SS 304L	Y	Y	N	1951
		Tank F1-24	Nitric Acid	30,500	Y	C/B	Q	SS 304L	Y	Y	N	1951
	4 (G-6)	Tank F1-25A	Uranyl Nitrate	14,203	Y	H/F	Q	SS 304L	Y	Y	N	1955
		Tank F1-26A	Uranyl Nitrate	14,203	Y	H/F	Q	SS 304L	Y	Y	N	1955
		Tank F2E-6NE	Uranyl Nitrate	25,265	Y	D	Q	SS 304L	Y	Y	N	1955
		Tank F2E-5SE	Uranyl Nitrate	25,265	Y	D	Q	SS 304L	Y	Y	N	1955
		Tank F2E-7NW	Uranyl Nitrate	25,265	Y	D	Q	SS 304L	Y	Y	N	1955
		Tank F2E-8SW	Uranyl Nitrate	25,265	Y	D	Q	SS 304L	Y	Y	N	1955
	7 (G-2)	Tank F2-605	Uranyl Nitrate	25,500	Y	E	Q	SS 304L	Y	Y	N	1967
		Tank F2-606	Uranyl Nitrate	25,500	Y	E	Q	SS 304L	Y	Y	N	1967
		Tank F2-607	Uranyl Nitrate	25,500	Y	E	Q	SS 304L	Y	Y	N	1967
		Tank F2-608	Uranyl Nitrate	25,500	Y	E	Q	SS 304L	Y	Y	N	1967
	17 (G-6)	Tank F2E-501	Tributylphosphate	4,000	Y	F/C	Q	SS 304L	Y	Y	N	1955
	26 (G-5)	Tank F3-22	Nitric Acid	7,775	Y	F/H	Q	SS 347	Y	Y	N	1951
		Tank F3-23	Nitric Acid	7,775	Y	F/H	Q	SS 347	Y	Y	N	1951
		Tank F3-24	Nitric Acid	7,775	Y	F/H	Q	SS 347	Y	Y	N	1951
		Tank F3-25	Nitric Acid	7,775	Y	F/H	Q	SS 347	Y	Y	N	1951
		Tank F3-12	Nitric Acid	4,165	Y	X	Q	SS 347	Y	Y	N	1952
		Tank F3-19	Nitric Acid	4,165	Y	X	Q	SS 347	Y	Y	N	1952
		Tank F3-11	Nitric Acid	3,600	Y	H	Q	SS 304L	Y	Y	N	1953
		Tank F3-2	Nitric Acid	4,165	Y	X	Q	SS 347	Y	Y	N	1952
		Tank F3E-27	Dilute Ammonia	4,165	Y	X	Q	SS 347	Y	Y	N	1952
	27 (G-3)	Tank F3E-408	Uranyl Nitrate	25,000	Y	H	Q	SS 304L	Y	Y	N	1955
		Tank F3E-409	Uranyl Nitrate	25,000	Y	H	Q	SS 304L	Y	Y	N	1955
		Tank F1-407	Uranyl Nitrate	3,487	Y	H	Q	SS 304L	Y	Y	N	1952
		Tank F1-400	Raffinate (Nitric Acid)	6,060	Y	H	Q	SS 347	Y	Y	N	1951
		Tank F1-401	Raffinate (Nitric Acid)	6,060	Y	H	Q	SS 347	Y	Y	N	1951

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Appendix D-1 Storage Tanks (CWA Hazardous Substance Tanks)

Building Number	Locator++ File Number	Identification Number	Service	Tank Capacity (Gallons)	RQ	Level Control	Evaluation Of Tank Construction	Tank Material	Inventory Control	Tank Visual Inspection	Heating Coil	Year Of Installation
Plant 2/3 Continued		Tank F1-402	Raffinate (Nitric Acid)	6,060	Y	H	Q	SS 347	Y	Y	N	1951
	27 (G3)	Tank F1-403	Raffinate (Nitric Acid)	6,060	Y	H	Q	SS 347	Y	Y	N	1951
		Tank F1-405	Uranyl Nitrate	6,000	Y	H	Q	SS 304L	Y	Y	Y	1951
		Tank F3E-404	Uranyl Nitrate	6,000	Y	H	Q	SS 304L	Y	Y	N	1951
		Tank F3E-405	Uranyl Nitrate	6,000	Y	H	Q	SS 304L	Y	Y	N	1951
		Tank F1-310	Uranyl Nitrate	8,200	Y	H/C	Q	SS 304L	Y	Y	N	1951
		Tank F1-311	Uranyl Nitrate	8,200	Y	H/C	Q	SS 304L	Y	Y	N	1951
		Tank F1-312	Uranyl Nitrate	8,200	Y	H/C	Q	SS 304L	Y	Y	N	1951
		Tank F1-317	Uranyl Nitrate	8,200	Y	H/C	Q	SS 304L	Y	Y	N	1951
BDN	28 (G-3)	Tank F-1	Sulfuric Acid	4,200	Y	F	Q	SS 316L	Y	Y	N	1984
		Tank F-2	Phosphoric Acid	2,200	Y	F	P	SS 304L	Y	Y	N	1984
		Tank F-3	Sulfuric Acid	2,200	Y	F	P	SS 304L	Y	Y	N	1984
Plant 5 Metals Production	29 (G-9)	Tank T-6	Nitric Acid	2,600	Y	X	Q	SS 304L	N	N	N	1983
Plant 6 Metals Fabrication	13 (G-14)	South Tank (1)	Nitric Acid	995	Y	X	Q	SS 304L	Y	Y	N	1955
	19 (G-12)	Tank F6-2	Nitric Acid	1,175	Y	H	Q	SS 304L	Y	Y	N	1953
		Tank F6-3	Nitric Acid	1,175	Y	H	Q	SS 304L	Y	Y	N	1953
	43 (G-12)	North Tank	Sodium Hydroxide	3,380	Y	G	Q	CS	Y	Y	N	1967
Plant 8 Recovery Plant	8 (G-5)	735-43-7020	Sodium Hydroxide	17,000	Y	X	Q	CS	Y	Y	Y	1957
		735-43-7021	Sodium Hydroxide	17,000	Y	X	Q	CS	Y	Y	Y	1957
		735-43-7004	Sodium Oxalate	12,250	Y	X	Q	CS	Y	Y	Y	1957
Plant 9 Special Products	20A (G-11)	East Tank (1)	Spent Nitric Acid	1,800	Y	H	Q	SS 304L	Y	Y	N	1952
		West Tank (1)	Spent Nitric Acid	5,000	Y	G	Q	SS	Y	Y	N	1961
	21 (G-11)	West Portable (1) Tank	Hydrofluoric Acid and Lime Slurry	1,000	Y	X	Q	CS Liner	Y	Y	N	1957
	21 (G-11)	East Portable (1) Tank	Hydrofluoric Acid and Lime Slurry	1,000	Y	X	Q	CS Liner	Y	Y	N	1957
	23 (G-11)	Tank 2429	Nitric Acid	2,300	Y	G	Q	SS 304L	Y	Y	N	1961
	24 (G-11)	PPT Tank	Ammonia	1,100	Y	X	Q	CS	Y	Y	N	1967
	44 (G-11)	Tank 1 (1)	HNO, and UNH	575	Y	N	P	CS Liner	Y	Y	N	1957

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Appendix D-1 Storage Tanks (CWA Hazardous Substance Tanks)

Building Number	Locator++ File Number	Identification Number	Service	Tank Capacity (Gallons)	RQ	Level Control	Evaluation Of Tank Construction	Tank Material	Inventory Control	Tank Visual Inspection	Heating Coil	Year Of Installation
Tank Farm	35 (G-8)	Tank T-19X-1800	Anhydrous HF	35,227	Y	D	Q	CS	Y	Y	N	1989
		Tank T-19X-1900	Anhydrous HF	35,227	Y	D	Q	CS	Y	Y	N	1989
		Tank T-19X-2000	Anhydrous HF	35,227	Y	D	Q	CS	Y	Y	N	1989
		Tank T-19X-2100	Anhydrous HF	35,227	Y	D	Q	CS	Y	Y	N	1989
		Tank T-19X-1500	Dilute HF	30,000	Y	C	Q	CS	Y	Y	N	1989
		Tank T-19X-1600	Dilute HF	30,000	Y	C	Q	CS	Y	Y	N	1989
Refinery Sump	36 (G-5)	Tank F2E-601	HNO_3 (Filter Wash Tank)	26,550	Y	H/B	Q	SS 304L	Y	Y	N	1955
		Tank F1-608	HNO_3 (Filter Wash Tank)	26,550	Y	H/B	Q	SS 304L	Y	Y	N	1953
		Tank F1-609	HNO_3 (Filter Wash Tank)	6,050	Y	C/B	Q	SS 304L	Y	Y	N	1953
		Tank F1-610	HNO_3 (Filter Wash Tank)	6,050	Y	C/B	Q	SS 304L	Y	Y	N	1953
		Tank F1-612	Nitric Acid	1,800	Y	X	Q	SS 304L	Y	Y	N	1953
		Tank F1-613	Nitric Acid	600	Y	H	Q	SS 304L	Y	Y	N	1953
General Sump	33B (G-5)	T-18X-2500 (1)	Raffinate (Nitric Acid)	50,000	Y	F/C	Q	SS 304L	Y	Y	N	1989
	33D (G-5)	Tank F2E-603	Uranyl Nitrate	16,800	Y	F/C	Q	SS 304L	Y	Y	N	1955
Water Plant	12 (G-7)	T-20X-1000 (1)	Sulfuric Acid	1,275	Y	X	Q	SS 304L	Y	Y	N	1955
Pilot Plant	9 (G-4)	F-54502	Anhydrous HF	8,300	Y	X	Q	CS	Y	Y	N	1982
	10A (G-4)	Tank F-100 (1)	Contaminated Solvent	8,225	Y	H	Q	SS 304L	Y	Y	N	1951
		Tank F-101 (1)	Contaminated Solvent	8,225	Y	H	Q	SS 304L	Y	Y	N	1951
	10B (G-4)	Tank 1	Contaminated Solvent	2,200	Y	H	Q	SS 347	Y	Y	N	1954
		Tank 2	Contaminated	2,200	Y	H	Q	SS 347	Y	Y	N	1954
	11 (G-4)	Tank T5 (1)	Contaminated Solvent	10,000	Y	X	Q	SS 304L	Y	Y	N	1954
		Tank T6 (1)	Contaminated Solvent	8,110	Y	X	Q	SS 304L	Y	Y	N	1954

Appendix D-1 Storage Tanks (CWA Hazardous Substance Tanks)

Building Number	Locator File Number	Identification Number	Service	Tank Capacity (Gallons)	RQ	Level Control	Evaluation Of Tank Construction	Tank Material	Inventory Control	Tank Visual Inspection	Heating Coil	Year Of Installation
Pilot Plant Continued		Tank T4 (1)	Thorium Nitrate	8,523	Y	G	Q	SS 304L	Y	Y	N	1954
		Tank T3 (1)	Contaminated Solvent	7,757	Y	X	Q	SS 304L	Y	Y	N	1954
		Tank T2 (1)	Thorium Nitrate (Nitric Acid)	7,707	Y	X	Q	SS 304L	Y	Y	N	1954
	39A (G-4)	Tank W10	Nitric Acid	2,000	Y	X	Q	SS 304	Y	Y	Y	1957
	39B (G-4)	Tank F1-5	Nitric Acid	5,000	Y	G	Q	SS 304L	Y	Y	N	1953
	39C (G-4)	Tank T9	Sodium Hydroxide	8,225	Y	H	Q	SS 304L	Y	Y	N	1953
	39D (G-4)	Tank T1 (1)	Nitric Acid	5,000	Y	G	Q	SS 304L	Y	Y	N	1953
		Tank T7 (1)	Nitric Acid	6,000	Y	X	Q	SS 304L	Y	Y	N	1953
		Tank T8 (1)	Nitric Acid	6,000	Y	X	Q	SS 304L	Y	Y	N	1953
	48 (G-4)	Tank 3 (1)	Hydrofluoric Acid	1,000	Y	X	P	CS	Y	Y	N	1953
		Tank 4 (1)	Hydrofluoric Acid	1,000	Y	X	P	CS	Y	Y	N	1953
	50 (G-4)	T-19X-3100	Anhydrous HF	20,019	Y	D	Q	CS	Y	Y	N	1986
		T-19X-3000	Anhydrous HF	20,019	Y	D	Q	CS	Y	Y	N	1986

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Appendix D-2 Storage Tanks (40 CFR Part 112 Tanks)

