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**STATUS OF FEMP WASTEWATER TREATMENT UNITS AS SWMUS OR
HWMUS**

05/13/93

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DOE-FN/FERMCO OEPA
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LETTER**

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

May 13, 1993

Letter No. C:OP:93-0737

Mr. Paul Pardi
Ohio EPA
Southwest District Office
40 South Main Street
Dayton, OH 45204-8704

STATUS OF FEMP WASTEWATER TREATMENT UNITS AS SWMUs OR HWMUs

Dear Mr. Pardi:

The purpose of this letter is to transmit updated information on the status of FEMP Wastewater Treatment System (WWTS) units. This information provides the basis for identifying specific units in the FEMP WWTS as either Solid Waste Management Units (SWMUs) or Hazardous Waste Management Units (HWMUs).

The FEMP WWTS units are SWMUs or wastewater treatment units regulated by the OEPA Permit to Install. To decide whether the units are HWMUs it had to be determined whether each unit managed either listed or characteristic hazardous waste. A summary of the determinations and reference to the supporting documentation follows.

The question of whether units managed *listed* hazardous waste (spent TCA) depended on the status of the wastewaters which the units managed. If the wastewaters met the conditions of the mixture rule exclusion promulgated at OAC 3745-51-03(A)(2)(e) then they were not regulated as listed hazardous waste based on the disposal of spent TCA to the treatment system. In September of 1991 the FEMP submitted a draft report for Ohio EPA (OEPA) review titled "Application of the Mixture Rule Exclusion to the FEMP Wastewater Treatment System." Based on review of the data to support the wastewater flows and in consideration of OEPA comments on the draft report, the FEMP has concluded that wastewaters managed in its WWTS meet the conditions of the mixture rule exclusion and are not regulated as listed hazardous waste. A final report titled "Application of the Mixture Rule Exclusion to Wastewaters Managed in the FEMP Wastewater Treatment System" is provided as Enclosure 1. A response to the OEPA comments on the draft report, are provided as Enclosure 2.

The determination regarding management of *characteristic* hazardous waste was made independently for each specific WWTS unit based on characterization of the unit contents. This includes characterization of both the aqueous contents and any accumulated sludge. The results of this characterization for each land-based unit in the WWTS is provided as Enclosure 3. To date, none of the land-based WWTS units have been determined to have managed characteristic hazardous waste. However, the characterization process for the wastewater treatment units is ongoing under the Remedial Investigation/Feasibility Study (RI/FS) activities. We will provide you with summary information for these units and any required updates to the Part A and B permit applications according to the requirements of the Stipulated Amendments to the Consent Decree (SACD).

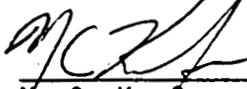
At this date, FEMP is changing the status of the Clearwell, Lime Sludge Ponds and the Coal Pile Run-off Basin to SWMUs. Due to the uncertainty of the characteristics of the sludge and past uses, the Sludge Drying Beds, the Bio-Surge Lagoon and the Waste Pit 5 will continue to be classified as HWMUs based on the possible management of characteristic wastes (e.g. sludge). Upon completion of the sampling and analyses work, a final determination of the status of these units will be made. Based on the sampling and analyses schedule, this determination can be made in December, 1993. The RCRA Permit Application will be updated to change the classifications of the six WWTs Units. An updated Table C-4 will also be submitted based on the definition of spent solvents contained in the FEMP Waste Characterization Plan.

Units identified as SWMUs will be addressed under the CERCLA process as stipulated by Section VIII of the Amended Consent Agreement (ACA) between U.S. DOE and U.S. EPA (Region V). The ACA recognizes the utility of integrating CERCLA response obligations and RCRA corrective action obligations for SWMUs at the FEMP.

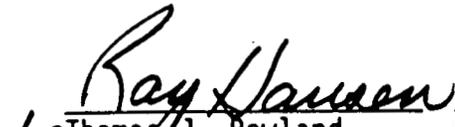
The information provided herein should resolve the outstanding issues regarding the regulatory status of specific WWTs units at the FEMP with respect to the mixture rule exclusion. We will keep you apprised as we complete characterization of Waste Pit 5, the Bio-Surge Lagoon and the Sludge Drying Beds.

If you have questions regarding any of the enclosures, please contact Mr. Wally Quaider at (513) 648-3137.

Very truly yours,



M. C. Kaufman,
President
FERMCO
5/11/93
Date


for _____
Thomas J. Rowland,
Acting Manager
DOE-FEMP
5/12/93
Date

Enclosures (3)

- c: Phil Harris, OEPA Southwest District Office
- Graham Mitchell, OEPA DERR
- K. L. Alkema
- J. Curtis
- M. E. Nelson
- M. J. Strimbu
- J. Thiesing
- T. J. Walsh
- N. S. Weatherup
- J. B. Williams
- File Record Storage Copy 102.1
- File 108.13

*c. John Miller
Wally Quaider
5/12/93*

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**FINAL REPORT ON THE APPLICATION OF THE MIXTURE RULE EXCLUSION TO WASTEWATERS
MANAGED IN THE FEMP WASTEWATER TREATMENT SYSTEM**

MAY 1993

**U.S. Department of Energy
Fernald Field Office**

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Enclosure 1

Final Report on the Application of the Mixture Rule Exclusion to Wastewaters
Managed in the FEMP Wastewater Treatment System

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History

In response to the Proposed Amended Consent Decree, FEMP initiated an investigation to identify all hazardous waste management units (HWMU) on the site. Based on this initial effort, the FEMP submitted a Revised Part A and RCRA Part B permit application in June, 1991 that identified nine HWMUs.

Five of these regulated units are part of the wastewater treatment system and one received wastewater from the treatment system. These include:

- Waste Pit 5
- Clearwell
- Bionitrification Lagoon
- Sludge Drying Beds
- Coal Pile Runoff Basin
- Lime Sludge Pond (received wastewater)

These units were identified based on the belief that they received a listed hazardous waste, 1,1,1 Trichloroethane (TCA), after July 26, 1982. This belief was based on an assumption that TCA was discharged to the Treatment System at a concentration greater than 25 ppm. However, a detailed analysis was not performed to validate this assumption.

In September 1991, the FEMP presented a draft document to Ohio EPA proposing to revise the hazardous waste management unit (HWMU) determination for these six units. This document provided four scenarios to support the determination that, based on the wastewater mixture rule exclusion, these basins should not be identified as HWMUs but rather as SWMUs. The scenarios presented four possible sets of calculations to demonstrate compliance with the mixture rule exclusion:

- Scenario 1: Assumed that all TCA purchased was disposed to one of the four sewer systems. TCA delivered to non-sewered areas was proportioned to the four sewer systems. Separate calculations were provided for each wastestream using calculated flows for the Contaminated General Sump (CGS) that were lower than the NPDES reported flows.
- Scenario 2: Assumed that all TCA purchased was diluted by the sum of all wastestream flows.
- Scenario 3: Similar to scenario 1 with the additional assumption that the recovered TCA was not discharged to the four individual wastestreams.
- Scenario 4: Similar to scenario 3 with the additional assumption that TCA used in buildings without floor drains was not discharged to the sewer systems.

Scenario 1 was termed the worst case. While this scenario is a mathematical worst case, it is not believed to accurately represent the example worst case scenario that EPA provided in the preamble to the regulation (56 FR 56582).

