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Indiana Michigan Power
Cook Nuclear Plant
One Cook Place
Bridgman, MI 49106
AEP.com

April 30, 2007

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DPR-58/74 Appendix B 5.4.1

Docket Nos.: 50-315
50-316

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Washington, D.C. 20555-0001

Donald C. Cook Nuclear Plant Units 1 and 2
ANNUAL ENVIRONMENTAL OPERATING REPORT

Enclosed is the Donald C. Cook Nuclear Plant Annual Environmental Operating Report. This report covers the period from January 1, 2006, through December 31, 2006, and was prepared in accordance with the requirements of Environmental Technical Specification 5.4.1.

There are no new commitments in this submittal. Should you have any questions, please contact Ms. Susan D. Simpson, Regulatory Affairs Manager, at (269) 466-2428.

Sincerely,

Joseph N. Jensen
Site Vice President

RV/rdw

Attachment

c: J. L. Caldwell, NRC Region III
K. D. Curry, Ft. Wayne AEP, w/o attachment
J. T. King, MPSC, w/o attachment
MDEQ – WHMD/RPMWS
K. Yale, MDEQ
NRC Resident Inspector
P. S. Tam, NRC Washington, DC

IE25

ATTACHMENT TO AEP:NRC:7541

ANNUAL ENVIRONMENTAL OPERATING REPORT

Donald C. Cook Nuclear Plant Units 1 & 2

Annual Environmental Operating Report

January 1 through December 31, 2006

Indiana Michigan Power Company
Bridgman, Michigan

Docket Nos. 50-315 & 50-316
License Nos. DPR-58 & DPR-74

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I. INTRODUCTION

Technical Specifications Appendix B, Part 2, Section 5.4.1, requires that an Annual Environmental Operating Report be produced and include summaries and analyses of the results of the environmental protection activities required by Section 4.2 of the Environmental Protection Plan for the report period. The Annual Environmental Operating Report shall include a comparison with preoperational studies, operational controls (as appropriate), previous non-radiological environmental monitoring reports, and an assessment of the observed impacts of the plant operation on the environment.

This report serves to fulfill these requirements and represents the Annual Environmental Operating Report for Units 1 and 2 of the Donald C. Cook Nuclear Plant (CNP) for the operating period from January 1 through December 31, 2006.

The following table summarizes the pertinent data concerning the Plant's operation during the period from January 1 to December 31, 2006.

Parameter	Unit 1	Unit 2
Gross Electrical Generation (megawatt hours)	7,551,146	8,664,097
Unit Service Factor (%)	82.8	88.3
Unit Capacity Factor – Maximum Dependable Capacity Net (%)	82.0	88.9

II. CHANGES TO THE ENVIRONMENTAL TECHNICAL SPECIFICATIONS

There were no changes to Environmental Technical Specifications in 2006.

III. NON-RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

A. Non-Routine Reports

A summary of the 2006 non-routine events is located in Appendix I of this Report. No long-term, adverse environmental effects were noted.

B. Environmental Protection Plan

There were no instances of Environmental Protection Plan noncompliance in 2006.

C. Plant Design and Operation

During 2006, there were no changes in station design, operations, tests, or experiments that involved a potentially significant unreviewed environmental issue. There were no environmental evaluations performed during the reporting period.

D. Environmental Monitoring – Herbicide Application

Herbicide applications are the activities monitored in accordance with Technical Specification Appendix B Section 4.2. There were no preoperational

herbicide studies to which comparisons could be made. Herbicide applications are managed by plant procedure PMP-2160-HER-001, "Guidelines for the Application of Approved Herbicides."

A summary of the 2006 herbicide application is contained in Appendix II of this report. Based on observations, there were no negative impacts or evidence of trends toward irreversible change to the environment as a result of the herbicide applications. Based on CNP's review of application records and field observations, the applications conformed to Environmental Protection Agency and State requirements for the approved use of herbicide.

E. Mollusc Biofouling Monitoring Program

Macrofouling monitoring and control activities during 2006 are discussed in Appendix III of this report.

F. NPDES Applications

On March 1, 2005, CNP made application to the Michigan Department of Environmental Quality (MDEQ) to renew its Groundwater Discharge Permit M00988. In response to MDEQ requests for additional information regarding the permit application, the plant made two additional submittals in letters to the MDEQ dated July 25, 2005, and August 11, 2005. The initial application and two additional submittals were reported in the 2005 Annual Environmental Operating Report under Appendix IV, NPDES Applications.

On January 6, 2006, the MDEQ issued a draft Groundwater Permit for CNP review and comment. CNP submitted the Plant's Operation and Maintenance Manual that included Sequencing Batch Reactor Standard Operating Procedures and a report on up-gradient monitoring Well #8 in correspondence dated February 3, 2006, and July 24, 2006. Also submitted were comments on the draft permit in correspondence dated January 20, 2006, and February 23, 2006. The MDEQ re-issued a draft Groundwater Permit for Public Notice in correspondence dated March 16, 2006, and a final Groundwater Permit in correspondence dated May 30, 2006.

As part of the new Groundwater permit conditions, CNP was required to submit a work plan for the installation of an additional up-gradient monitoring Well #16 to replace monitoring Well #8. The work plan is described in CNP correspondence dated July 3, 2006. This work plan was reviewed and accepted by the MDEQ in their correspondence of July 24, 2006. Also within this correspondence, the MDEQ requested that a modified Groundwater Sampling and Analysis Plan be submitted for their review. In correspondence dated August 30, 2006, CNP submitted a revised Groundwater Sampling and Analysis Plan. In the interim, the MDEQ issued a Modified Groundwater Discharge Permit GW1810102 in their correspondence dated August 11, 2006.

The above mentioned 2006 Groundwater Permit application correspondence is listed in Appendix IV of this report.

G. Special Reports

On June 29, 2006, an interim report was submitted to the USEPA, Office of Chemical Emergency Preparedness and Prevention in Chicago, IL. The report was submitted in accordance with paragraph 22 of the Consent Agreement and Final Order (CAFO) to address the status of the supplemental environmental project (SEP) and associated costs to upgrade the Plant's sodium hypochlorite system. Specifically, new double-walled feed piping for the plant sodium hypochlorite system, improved leak detection devices, and a new sodium hypochlorite pump room with improved secondary containment were purchased and installed at CNP and became operational on May 11, 2006.

This CAFO was initially reported in the 2005 Annual Environmental Operating Report under Appendix I, Non-Routine Reports. The interim report is included in Appendix V of this report.

APPENDIX I

NON-ROUTINE REPORTS

2006

2006 Non-Routine Reports

February 28, 2006 – The Total Residual Oxidant (TRO) discharged via Outfall 001 to Lake Michigan exceeded the continuous discharge limit for TRO of 38 micro grams per liter from 1740 to 1750 hrs. on February 23, 2006. A "fresh" sodium hypochlorite delivery that occurred just prior to the event may have changed the concentration in the feed tank and caused the exceedence.

August 18, 2006 – Notice was made to the MDEQ that the recent rise in Lake Michigan temperature had caused CNP to install supplemental cooling for both unit's containment buildings. This supplemental cooling successfully reduced ambient temperatures below technical specification limits of 120 degrees Fahrenheit. The supplemental cooling system consists of pumps drawing Lake Michigan water from the North Intake Tunnel of the Circulating Water System. The untreated lake water is strained and cooled by portable air conditioning units before entering the containment ventilation units. The supplemental cooling water enters the Nonessential Service Water (NESW) system and is routed to the normal NESW discharge point. No chemicals are added to this system and the total volumes for NESW discharge remained unchanged. The system did not result in new or increased loadings of pollutants to the receiving waters of the State, and was deemed not reportable under Part II.C.10, "Notification of Change in Discharge." The system was installed on July 26, 2006, and removed from site on November 2, 2006.

August 31, 2006 – Early on August 24, 2006, CNP reported a potential Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Reportable Quantity (RQ) exceedence involving sulfuric acid at CNP to the National Response Center, the Michigan Pollution Emergency Alert System, the Local Emergency Planning Coordinator, and the Lake Township Fire Department. CNP personnel did this as a precautionary measure as CNP personnel did not know the exact amount of sulfuric acid that had been spilled and whether an RQ had been exceeded triggering a CERCLA/Emergency Planning and Community Right to Know Act notification. Later that morning CNP personnel determined that the 1,000 pound RQ was not exceeded, and none of the spilled acid was released to the environment and CNP retracted the notification to all agencies listed above.

CNP's data originally indicated that approximately 50 gallons was spilled to the secondary containment. It was determined that a diaphragm failure on a pump caused the acid to leak from the acid delivery system to the containment vault. CNP personnel determined that the spill was contained within the containment and no acid was discharged to the environment. CNP personnel recovered the spilled acid and cleaned up the immediate area. It was unnecessary to notify the State Emergency Response Commission/Local Emergency Planning Committee or the Fire Department. There was no known anticipated chronic health risks associated with this reporting event. Also, there were no exposed individuals associated with this event and therefore no medical attention was provided.

September 13, 2006 – Notice was made to the MDEQ that a temporary Reverse Osmosis (RO) trailer was brought on site to replace the CNP permanent RO unit while it underwent repairs. The temporary RO process was almost identical to that in the installed RO pretreatment system, and used the same water treatment additives.