Building Number	Locator++ File Number	Identification Number	Service	Tank Capacity (Gallons)	RQ	Level Control	Evaluation Of Tank Construction	Tank Material	Inventory Control	Tank Visual Inspection	Heating Coil	Year Of Installation
Plant 2/3	5 (G-6)	Tank 5A (1)	Kerosene-TBP Mix	2,615	Y	X	Q	SS 304L	Y	Y	N	1955
		Tank 5B (1)	Kerosene-TBP Mix	2,594	Y	X	Q	SS 304L	Y	Y	N	1955
	6 (G-6)	Tank 17A	Kerosene-TBP Mix	2,500	Y	X	Q	SS 304	Y	Y	N	1951
		Tank 17B	Kerosene-TBP Mix	2,500	Y	X	Q	SS 304	Y	Y	N	1951
		Tank 17C	Kerosene-TBP Mix	1,050	Y	X	Q	SS 304	Y	Y	N	1951
	17 (G-6)	Tank F2E-502	Kerosene	4,000	Y	F/H/C	Q	SS 304L	Y	Y	N	1955
		Tank F1-512	Kerosene-TBP Mix	25,600	Y	C/H	Q	SS 347	Y	Y	N	1953
	27 (G-3)	Tank F3E-406	Oil	6,000	Y	H	Q	SS 304L	Y	Y	N	1951
Plant 9 Special Products	25 (G-11)	Rapid Bore Facility-NE	Cutting Oil	3,000	Y	X	Q	CS	Y	Y	N	1963
Main Electricial Substation	37A (G-14)	Number 1 Transformer	Transformer (Oil Cooled)	8,360	Y	X	Q	CS	NA	Y	N	1952
		NO. 1 Circuit Breaker	Circuit Breaker (Oil Cooled)	2,400	Y	X	Q	CS	NA	Y	N	1952
	37B (G-14)	Number 2 Transformer	Transformer (Oil Cooled)	8,360	Y	X	Q	CS	NA	Y	N	1952
		NO. 2 Circuit Breaker	Circuit Breaker (Oil Cooled)	2,400	Y	X	Q	CS	NA	Y	N	1952
	37C (G-14)	Number 3 Transformer	Transformer (Oil Cooled)	8,360	Y	X	Q	CS	NA	Y	N	1955
		NO. 3 Circuit Breaker	Circuit Breaker (Oil Cooled)	2,400	Y	X	Q	CS	NA	Y	N	1952
Maintenance Shops	31A (G-10)	Portable Tank	Diesel Fuel	565	Y	X	Q	CS	Y	Y	N	1955
Garage	30A (G-13)	Tank (1)	Gasoline	500	Y	X	Q	CS	Y	Y	N	1976
	30B (G-13)	Tank (1)	Gasoline	500	Y	X	Q	CS	Y	Y	N	1976
	30C (G-13)	Tank (1)	Gasoline	140	Y	X	Q	CS	Y	Y	N	1976
	30D (G-13)	Tank (1)	Diesel Fuel	140	Y	X	Q	CS	Y	Y	N	1976
	30E (G-13)	Tank (1)	Gasoline	500	Y	X	Q	CS	Y	Y	N	1976
	30F (G-13)	Tank (1)	Diesel Fuel	500	Y	X	Q	CS	Y	Y	N	1976

Appendix D-2 Storage Tanks (40 CFR Part 112 Tanks)

Building Number	Locator++ File Number	Identification Number	Service	Tank Capacity (Gallons)	RQ	Level Control	Evaluation Of Tank Construction	Tank Material	Inventory Control	Tank Visual	Heating Coil	Year Of Installation
Pilot Plant	53 (G-4)	Tank (1)	NO. 2 Fuel Oil	550	Y	X	Q	CS	Y	Y	N	1976
Admin. Building	46 N/A	Tank (1)	NO. 2 Fuel Oil	275	Y	X	Q	CS	Y	Y	N	1986
OS&H Building	49 N/A	Tank (1)	NO. 2 Fuel Oil	275	Y	X	Q	CS	Y	Y	N	1989
North Of Plant 1 Pad	52 (G-1)	Tank 1 (1)	Gasoline	550	Y	X	Q	CS	Y	Y	N	1982
		Tank 2 (1)	Gasoline	300	Y	X	Q	CS	Y	Y	N	1982

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Appendix D-3 Underground Storage Tanks

Building Number	Locator++ File Number	Identification Number	Service	Tank Capacity (Gallons)	RQ	Evaluation Of Tank Construction	Tank Material	Inventory Control	Corrosion Protection Inspection	Year Of Installation
Plant 6 Metals Fabrication	59 (G-12)	Tank 14 (1)	Soluble Oil	3,000	Y	Q	CS	N	NA*	1964
Garage	30 (G-13)	Tank 5 (1)	Waste Oil	200	Y	Q	CS	N	NA	1954
Heavy Equipment Building	30 (G-13)	Tank 17	Waste Oil	200	Y	Q	CS	N	NA	1954

* To be abandoned-in-place

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APPENDIX D-4 Oil And PCB Container Storage

Building Number	Locator++ File Number	Identification Number	Service	Container Capacity (Gallons)	RQ	Evaluation Of Tank Construction	Tank Material	Tank Visual Inspection	Age Of Container (Years)
Maintenance Shops	41 (G-10)	Drums	Oil Storage Area	55	Y	Q	CS	Y	NA
Building 81	56(G-11)	Drums	PCB Contaminated Transformer Oil	55	Y	Q	CS	Y	NA

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APPENDIX E

ANALYSIS OF SECONDARY CONTAINMENTS

Appendix E

NOTATION: + + Locate tanks according to Locator File Numbers shown on Figure 2-3
* Analysis of secondary containment area performed by A. M. Kinney on July 29, 1988

Destination Of Water From Diked Area:
A = Gravity drain to storm sewer is manually closed and sealed at all times except when stormwater is being drained (after analysis if acceptable).
B = Water is pumped automatically by a sump pump to an FMPC Treatment Facility without analysis.
C = Water is pumped by a manually operated sump pump to an FEMP Treatment Facility.
D = Water is pumped to the storm sewer system by a portable pump after analysis if acceptable or to an FEMP Treatment Facility after analysis if not acceptable.
E = Water is pumped by a portable pump to 55 gallon drums to be handled as a hazardous waste.
F = Water flows directly to the storm sewer system due to no secondary containment system.
G = Water flows by a gravity drain to a sump and is handled similar to B above.
X = Gravity drain to storm sewer is not closed and sealed at all times. Intent is to manually close the drain in the event of a spill.

Capped or Blanked-Flanged - is the terminal connection for the loading and unloading station capped or blank-flanged when not in use:
I = Unloading and loading station terminal connection is blank-flanged when not in use
J = Unloading and loading station terminal connection is capped when not in use
X = Neither

Interlocked Warning Light - a warning light is present to prevent vehicular departure before complete disconnect of flexible or fixed transfer hose:
Y = Yes
N = No
Visual Tanker Inspection - is there a visual inspection of tanker and transfer line before vehicular departure:
Y = Yes
N = No

General Abbreviations:
SC = Secondary Containment
Ft^2 = Square Feet
NA = Not Applicable
* = Containment Systems (all containment systems are concrete except for those areas that also have a stainless steel liner or the secondary containment is a steel tank)
(G-1) = Is the corresponding Grid Plate Number in Appendix F associated with this Locator File Number

APPENDIX E-1 -Storage Tanks (CWA Hazardous Substance Tanks)

Building Number	Locator ++ File Number	Capacity of Largest Tank	Surface of Diked Area	Number of Containers	Required Containment Capacity	Diked Area Containment Capacity	Sufficient Capacity	Destination of Water From Diked Area	Tanks Containment System
Plant 2/3 Refinery	1 (G-5)	60,000 gal	2,343 Ft^2	4	67,303 gal	76,831 gal	Y	B	Controlled, diked
	2 (G-5)	1,100 gal	90 Ft^2	1	1,381 gal	1,378 gal	Y	D	Controlled, diked
	3* (G-3)	30,500 gal	2,268 Ft^2	3	37,509 gal	32,226 gal	N	B	Controlled, diked
	4* (G-6)	25,265 gal	2,368 Ft^2	6	32,645 gal	31,658 gal	N	B	Controlled, diked
	7 (G-2)	25,500 gal	3,071 Ft^2	4	35,071 gal	35,769 gal	Y	B	Controlled, diked
	17 (G-6)	25,600 gal	796 Ft^2	3	28,080 gal	32,543 gal	Y	B	Controlled, diked
	26* (G-5)	7,775 gal	7,345 Ft^2	9	30,617 gal	41,376 gal	Y	B	Controlled, diked
	27* (G-3)	25,000 gal	5,684 Ft^2	15	42,716 gal	26,068 gal	N	B	Controlled, diked
BDN	28* (G-3)	4,200 gal	605 Ft^2	3	4,200 gal	5,156 gal	Y	B	Controlled, diked
Plant 5 Metals Production	29 (G-9)	2,600 gal	110 Ft^2	1	2,943 gal	2,408 gal	N	X	Controlled, diked
Plant 6 Metals Fabrication	13 (G-14)	995 gal	72 Ft^2	1	1,219 gal	991 gal	N	A/D	Controlled, diked
	19 (G-12)	1,175 gal	118 Ft^2	2	1,543 gal	1,217 gal	N	D	Controlled, diked with steel liner
	43 (G-12)	3,380 gal	144 Ft^2	1	3,829 gal	3,199 gal	N	D	Controlled, diked
Plant 8 Recovery Plant	8 (G-5)	17,000 gal	3,097 Ft^2	3	26,654 gal	24,750 gal	N	B	Controlled,dike
Plant 9 Special Products	20A (G-11)	5,000 gal	528 Ft^2	2	6,646 gal	7,947 gal	Y	D	Controlled,diked
	21 (G-11)	1,000 gal	145 Ft^2	2	1,451 gal	1,372 gal	N	A/D	Controlled, diked
	23 (G-11)	2,300 gal	130 Ft^2	1	2,706 gal	1,900 gal	N	B	Controlled, diked with steel liner
	24 (G-11)	1,100 gal	100 Ft^2	1	1,412 gal	1,973 gal	Y	A/D	Controlled, diked
	44 (G-11)	575 gal	83 Ft^2	1	651 gal	757 gal	Y	A/D	Controlled, diked
Refinery Sump	36 (G-5)	26,550 gal	2,633 Ft^2	6	34,758 gal	6,019 gal	N	B	Controlled, diked
General Sump	33B (G-5)	56,000 gal	5,591 Ft^2	8	73,426 gal	12,307 gal	N	B	Controlled, diked
	33D (G-5)	16,800 gal	1,976 Ft^2	3	22,960 gal	5,444 gal	N	B	Controlled, diked
Water Treatment	12* (G-7)	1,275 gal	88 Ft^2	1	1,549 gal	1,272 gal	N	D	Controlled, diked

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APPENDIX E-1 -Storage Tanks (CWA Hazardous Substance Tanks)

Building Number	Locator ++ File Number	Capacity of Largest Tank	Surface of Diked Area	Number of Containers	Required Containment Capacity	Diked Area Containment Capacity	Sufficient Capacity	Destination of Water from Diked Area	Tanks Containment System
Pilot Plant	9 (G-4)	8,300 gal	261 Ft^2	1	9,113 gal	5,701 gal	N	A	Controlled, diked
	10A (G-4)	8,800 gal	663 Ft^2	2	10,866 gal	12,378 gal	Y	A	Controlled, diked
	10B (G-4)	2,200 gal	275 Ft^2	2	3,051 gal	3,923 gal	Y	A	Controlled, diked
	11* (G-4)	10,000 gal	1,186 Ft^2	5	13,698 gal	10,233 gal	N	A	Controlled, diked
	39A (G-4)	2,000 gal	324 Ft^2	1	3,009 gal	2,827 gal	N	G	Controlled, diked
	39B (G-4)	7,640 gal	324 Ft^2	1	8,649 gal	2,827 gal	N	G	Controlled, diked
	39C (G-4)	6,000 gal	669 Ft^2	2	8,085 gal	13,758 gal	Y	G	Controlled, diked
	39D (G-4)	6,000 gal	669 Ft^2	2	8,085 gal	13,758 gal	Y	G	Controlled, diked
	48 (G-4)	1,000 gal	170 Ft^2	2	1,530 gal	583 gal	N	B	Controlled, diked
	50 (G-4)	20,019 gal	2,003 Ft^2	2	26,263 gal	51,635 gal	Y	B	Controlled, diked

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APPENDIX E-2 - Storage Tanks (40 CFR Part 112 Tanks)

Building Number	Locator ++ File Number	Capacity of Largest Tank	Surface of Diked Area	Number of Containers	Required Containment Capacity	Diked Area Containment Capacity	Sufficient Capacity	Destination of Water From Diked Area	Tanks Containment System
Plant 2/3 Refinery	5 (G-6)	2,615 gal	837 Ft^2	2	5,225 gal	7,517 gal	Y	B	Controlled, diked
	6 (G-6)	2,500 gal	561 Ft^2	3	4,249 gal	4,313 gal	Y	B	Controlled, diked
	17 (G-6)	25,600 gal	796 Ft^2	3	28,080 gal	32,543 gal	Y	B	Controlled, diked
	27* (G-3)	25,000 gal	5,684 Ft^2	15	42,716 gal	26,068 gal	N	B	Controlled, diked
Plant 9 Special Products	25 (G-11)	3,000 gal	225 Ft^2	1	3,901 gal	4,029 gal	Y	A/D	Controlled, diked
Main Electrical Substation	37A (G-14)	8,360 gal	613 Ft^2	1	10,270 gal	11,458 gal	Y	X	Uncontrolled, diked
	37B (G-14)	8,360 gal	613 Ft^2	1	10,270 gal	11,458 gal	Y	X	Uncontrolled, diked
	37C (G-14)	8,360 gal	613 Ft^2	1	10,270 gal	11,458 gal	Y	X	Uncontrolled, diked
Maintenance Shops	31A (G-10)	565 gal	45 Ft^2	1	706 gal	452 gal	N	F	Controlled, diked
Garage	30A (G-13)	500 gal	44 Ft^2	1	638 gal	543 gal	N	X	Steel tank
	30B (G-13)	500 gal	44 Ft^2	1	638 gal	543 gal	N	X	Steel tank
	30C (G-13)	140 gal	27 Ft^2	1	226 gal	271 gal	Y	D	Steel tank
	30D (G-13)	140 gal	27 Ft^2	1	226 gal	271 gal	Y	D	Steel tank
	30E (G-13)	500 gal	59 Ft^2	1	684 gal	516 gal	N	D	Controlled, diked
	30F (G-13)	500 gal	44 Ft^2	1	638 gal	543 gal	N	X	Steel tank
Pilot Plant	53 (G-4)	550 gal	38 Ft^2	1	668 gal	820 gal	Y	D	Steel tank
Administration Building	46 (N/A)	275 gal	59 Ft^2	1	460 gal	195 gal	N	D	Controlled, diked
H&S Building	49 (N/A)	275 gal	44 Ft^2	1	460 gal	312 gal	N	D	Controlled, diked
North Of Plant 1 Pad	52 (G-1)	550 gal	168 Ft^2	2	1,074 gal	1,244 gal	Y	D	Controlled, diked