This report has been finalized by providing a demonstration that best applies to the FEMP site in the light of the regulatory guidance for the exclusion. Additionally the values for the flow, the amount of TCA used and the amount of TCA recovered have been revised based on additional information and data collected since the September 1991 draft demonstration.

The Boiler Plant drains were mistakenly identified to discharge to the Coal Pile Runoff Basin (CPRB). This is not correct. From October 1985 to 1990, wastewaters from the Ash Wash Sump and Continuous Blowdown in the Boiler Plant flowed to the CPRB and on to the general sump. The Boiler Plant basement floor sumps and drains flowed under the Water Plant to the Chemical Feed Sump and on to the general sump. The Boiler Plant floor sumps and drains never went to the CPRB. Based on this information, the CPRB should not be regulated as a HWMU based on managing a listed hazardous waste.

On November 25, 1991, Ohio EPA sent comments requesting further documentation on flows for the non-contaminated general sump (NGS); flows, TCA usage and recovery at the Boiler plant; and TCA analytical data for the water, sludge and sediment from the Coal Pile Runoff Basin and the Lime Sludge Pond.

Regulatory Discussion

Regulation OAC 3745-51-03 (A)(2)(e) provides an exemption under RCRA for mixtures of wastewater and listed hazardous wastes that meet the criteria contained therein. Specific to this discussion, the exemption is provided if:

- The mixture consists of wastewater, the discharge of which is subject to regulation under Section 402 of the Clean Water Act; and
- The maximum total weekly usage of solvents (other than the amounts that can be demonstrated not to have been discharged to the wastewater) divided by the weekly flow of wastewater into the headworks of the facility's wastewater treatment system does not exceed 25 parts per million.

The preamble to this regulation states that if a facility can demonstrate by means of appropriate records that any portion of the solvents used at the facility are not disposed to the wastewater, that portion is to be excluded from the calculation. The preamble additionally states that the headworks is the combination of the flows prior to the last treatment step.

EPA believed this rule to be sufficiently conservative based on the following factors:

- The treatment of the wastewater mixture.
- The attenuation mechanisms for organics leaving the treatment system through adsorption to organic soils, biodegradation and dilution.
- The portion of solvent which is volatilized is included in the calculation of solvent discharged to the wastewater. This is converse to EPA AP-42 that provides solvent loss emission factors for degreasing operations (ref:Table 4.6-2) to be equal to the amount of solvent used.

EPA built in conservative factors so rigorous sampling and demonstrations would not be needed. As demonstrated in the preamble's sample calculation, they intended the solvent concentration to be estimated by dividing the headworks flow into the amount of solvent used less the amount of recovered solvent. The preamble states that flow used in this calculation should be the influent of the final wastewater treatment step.

To determine the solvent usage allowable in this exclusion, the regulation requires the summation of a subset of the listed spent solvents: methylene chloride, TCA, chlorobenzene, o-dichlorobenzene, cresols, cresylic acid, nitrobenzene, toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine and spent chlorofluorocarbon solvents. The FEMP Waste Characterization Plan (Final Draft - 11/30/92) identifies that certain conditions must be met to determine if product meets the listing description of a waste solvent(F001-F005). First, the solvent must be used for its solvent properties. If the solvent is used as an ingredient or reactant in a commercial chemical product, than the solvent is not regulated under F001-F005. Second, the solvent mixture must have contained, prior to use, a total of ten percent or more (by volume) of the listed constituents. The record of materials purchased was reviewed to determine if any products, meeting this definition, was brought onsite in addition to TCA. This review showed that a minimal amount of additional solvents were brought onsite during this time period. The quantities, however, are in quarts and pints compared to the TCA that was delivered in and utilized from 55 gallon drums. For simplicity, these small quantities were not added to the calculations.

The current Part B application, Table C-4 identifies RCRA Regulated Hazardous Wastes and the associated U.S. EPA Hazardous Waste Number. Currently, this list conservatively lists many substances that contain organic constituents as F001-F005. This listed will be upgraded to identify F001-F005 wastes based on the definition of a spent solvent in the Waste Characterization Plan. The RCRA permit application will also be modified to change the classification and supporting determination of the six WWTs land based units.

When formulating this exemption, EPA considered the wastewater sampling that was provided by the American Petroleum Institute that showed wastewater treatment generally reduced the concentration of the organics to a range of 10 to 100 ppb, levels that approach the Water Quality criteria. Sampling at FEMP for the NPDES permit application renewal (August 1, 1988) showed that the levels of TCA ranged from less than the detection level of 0.5 ppb in the storm water wastestream to 17.9 ppb at the Clearwell. Sampling at the NPDES outfall 001 (MH 175) showed a maximum level of 0.9 ppb based on three sample results. The FEMP values are less than the levels expected by EPA when allowing the exclusion.

Exclusion Demonstration

To demonstrate that the wastewater to the FEMP Wastewater Treatment System (WWTs) is excluded from the RCRA regulations, the following formula will be used.

$$\text{Estimate of TCA in Wastestream at Headworks} = \frac{\text{TCA distributed} - \text{Estimate of TCA recovered}}{\text{Flow}}$$

Table 1 shows the wastewater flow of the WWTs, the solvent usage, and the resulting concentration of TCA in the wastewater treatment system. The TCA recovered was not subtracted from this set of calculations, thus making the calculations conservative. The headworks flow, the combined wastewater flow of the treatment system, was obtained from the NPDES discharge monitoring reports (DMRs) for Manhole 175, Outfall 001. The TCA usage was determined from the

"Requisition to Storekeeper" records maintained on the site. A review of the products purchased over the ten year period indicates that TCA was the major solvent used on the site. Other solvents or possible solvents were in minor use. Each product was used in the order of magnitude of gallons over the ten year period.

TABLE 1: Calculations of TCA in the Total Flow

YEAR	TCA USAGE (drums)	FLOW (million gallons/year)	TCA CONCENTRATION ppm
1980	15	149.542	7.04
1981	27	151.245	12.53
1982	41	177.883	18.19
1983	37	171.868	15.12
1984	43	211.970	14.25
1985	48	177.190	19.02
1986	49	182.877	18.81
1987	47	212.306	15.55
1988	26	201.448	9.07
1989	12	241.454	3.49
1990	6	258.197	1.90

Since all concentrations of TCA are below 25 ppm, wastewaters managed in the FEMP's wastewater treatment system is exempt from RCRA regulations as listed spent solvent waste.

Work has been performed in the past, part of which was provided to Ohio EPA in a September, 1991 draft document, to demonstrate that each individual wastestream also met the exclusion. While this level of complexity is not indicated by EPA's discussion and sample calculation presented in the preamble, additional calculations are provided in this report to further demonstrate that FEMP meets the exclusion requirement. The formula used for this additional demonstration is:

$$\text{Estimate of TCA in Headworks of individual systems of WWTS} = \frac{\text{TCA distributed} - \text{Estimate of TCA recovered}}{\text{Flow}}$$

The plant is served by four waste collection and treatment systems. These systems are called the Contaminated General Sump (CGS), Noncontaminated General Sump (NGS), the Sanitary Sewer System and the Storm Sewer System. Block flow diagrams of the wastewater treatment system from 1980 to 1990 are provided in Attachment 1. A summary of the land based units associated with the four wastewater collection and treatment systems is provided in Table 2.