APPENDIX II

HERBICIDE APPLICATION REPORT

2006

INDIANA MICHIGAN POWER
A unit of American Electric Power

Date March 8, 2007

Subject **2006 Herbicide Spray Report - Cook Nuclear Plant**

From Craig Wohlgamuth

To John Carlson, Environmental Manager

The following herbicides were applied per manufacturers' direction by certified Michigan licensed applicators on Cook Nuclear Plant property during 2006:

Via Contractor	Via AEP Personnel
Oust/SFM 75, Du Pont/Vegetation Mgmt.	Round–Up Pro
Diuron 4L, Mana	Garlon 4, Dow
Glyphosate, Du Pont	
2-4D, Riverdale	
Diuron 80, Drexel	

DeAngelo Brothers Applications:
DeAngelo Brothers; a Michigan licensed herbicide applicator on contract to the AEP Energy Delivery and Customer Relations performed the applications (Bill Rahm and Chris Weirich).

On the dates of June 8 and 9 of 2006 a mixture of Diuron 4L, Oust, 2-4D, and Glyphosate was used for total plant control in the 69 KV, 345 KV and 765 KV switch yards, around the Fire Protection Tanks, Kelly Buildings, Steam Generator Mausoleum, Mechanics Garage, Sewage Plant, Dumpster Yard, Fire Training and Laydown Area, CESA Yard, W-Yard, and railroad right-of-ways. A total of 100 quarts of Diuron 4L, 60 ounces of Oust/SFM 75, 18 pounds of 2-4D (granular), 0.5 quarts of 2-4D (liquid), and 20 quarts of Glyphosate were used for the application and spread over 23.0 acres in accordance with the manufacturers' labels.

On July 12, a mixture of Diuron, Glyphosate, SFM-75, and 2-4D was applied to the Railroad "Right-of-Way" across Red Arrow Highway. A total of 55 pounds of Diuron 80, 16 quarts of Glyphosate, 20 ounces of Oust/SFM-75 and 16.0 quarts of 2-4D (liquid) were used for the application and spread over 5 acres in accordance with the manufacturers' labels.

Transmission Forestry:
On April 4, 6, 11, 18, 19, & May 2 of 2006, Brian Welles of American Electric Power's Transmission Forestry Division applied 30.5 gallons of Garlon 4 under the 345 and 765 distribution lines at Cook (aprox. 30 acres).

The following table details the application rates used compared to the allowable application rates for the above applications.

Product Name	Quantity Used		Quantity Used/Acre		Quantity Allowed/Acre	
Diuron 80	55.0	lbs	11.0	lbs	60.0	lbs
Oust/SFM-75	80.0	oz	3.2	oz	8.0	oz
Glyphosate	36.0	qt	1.5	qt	6.4	qt
2-4D (liquid)	16.5	qt	2.4	qt	8.0	qt
2-4D (granular)	18.0	lbs	1.0	lbs	5.0	lbs
Garlon 4	30.5	gal	1.0	gal	8.0	gal
Diuron 4L	100.0	qt	5.1	qt	12.0	qt

Maintenance Building and Grounds:
Round-Up Pro mixed with water in a backpack sprayer was applied to Owner Controlled Areas by licensed applicators from the Maintenance ANR Buildings and Grounds crew (Ron Pressler, Todd Brooks, and John Mock).

Weeds were spot-sprayed at the Visitor's Center, Radioactive Material Building, Training Center, Main Plant Roadway, Sewage Pond Area, Protected Area, Unit 1 RWST Yard and the Unit 2 RWST Yard. A total of 157 ounces of Round-Up Pro were used for spot spraying in 2006. According to the product label, spot spraying should contain a 5 - 10% solution.

The following table details the application rates used for weed control in the grass and garden beds compared to the allowable application rates.

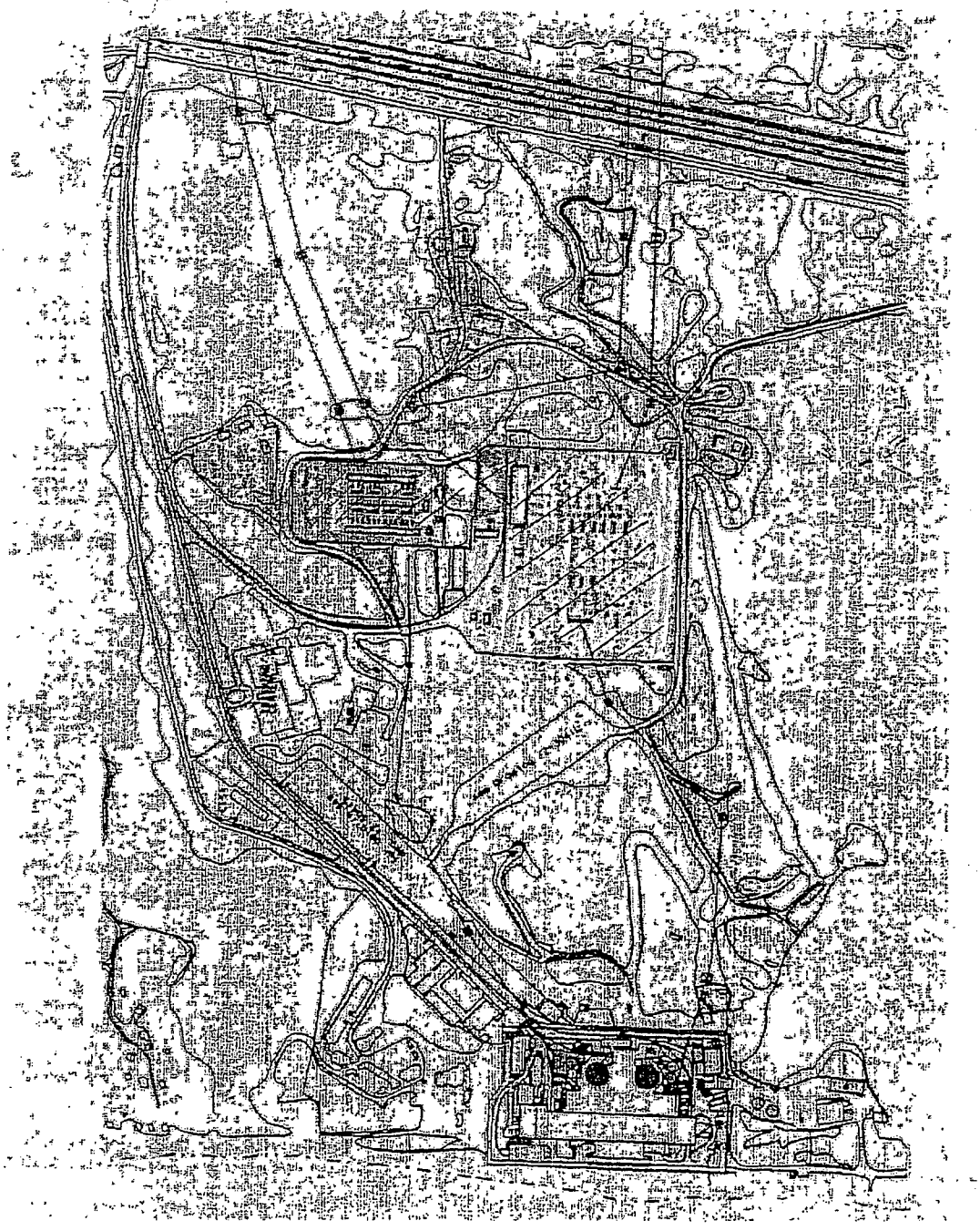
Product Name	Quantity Used	Concentration Used	Concentration Allowed
Round-Up Pro	157 oz	0.8% solution	5 – 10 % solution

Mortality Inspection:
On November 4 - 5, 2006, the mortality of these herbicide applications was assessed to be approximately 90% by environmental technician Dean Warlin. There were no instances of overspray or spills. As a result of the inspection, the following areas require further applications in 2007, as 2006's application was not fully effective:

- Lay down area (bone yard)
- ONS-3 area
- Refuel island rock area
- 12AB Loop Feed Enclosure on the east side of the "blow down" parking lot
- Rock area west and south of the U2 portion of the Turbine Building.

Summary:
In summary, based upon our review of the application records, manufacturer specifications, material safety data sheets (MSDSs) and observations of the treated areas, the herbicides were applied according to the manufacturer's labeled instructions and according to Federal and State requirements. As required by the State of Michigan, all

personnel performing herbicide applications were licensed. A map has been included with this report indicating areas of herbicide application. Detailed maps and application records are filed in PMP-2160-HER-001, Guidelines for the Application of Approved Herbicides. No signs of over spray or spillage were observed. No adverse environmental effects occurred.



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Verified By:
Initial: CW Date: 3-7-07

APPENDIX III

MOLLUSC BIOFOULING MONITORING PROGRAM REPORT

2006

Mollusc Biofouling Monitoring Program 2006

Performed at Donald C. Cook Nuclear Plant

Performed and Submitted
By
Cook Plant Environmental

Prepared for:

American Electric Power
Donald C. Cook Nuclear Plant
One Cook Place
Bridgman, Michigan

MOLLUSC BIOFOULING MONITORING PROGRAM
2006

March 2007

Cook Nuclear Plant
Environmental Section

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List of Tables and Figures

Executive Summary

Biofouling studies have been conducted at the Donald C. Cook Nuclear Plant since 1983. In 1991, monitoring of zebra mussels in the circulating water, essential service water (ESW), and nonessential service water (NESW) systems was added to the program. The objectives of this monitoring program are to detect the presence and determine the density of zebra mussel veligers in the Circulating Water System and postveliger settlement and growth rate in the forebay and service water systems, and to determine the effectiveness of oxidizing and non-oxidizing biocides in the plant systems by comparing densities and sizes of settled zebra mussels when applicable.