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Appendix E-3 Underground Storage Tanks

Building Number	Locator++ File Number	Capacity Of Container	Number Of Containers	Secondary Containment
Plant 6 Metals Fabrication	59 (G-14)	3,000 gal *	1	None
Garage	30 (G-13)			
Heavy Equipment Building	30 (G-13)	200 gal	1	None

* To be abandoned-in-place

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Appendix E-4 Loading And Unloading Facilities

Building Number	Locator++ File Number	Capacity Of Largest Tanker	Surface Area Of SC Areas	Capped Or Blank-Flanged	Required Containment Capacity	Diked Area Containment Capacity	Sufficient Capacity	Destination Of Water From SC Area	Containment System	Interlocked Warning Light	Visual Tanker Inspec.
North Of Plant 1 Pad	100 (G-1)	550 gal	None	X	? gal	0 gal	N	F	None	N	Y
Plant 2/3 Refinery	101 (G-6)	4,000 gal	258 Ft^2	X	4,804 gal	966 gal	N	B	Controlled, diked pad	N	Y
	109 (G-5)	3,000 gal	None	X	? gal	0 gal	N	F	None	N	Y
Plant 8 Recovery Plant	103 (G-5)	19,000 gal	None	X	? gal	0 gal	N	F	None	N	Y
Tank Farm	104 (G-8)	19,000 gal	2,000 Ft^2	I	25,233 gal	51,635 gal	Y	B	Controlled, diked	N	Y
Water Plant	105 (G-7)	3,000 gal	None	X	? gal	0 gal	N	F	None	N	Y
Garage	106 (G-13)	9,000 gal	None	X	? gal	0 gal	N	F	None	N	Y
Pilot Plant	107 (G-4)	5,000 gal	2,000 Ft^2	I	11,233 gal	54,900 gal	Y	B	Controlled, diked pad	N	Y
Receiving And Incoming Materials Warehouse	108 (G-15)	15,840 gal	1,720 Ft^2	NA	21,201 gal	51,462 gal	Y	X	Controlled, diked pad	NA	Y
Plant 6 Metals Fabrication	110 (G-12)	4,000 gal	315 Ft^2	X	6,509 gal	8,906 gal	Y	B	Controlled, diked pad	N	Y
BDN Facility	102 (G-3)	3,000 gal	None	X	? gal	0 gal	N	F	None	N	Y

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Appendix E-5 OIL And PCB Container Storage

Building Number	Locator++ File Number	Capacity Of Largest Container	Number Of Containers	Capacity Of 10% Of All Containers	Required Containment Capacity	Diked Area Containment Capacity	Sufficient Capacity	Destination Of Water From Diked Area	Containment System
Maintenance Shops	41 (G-10)	55 gal	9	50 gal	55 gal	0 gal	N	F	Controlled, diked
Building 81	56 (G11)	55 gal	48	264 gal	264 gal	335 gal	Y	D	Controlled, diked
Building 79	56 N/A	55 gal	1800	1900 gal	1900 gal	48,581 gal	Y	D	Controlled, diked

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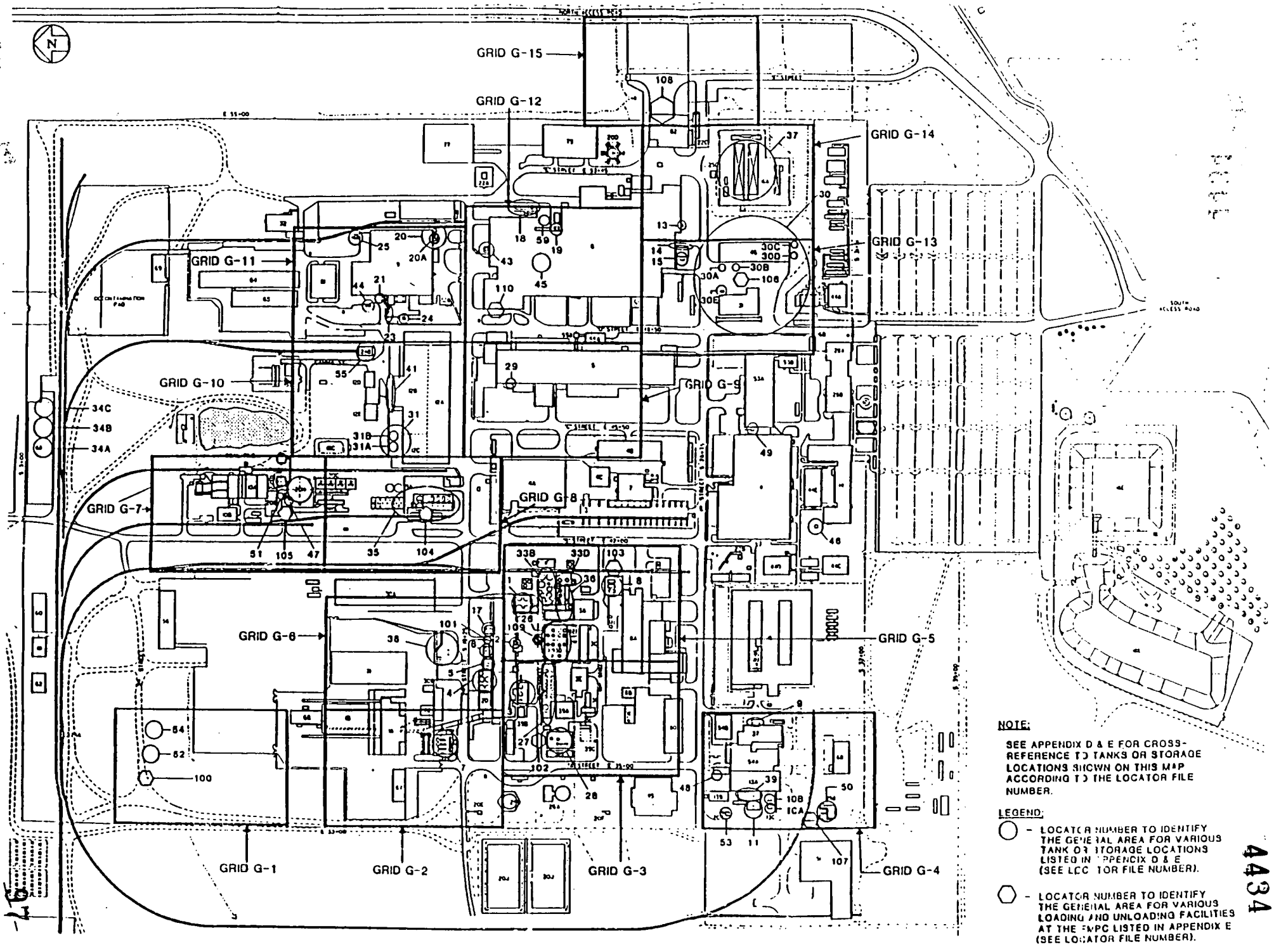
APPENDIX F