Table 2: Land Based Units Associated with the Four Collection and Treatment Systems	
Sanitary System	Sludge Drying Beds
Noncontaminated General Sump	Lime Sludge Ponds
Contaminated General Sump	Waste Pit 5 Clearwell Biodenitrification Lagoon
Storm Sewer System	--

In 1987, the CGS wastestream was routed through the Sanitary System.

The sewer systems for areas in the plant are summarized in Table 3. A discussion of the sewer drain connections for each building is provided in Attachment 2.

Table 3: Sewer Systems For Buildings Using TCA				
SANITARY SYSTEM	NONCONTAMINATED GENERAL SUMP SYSTEM	CONTAMINATED GENERAL SUMP SYSTEM	STORM SEWER SYSTEM	NO DRAINS (N/A)
Garage	Boiler Plant Note: In 1988 boiler Maint. moved to bldg. without sewer.	Plants 1,2/3,4,5,6,8,9	Instrument Shop	Pilot Plant Maintenance
			Plant 2/3 Maintenance	Plant 4 Maintenance
			Maint./Mill Shop	Quonset Hut #1
			Paint Shop	Rust. Bldg
			Plant 8 Maintenance	Electrical Shop

Historical flows obtained from the NPDES DMRs for each wastestream are provided in Table 4.

Table 4: Wastewater Volume Data million gallons				
YEAR	SANITARY STREAM POINT 601	NGS STREAM POINT 602	CGS STREAM POINT 603	STORM STREAM POINT 604
1980	29.134	13.143	23.018	60.234
1981	32.594	13.268	30.063	70.383
1982	39.604	15.797	41.003	79.672
1983	44.29	18.697	38.397	72.861
1984	43.563	17.176	49.093	90.583
1985	45.467	15.44	57.407	90.006
1986	44.012	15.301	25.86	80.06
1987	78.408	20.455	NA (1)	82.792

YEAR	SANITARY STREAM POINT 601	NGS STREAM POINT 602	CGS STREAM POINT 603	STORM STREAM POINT 604
1988	92.983	16.625	NA	63.257
1989	85.754	18.487	NA	91.499
1990	50.731	26.819	NA	33.364

(1) IN 1987 CGS SYSTEM WAS ROUTED THROUGH SANITARY SYSTEM

The TCA distributed throughout the site is obtained from the "Requisition to Storekeeper" tickets used at the FEMP facility. A summary of TCA usage by location is provided in Table 5. The TCA delivered to buildings without sewer connections was assumed not to discharge to the wastewater treatment system.

YEAR	SANITARY STREAM POINT 601 drums	NGS STREAM POINT 602 drums	CGS STREAM POINT 603 drums	STORM STREAM POINT 604 drums	N/A (1) drums
1980	5	2	5	0	3
1981	1	2	7	14	3
1982	3	3	13	20	2
1983	2	4	14	11	6
1984	3	2	11	9	7
1985	4	5	15	9	12
1986	4	4	15	14	14
1987	18	5	0	8	12
1988	13	0	0	6	10
1989	3	0	0	4	3
1990	0	0	0	5	1
TOTAL	56	27	80	100	73

(1) N/A - No sewers at the area TCA was delivered

The TCA recovered is estimated from the waste drum storage log. This log lists where the drum was picked up and the weight of the drum. Sampling of these drums provided an estimate of the TCA that was not discharged to the treatment systems. The estimate for TCA recovery from each wastestream is provided in Table 6. A summary of sampling analyses and the basis for the amount recovered is located in Attachment 3.

Table 6: TCA Recovered by Wastestream

YEAR	SANITARY STREAM POINT 601- drums	NGS STREAM POINT 602 drums	CGS STREAM POINT 603 drums	STORM STREAM POINT 604 drums	N/A drums
1980	1.24	-	0.95	0	0.10
1981	1.19	-	2.41	0	-
1982	0.98	-	5.12	0	-
1983	1.30	-	4.80	0	-
1984	1.14	-	2.23	0	-
1985	1.66	-	4.36	0	-
1986	1.04	-	6.07	0	0.87
1987	2.23	-	1.41	0	0.05
1988	0.88	-	1.80	0.05	0.37
1989	1.66	-	5.90	0.22	1.82
1990	1.30	-	1.31	0.16	0.52
TOTAL	14.6	-	36.2	0.43	3.73

The supporting NPDES records, "Requisitions to Storekeeper" records, waste drum collection records and spot sampling are contained in a file at the site.

Table 7 provides the results of the calculations for each sewer system. Attachment 4 contains the fact sheet/assumptions used in the calculations. All concentrations are below 25 ppm, further demonstrating the applicability of the wastewater exclusion for the FEMP wastewater treatment system.

Table 7: TCA Concentration

YEAR	SANITARY STREAM POINT 601 ppm	NGS STREAM POINT 602 ppm	CGS STREAM POINT 603 ppm	STORM STREAM POINT 604 ppm
1980	9.06	10.69	12.36	0.00
1981	0.00	10.58	10.72	13.97
1982	3.58	13.34	13.49	17.63
1983	0.00	15.02	17.19	10.60
1984	3.00	8.18	12.54	6.98
1985	3.61	22.74	13.01	7.02
1986	4.72	18.36	24.25	12.28
1987	14.12	17.16	-	6.79
1988	9.15	-	-	6.60
1989	1.10	-	-	2.90
1990	0.00	-	-	10.19