Veligers were present in the forebay from 27 April through 7 December 2006. Peak densities occurred on 24 May, 13 July, and 12 October with the major peak occurring on 12 Ocotober (191,750 veligers per cubic meter). Past years' studies have determined that zebra mussel density is independent of the volume of water entering the plant, as the concentration of veligers in the water remains the same regardless of the flow rate through the plant. The past sixteen years data suggest that the zebra mussel population is highly variable and future populations of zebra mussels are difficult to accurately predict.

Cumulative settlement was monitored in the forebay using a six-inch PVC pipe. As in 2005, the time period of collection was made to more accurately coincide with the annual fall intake crib cleaning to estimate the size and density of mussels the divers might encounter at the time of cleaning. The PVC pipe was deployed on 15 September 2005 and was retrieved on 13 September 2006. The settlement density and average size of postveligers for the 12-month period was 303,801 individuals/m^2 and 2470u (2.5 mm).

Despite its deployment for an 12 month period vs. 8 months in 2005, the mussel density on the PVC sampler pulled in September 2006 was about one third higher as one would expect with the longer sampling duration than the sampler pulled in September 2005 (213,125 ind./m^2). However, the average individual size was about the same those of the 2005 sampler (2.4 mm).

Service Water Systems and Miscellaneous Sealing and Cooling Water

The return sides (after systems' use) of the ESW and NESW systems and the MSCW system were monitored in the 2006 Mollusc Biofouling Monitoring Program. The results indicate that the chlorination system was effective in preventing growth and prolonged settlement of postveligers in the service water systems. Zebra mussel settlement on NESW and MSCW artificial substrates was slightly elevated for a short period in mid-July due to a plugged NESW chemical injection quill. Settlement was brought under control throughout the remainder of the summer. During the fall Unit 1C21 Refueling Outage, service water system chlorination was secured due to diver cleaning of the circulating water intake forebay and valve maintenance on the Unit 1 Circulating Water Discharge Vault valves. Settlement was again brought under control when chlorination was resumed near the end of the outage. The results showed that even when the system was taken out of service for short periods of time for system maintenance, or that system TRC residuals fell below their target band of 0.08-0.6 ppm, settlement control was quickly re-established.

The Unit 2 Plant Air Compressor first stage intercooler zebra mussel blockage event of 17 November indicates that small bore piping systems are potentially at risk to zebra

mussel trans-locators in the absence of chlorination. Therefore, chlorination system outages should be kept to a minimum, especially during the spawning season.

Biocide Treatment

There were no biocide treatments in 2006.

Chapter 1

Introduction

1.1 Past History

American Electric Power Company (AEP) has been conducting zebra mussel monitoring studies at the Donald C. Cook Nuclear Plant since 1991. The purpose of these studies is to monitor zebra mussel veliger and postveliger settlement densities in the Circulating Water, Essential Service Water (ESW), Nonessential Service Water (NESW), and Miscellaneous Sealing and Cooling Water (MSCW) systems to help determine the effectiveness of the zebra mussel control program.

Since 1999, Grand Analysis conducted the monitoring program, designed to detect the timing of spawning and settling of zebra mussels at the Cook Nuclear Plant. In 2004 the program was taken "in house" by the Plant's Environmental staff. The program also determines densities for: 1) whole water samples for planktonic veligers; and 2) artificial substrates set within the ESW, NESW, and MSCW systems for cumulative postveliger settlement. In the Circulating Water System, a section of PVC piping was used to determine the cumulative settlement in the intake forebay.

There were no biocide treatments performed in 2006.

1.2 Objectives

Specific objectives for the 2006 Mollusc Biofouling Monitoring Program were as follows:

- Conduct whole-water sampling of the Circulating Water System weekly (July-September), bimonthly (May, June, October & November), and monthly (April and December) to determine the presence and density of larval zebra mussels.

- Deploy artificial substrates (microscope slides in test tube racks) in the service water systems to determine cumulative settlement of postveligers. Collect samples monthly from May through December.

- Deploy a PVC piping section, also as an artificial substrate, in the intake forebay to determine cumulative settlement for approximately one year.

Chapter 2

Methods

2.1 Whole-Water Sampling

Whole-water sampling of the Circulating Water System was conducted from 27 April to 7 December 2006 (Table 2-1). Samples were collected from mid-depth in the intake forebay by pumping lake water through an in-line flowmeter into a plankton net. The sampling location was consistent with that of previous studies. Two replicates (2,000 liters each) were collected during each sampling date.

A Myers Model 2JF-51-8 pump or equivalent was connected to an in-line flowmeter assembly (Signet Model #P58640) and pumped water into a plankton net for approximately one hour. To minimize organism abrasion, measured flow was directed into a No. 20 plankton net that was suspended in a partially filled 55-gallon plastic barrel.

Samples were gently washed into the cod-end bucket of the plankton net using filtered Circulating Water System water and then transferred to a one-liter plastic container. Filtered water was added to the container to ensure that a full liter was analyzed. The two samples were analyzed immediately in an on-site laboratory.

Samples were mixed thoroughly for three minutes using a magnetic stir plate. Then, using a calibrated Pasteur pipette, a 1-milliliter aliquot of mixed sample was placed into a Sedgewick-Rafter cell for counting. An Olympus SZ-1145 binocular microscope (18-110x) equipped with cross-polarizing filters was used. Ten aliquots

TABLE 2-1

SAMPLING SCHEDULE FOR ZEBRA MUSSEL MONITORING AT THE D.C. COOK NUCLEAR PLANT IN 2006

Date		Whole Water	Artificial Substrates
April	27	X(1)	
May	11	X	
	24	X	X
June	8	X	
	22	X	X
July	6	X	
	13	X	
	20	X	X
	27	X	
August	2	X	
	11	X	
	17	X	X
	24	X	
	31	X	
September	7	X	
	13	X	X (2)
	21	X	
	27	X	
October	12	X	X
	27	X	
November	9	X	X
	21	X	
December	7	X	X

1. Deploy slide racks.
2. Retrieve PVC pipe section. Read, clean & re-deploy.

were counted and the average was extrapolated to determine the number of individuals per cubic meter. The density was calculated as follows:

Density (#/m3)=(average #*DF)/0.001L*1L/2000L*1000L/m3

DF- Dilution Factor

This process was repeated for the second replicate and the mean of the two values was calculated to yield a final density value. Size measurements were recorded for up to 50 organisms from each sample. Veliger size was measured using an ocular micrometer that was calibrated to a stage micrometer.

2.2 Artificial Substrates

To determine zebra mussel settlement in the Circulating Water, a PVC section was deployed in the intake forebay, upstream of the trash racks. Bio-box side-stream samplers were installed on the return sides of both service water systems and on the Miscellaneous Sealing and Cooling Water System to determine settlement in these systems. The side-stream samplers consisted of modified test-tube racks designed to hold microscope slides and placed in bio-boxes for cumulative sampling.

2.2.1 Intake Forebay

On 13 September 2006, a PVC pipe section was analyzed that was placed in the forebay on 15 September 2005. The PVC section measured 6 inches long and had an inside diameter of 3.5 inches. It had been cut in half lengthwise, rejoined using hose clamps, attached to a rope weighted by a stainless steel pipe section, and suspended at

mid-depth in the intake forebay. The PVC sampler was analyzed for densities and shell sizes by analyzing scrapings from two separate one-inch square sections of the PVC sampler. The PVC sampler was designed to provide information on zebra mussel accumulated infestation and sizes occurring over a 1-year period from September 2005 to September 2006.

2.2.2 Service Water Systems

Side-stream bio-boxes were placed on the return side of the service water systems (1 ESW, 2 ESW, NESW) and the Miscellaneous Sealing and Cooling (MSCW) Water System. Each bio-box contained two modified test tube racks containing a total of 80 microscope slides. The racks held the slides above the bio-box base that allowed silt and sediment to fall out before they could affect the slide settlement. The bio-boxes were covered with a plant-approved fireproof fabric to limit light exposure. Plant personnel checked the bio-boxes periodically to ensure that adequate flow was available, and flow was adjusted as necessary. Ten slides from each location were retrieved monthly and immediately analyzed for densities and shell size.

2.2.3 Artificial Substrate Cumulative Sample Analysis

An Olympus SZ-1145 binocular microscope (18-110x) equipped with cross polarizing filters was used for analyzing samples. After one side of the slide was scraped clean, the slide was placed on the microscope stage so that the attached postveligers could be counted. When slides became heavily infested, a sub-sampling technique was followed:

- The slides were sub-sampled using a straight edge that permitted either half or a quarter of the slide to be counted. Counts were then proportionally extrapolated to one square meter.

Settlement rates were computed by taking the average number of mussels from the ten slides and multiplying this value by 533.33 to obtain the density of zebra mussels per square meter. (One postveliger/microscope slide equals 533.33 postveligers per square meter.)

Shell diameters were measured for up to 50 random individuals to obtain maximum, minimum and mean sizes. Diameters were measured using an ocular micrometer calibrated to a stage micrometer.

Chapter 3

Results and Discussion

The zebra mussel monitoring system performed up to expectations in 2006. The whole-water sampling for free-swimming veligers coupled with monitoring postveliger settlement on artificial substrates provided sample results that could be compared with previous years' data.

Appendix Table 1 shows the chlorination values for the ESW and NESW systems. A 0.08-0.6 ppm total residual chlorine (TRC) was the target band for the control of zebra mussel settlement. Total residual chlorine values for the ESW and NESW systems were taken periodically. The MSCW system, which was cross-connected to the NESW system, was chlorinated on all of the dates that the NESW system was chlorinated.