GRID PLATES



FMPC STORAGE TANK LOCATIONS AND SPCC MASTER GRID

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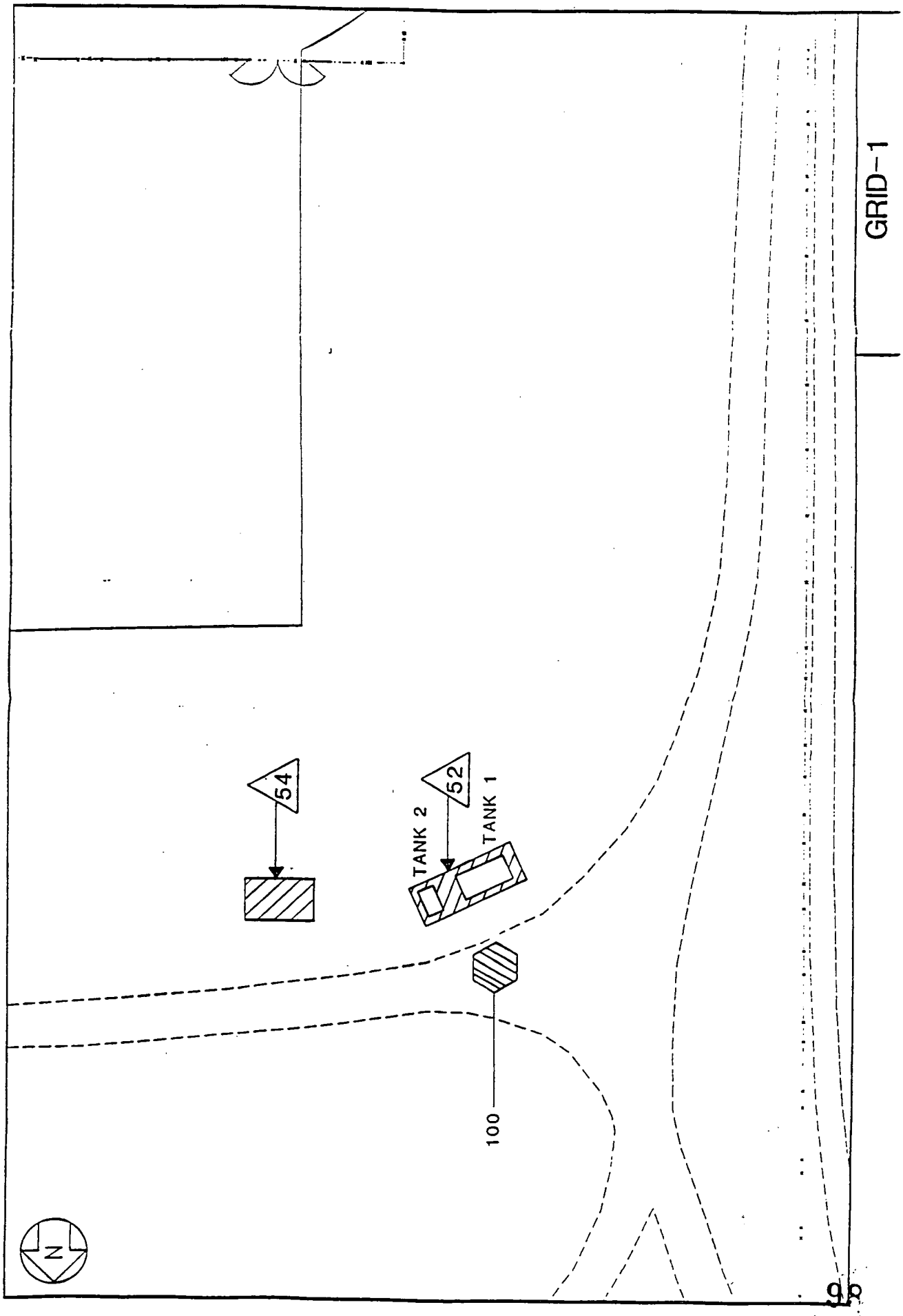
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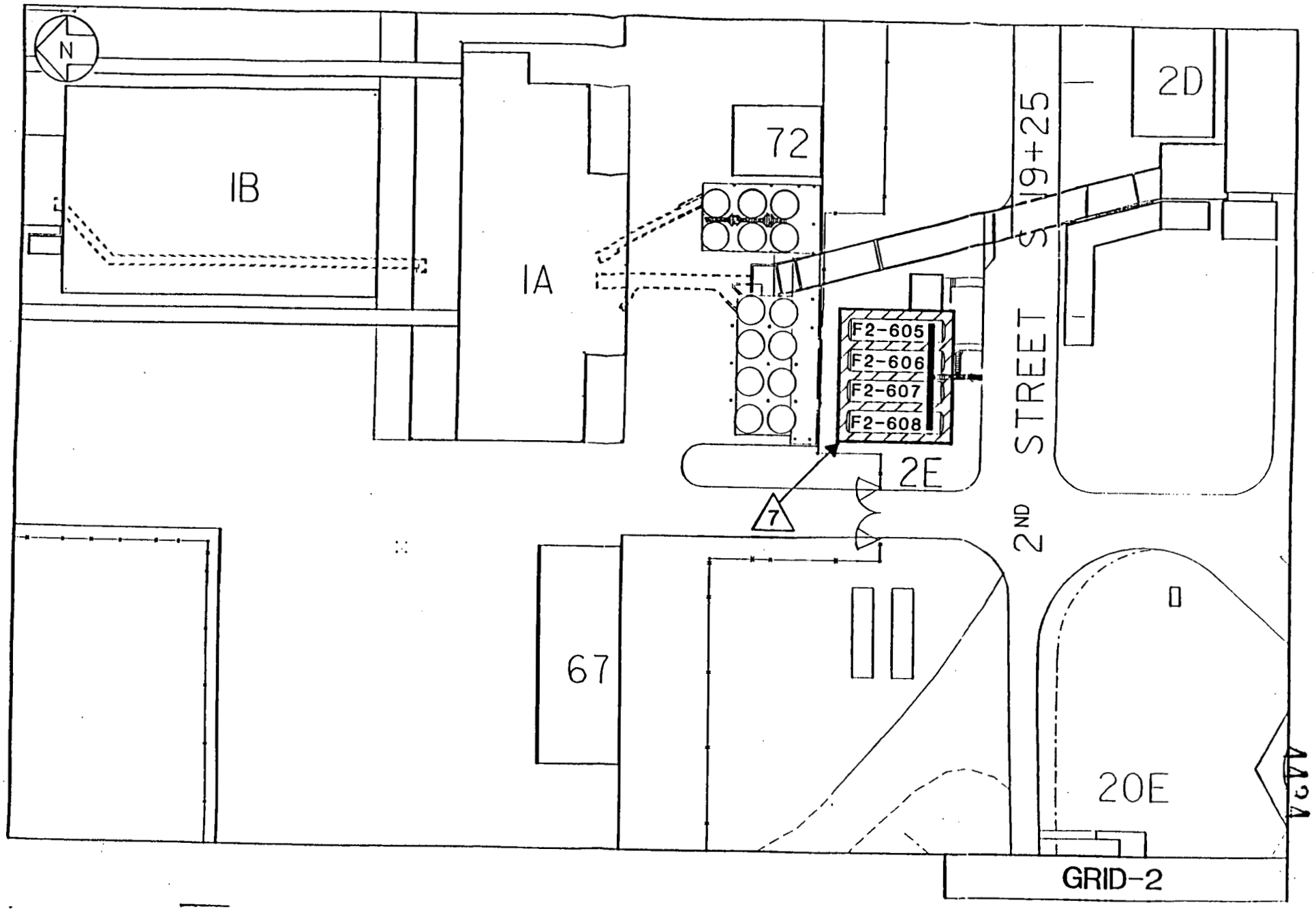
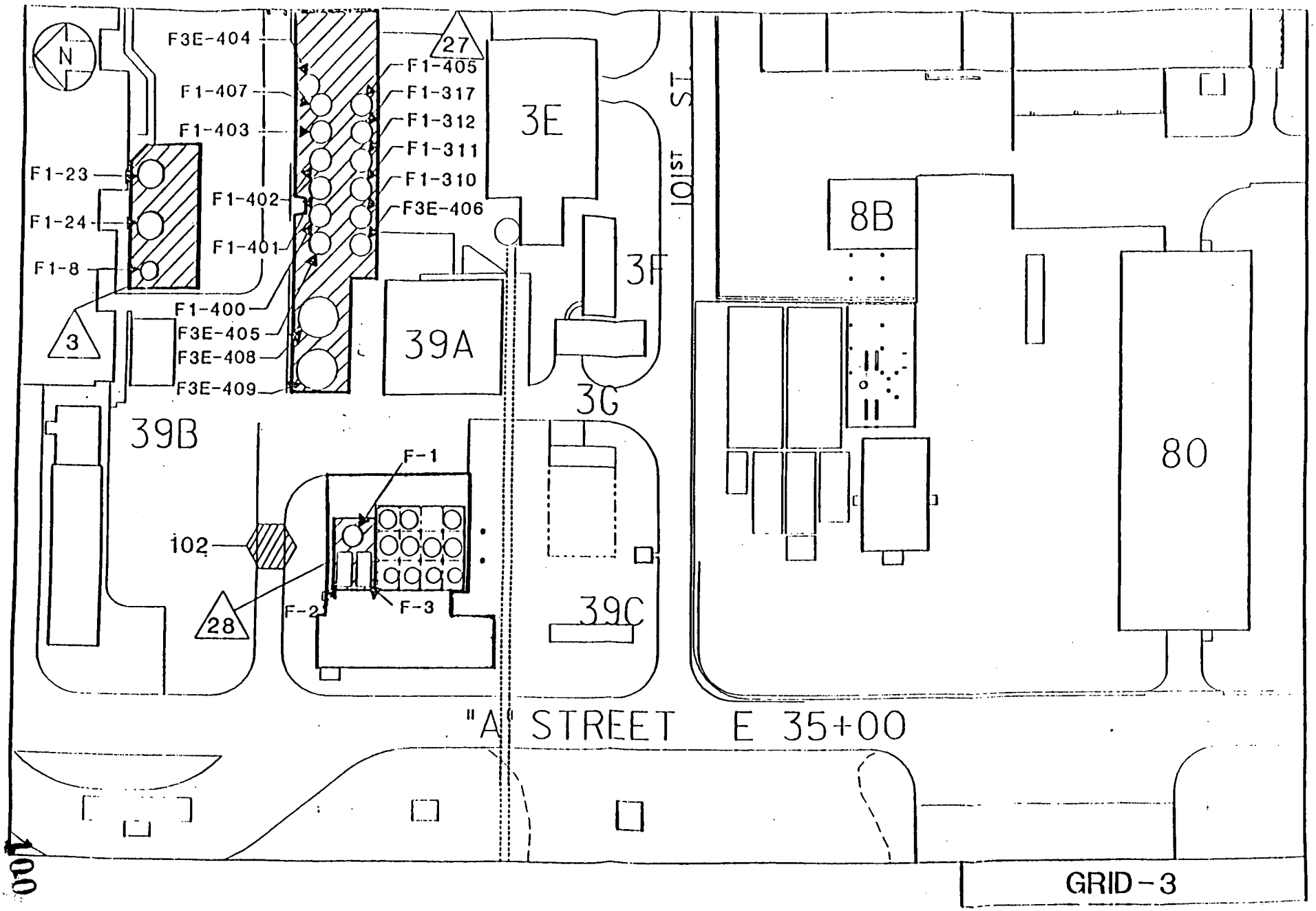
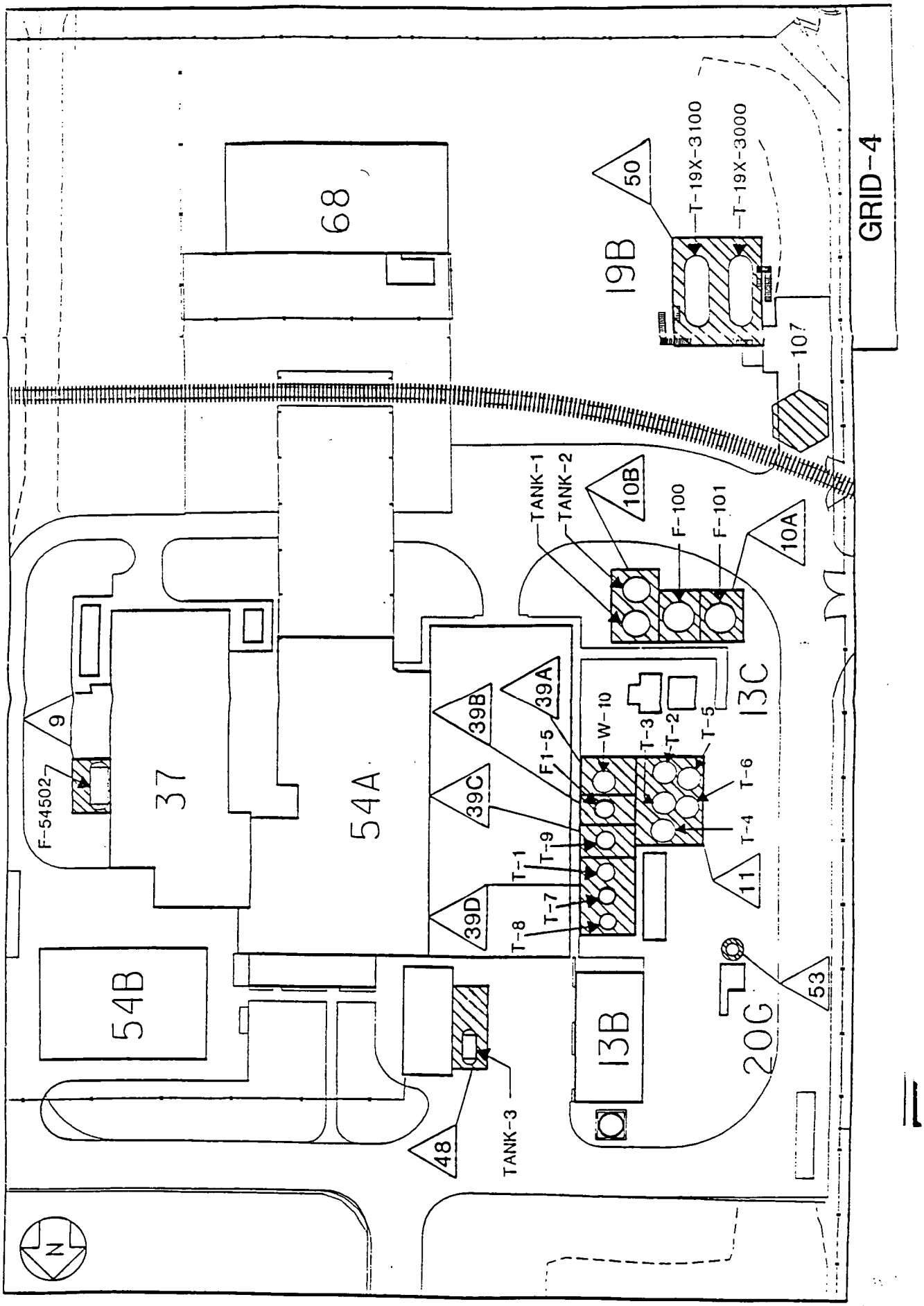
54
52
TANK 2
TANK 1
100
N


N
IB
IA
72
67
2D
2E
20E
19+25
STREET
2ND
F2-605
F2-606
F2-607
F2-608
7
GRID-2

F-3


N
F3E-404
F1-407
F1-403
F1-23
F1-24
F1-8