Conclusion

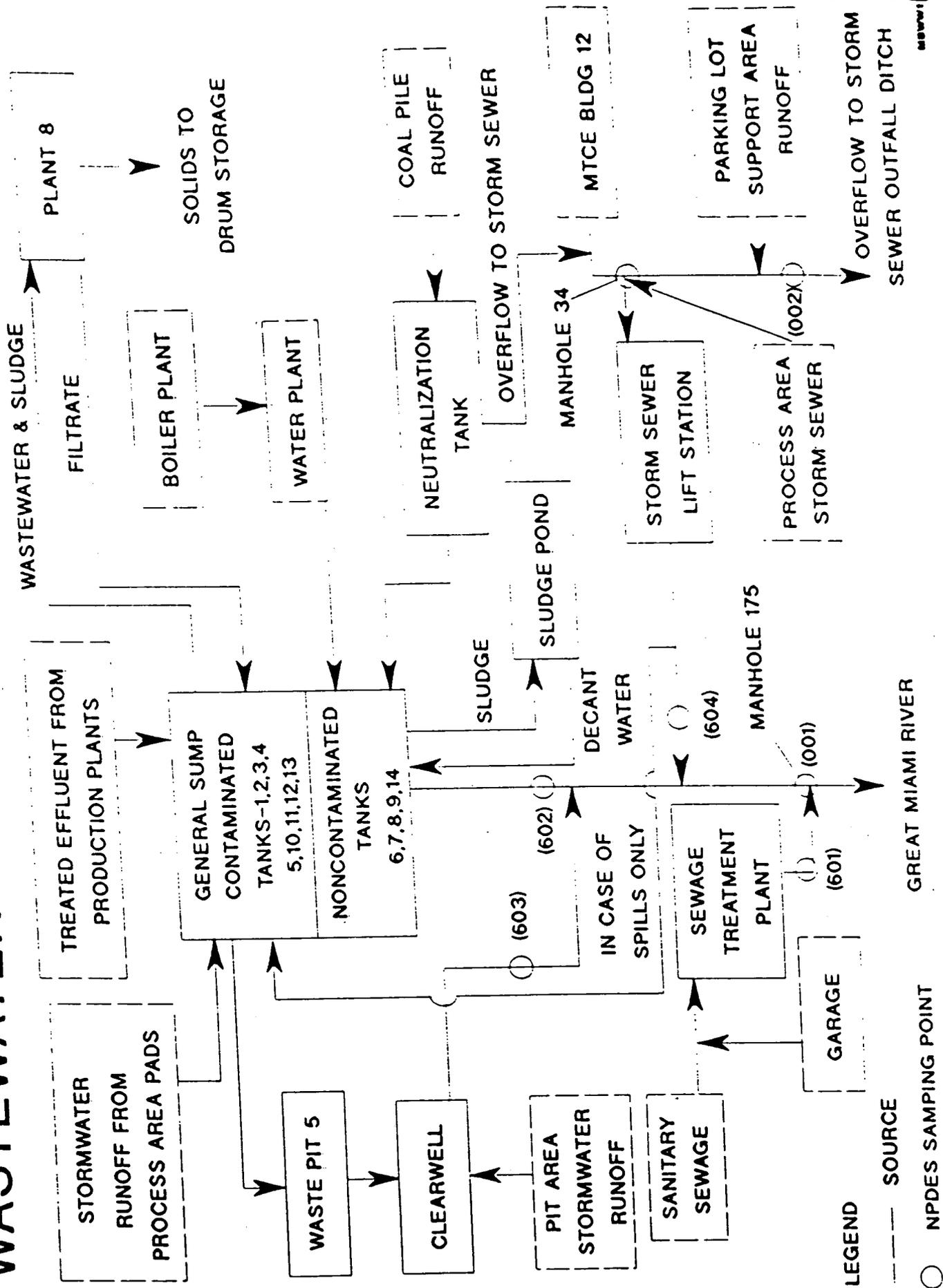
The first calculation provided in this demonstration is based on the sample calculations provided in the preamble of the wastewater mixture rule exclusion (56 FR 56582). These calculations (Table 1) show that the wastewaters managed in the FEMP's WWTs qualify for the exclusion from RCRA regulations as listed hazardous wastes.

Additional calculations, while more complex than EPA had intended, were performed to provide a link with the draft document presented to OEPA in September 1991. These complex calculations (Table 7) also demonstrate that the wastewaters meet the exclusion.

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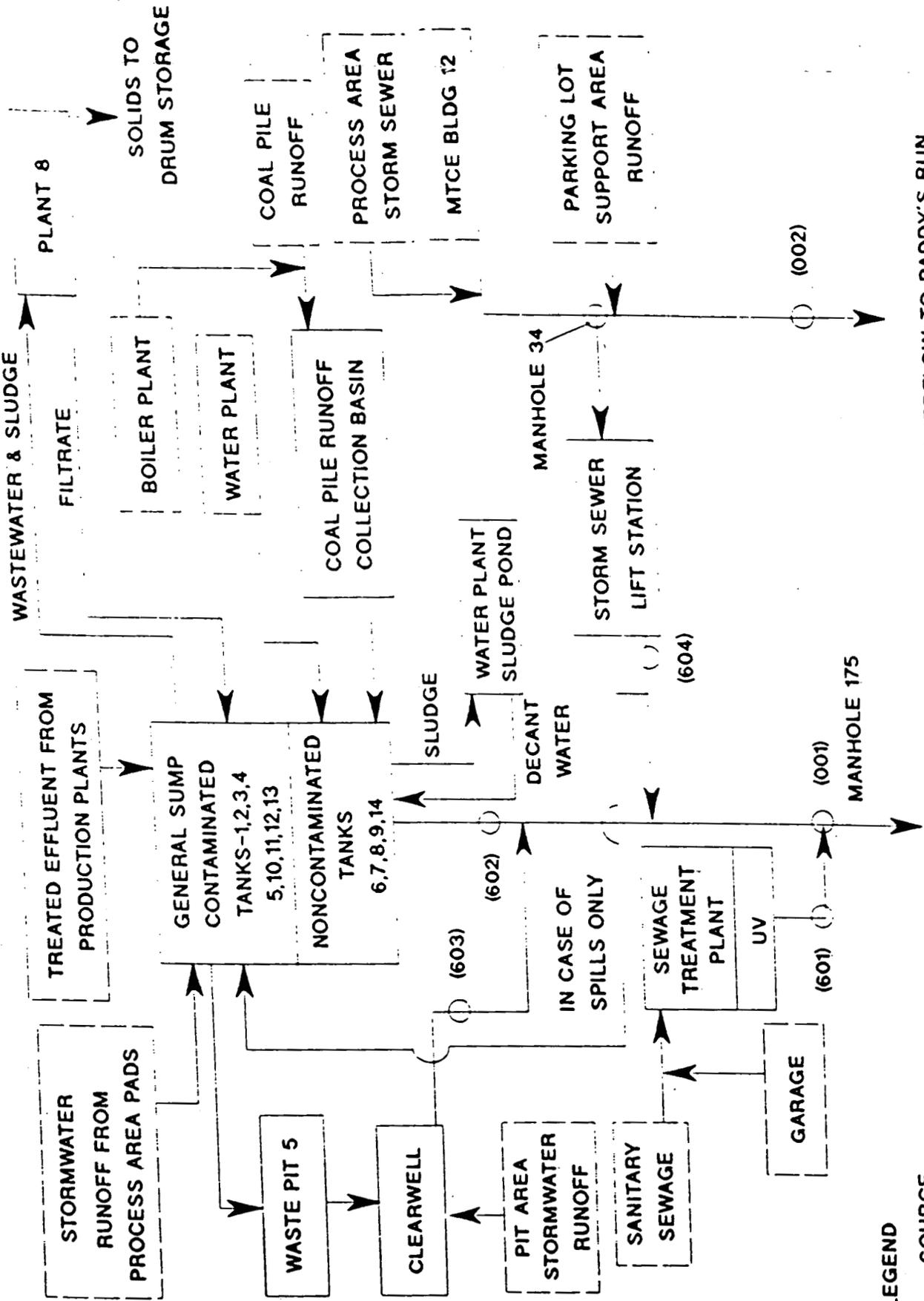
Attachment 1
Block Flow Diagrams for the FEMP Wastewater Treatment System
(1980 to 1990)

WASTEWATER FLOW DIAGRAM - 1980 TO 1984



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WASTEWATER FLOW DIAGRAM - 1984 TO 1986