3.1 Whole-Water Sampling

Sampling of planktonic veligers in the circulating water system was initiated 27 April and was completed on 7 December. Results are presented in Table 3-1 and in Figure 3-1. Veligers were present in all samples throughout the monitoring season.

Heaviest spawning activity occurred during mid-May to early June, mid-July, and late August through mid-October. The major peak density occurred on 12 October (191,750 ind./m^3). This major peak occurred two weeks later than 2005's, and is consistent in timing with major peaks that occurred on 11 October 1993 (108,950 ind./m^3) and 10 October 1996 (292,750 ind./m^3). The 2006 peak density fell between the 1993 and 1996 peak densities. Overall, 2006's Whole-Water results were less than half

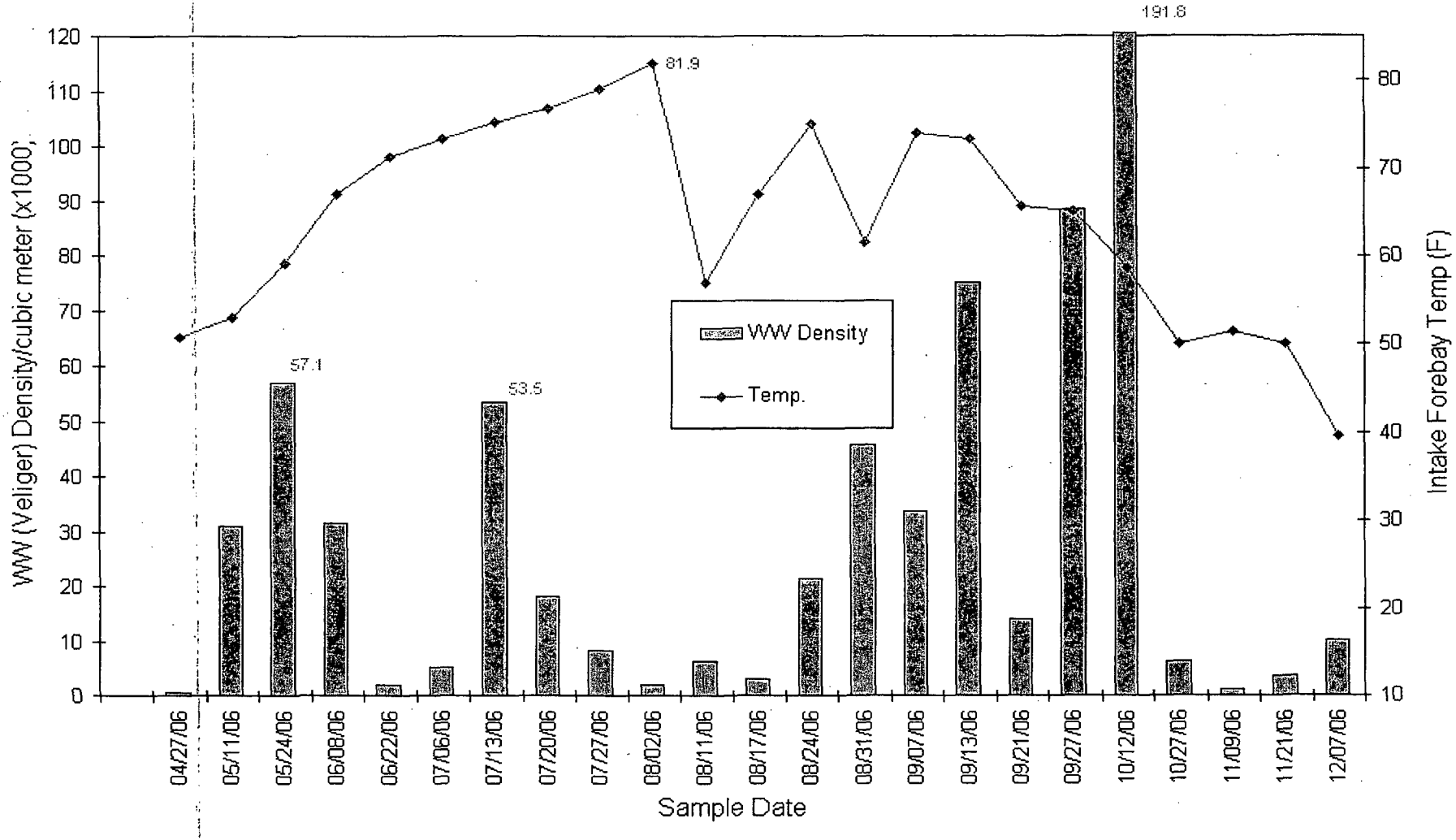
TABLE 3-1

Whole-Water Sampling Program Number of Zebra Mussel Veligers Per Cubic Meter, Veliger Size Range, and Mean Veliger Size (*um*) Collected in The D.C. Cook Nuclear Plant Forebay in 2006

Date	Density (No./m3)	Size Range (*um*)	Mean Size (*um*)
4/27/06	625	100-366	136
5/11/06	30825	121-123	122
5/24/06	57100	83-233	122
6/8/06	31575	100-266	169
6/22/06	1950	100-250	132
7/6/06	5150	100-316	182
7/13/06	53450	100-266	147
7/20/06	17975	121-145	222
7/27/06	8225	118-314	201
8/2/06	1825	100-283	116
8/11/06	6325	118-314	158
8/17/06	3150	100-233	163
8/24/06	21450	83-300	167
8/3106	45650	100-333	144
9/7/06	33750	100-266	154
9/13/06	75000	83-233	147
9/21/06	14025	100-1232	193
9/27/06	88500	67-266	139
10/12/06	191750	83-250	126
10/27/06	6300	97-338	188
11/9/06	1000	117-333	176
11/21/06	3525	83-433	176
12/7/06	10125	83-666	165

FIGURE 3-1

2006 D.C. Cook Plant- Whole-Water Zebra Mussel Veliger Density and Water Column Temperature in Intake Forebay



than the recorded peak density for 2005 (455,000 ind./m^3) and much like 2004 (212,500 ind./m^3). Secondary peaks were recorded in 2006 on 24 May (57,100 ind./m^3) and 13 July (53,450 ind./m^3).

Whole water veliger densities collapsed after their peak on 12 October and remained low with falling lake temperatures into December. The whole-water densities show that there are substantial numbers of veligers in the forebay, indicating the need for effective chlorination in the service water systems.

The 2003 report concluded that yearly results in peak abundances make it difficult to predict when the peak abundance will occur each season other than estimating some time between July and October. Continued whole-water monitoring during the veliger spawning season will detect when these peak abundances occur.

Whole-water densities recorded during 1993 through 1995 for the November and December sampling periods were less than 1,000 ind. /m^3 for sampling conducted after 3 November. During the 1996 through 2000 as well as 2002 through 2006 sampling seasons, whole-water densities recorded in November were about five times greater than those of the 1993 through 1995 period, showing that spawning occurred into the late fall due to warm fall weather. In 2001, warm fall weather was not experienced as in the previous five years, as whole-water densities observed in November 2001 were less than 2,000 ind. /m^3. Because of the late fall spawning in recent years, there is a need for chlorination to continue into the late fall months to prevent zebra mussel settlement and growth in plant systems.

In summary, zebra mussel veligers were present in the water column on all sampling dates from 27 April through 7 December. Spawning commenced in mid-May and continued through the end of the sampling program. Peak veliger densities occurred on 24 May, 13 July, and 12 October.

3.2 Artificial Substrate Sampling, Biocide Treatment, and Mechanical Cleaning

3.2.1 Circulating Water System Artificial Substrate Sampling

Cumulative settlement was monitored in the intake forebay using a six-inch PVC pipe with a 3.5 inch inside diameter. The PVC pipe was set in the forebay on 15 September 2005 and retrieved on 13 September 2006 to determine the average density and size range for 12 months. The density on the substrate was 303,801 ind./m^2. Individuals ranged from 242*u*-16,181*u* (.24mm – 16.18mm) and the mean size of fifty randomly selected individuals was 2,470*u* (2.5mm). As in 2005, the time period of collection was designed to coincide with the annual fall intake crib cleaning to estimate the size and density of mussels the divers might encounter at the time of cleaning. Despite its deployment for an 12 month period vs. 8 months in 2005, the mussel density on the PVC sampler pulled in September 2006 was about one third higher as one would expect with the longer sampling duration than the sampler pulled in September 2005 (213,125 ind./m^2), but the average individual size was about the same those of the 2005 sampler (2.4 mm).

3.2.2 Service Water Systems and Miscellaneous Sealing and Cooling Water System Artificial Substrate Sampling

The return sides (after systems' use) of the ESW and NESW systems and the MSCW system were monitored in the 2006 Mollusc Biofouling Monitoring Program. Chlorine is injected beneath each ESW pump suction. The ESW trains are typically cross-tied downstream of the chlorine injection point so that both ESW trains are served. A separate chlorine injection point, which is in the suction header, serves the NESW system and subsequently the MSCW system.

Cumulative settlement sampling and analysis was performed on a monthly basis in 2006. Artificial substrate slides were installed on 27 April and ten slides per month were examined and not replaced. Results are shown in Table 3-2 and Figure 3-2.

The chlorine residual and postveliger settlement data indicate that the permanent chlorination system installed under 12-MOD-50719 on 18 July 2005 performed up to expectations. When chlorine was being delivered to the service water and MSCW systems, post-veliger settlement was maintained under control (<1,000 ind./m^2).