F1-402
F1-401
F1-400
F3E-405
F3E-408
F3E-409
27
F1-405
F1-317
F1-312
F1-311
F1-310
F3E-406
3
3E
3F
3G
39A
39B
39C
8B
80
101ST ST
F-1
F-2
F-3
102
28
"A" STREET E 35+00
GRID-3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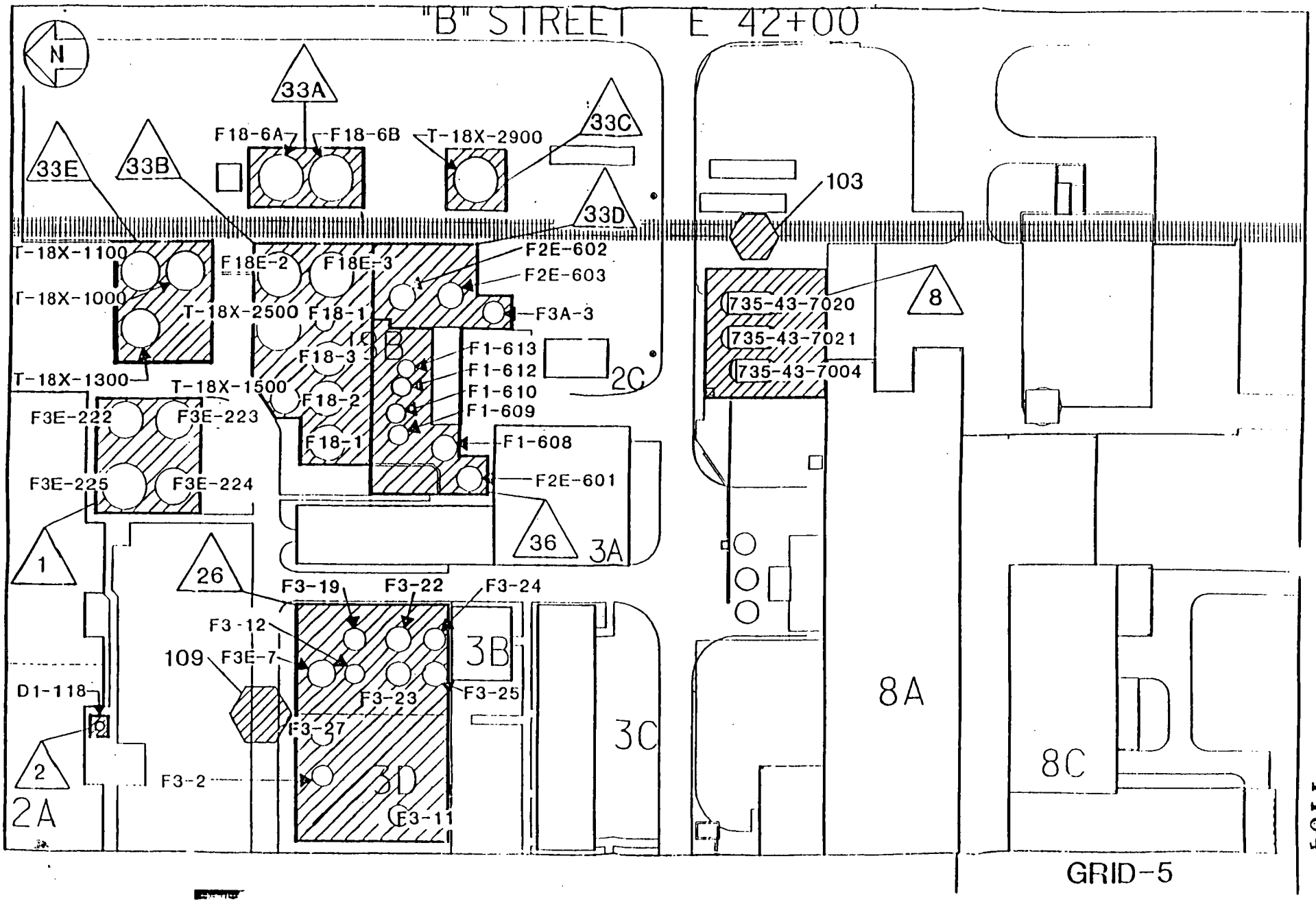
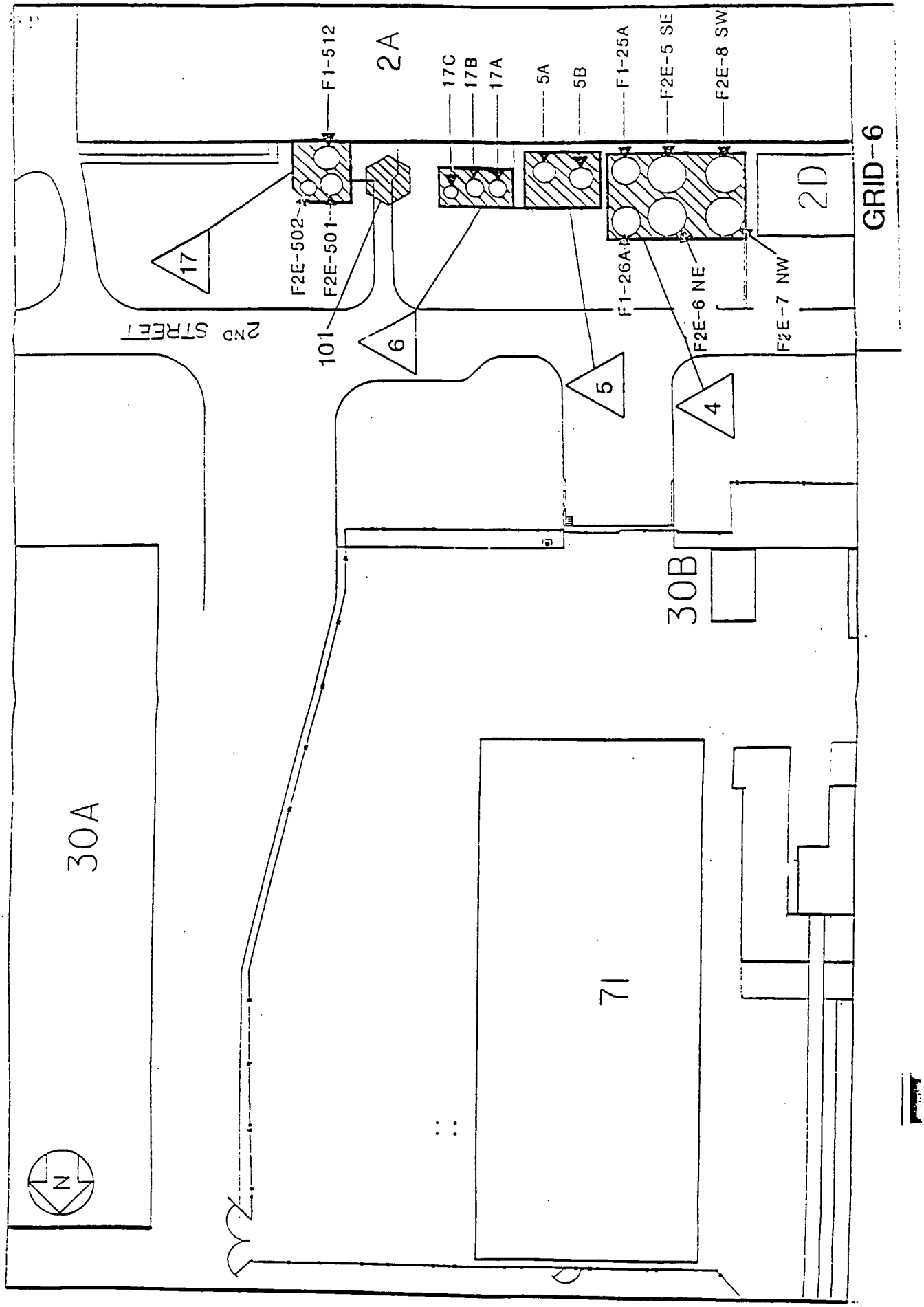
68
19B
50
T-19X-3100
T-19X-3000
107
TANK-1
TANK-2
10B
F-100
F-101
10A
13C
W-10
T-3
T-2
T-5
T-6
T-4
11
F1-5
39A
39B
39C
39D
T-9
T-1
T-7
T-8
9
F-54502
37
54A
54B
13B
20C
53
48
TANK-3
N