LEGEND
 - - - - SOURCE
 ○ NPDES SAMPLING POINT

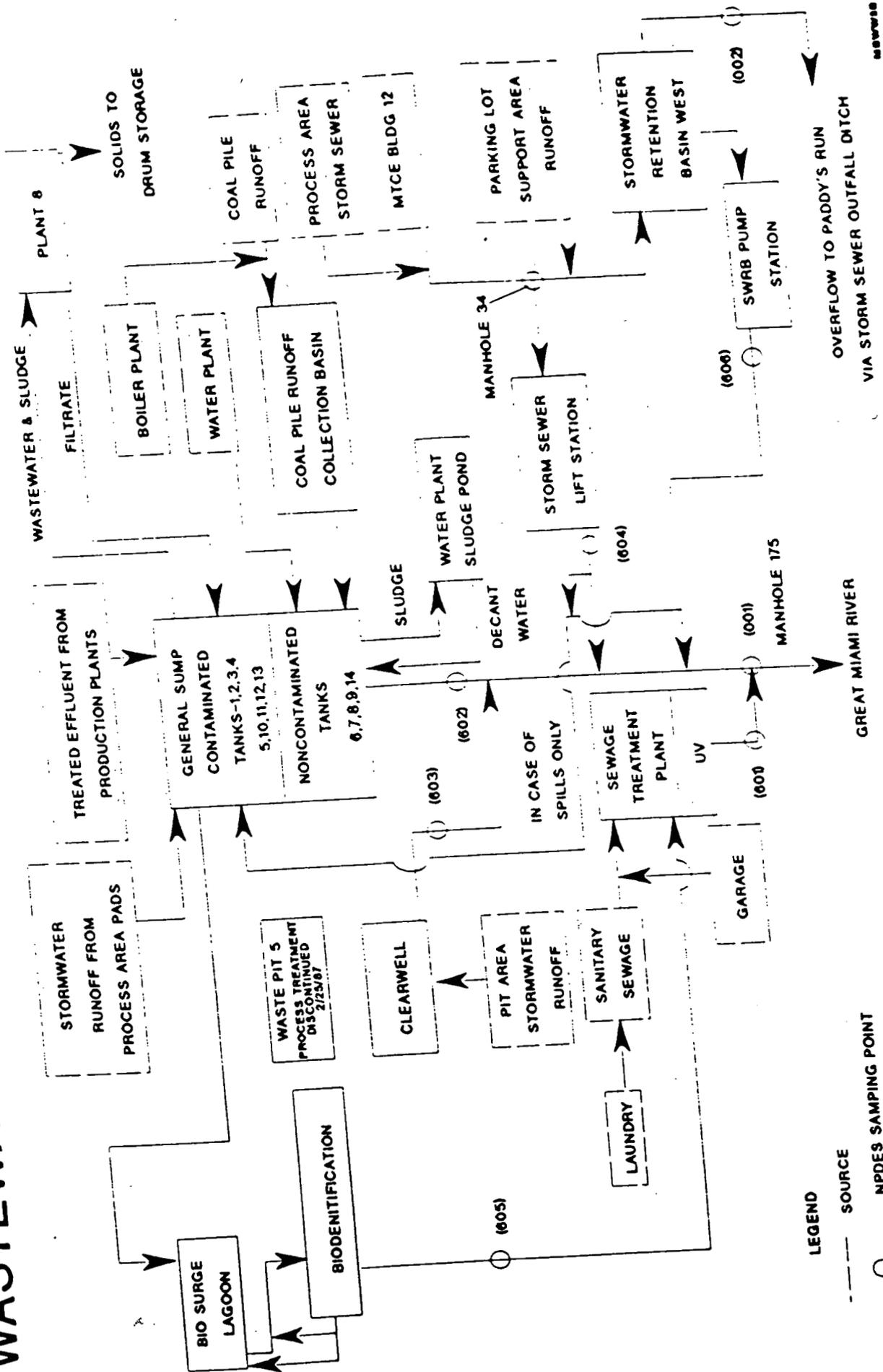
OVERFLOW TO PADDY'S RUN
 VIA STORM SEWER OUTFALL DITCH

GREAT MIAMI RIVER

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WASTEWATER FLOW DIAGRAM - 1986 TO MAY 1987