During the 20 July sampling period, post-veliger densities in the NESW and MSCW became slightly elevated due to the sodium hypochlorite tubing to the NESW injection quills being blocked. Early signs of this blockage became apparent in early June after the chlorination system was restarted after the Total Residual Chlorine (TRC) Sample System breaker cleaning on 31 May. In June, NESW chlorine delivery had difficulty being maintained within its intended target band of 0.08-0.6 ppm. NESW chlorination

was taken out of service between 12 July and 4 August to clear the blockage (WR06350455).

Service water and NESW chlorination was shut down during the fall Unit 1 C21 Refueling Outage to allow diver cleaning of the intake forebay and maintenance work on the Unit 1 Discharge Vault valves. When chlorination was resumed post-outage, post-veliger settlement came back under control through the end of the study period.

On 17 November 2006, suspect partial blockage of the Unit 2 Plant Air Compressor 2-OME-41 first stage intercooler NESW cooling line was reported. (WR06352933, AR 00805601) Removal of the front turning end plate revealed debris across the tube entrance was at the inlet to the first pass. The debris was primarily very small (1/4 inch or less) live zebra mussels. The tube entrances were blocked by the bridging of these small mussels. The volume of mussels was determined by the System Engineer to be a handful. The first stage intercooler was replaced and "last chance Y strainers" were installed on the inlet side of the intercooler. A similar "Y strainer" modification is planned for the Unit 1 Plant Air Compressor intercooler. The combination of the NESW chlorination being out of service between 12 July and 4 August and again during the fall Unit 1 C21 Refueling Outage, may have contributed to zebra mussel trans-locators being established in the intercooler.

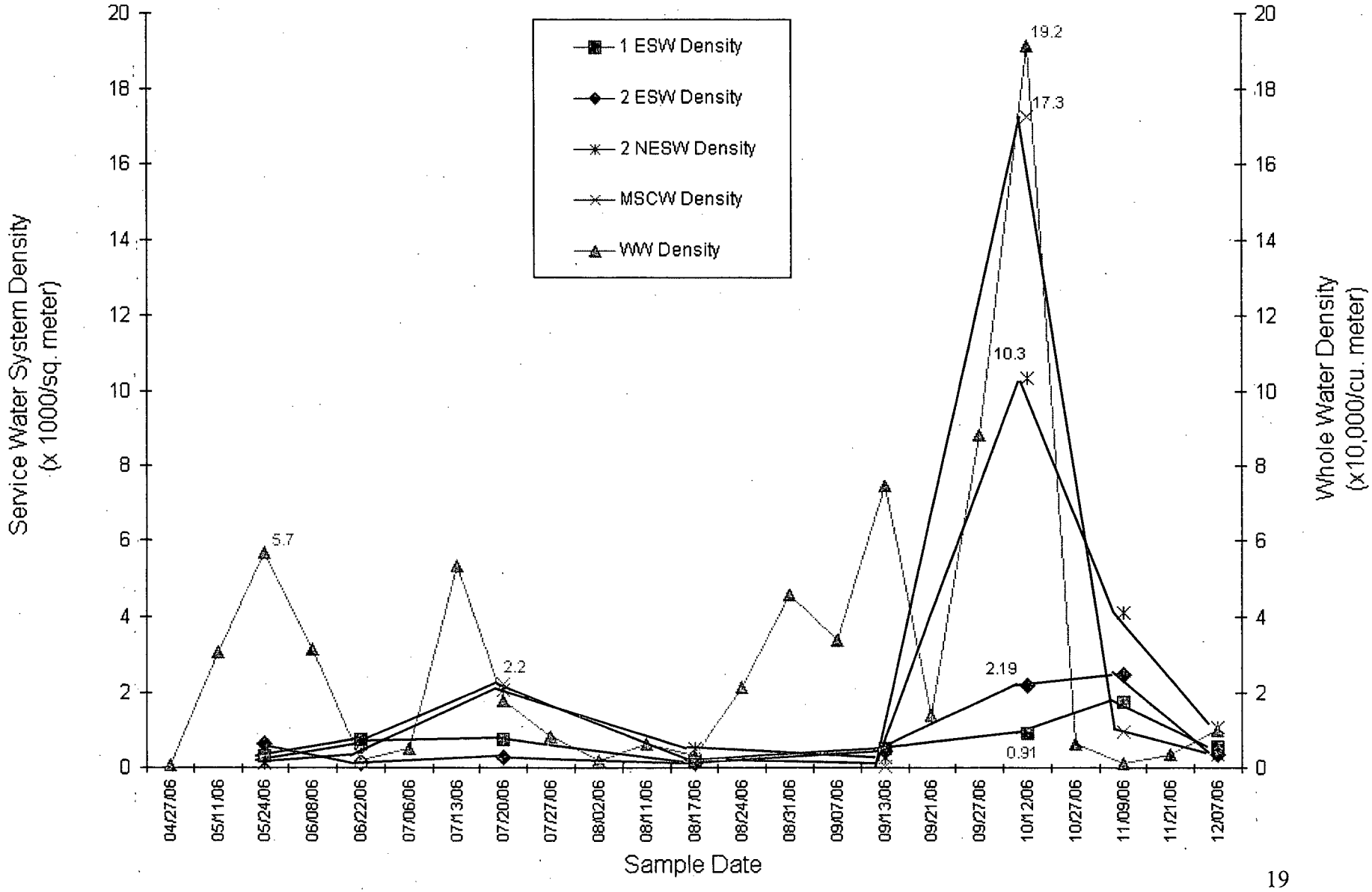
TABLE 3-2

Density, Average Size, and Size Range of Settled Zebra Mussel Postveligers Collected on Cumulative Artificial Substrates Placed in the Forebay, in the Service Water Systems and Miscellaneous Sealing and Cooling Water System in the D.C. Cook Nuclear Plant in 2006.

Cumulative Samples															
	Forebay			NESW			MS&CW			1 ESW			2 ESW		
Date	Density (no/m2)	Avg. Size (um)	Range (um)	Density (no/m2)	Avg. Size (um)	Range (um)	Density (no/m2)	Avg. Size (um)	Range (um)	Density (no/m2)	Avg. Size (um)	Range (um)	Density (no/m2)	Avg. Size (um)	Range (um)
5/24/2006	-	-	-	107	97	97-97	160	113	97-145	320	97	97-97	640	119	97-217
6/22/2006	-	-	-	373	148	97-242	640	244	121-411	747	257	217-290	107	242	217-266
7/20/2006	-	-	-	2080	167	98-294	2240	238	78-627	747	228	78-588	267	157	118-235
8/17/2006	-	-	-	533	209	121-242	213	350	290-435	160	201	121-242	107	109	97-121
9/13/2006	303,801	2470	242-2807	267	110	78-196	53	294	294-294	533	123	78-196	427	113	59-196
10/12/2006	-	-	-	10,347	325	78-510	17,280	407	78-784	907	189	78-353	2187	204	98-392
11/9/2006	-	-	-	4107	336	196-470	960	341	98-510	1760	237	118-392	2453	236	97-588
12/7/2006	-	-	-	1067	335	274-431	373	319	118-588	53	157	157-157	373	221	118-470

FIGURE 3-2

2006 D.C. Cook Plant- Whole-Water Zebra Mussel Veliger Density and Zebra Mussel Postveliger Cumulative Settlement in the Service Water Systems



In summary, the results indicate that the chlorination system was effective in preventing growth and prolonged settlement of postveligers in the service water systems. Zebra mussel settlement on NESW and MSCW artificial substrates was slightly elevated for a short period in mid-July due to a plugged NESW chemical injection quill. Settlement was brought under control throughout the remainder of the summer. During the fall Unit 1C21 Refueling Outage, service water system chlorination was secured due to diver cleaning of the circulating water intake forebay and valve maintenance on the Unit 1 Circulating Water Discharge Vault valves. Settlement was again brought under control when chlorination was resumed near the end of the outage. The results showed that even when the system was taken out of service for short periods of time for system maintenance, or that system TRC residuals fell below their target band of 0.08-0.6 ppm, settlement control was quickly re-established.

3.2.3 Biocide Treatment

There were no biocide treatments in 2006.