"B" STREET E 42+00
N
33A
33B
33C
33D
33E
F18-6A
F18-6B
T-18X-2900
103
T-18X-1100
T-18X-1000
T-18X-2500
F18E-2
F18E-3
F18-1
F18-3
F18-2
F18-1
F2E-602
F2E-603
F3A-3
F1-613
F1-612
F1-610
F1-609
F1-608
F2E-601
2C
735-43-7020
735-43-7021
735-43-7004
8
T-18X-1300
T-18X-1500
F3E-222
F3E-223
F3E-225
F3E-224
36
3A
1
26
F3-19
F3-22
F3-24
F3-12
109
F3E-7
3B
D1-118
F3-23
F3-25
F3-27
3C
8A
2
F3-2
3D
E3-11
2A
8C
GRID-5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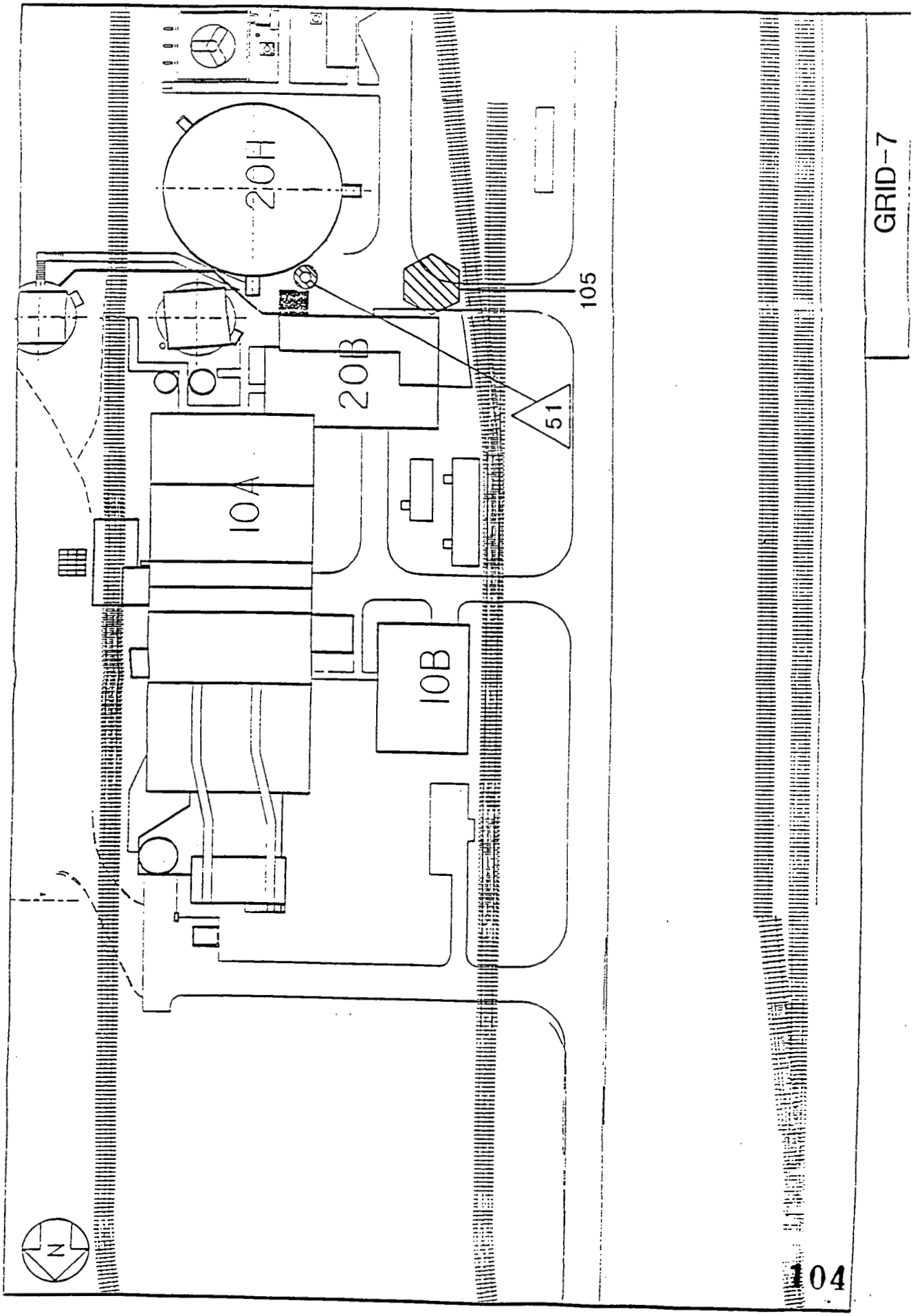
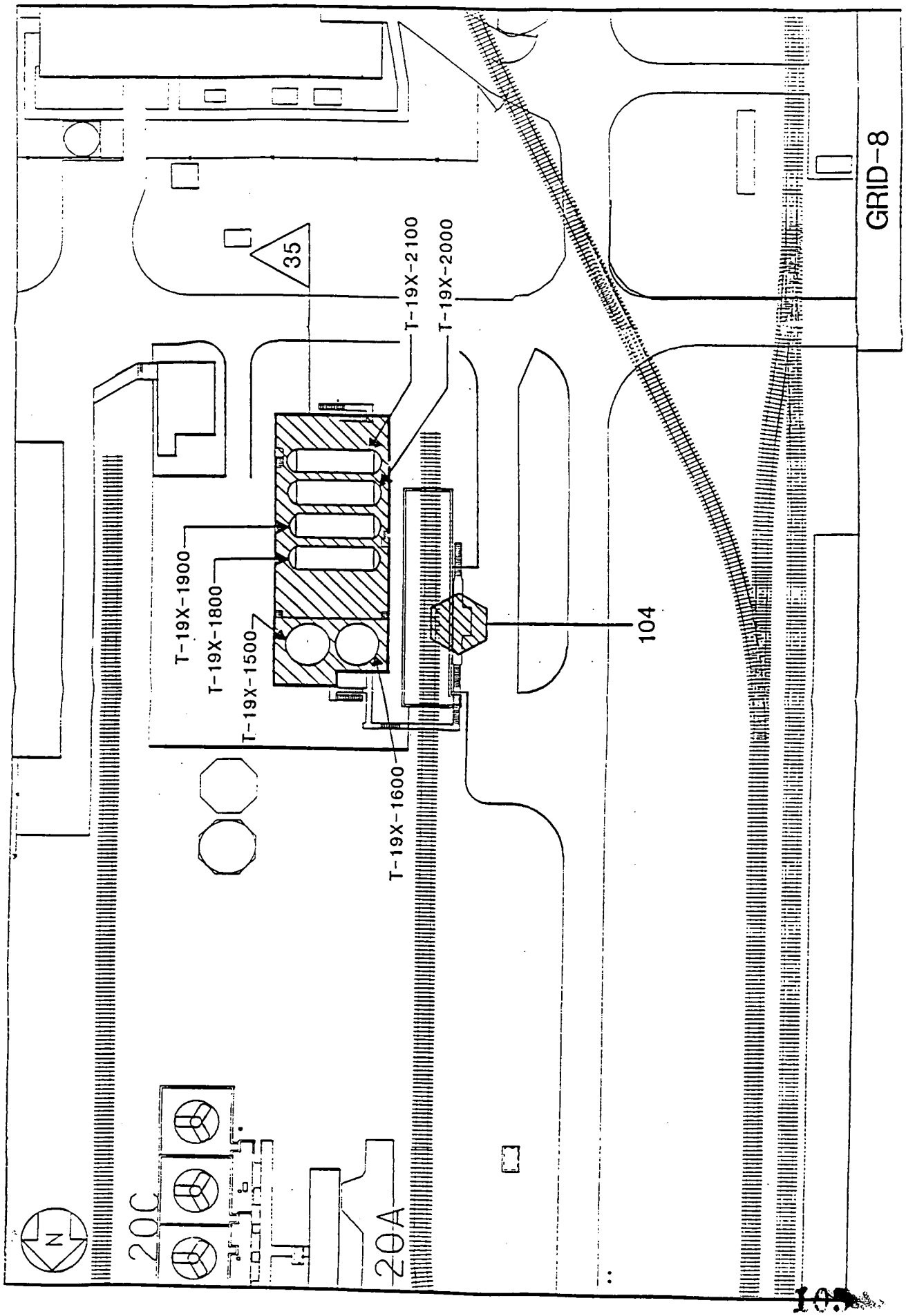
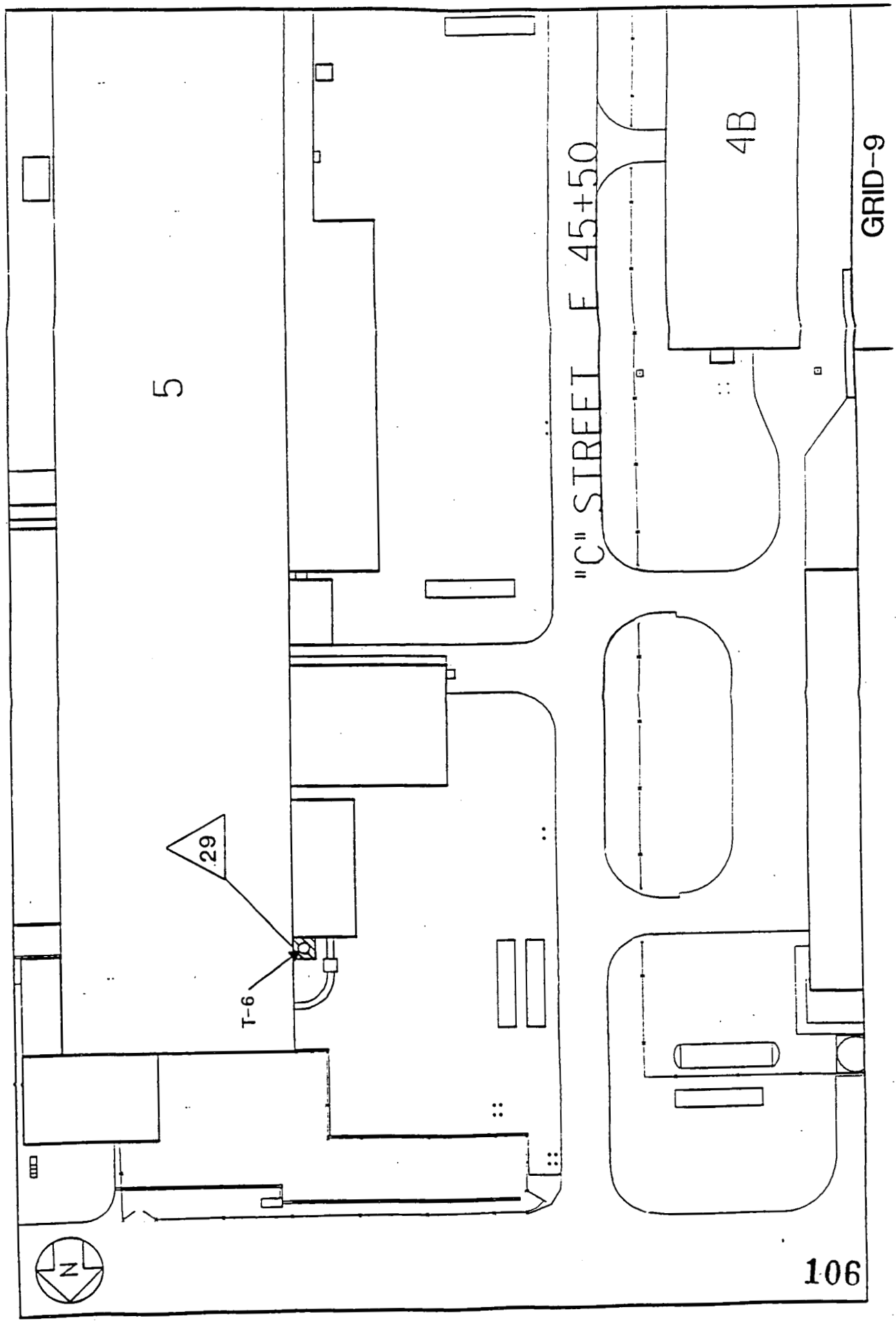
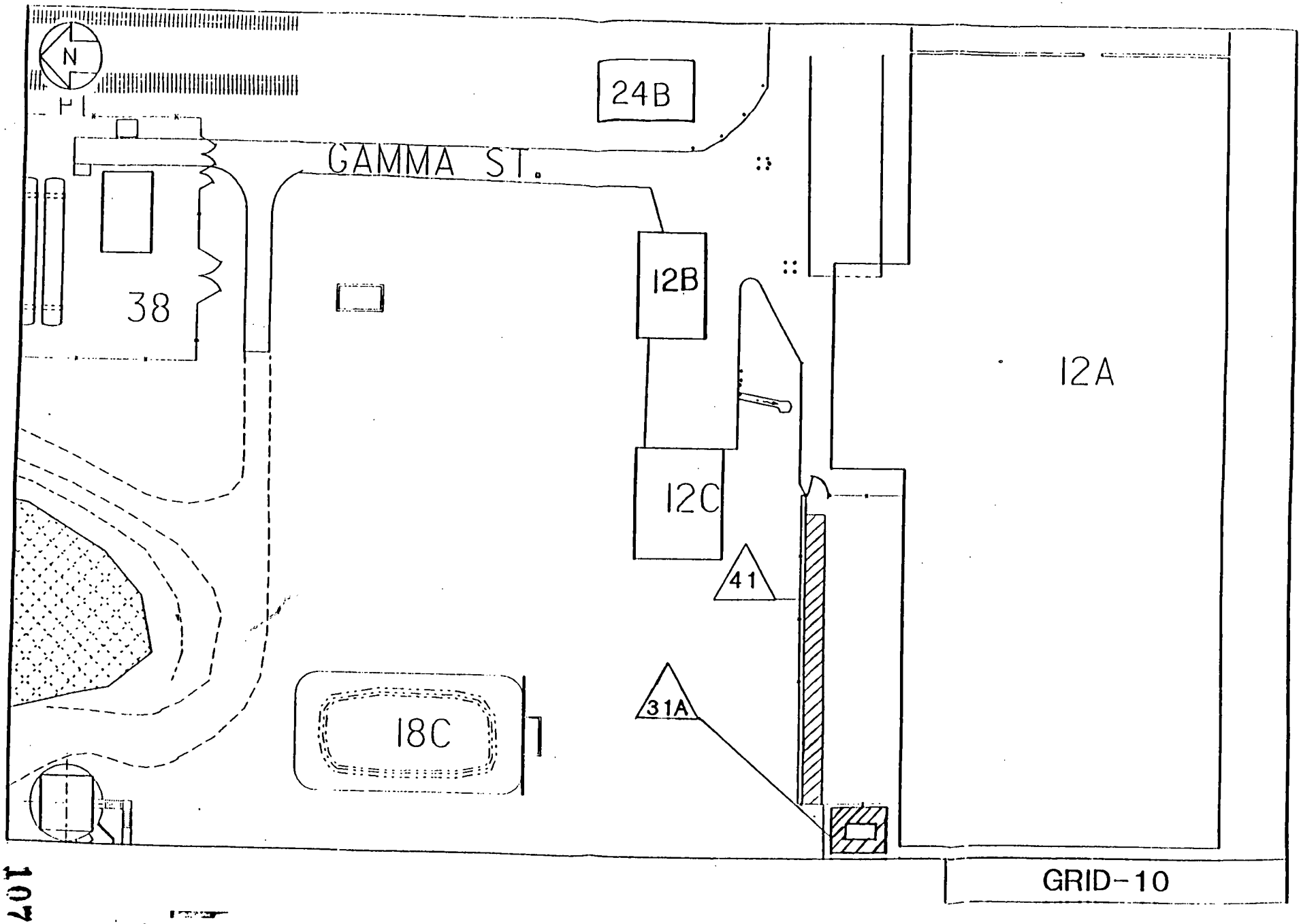
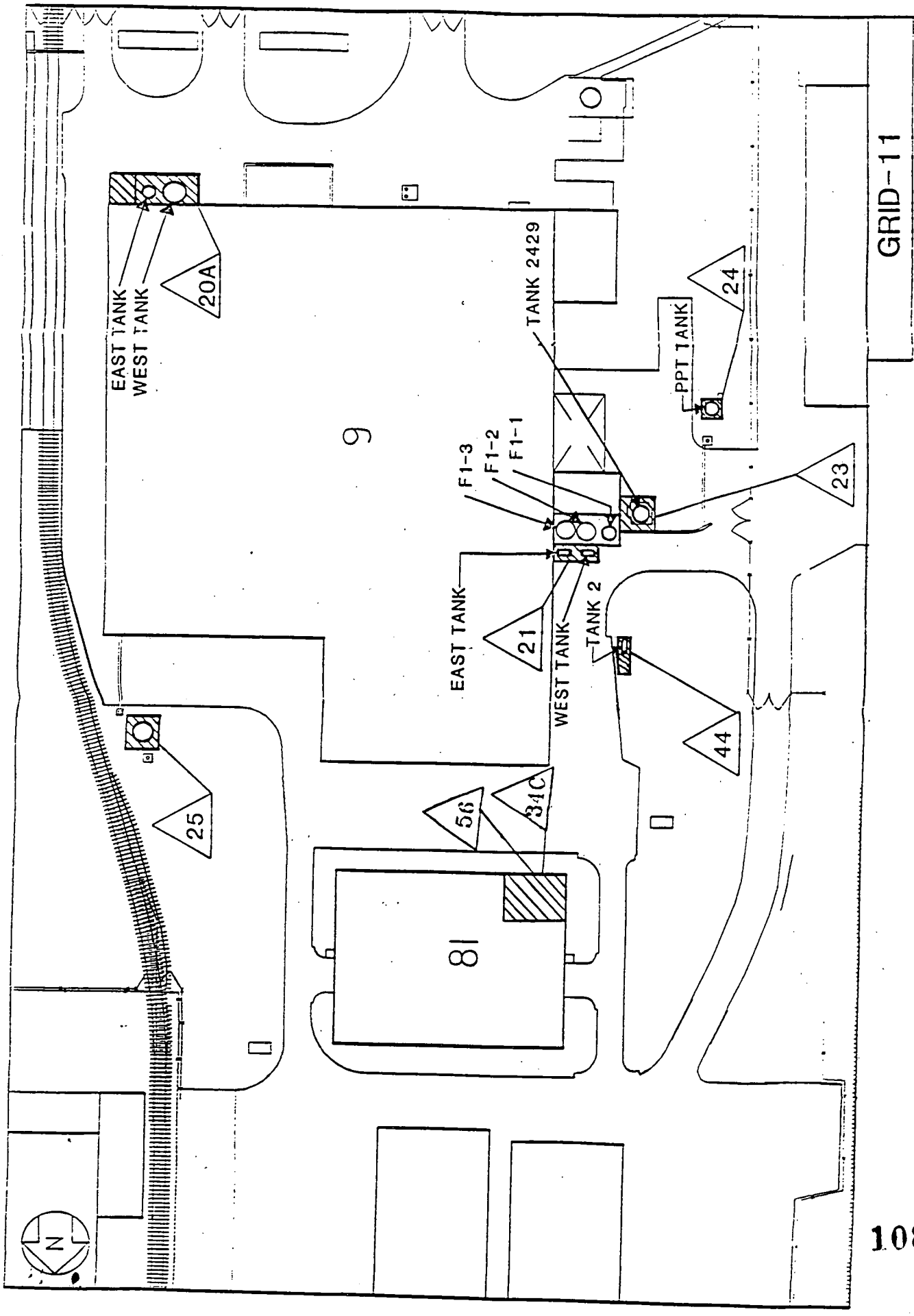
2A
17C
17B
17A
5A
5B
F1-25A
F2E-5 SE
F2E-8 SW
GRID-6
2D
17
F2E-502
F2E-501
101
6
5
4
F1-26A
F2E-6 NE
F2E-7 NW
2ND STREET
30B
30A
71
N