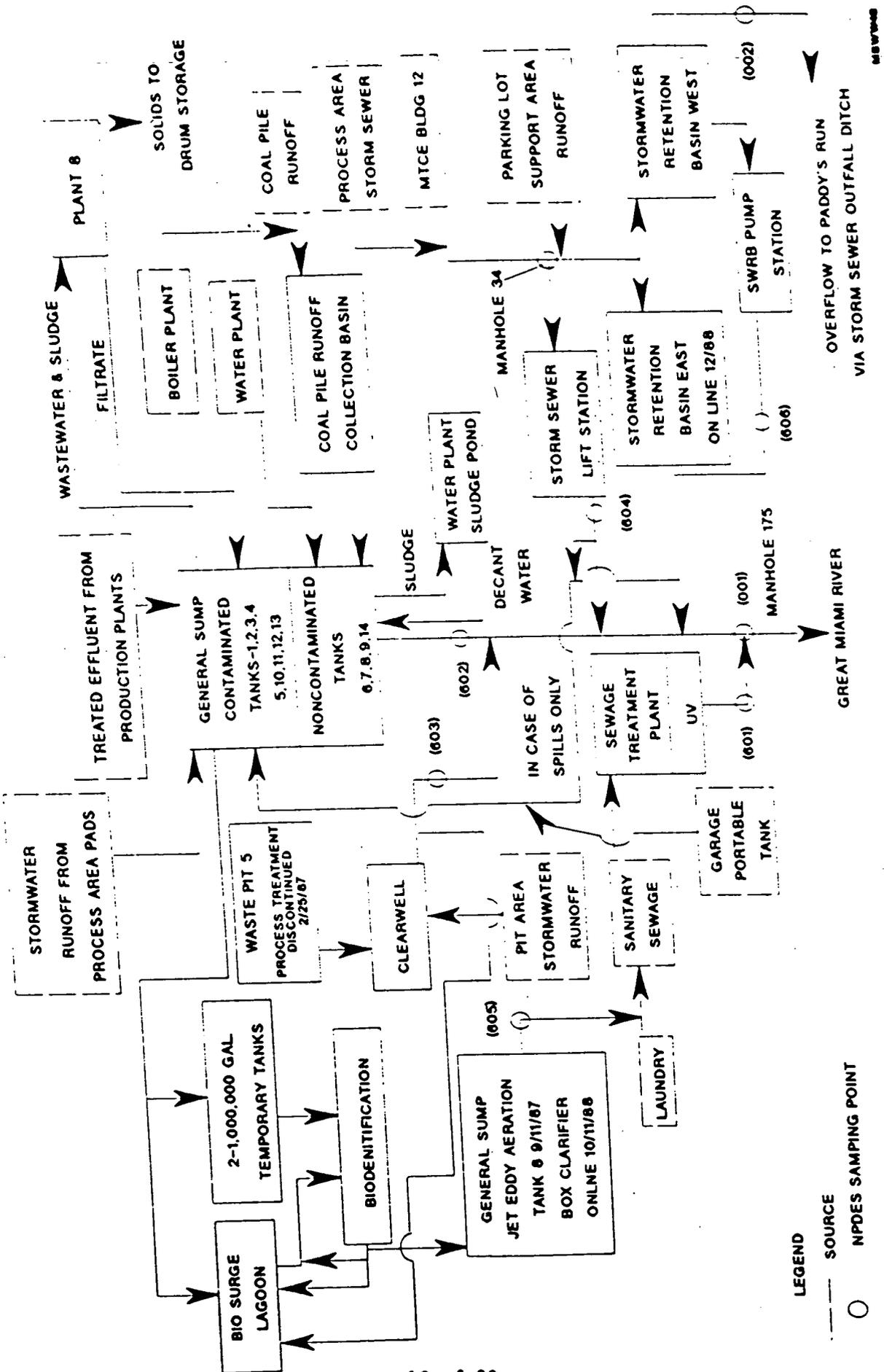


LEGEND

--- SOURCE

○ NPDES SAMPLING POINT

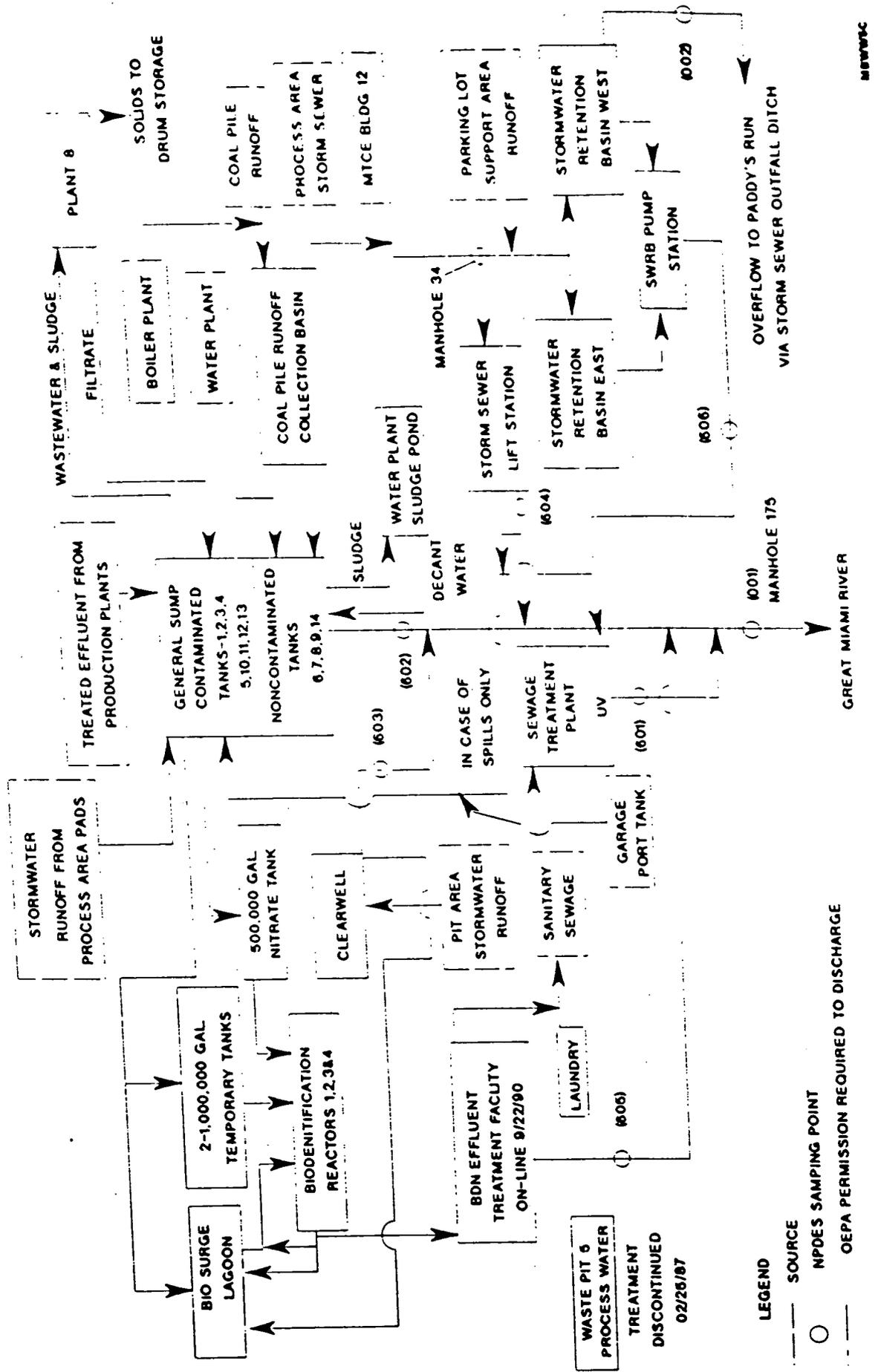
WASTEWATER FLOW DIAGRAM - JUNE 1987 TO APRIL 1990



LEGEND
 ○ SOURCE
 ○ NPDES SAMPLING POINT

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WASTEWATER FLOW DIAGRAM - APRIL 1990 TO FEBRAURY 1991



LEGEND

— SOURCE

○ NPDES SAMPLING POINT

— OSPA PERMISSION REQUIRED TO DISCHARGE

Attachment 2

Discussion of Sewer Connection for the Areas using TCA

The primary application of TCA to parts, components, equipment, and structures was with a rag or brush. Any residue generated would be collected in 55-gallon drums. This residue material could consist of rags, gloves, brushes, liquid, sludges, oil, other solvents, and TCA in the same container. Prior to 1987, all non-production areas labelled their containers with text. The Production Plants utilized the 15-digit FMPC Lot Marking Code system, which specifies the point of generation, the generation date, the material type, and other applicable information.

From 1980 to June 1988, the Boiler Plant utilized TCA for degreasing functions. TCA was maintained and used on the first floor and basement levels on the west side of the Boiler Plant. Noncontaminated Process Water was the collection source for this area. After June 1988, Maintenance functions were centralized in a new structure (Building 10B), located west of the Boiler Plant. There are no floor drains or sumps located in this building.

The Garage used TCA to degrease automotive parts by placing the material in a small pail and using a rag or brush to apply it to the parts. There were two different drain systems in the Garage. The drains under the wash station drained into sumps, and then into the Sanitary Waste Water Stream. Since 1987, these drains have been pumped into a portable water tank. Once the tank was full, its contents would be transferred to Plant 8 for processing through the Contaminated General Sump. The drains under the service area and carlifts drained into an oil separator and then into the Sanitary Waste Water. These drains were plugged in 1990.

The Pilot Plant maintenance functions were conducted in a building located northwest of the Pilot Plant. There are no drains or sumps located in the floor of this building; however, a sink is located on the north wall of the building which discharges to the Sanitary Waste Water. The TCA used in this building was applied to equipment parts with a rag or brush in this building.

The Plant 1 area used TCA to clean the drum reconditioning equipment. Floor drains and sumps located in this area discharge to the Contaminated General Sump.

Plant 2/3 used TCA to clean surface areas prior to painting. Floor drains within this building discharge to tank(s) within Plant 2/3. The waste water would either be treated in Plant 2/3 or transferred to the General Sump prior to treatment.

The Plant 2/3 Maintenance Building received drums of TCA material for degreasing use from 1980 to present. The floor drain located in this building discharges to the Storm Sewer. Used materials were drummed and transferred to proper storage areas.

From 1980 until 1987, Plant 4 Maintenance was located on the third floor at the south end of Plant 4. There are no floor drains or sumps within this section of Plant 4 with the exception of the safety showers, which are surrounded by small diked areas. All drains and sumps in Plant 4 were located on the first floor. These drains and sumps discharged to the Contaminated General Sump. Plant 4 Maintenance was relocated in 1987 to an existing shop building situated southeast of Plant 4. This shop building has no drains or sumps; however, a sink is located on the south wall of the shop which discharges to the Sanitary Waste Water. TCA was used in a parts cleaning unit located in the north area of the shop building. The parts cleaning unit was used in conjunction with rags and brushes to clean equipment parts.