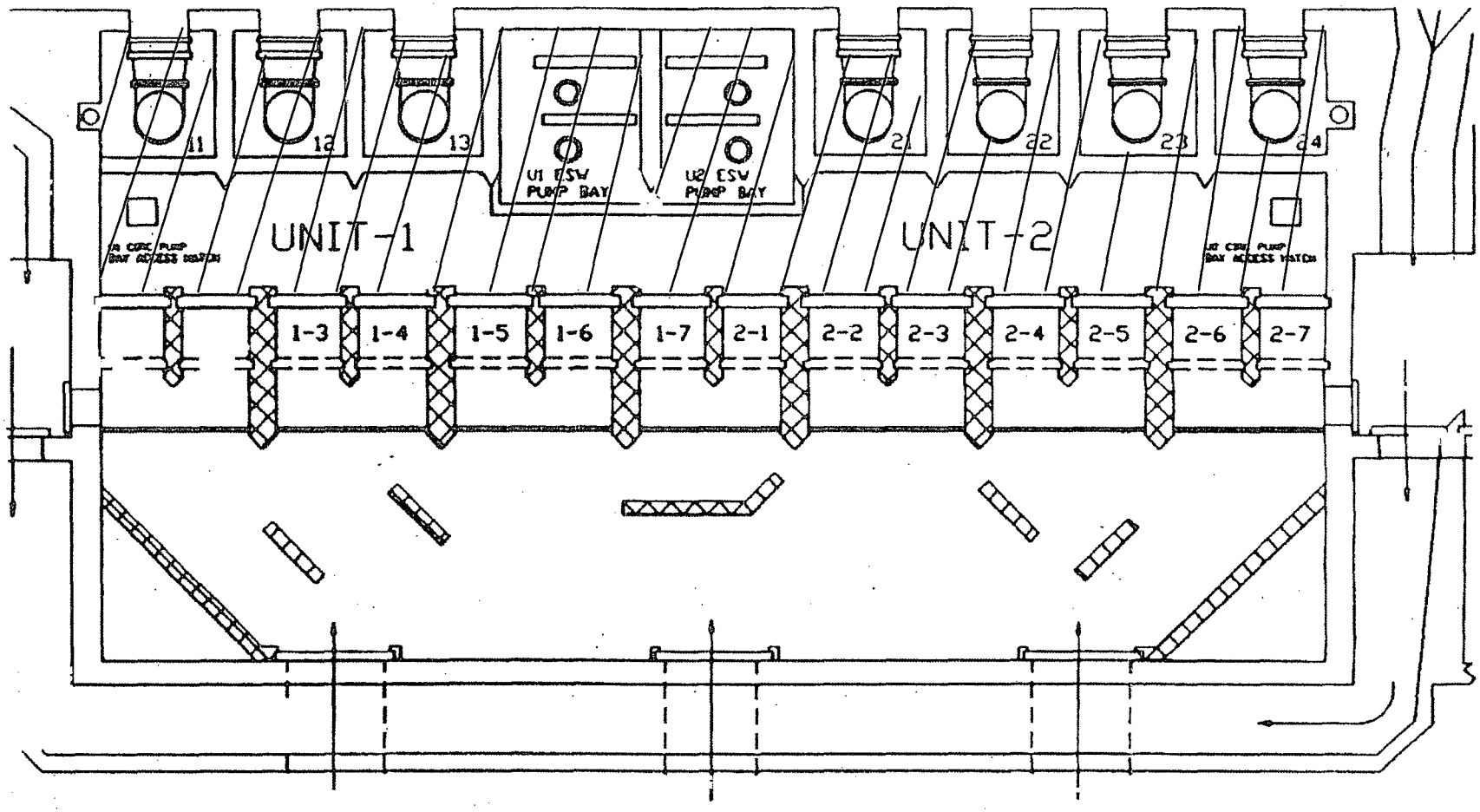
3.2.4 Mechanical Cleaning

During the Unit 2C16 (March-April) and Unit 1C21 (Sept.-Oct) refueling outages , divers were employed to mechanically clean sand, zebra mussels, and debris from the walls and floors of the Unit 1&2 Circulating Water Intake Forebays and Unit 1&2 Condenser Inlet Tunnels. The Unit 1&2 Condenser Inlet Tunnels were cleaned in their entirety. The Unit 1&2 Intake Forebays were cleaned on the east (plant) side of the traveling screens (Figure 3-3). This included areas of the Unit 1&2 Circulating Water Pump and Unit 1&2 ESW

Pump bays. The bays on the west (lake side) of the traveling screens to the trash racks, and further west of the trash racks extending to the west wall of the intake forebay were not cleaned. These areas were eliminated from the cleaning schedule due to diver safety and flow restraints and also with the expectation that the new robust multi-disk screens would be able to handle the zebra mussel sloughage from the walls and surfaces, and sand and mussel debris accumulation on the floor upstream.

In the Fall of 2006, the divers cleaned the intake crib velocity caps, ice guards, and trash racks of zebra mussels to remove the food source that attracts wild ducks to the intake cribs.

Figure 3-3
Screenhouse Intake Forebay



Note: Lined out areas were cleaned during the U1C21 and U2C16 Refueling Outages.

Chapter 4

Summary and Recommendations

4.1 Summary

The 2006 Mollusc Biofouling Monitoring Program was initiated on 27 April and continued to 7 December. The major spawning peak occurred on 12 October. The major spawning periods were mid-May to early June, mid-July, and late August through mid-October. Whole water veliger densities collapsed after their peak on 12 October and remained low with falling lake temperatures into December. The whole water densities show that there are substantial numbers of veligers in the forebay, indicating the need for effective chlorination in the service water systems. The 2003 report concluded that yearly results in peak abundances make it difficult to predict when the peak abundance will occur each season other than estimating some time between July and October. Continued whole-water monitoring during the veliger spawning season will detect when these peak abundances occur.

The intake forebay PVC sampler zebra mussel density was 303,801 ind./m^2. Individuals ranged from 242*u*-16,181*u* (.24mm – 16.18mm) and the mean size of fifty randomly selected individuals was 2,470*u* (2.5mm). As in 2005, the time period of collection was designed to coincide with the annual fall intake crib cleaning to estimate the size and density of mussels the divers might encounter at the time of cleaning. Despite its deployment for an 12 month period vs. 8 months in 2005, the mussel density on the PVC sampler pulled in September 2006 was about one third higher as one would expect with the longer sampling duration than the sampler pulled in September 2005 (213,125 ind./m^2), but the average individual size was about the same those of the 2005 sampler (2.4 mm).

The data indicates that the chlorination system, when operational, was effective in preventing growth and prolonged settlement of postveligers in the service water systems. The results showed that even when the system was taken out of service for short periods of time for system maintenance, or that system TRC residuals fell below their target band of 0.08-0.6 ppm, settlement control was quickly re-established. The Unit 2 Plant Air Compressor first stage intercooler zebra mussel blockage event indicates that small bore piping systems are potentially at risk to zebra mussel trans-locators in the absence of chlorination. Therefore, chlorination system outages should be kept to a minimum especially during the spawning season.

Reports of visual inspections of heat exchangers performed during the Unit 1C21 Refueling Outage showed no live zebra mussel colonies residing in systems that were chlorinated.

4.2 Recommendations

Based on observations made during the course of this program, the following recommendations are being made:

- Whole-Water sampling should continue to be initiated in April to determine the presence of veligers in the water column, as currently implemented. The whole-water sampling frequency in 2005 was reduced from weekly to twice monthly in the months of June, October, and November to lessen the sampling burden and better target sampling based on previous years' spawning data. This sampling frequency reduction proved to be effective in 2005 and 2006 as the major spawning peaks were still able to be captured, but with less sampling and

analysis effort. This reduced sampling schedule should be continued as currently implemented.

- Studies of cumulative postveliger settlement should continue to be conducted from May through December, as currently implemented.
- Chlorination should continue to run throughout the spawning season, as currently implemented. Chemistry issued Rev. 15 to 12-THP-6020-CHM-313, Chlorination on 6 February 2006, which expanded their chlorination target band from 0.2-0.5 ppm to the range of 0.08-0.6 ppm TRC to provide more flexibility to reduce chlorine concentrations in times when bio-fouling is not a concern. Zebra mussel sampling and analysis in 2006 confirmed the efficacy of this target band change. Chlorination system outages should be kept to a minimum to the extent possible to minimize the potential for trans-locator fouling in small bore piping systems.
- Maintain daily bio-box flow checks to ensure bio-box conditions are representative of system conditions.
- Chlorination data from all water systems (ESW, NESW, and MSCW) and temperature data should continue to be made available to allow meaningful interpretation of results.

References

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Appendix Table 1

SWS Chlorination Values for 2006 Zebra Mussel Monitoring Program

Date	U-1 ESW [Cl2] East (ppm)	U-1 ESW [Cl2] West (ppm)	U-2 ESW [Cl2] East (ppm)	U-2 ESW [Cl2] West (ppm)	U-1 NESW [Cl2] (ppm)	U-2 NESW [Cl2] (ppm)
5/3/2006	Cl2 ON		Cl2 ON	Cl2 ON	Cl2 ON	Cl2 ON
5/4/2006	0.52	0.12	0.11	0.53	0.18	0.35
5/5/2006	0.47	0.11	0.11	0.48	0.18	0.2
5/8/2006	0.17	0.12	0.22	0.19	0.19	0.28
5/10/2006	< 0.08	0.21	0.17	< 0.08	0.22	0.29
5/11/2006	< 0.08			< 0.08		
5/12/2006	0.19	0.14	0.15	0.16	0.24	0.24
5/15/2006	0.14	0.1	0.13	0.14	0.18	0.2
5/17/2006	< 0.08	0.12	0.1	< 0.08	0.19	0.26
5/17/2006	0.12			0.14		
5/19/2006	< 0.08	0.09	0.08	< 0.08	0.2	0.23
5/20/2006	0.28	0.11	0.23	0.33		
5/22/2006	0.15	0.11	0.11	0.23	0.19	0.19
5/24/2006	< 0.08	0.13	0.18	< 0.08	0.22	0.2
5/26/2006	0.14	0.14	0.12	0.09	0.22	0.26
5/29/2006	< 0.08	0.13	0.14	0.09	0.22	0.28
5/31/2006	Cl2 OFF		Cl2 OFF		Cl2 OFF	Cl2 OFF
6/1/2006	Cl2 ON		Cl2 ON		Cl2 ON	Cl2 ON
6/2/2006	0.66	< 0.08	< 0.08	0.49	< 0.08	< 0.08
6/2/2006	< 0.08	< 0.08	< 0.08	0.09	< 0.08	< 0.08
6/4/2006	< 0.08	0.18	0.18	0.08	< 0.08	< 0.08
6/5/2006	0.09	0.2	0.16	0.09	< 0.08	0.1
6/6/2006					< 0.08	< 0.08
6/7/2006	< 0.08	0.1	0.1	< 0.08	< 0.08	< 0.08
6/7/2006			Cl2 OFF			
6/8/2006			Cl2 ON			
6/9/2006	< 0.08	0.14	0.13	0.08	< 0.08	0.08
6/9/2006	0.16	0.09	0.1	0.2	< 0.08	< 0.08
6/9/2006					< 0.08	0.1
6/9/2006					< 0.08	< 0.08