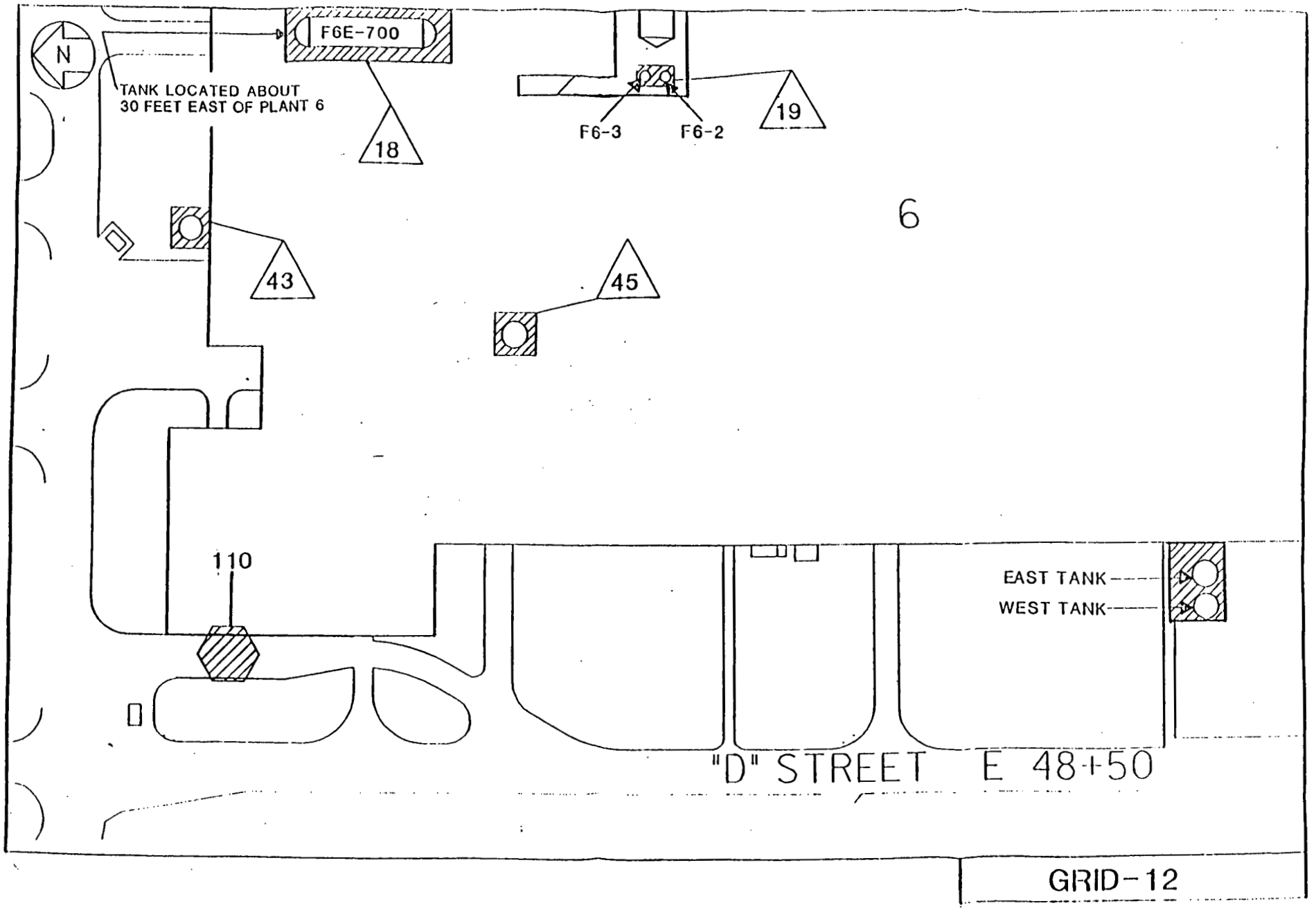

20H
20B
10A
10B
105
51
N
GRID-7

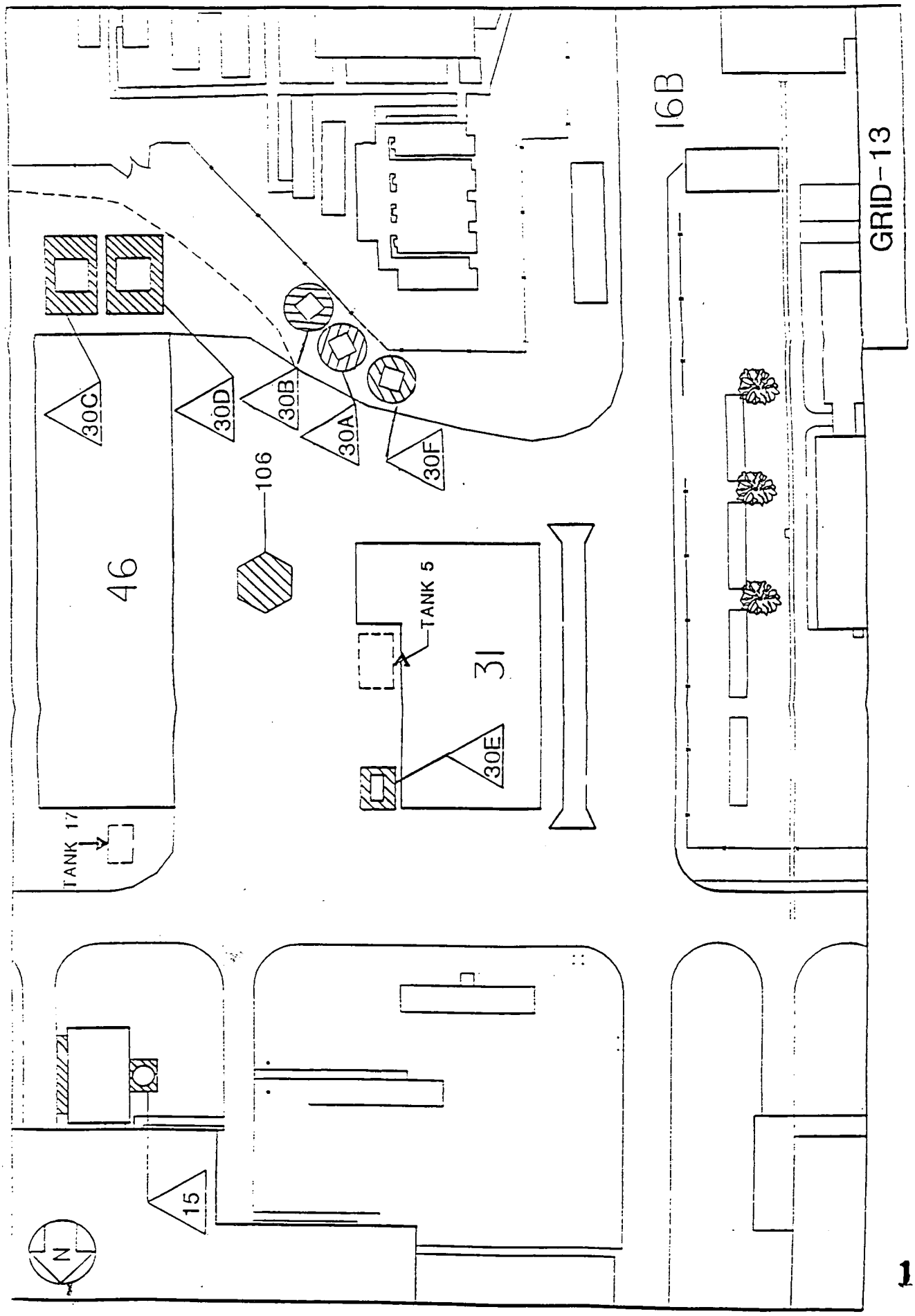

GRID-8
35
T-19X-2100
T-19X-2000
T-19X-1900
T-19X-1800
T-19X-1500
T-19X-1600
104
20C
20A
N


5
"C" STREET F 45+50
4B
GRID-9
29
T-6
N
106


N
24B
GAMMA ST.
38
12B
12A
12C
41
31A
18C
GRID-10


GRID-11
EAST TANK
WEST TANK
20A
TANK 2429
24
PPT TANK
9
F1-3
F1-2
F1-1
23
EAST TANK
21
WEST TANK
TANK 2
44
25
56
34C
18
N


N
F6E-700
TANK LOCATED ABOUT
30 FEET EAST OF PLANT 6
18
F6-3
F6-2
19
6
43
45
110
EAST TANK
WEST TANK
"D" STREET E 48+50
GRID-12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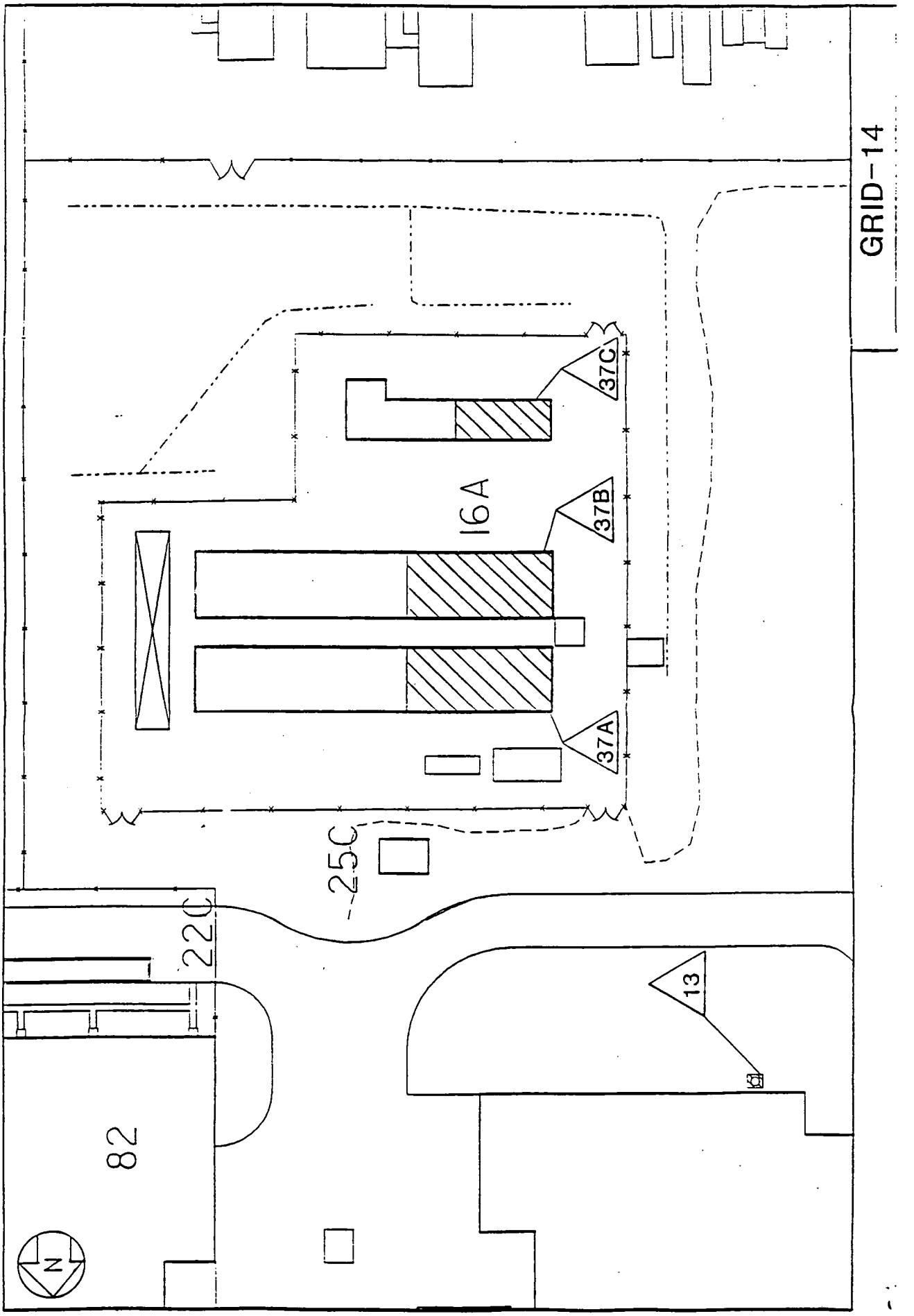
16B
30C
30D
30B
30A
30F
106
46
TANK 5
31
30E
TANK 17
15
N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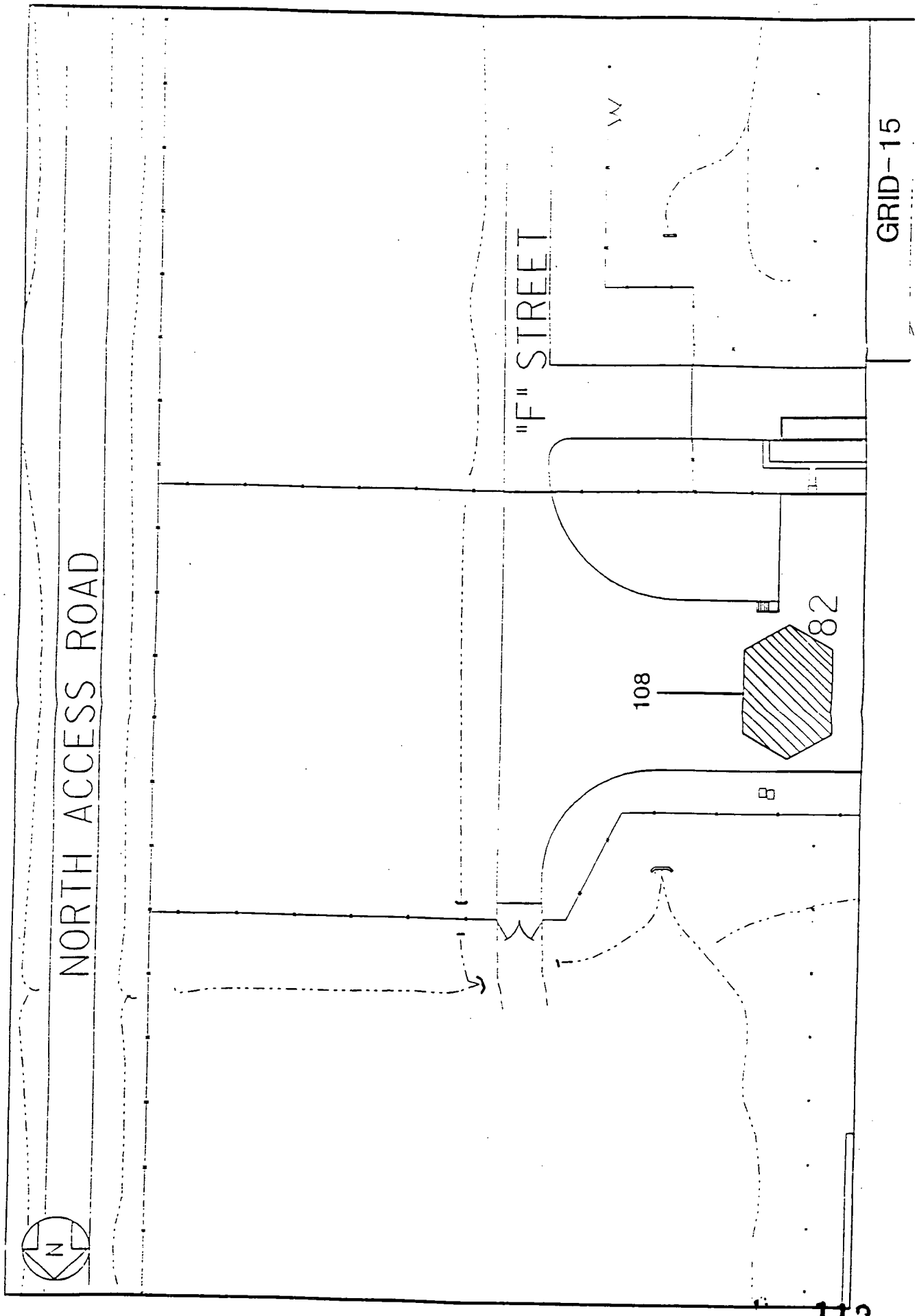
37C
16A
37B
37A
25C
22C
13
82
N


NORTH ACCESS ROAD
"F" STREET
GRID-15
108
82
8
N

APPENDIX G

TRAVEL TIME ESTIMATES
(Hydraulic Calculations)

APPENDIX G
TRAVEL TIME ESTIMATES

GENERAL:

Pipe flow calculations are based on Manning's Equation for pipes flowing full (Daugherty, 1977), and for partial flow conditions (SCS-NEH, 1972).

Manning's Equation for full flow conditions:

$$Q = (1.49/n)AR_h^{2/3}S^{1/2}$$

Where: Q = flow in cubic feet per second
A = cross sectional area (ft^2)
D = diameter (ft)
R_h = hydraulic radius (ft)
= area/wetted perimeter = D/4
S = hydraulic gradient (ft/ft)
n = Manning's roughness coefficient

Notes:

(1) Manning's "n" roughness coefficient of 0.013 was used for concrete and cast iron pipes.