Plant 5 used TCA as a degreaser. The parts cleaning unit was located on the east center side of the plant. The floor drains and sumps located in the area discharged to the Contaminated General Sump. After collection, the waste water was either transferred to Plant 6 (and subsequently treated) or transferred directly to the General Sump.

Plant 6 utilized the material as a degreaser and cleaner. Two parts cleaning units were located on the east side of the plant. There are no drains or sumps in the immediate area of the Maintenance Shop. TCA was applied to milling machines with rags or brushes to degrease equipment. Until 1990, floor drains and sumps in Plant 6 collected the waste water and discharged it to a storage tank located on the northeast end of Plant 6 for treatment. The water would then be transferred to the Contaminated General Sump. In 1990, treatment of waste water in Plant 6 ceased. All waste water is now transferred to the Contaminated General Sump for treatment.

Plant 8 used TCA to clean structure surfaces prior to painting. Floor drains and sumps located in Plant 8 collect the waste water and discharge it to a storage tank located on the west side of Plant 8 for treatment. The water is then transferred to the Contaminated General Sump. Plant 8 Maintenance is in a separate building and discharges to the Storm Drain.

The Plant 9 Maintenance area was located in the northeast corner of Plant 9. A parts cleaner was operated in this area. There are no floor drains or sumps in the immediate area. A plumbing drain lies in a restroom within 40 feet of the parts cleaner, but this drain is separated from the parts cleaner by two walls. A grating drain lies 120 feet from the parts cleaner, but a wall blocks any direct line between this drain and the parts cleaner. Until 1990, floor drains and sumps in Plant 9 collected the waste water and discharged it to a storage tank located on the west side of Plant 9 for treatment. The water would then be transferred to the Contaminated General Sump. In 1990, treatment of waste water in Plant 9 ceased. All Plant 9 waste water is now transferred to the Contaminated General Sump for treatment.

The Electric Shop utilized TCA to degrease electrical components. There are no floor or sump drains in the Electric Shop. The material was also used to degrease electrical equipment located at external switchyards.

The Quonset Hut (#1) is a prefabricated shelter located at the northern section of the site. There are no drains or floor sumps at this location. The TCA used at this structure was used to degrease a Super Compactor, which is a portable unit mounted on a semi-truck assembly designed to compact drums. This compactor was in operation at the Fernald site during late 1986 and early 1987.

Building 3045 housed the construction subcontractor RUST. A parts cleaning unit was operated in a small building on the north side of building 3045. There are no drains or sumps in this area.

The Paint Shop floor drain has been inoperative for approximately ten years. TCA was used here to clean components prior to painting.

A small table located on the southeast wall of the Paint Shop was used to clean small components of painting equipment. The Paint Spray Booth was not used to clean painting equipment.

Attachment 3

Summary of the Waste 014 (Waste Oil) Sample Analyses

Table 8: Sample Analyses of Waste Oil (Coded 015)	
Waste Oil sent to Oak Ridge	TCA Concentration ppm
17061110 (7/28/87)	21000
1706358 (7/10/87)	7900
17071226(8/07/87)	22000
07/30/87	4100
17071227 (08/07/87)	28000
17051146 (06/25/87)	28000
Average	18167
Sampling plan 052 (4/18/91)	
R052-1	890
R052-2	140000
R052-3(2D)	300000
R052-4	45000
Mean	88600
Sampling Plan 265 (12/11/90)	
265-1	740
265-1(D)	71
265-2	1.6
265-2(D)	1.3
265-3	38000
265-4	4100
Mean - 1&2 from same drum; duplicates not included in statistical analyses	14150
Sampling Plan 267 (10/29/90)	
R267-1	170000
R267-1(D)	420000
R267-2	123
R277-2(D)	93
R267-3	19000
R267-4	120
Mean (3 & 4 were from same drum)	101556

Note: Mean values are calculated by first averaging duplicates and samples from the same drums and then averaging with the remaining analytical values.

Table 9:		Basis for TCA Recovery	
Type of waste recovered	Number of drums	Percentage of TCA in Drums	Notes
MC&A - Coded 015 (used Oil) Material Transferred to Oak Ridge for Incineration	377	1.8%	Average of samples in 1987; see previous table
MC&A - Coded 015 (used oil) Material Incinerated at On-site Trane Incinerator	235	5.2	Weighted average of samples in previous table
Non-MC&A - Coded 015 (used oil) Material Incinerated at On-site Trane Incinerator	183	5.2%	Weighted average of samples in previous table
MC&A - Coded 015 (used oil) Material stored On-site	463	5.2%	Weighted average of samples in previous table
MC&A - Coded 041 (city sludge for Ox) Material Incinerated On-site	416	0.68%	Estimate

Attachment 4

Assumptions

1. Flows used in the demonstration are from the NPDES discharge monitoring reports. The 1985 through 1990 flow values were checked and changed from the draft document.
2. TCA usage was determined from the distribution tickets (Requisition to Storekeeper) and totaled 336 drums. Purchasing records showed the purchase of 346 drums over the ten year period with 9 drums in stock on 1/80. Seven drums were sold back to the distributor in 1990 and 1991. The total number of drums purchased is 348. The distribution tickets vary approximately 3% from the purchase records over the ten year period.
3. Recycled TCA that was used in 1980 and 1981 that was added and then subtracted in the draft document has been eliminated from the calculations.
4. Sewer connections for areas of the plant were not changed from the September 1991 draft document. The TCA distribution numbers for Plant 8 maintenance appear to be distributed to the storm system in the draft document but is not addressed in the narrative. The narrative in this report has been corrected to include Plant 8 Maintenance in the Storm Water System.
5. TCA solvent that was delivered to areas that are not connected to a sewer system was assumed not to discharge to the Wastewater Treatment System.
6. The record of TCA recovery at the facility is obtained from the waste tracking data base. The recovery estimates are based on the number of drums collected from each area and sample analyses of the waste oil. The sample analyses summary is provided in Attachment 3. Conservative TCA values in the recovery drums were used in the calculations.
7. Waste oil drums collected from the boiler area in 1980 were not included in this demonstration. It is believed that the 440 drums were from the closing of an oil burning area located near the boiler building during the previous year.
8. The September 1991 draft demonstration used process knowledge to estimate the amount of TCA in the 013 solvent waste code accumulated drums. Analyses of the 013 solvent waste code showed that many types of wastes were disposed using this code. This code was also used for waste paint, leaded gas, mineral spirits, etc. To be conservative, the 013 waste accumulation was not included in this demonstration.
9. Drums of TCA were assumed to contain 53.2 gallons and have a density of 1.32 kg/l.