Appendix Table 1

SWS Chlorination Values for 2006 Zebra Mussel Monitoring Program

Date	U-1 ESW [Cl2] East (ppm)	U-1 ESW [Cl2] West (ppm)	U-2 ESW [Cl2] East (ppm)	U-2 ESW [Cl2] West (ppm)	U-1 NESW [Cl2] (ppm)	U-2 NESW [Cl2] (ppm)
6/12/2006	< 0.08	< 0.08	0.1	< 0.08	< 0.08	0.11
6/14/2006	< 0.08	0.1	0.1	0.08		0.12
6/16/2006	0.08	< 0.08	0.09	< 0.08	< 0.08	< 0.08
6/19/2006	0.11	0.17	0.21	0.21	psc	psc
6/21/2006	< 0.08	0.12	< 0.08	0.09		0.1
6/23/2006	< 0.08	< 0.08	< 0.08	< 0.08		< 0.08
6/23/2006	0.19	0.23	0.2	0.34		0.09
6/30/2006	< 0.08	< 0.08	< 0.08	< 0.08		< 0.08
6/30/2006	< 0.08	< 0.08	0.09	< 0.08		0.1
7/1/2006	< 0.08	0.09	0.1	0.27		< 0.08
7/1/2006	< 0.08	0.08	0.1	< 0.08		< 0.08
7/2/2006	0.52	0.11	0.17	0.55		< 0.08
7/3/2006	0.28	0.09	0.11	0.3	Cl2 OFF	< 0.08
7/5/2006	0.14	0.09	0.08	0.24		0.08
7/6/2006					Cl2 ON	
7/7/2006	< 0.08	0.13	0.13	< 0.08	< 0.08	< 0.08
7/7/2006	0.1	0.13	0.29	0.08	< 0.08	< 0.08
7/10/2006	< 0.08	0.09	0.12	< 0.08	< 0.08	< 0.08
7/12/2006	0.09	0.13	0.18	0.1	< 0.08	< 0.08
7/12/2006					Cl2 OFF	Cl2 OFF
7/14/2006	0.09	0.12	0.14	0.11	psc	
7/17/2006	0.1	0.13	0.13	0.1		
7/19/2006	< 0.08	< 0.08	0.16	< 0.08		
7/20/2006	< 0.08	0.09	0.08	< 0.08		
7/21/2006	0.11	0.2	0.2	0.16		Cl2 ON
7/21/2006						0.32
7/22/2006			Cl2 OFF			Cl2 OFF
7/24/2006	Cl2 OFF	Cl2 OFF	Cl2 OFF	Cl2 OFF		Cl2 OFF
7/25/2006	< 0.08	< 0.08	Cl2 ON			
7/25/2006			0.13	< 0.08		

Appendix Table 1

SWS Chlorination Values for 2006 Zebra Mussel Monitoring Program

Date	U-1 ESW [Cl2] East (ppm)	U-1 ESW [Cl2] West (ppm)	U-2 ESW [Cl2] East (ppm)	U-2 ESW [Cl2] West (ppm)	U-1 NESW [Cl2] (ppm)	U-2 NESW [Cl2] (ppm)
7/26/2006	0.09	0.12	0.12	0.09		Cl2 ON
7/26/2006						0.18
7/28/2006	< 0.08	0.15	0.11	< 0.08	S/D	0.17
7/31/2006	< 0.08	< 0.08	< 0.08	< 0.08		0.16
8/1/2006	Cl2 OFF	Cl2 OFF	Cl2 OFF	Cl2 OFF	Cl2 ON	Cl2 OFF
8/1/2006					Cl2 OFF	
8/3/2006					Cl2 ON	Cl2 ON
8/4/2006	< 0.08	< 0.08	< 0.08	0.1	0.2	0.19
8/5/2006	< 0.08			< 0.08		
8/5/2006	< 0.08	0.11	0.12	< 0.08		
8/6/2006						Cl2 OFF
8/7/2006	< 0.08	0.08	0.08	< 0.08	0.15	< 0.08
8/8/2006	0.14	0.11	0.14	< 0.08		
8/9/2006	< 0.08	0.13	0.14	0.12	0.19	Cl2 ON
8/9/2006						0.23
8/11/2006	< 0.08	0.16	0.21	< 0.08	0.31	0.29
8/14/2006	0.92	0.13	0.13	0.86	0.18	0.17
8/16/2006	0.12	0.15	0.18	0.9	0.09	0.27
8/17/2006			0.38	< 0.08		
8/18/2006	< 0.08	0.09	0.11	< 0.08	0.17	0.15
8/19/2006	< 0.08	0.1	< 0.08	0.15		
8/21/2006	< 0.08	0.15	0.14	0.1	0.2	0.12
8/23/2006	< 0.08	0.08	0.32	< 0.08	0.21	0.21
8/25/2006	0.12	0.09	0.41	0.14	0.24	0.26
8/28/2006	0.09	0.13	0.16	0.15	0.21	0.28
8/30/2006	0.28	< 0.08	< 0.08	0.53	< 0.08	< 0.08
9/1/2006	< 0.08	0.17	0.17	< 0.08	< 0.08	< 0.08
9/2/2006	0.14	0.21	0.22	< 0.08	0.32	0.15
9/4/2006	0.36	0.23	0.22	0.43	0.2	0.23
9/6/2006	1.12	0.35	0.25	1.18	0.22	0.34

Appendix Table 1

SWS Chlorination Values for 2006 Zebra Mussel Monitoring Program

Date	U-1 ESW [Cl2] East (ppm)	U-1 ESW [Cl2] West (ppm)	U-2 ESW [Cl2] East (ppm)	U-2 ESW [Cl2] West (ppm)	U-1 NESW [Cl2] (ppm)	U-2 NESW [Cl2] (ppm)
9/7/2006	1.41			1.38		
9/8/2006	0.86	0.19	0.15	0.56	0.14	0.2
9/11/2006	0.71	0.58	0.17	0.74	0.39	0.38
9/13/2006	0.54	0.29	0.2	0.53	0.23	0.3
9/15/2006	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
9/18/2006	oos	oos	oos	oos	oos	oos
10/2/2006	oos	oos	oos	oos	oos	oos
10/17/2006	Cl2 ON		Cl2 ON		Cl2 ON	Cl2 ON
10/18/2006	0.12	0.1	0.08	0.09	sampling unavailable	0.17
10/20/2006	< 0.08	< 0.08	0.08	0.09		0.13
10/23/2006	0.09	0.15	0.16	0.24	sampling unavailable	0.14
10/25/2006					oos	oos
10/26/2006	0.15	0.14	0.17	0.32	Cl2 ON	Cl2 ON
10/26/2006						0.17
10/27/2006	0.1	0.12	0.24	0.13		0.16
10/30/2006	0.14	0.14	0.18	0.24	Cl2 OFF	0.2
10/30/2006			Cl2 OFF			Cl2 OFF
11/3/2006	Cl2 ON		Cl2 ON		Cl2 ON	Cl2 ON
11/3/2006	0.08	0.22	0.25	0.29		0.27
11/6/2006	0.1	0.13	0.51	0.11	oos	0.21
11/8/2006	< 0.08	0.09	< 0.08	< 0.08	0.12	0.17
11/10/2006	0.08	0.38	0.41	0.1	0.12	0.17
11/13/2006	0.08	0.2	0.16	0.11	0.13	0.19
11/16/2006	Cl2 ON		Cl2 ON		Cl2 ON	Cl2 ON
11/17/2006	0.12	0.26	0.28	0.2	0.21	0.23
11/20/2006	0.19	0.43	0.16	0.29	0.22	0.22
11/22/2006	0.29	0.21	0.31	0.47	0.17	0.2
11/24/2006	0.09	0.22	0.3	0.12	0.14	0.12
11/27/2006	0.18	0.22	0.25	0.43	0.13	0.16

Appendix Table 1

SWS Chlorination Values for 2006 Zebra Mussel Monitoring Program

Date	U-1 ESW [Cl2] East (ppm)	U-1 ESW [Cl2] West (ppm)	U-2 ESW [Cl2] East (ppm)	U-2 ESW [Cl2] West (ppm)	U-1 NESW [Cl2] (ppm)	U-2 NESW [Cl2] (ppm)
12/1/2006	0.16	0.21	0.26	0.21	0.23	0.29
12/4/2006	0.27	0.37	0.38	0.24	0.25	0.25
12/5/2006	Cl2 OFF		Cl2 OFF			
12/6/2006					0.31	0.29
12/8/2006					< 0.08	< 0.08
12/10/2006					0.75	0.34
12/11/2006					0.49	0.34
12/13/2006					0.48	0.22
12/15/2006					0.55	0.18
12/18/2006					0.41	0.23
12/20/2006					0.51	0.26
12/22/2006					0.34	0.21
12/22/2006					Cl2 OFF	Cl2 OFF
12/28/2006					Cl2 ON	Cl2 ON
12/29/2006					0.48	0.21

APPENDIX IV

NPDES APPLICATIONS

2006

Blair K Zordell /BC1/AEPIN

02/03/2006 10:50 AM

To Marcia A Strefling/BC1/AEPIN@AEPIN
cc
bcc
Subject Fw: Draft Groundwater Discharge Permit

Correspondence control number please.
----- Forwarded by Blair K Zordell/BC1/AEPIN on 02/03/2006 10:49 AM -----

"Jeanette Bailey "
<baileyjm@michigan .gov>

01/06/2006 11:28 AM

To <bkzordell@aep.com>
cc "Sherry Thelen" <THELENSL@michigan.gov>, "Jeffrey Warner" <WARNERJB@michigan.gov>
Subject Draft Groundwater Discharge Permit

Blair,

Here is the draft permit for Cook Nuclear. Please review it and send me any comments or concerns by January 23, 2006. I've highlighted an area where we need info from you (address of parent company). Thanks.