(2) The Travel Time in a section of pipe or reach is the length divided by the calculated velocity.

(3) The maximum pipe velocity occurs at approximately 83% total depth and is approximated by 110% full flow velocity. This maximum velocity was used to calculate high flow travel times.

From Manhole 10 to Manhole 34

(Col.1) Pipe Dia. (in.)	(Col.2) Dist. (ft.)	(Col.3) Slope (%)	(Col.4) Full Flow (cfs)	(Col.5) Full Vel. (fps)	(Col.6)* Part. Flow (cfs)	(Col.7) Part. Vel. (fps)
30	280	.35	24.33	4.96	24.33	4.96
30	200	.35	24.33	4.96	24.33	4.96
30	120	.35	24.33	4.96	24.33	4.96
48	270	.29	77.56	6.17	24.80	4.64
54	315	.30	108.00	6.79	24.80	4.61
54	210	.29	106.00	6.68	24.80	4.56

High flow travel time = Σ [Col.2/(1.10 X Col.5)]/60
= 3.68 minutes or 4 minutes

Low flow travel time = Σ (Col.2/Col.7)/60
= 4.89 minutes or 5 minutes

From Catch Basin 10 to Manhole 34

(Col.1) Pipe Dia. (in.)	(Col.2) Dist. (ft.)	(Col.3) Slope (%)	(Col.4) Full Flow (cfs)	(Col.5) Full Vel. (fps)	(Col.6)* Part. Flow (cfs)	(Col.7) Part. Vel. (fps)
12	120	1.00	3.57	4.55	3.57	4.55
30	200	0.35	24.33	4.96	4.04	3.02
30	120	0.35	24.33	4.96	4.04	3.02
48	270	0.29	77.56	6.17	4.04	2.49
54	315	0.30	108.00	6.79	4.04	2.42
54	210	0.29	106.00	6.68	4.04	4.56

High flow travel time = Σ [Col.2/(1.10 X Col.5)]/60
= 3.22 minutes or 3 minutes

Low flow travel time = Σ (Col.2/Col.7)/60
= 6.95 minutes or 7 minutes

From Catch Basin 25 to Manhole 34

(Col.1) Pipe Dia. (in.)	(Col.2) Dist. (ft.)	(Col.3) Slope (%)	(Col.4) Full Flow (cfs)	(Col.5) Full Vel. (fps)	(Col.6)* Part. Flow (cfs)	(Col.7) Part. Vel. (fps)
10	40	1.00	2.19	4.02	2.19	4.02
36	140	0.22	31.37	4.44	2.66	2.14
48	270	0.29	77.56	6.17	2.66	2.13
54	315	0.30	108.00	6.79	2.66	2.07
54	210	0.29	106.00	6.68	2.66	2.05

High flow travel time = Σ [Col.2/(1.10 X Col.5)]/60
= 2.47 minutes or 2 minutes

Low flow travel time = Σ (Col.2/Col.7)/60
= 6.64 minutes or 7 minutes

From Catch Basin 35 to Manhole 34

(Col.1) Pipe Dia. (in.)	(Col.2) Dist. (ft.)	(Col.3) Slope (%)	(Col.4) Full Flow (cfs)	(Col.5) Full Vel. (fps)	(Col.6)* Part. Flow (cfs)	(Col.7) Part. Vel. (fps)
10	20	1.00	2.19	4.02	2.19	4.02
24	120	0.45	15.21	4.84	2.66	3.01
24	385	0.78	20.03	6.38	2.66	3.60
30	100	0.35	24.33	4.96	2.66	2.62

High flow travel time = Σ [Col.2/(1.10 X Col.5)]/60
= 1.68 minutes or 2 minutes

Low flow travel time = Σ (Col.2/Col.7)/60
= 3.16 minutes or 3 minutes

From Catch Basin 82 to Manhole 34

(Col.1) Pipe Dia. (in.)	(Col.2) Dist. (ft.)	(Col.3) Slope (%)	(Col.4) Full Flow (cfs)	(Col.5) Full Vel. (fps)	(Col.6)* Part. Flow (cfs)	(Col.7) Part. Vel. (fps)
18	40	.90	9.99	5.65	9.99	5.65
36	130	.13	24.11	3.41	10.46	2.80
36	170	.21	30.64	4.34	10.46	3.32
36	60	.29	36.01	5.09	10.46	3.72
48	270	.29	77.56	6.17	10.46	3.51
54	315	.30	108.00	6.79	10.46	3.43
54	210	.29	106.00	6.68	10.46	3.40

High flow travel time = Σ [Col.2/(1.10 X Col.5)]/60
= 3.30 minutes or 3 minutes

Low flow travel time = Σ (Col.2/Col.7)/60
= 5.82 minutes or 6 minutes

From Catch Basin 100 to Manhole 34

(Col.1) Pipe Dia. (in.)	(Col.2) Dist. (ft.)	(Col.3) Slope (%)	(Col.4) Full Flow (cfs)	(Col.5) Full Vel. (fps)	(Col.6)* Part. Flow (cfs)	(Col.7) Part. Vel. (fps)
6	220	1.42	0.67	3.41	0.67	3.41
10	130	1.00	2.19	4.02	1.14	3.47
12	60	0.60	2.77	3.52	1.14	2.85
54	315	0.30	108.00	6.79	1.14	1.51
54	210	0.29	106.00	6.68	1.14	1.49

High flow travel time = Σ [Col.2/(1.10 X Col.5)]/60
= 2.91 minutes or 3 minutes

Low flow travel time = Σ (Col.2/Col.7)/60
= 7.88 minutes or 8 minutes

Flow from Manhole 34 to Manhole 175

See Section 5 for a description of low-flow and high-flow.

The pipe from MH 34 to MH 175 is 12 inch diameter and is approximately 2400 feet long.

Low Flow

500 gpm = 1.11 cfs
V = Q/A
V = 1.11 cfs/($\pi(1^2)/4$)
V = 1.41 fps

Pipe Length = 2400 feet

T_t = 2400 feet/1.41 fps/60 sec/min.
T_t = 28.4 minutes

High Flow

Q = 1000 gpm = 2.23 cfs
V = Q/A
V = 2.23/[$\pi(1^2)/4$]
V = 2.84 fps

Pipe Length = 2400 feet

T_t = 2400 feet/2.84 fps/60 sec/min.
T_t = 14.1 minutes

Flow from Manhole 175 to outfall Great Miami River

See Section 5 for a description of low-flow and high-flow.

The 16 inch outfall line from MH 175 to the Great Miami River is approximately 4150 feet long. It consists of several segments of different slopes. All segments would have different travel times and are calculated as such. Manning's equation, as previously identified, was utilized for full flow calculations and for partial flow conditions SCS-NEH, 1972.

Low Flow = 650 gpm = 1.45 cfs
High Flow = 1150 gpm = 2.56 cfs

Pipe Seg	Length** (feet)	Slope** (%)	Travel Time (min)				
			Full Flow (calculated)	Low Flow (1.45 cfs)		High Flow (2.56 cfs)	
				V (ft/sec)	t (min)	V (ft/sec)	t (min)
1)	528	1.00	7.69	3.53	2.49	4.24	2.07
2)	227	0.24	3.77	2.13	1.77	2.48	1.52
3)	255	6.44	19.52	6.64	0.64	7.83	0.54
4)	530	0.57	5.81	2.91	3.03	3.37	2.62
5)	278	1.29	8.74	3.82	1.21	4.57	1.01
6)	2328		5.44	2.77	14.01	3.20	12.13
Total	4146	N/A	N/A	N/A	23.15	N/A	19.89

The Total Travel Time from Manhole 34 to the Great Miami River is:

Low Flow : 28.4 + 23.15 = 51.55 minutes

High Flow : 14.1 + 19.89 = 33.99 minutes

*Column 6 partial flow is the peak flow the pipe receiving the spill could transport plus the average background flow added to the next pipe in the system that is large enough to carry the total flow. The average background flow of 0.47 cfs was obtained from NPDES monitoring data.

**The run and profile of the segments of the outfall from MH-175 to the Great Miami River are taken from FEMP drawing number 3025-H-51-A, "Profile of Outfall Sewer".

APPENDIX H

UPGRADE OF SECONDARY CONTAINMENT SYSTEMS

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UPGRADE OF SECONDARY CONTAINMENT SYSTEMS

Appendix H is a listing of the Action Items (or work) that will be needed to comply with the secondary containment guidelines in the Code of Federal Regulations (CFR) Title 40, Part 112. This will include upgrading of the secondary containment systems at some locations (including loading/unloading facilities). Other areas will not be upgraded but will be placed in a visibly nonuseable condition. Placing these areas in a visibly nonuseable condition will involve removing flanged spool pieces of piping from the pipelines connecting to the tanks and blind flanging both remaining open flanges; or removing a two (2) foot section of piping connecting the tanks, blind flanging the tank nozzle and capping off the remaining end-of-pipe; or implementing approved lock and tag procedures. This is deemed necessary so that it can be visually verified that the tank cannot be filled using existing pipelines. Also, the existing lower-most outlet nozzle or drain port will be left open (including removing any existing valve) so that it can be visually verified that the tank is empty. The tank will also be marked "In Standby" and placed on the excess equipment list. Still other tanks are out of service and scheduled to be closed in FY-93 through FY-94 under the Safe Shutdown Program. For convenience, the tanks have been organized into groups based on the scope of work proposed to bring each specific grouping into compliance with the guidelines.

Appendix F of the FEMP SPCC Plan presents grid plates that show the specific locations of the systems that are listed in Appendix H. The specific grid plate for each tank is indicated (in parentheses) in the column entitled "Location File Number".

SECONDARY CONTAINMENT UPGRADE SCENARIO

Building Number	Locator File Number	Scope of Required Work for Full Compliance
STORAGE TANK AREAS		
Group I		
General Sump	33B (G-5)	1) Increase the height of the existing containment to provide for full secondary containment capacity for the largest tank in the area plus freeboard to allow for precipitation.
General Sump	33D (G-5)	
Refinery Sump	36 (G-5)	2) Seal any cracks in the existing containment dikes and floor.
• Administration Bldg.	46 (N/A)	
* H&S Building	49 (N/A)	
Group II		
• Garage	30A (G-13)	1) Provide a new permanent concrete secondary containment area.
* Garage	30B (G-13)	
• Garage	30E (G-13)	
* Garage	30F (G-13)	2) Or install an alternative overflow containment system for Garage tanks.
• Maintenance Shop	31A (G-10)	
* Main Electrical Substation	37A (G-14)	
• Main Electrical Substation	37B (G-14)	
* Main Electrical Substation	37C (G-14)	
• Main Electrical Substation	37D (G-14)	
• Main Electrical Substation	37E (G-14)	
* Main Electrical Substation	37F (G-14)	
Group III		
* Plant 2/3	3 (G-3)	1) Dike upgrades have been completed. New containment capacities must be calculated to determine compliance or non-compliance.
• Plant 2/3	4 (G-3)	
* Plant 2/3	27 (G-3)	
* Plant 2/3	36 (G-3)	
* Plant 8	8 (G-5)	
Group IV		
* Maintenance Shops	41 (G-10)	1) Provide a new permanent secondary containment area. At the present time there is no secondary containment for this area. Design has been completed.
Group V		
Plant 5	29 (G-9)	1) These tanks will be placed visibly out of service.
Plant 6	19 (G-12)	
Plant 6	43 (G-12)	2) The tank(s) in this secondary containment area will be isolated and removed under the Safe Shutdown Program
Pilot Plant	23 (G-11)	
Pilot Plant	9 (G-4)	
Pilot Plant	39A (G-4)	3) The secondary containment system for this area will not be upgraded.
Pilot Plant	39B (G-4)	
Pilot Plant	11 (G-4)	

• Tank(s) regulated under 40 CFR, Part 112.

SECONDARY CONTAINMENT UPGRADE SCENARIO

Building Number	Locator File Number	Scope of Required Work for Full Compliance
Group VI		
Water Treatment Plant	12 (G-7)	1) Remove any substance remaining in the tank using proper procedures and then send the tank to decontamination.
Plant 9	44 (G-11)	2) Or place tank in a visibly out of service condition.
		3) The secondary containment system for this area will not be upgraded.
UNDERGROUND STORAGE TANKS		
Group VII		
Heavy Equipment	UST-17 (G-13)	1) UST-5 & UST-17 have been classified as Hazardous Waste Management Units (HWMU). 2) RCRA closure plans must be approved prior to tank removal. 3) UST-14 will be abandoned-in-place.
* Garage	UST-5 (G-13)	
Plant 6	UST-14 (G-12)	
Group VIII		
Plant 9	25 (G-11)	1) These tanks are no longer in use and will be rendered visibly out of service.
Plant 9	44 (G-11)	
LOADING AND UNLOADING FACILITIES		
Group IX		
Plant 2/3 Refinery	109 (G-5)	1) Remove areas 103 amd 105 from service as Loading and Unloading facilities.
Plant 8	103 (G-5)	2) Provide new piping, level controls, etc. at Station 109 so that the CWA hazardous substances now being handled in this area will be loaded and unloaded at Plant 2/3's Loading and Unloading Station Number 101 (G-6).
Water Treatment Plant	105 (G-7)	
Group X		
BDN Facility	102 (G-3)	1) Need to provide new secondary containment areas as none presently exists. 2) Include appropriate safety features for the storage tanks in this common area.
* Garage	106 (G-13)	
North of Plant 1 Pad	100 (G-1)	
Group XI		
* Plant 2/3	101 (G-6)	1) Curbing has been upgraded. Calculations of new containment capacity must be done to determine compliance or non-compliance.

* Tank(s) regulated under 40 CFR, Part 112.