10. Concentration of TCA was determined by:

$$\text{Estimate of TCA in Wastestream at Headworks} = \frac{A}{b} \times 70.22$$

where A = # of drums/year

B = flow, in units of MG/year

70.22 =	# of drums	53.2 gallons	3.8 liter	1.32 kg	1x10 ⁶ mg	year	1 gallon
	year	1 drum	1 gallon	1 liter	kg	1x10 ⁶ gallons	3.8 liters

ENCLOSURE 2
RESPONSE TO SPECIFIC OEPA COMMENTS ON THE DRAFT REPORT ON FEMP'S WWTs

On November 25, 1991, Ohio EPA requested additional information concerning the draft Application of the Mixture Rule Exclusion to the FEMP Wastewater Treatment System document. While the final document should clarify the areas of your comments, a specific response to the OEPA request is provided.

1. *Ohio EPA requests all documentation which exists to support the numbers used for wastewater flow in the 9/5/91 report for the NGS headworks calculations. Indicate any and all locations at which this flow was measured.*

The final wastewater mixture rule exclusion report uses the National Pollutant Discharge Elimination System (NPDES) Discharge Monitoring Report (DMR) data for all flows used in the calculations. The NPDES permit requires flow measurement at the final outfall 001 and the internal outfalls:

- Sanitary System - Sampling Point 601
- Noncontaminated General Sump - Sampling Point 602
- Contaminated General Sump - Sampling Point 603 (prior to 1987)
- Stormwater System - Sampling Point 604

The block flow diagrams in Attachment 1 show the location of these sampling points. A summary of the data is provided in Table 4 of the report.

2. *Ohio EPA requests any data available which indicates the wastewater flow from the boiler plant from 1985-1990.*

There is not a flow measurement device that measures discharges from the Boiler Plant discharge. The Boiler feed water was estimated as 88,328 gpd in the NPDES permit application renewal. The Boiler Plant discharge is expected to be less than the feed rate. The flow for the NGS calculation used the sampling point 602 of the NPDES DMRs.

The Boiler Plant drains were mistakenly identified in the previous submittal to discharge to the Coal Pile Runoff Basin (CPRB). This is not correct. From October 1985 to 1990, wastewaters from the Ash Wash Sump and Continuous Blowdown in the Boiler Plant flowed to the CPRB and on to the general sump. The Boiler Plant basement floor sumps and drains flowed under the Water Plant to the Chemical Feed Sump and on to the general sump. The Boiler Plant floor sumps and drains never went to the CPRB. Based on this information, the CPRB should not be a regulated as a HWMU.

3. *Ohio EPA requests 1,1,1-TCA distribution and use data for the boiler plant during the years 1985 - 1990.*

FEMP's delivery system requires a "Requisition to Storekeeper" to be completed for delivery of the material. A summary of the Requisition to Storekeeper delivery slips for the Boiler plant is as follows:

YEAR	Boiler Plant (55 gal drums)
1985	5
1986	4
1987	5
1988	6
1989	1
1990	1

4. Ohio EPA requests all documents supporting the calculations for the amount of 1,1,1-TCA in the waste from the boiler plant.

The Boiler plant is the only area in the Noncontaminated General Sump drainage system that TCA was delivered. Therefore, calculations for the Boiler Plant and NGS are the same for 1980 to 1987 and are summarized in the table below. In 1988, the Boiler Plant Maintenance was moved to a building that did not have a drainage system and thus did not add to the NGS TCA concentration.

YEAR	Flow POINT 802 million gallons	TCA USAGE drums	TCA Recovered	TCA Concentration ppm
1980	13.143	2	-	10.69
1981	13.268	2	-	10.58
1982	15.797	3	-	13.34
1983	18.697	4	-	15.02
1984	17.176	2	-	8.18
1985	15.44	5	-	22.74
1986	15.301	4	-	18.36
1987	20.455	5	-	17.16
1988	16.625	6	-	0'
1989	18.467	1	-	0'
1990	26.819	1	-	0'

Boiler Maintenance moved to an area without drains and therefore did not contribute to the NGS system.

5. Ohio EPA requests all available 1,1,1-TCA analytical data from samples collected from the Coal Pile Runoff Basin and the Lime Sludge Ponds.

Coal Pile Runoff Basin (CPRB):

The analytical data available for the CPRB is from two water and two sludge samples taken on November 18, 1991. The samples were analyzed for Total Volatile Organics by GC/MS. A summary of the analytical results is provided in the following table. The water samples (SP-1 and SP-2) were taken inside the CPRB. Sludge composite samples (SP-5 and SP-6) were taken from removed sludge placed northeast of the basin.

DATE SAMPLED/ RELEASE NUMBER	SAMPLE TYPE	TCA CONCENTRATION
11/18/91 Rel. No. 981	(2) Water SP-1, SP-2	< 5 ppb
11/18/91 Rel. No. 981	(2) Sludge SP-5, SP-6	SP-5: 166 ppb and 114 ppb (re-analyses) SP-6: 314 ppb and 263 ppb (re-analyses)

The sludge samples were analyzed twice for volatile organics due to severe matrix effects. The sample and matrix effects resulted in a very low or no recovery of

internal standards and surrogates. The laboratory indicated TCA was detected in both samples, however, "results should be considered only estimated values and not valid results."

Lime Sludge Ponds:

One water sample was taken in May 1991 and analyzed for the Target Compound List (TCL) Volatile organics by GC/MS. The results showed a TCA concentration of 5 ppb.

Water and sludge samples were taken in November 1991 and March 1992. The samples were analyzed for Total Volatile Organics and the full Toxicity Characteristics. The results are summarized as follows:

Table 4: RCRA Facility Assessment Data for The Lime Sludge Ponds		
DATE SAMPLED/ RELEASE NO.	SAMPLE TYPE	TCA CONCENTRATION
11/14/91 Rel. No. 974	3 samples: (1) sludge; (2) water	water: 5.29 ppb, < 5ppb sludge: < 9.3 ppb
11/20/91 Rel. No. 986	3 samples; (3) water	< 5 ppb
11/22/91 Rel. No. 993	4 samples: (1) sludge; (3) water	water: < 200 ppb sludge: < 500 ppb
3/19/92 Rel. No. 1333	9 samples: (9) sludge	8 of 9 samples: non-detectable (range: < 9.2 - < 49.6 ppb); one sample: 23.3 ppb
3/23/92 Rel. No. 1343	12 samples: sludge	10 of 12 samples: < 5 ppb; Two sludge samples: 6 ppb "J" and 1 ppb "J"
4/07/92 Rel. No. 1361	8 samples:sludge	< 500 ppb

The RI/FS sampling program contained two water samples (5/14/91 and 11/6/91) and 2 sludge samples (December 1991) from the Lime Sludge Ponds. The analytical results for the water samples for TCA were < 5 ppb and the total TCA concentration of the sludge samples were < 8 and < 12 ppb.

ENCLOSURE 3
CHARACTERIZATION OF LAND-BASED UNITS IN THE WWTs

Table 1: Updated Characterization of Land-Based Units in the WWTs			
UNITS ID	CRU	AQUEOUS WASTE CHARACTERIZATION ¹	SLUDGE CHARACTERIZATION ¹
Waste Pit 5	1	July, 1993	July, 1993
Clearwell	1	July, 1993	July, 1993
Biodenitrification Lagoon	3	July, 1993	July, 1993
Sludge Drying Beds	3	July, 1993	July, 1993
Coal Pile Runoff Basin	3	-	-
Lime Sludge Ponds	2	SWMU	SWMU

¹ Sampling date with an estimated analyses date by December, 1993