Jeanette Bailey
Environmental Quality Analyst
Groundwater Permits Unit
Permits Section
Water Bureau
Michigan Department of Environmental Quality
517-373-7263
Fax: 517-241-1328

Mail To:
P.O. Box 30630
Lansing, MI 48909-8130
Location: Constitution Hall - North Tower
2nd Floor
525 W. Allegan St.
Lansing, MI 48933
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http://www.michigan.gov/deq

Cook Nuclear Draft 221.8.10-05.doc

2006-141

DRAFT

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER BUREAU

GROUNDWATER DISCHARGE PERMIT

This permit is issued under the provisions of Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), being Sections 324.3101 through 324.3119 of the Compiled Laws of Michigan, and the Administrative Rules promulgated thereunder. This permit does not relieve the permittee from obtaining and complying with any other permits required under local, state, or federal law.

Permit Number: GW **Authorization Rule:** 2218
Facility Name: Donald C. Cook Nuclear Plant
Issue Date: 2005 **Effective Date:**
Expiration Date:
Deadline for Submittal of Renewal Application:

Facility Address: 1 Cook Place, Mail Zone 5A, Bridgman, Michigan 49106
Telephone: 269-465-5901, ext.1153 **Fax:** 269-466-2550

Discharge Location Description:
SW 1/4 of the SE 1/4 of Section 6, T06S, R19W, Lake Township, Berrien County, Michigan, as identified in Attachment 1 (Site Map) and fully described in this permit.

Permittee Name: Indiana Michigan Power
Permittee Address: NEED ADDRESS/PHONE OF PARENT COMPANY
Telephone: **Fax:**

Authorization to discharge a maximum: 2.4 million gallons per day (876 million gallons per year) of process wastewater and 60,000 gallons per day (21.9 million gallons per year) of sanitary sewage and chemistry lab wastewater in accordance with the limitations, monitoring requirements, and other conditions as set forth in this permit, Part 31, and its administrative rules.

Type of Wastewater #1: Process
Method of Treatment: Neutralization (B-1b)
Method of Disposal: Seepage Ponds (A-1f)
Type of Wastewater #2: Sanitary Sewage/Chemistry Lab
Method of Treatment: Sequencing Batch Reactor (C-3b)
Method of Disposal: Rapid Infiltration Basins (A-1f)

In accordance with Section 324.3122 of the Michigan Act, the permittee shall make payment of an annual permit fee to the Department for each December 15 the permit is in effect regardless of occurrence of discharge. The permittee shall submit the fee in response to the Department's annual notice. The fee shall be postmarked by March 1 for notices mailed by January 15. The fee is due no later than 45 days after receiving the notice for notices mailed after January 15. Fees paid in accordance with the Michigan Act are not refundable.

All construction, maintenance, operations, and monitoring of this facility must comply with the conditions set forth in this permit or in plans approved by the Department in accordance with this permit. Failure to comply with the terms and provisions of this permit may result in civil and/or criminal penalties as provided in Part 31.

This permit is based upon the information submitted in the July 25, 2005 application for Groundwater Discharge received by the Michigan Department of Environmental Quality and any subsequent amendments. This permit supersedes Permit M 00988 issued to the facility on September 29, 2000.

Issued this ____ day of _____ for the Michigan Department of Environmental Quality.

_____

James R. Janiczek, Chief
Groundwater Permits Unit
Water Bureau
Michigan Department of Environmental Quality

A. Effluent Limitations and Monitoring Requirements

The wastewater discharge shall be limited and monitored by the permittee, at a minimum, as specified below. The permittee shall submit reports quarterly as specified in Section F.1 of this permit. In the event of any non-compliance of limitations, including any detected in additional sampling to the minimum required below, the permittee shall fulfill the requirements of Section D.1 of this permit (Rule 2227)

SAMPLE LOCATION ID	PARAMETER	LIMITATION-UNITS	MEASUREMENT FREQUENCY	SAMPLE TYPE
Effluent				
Flows:				
EF-1 Process Wastewater (Outfall 00D)	Flow	2,400,000 GPD	Daily	Direct Measurement
		876, 000, 000 GPY	Annually	Calculation
EF-2 Sanitary Sewage/ Chemistry Lab Wastewater (Outfall 00E)	Flow	60,000 GPD	Daily	Direct Measurement
		21,900,000 GPY	Annually	Calculation
Effluent Quality:				
EQ-1 Process Wastewater (Outfall 00D)	Chloride	mg/l	Daily	Grab
	Ethanolamine	mg/l	Daily	Grab
	Hydrazine	ug/l	Daily	Grab
	Total Inorganic Nitrogen	mg/l	Daily Weekdays	Calculation Ammonia (N) + Nitrate (N) + Nitrite (N)
	Ammonia Nitrogen	Grab	Daily Weekdays	Grab
	Nitrite Nitrogen	Grab	Daily Weekdays	Grab
	Nitrate Nitrogen	Grab	Daily Weekdays	Grab
	pH	6.5-9.0 S.U..	Daily	Grab
	Sodium	mg/l	Daily	Grab
	Sulfate	mg/l	Daily	Grab

EQ-2 ıitary Sewage/Chemistry Lab Wastewater (Outfall 00E)	BOD5	35 mg/l	Daily	Grab
	Chloride	mg/l	Daily	Grab
	Dissolved Oxygen	mg/l	Daily	Grab
	Phosphorus	15 mg/l	Daily	Grab
	pH	6.5-9.0 S.U.	Daily	Grab
	Sodium	mg/l	Daily	Grab
	Total Inorganic Nitrogen	mg/l daily max	Daily	Calculation: Ammonia (N) + Nitrate (N) + Nitrite (N)
	Ammonia Nitrogen	mg/l	Daily	Grab
	Nitrate Nitrogen	mg/l	Daily	Grab
	Nitrite Nitrogen	mg/l	Daily	Grab

* The daily maximum is defined as the total discharge by weight, volume or concentration if specified, during any calendar day.

** The monthly average is defined as the total discharge by weight, volume or concentration if specified, during the reporting month divided by the number of days in the reporting month that the discharge occurred. When less than daily sampling occurs, the monthly average shall be determined by the summation of the measured daily discharge, by weight or concentration, divided by the number of days in which samples were collected, analyzed, and reported during the reporting month.

B. Groundwater Limitations and Monitoring Requirements

The disposal of treated wastewater shall not cause the groundwater quality to exceed the limitations listed below. Groundwater monitoring wells EW-1A, EW-8, EW-12, EW-13, and EW-19 shall be sampled and the groundwater analyzed for the parameters listed below at least at the minimum frequencies indicated. Monitoring well EW-8 is the upgradient well. Compliance with limits established in this section will be measured at monitor wells EW-1A, EW-12, EW-13, and EW-19. Monitoring wells and groundwater flow direction are identified on Attachment 3 (Groundwater Monitoring Well Map). In the event of any non-compliance with limitations, including any detected in sampling additional to the minimum required below, the permittee shall fulfill the requirements of Section D.1 of this permit (Rule 2227).

PARAMETER	LIMITATION UNIT	MEASUREMENT FREQUENCY	SAMPLE TYPE
Static Water Elevation	USGS - Ft	Quarterly	Direct Measurement
pH	6.5-9.0 S.U.	Quarterly	Grab
Chloride	250 mg/l	Quarterly	Grab
Specific Conductance	umhos/cm	Quarterly	Grab
Total Inorganic Nitrogen	5 mg/l	Quarterly	Calculation = Ammonia-N+ Nitrate-N+Nitrite-N
Ammonia Nitrogen	mg/l	Quarterly	Grab
Nitrite Nitrogen	0.5 mg/l	Quarterly	Grab
Nitrate Nitrogen	mg/l	Quarterly	Grab
Total Phosphorus	1 mg/l	Quarterly	Grab
Sulfate	250 mg/l	Annually	Grab
Dissolved Sodium	120 mg/l	Quarterly	Grab
Total Dissolved Solids	mg/l	Quarterly	Grab
Total Alkalinity	mg/l	Annually	Grab
Bicarbonate	mg/l	Annually	Grab
Dissolved Aluminum	150 ug/l	Annually	Grab
Dissolved Barium	440 ug/l	Annually	Grab
Dissolved Boron	1900 ug/l	Annually	Grab
Dissolved Cadmium	2.2 ug/l	Annually	Grab
Dissolved Calcium	mg/l	Annually	Grab
Dissolved Chromium	11 ug/l	Annually	Grab
Dissolved Copper	9 ug/l	Annually	Grab
Dissolved Iron	300 mg/l	Annually	Grab
Dissolved Lead	10 ug/l	Annually	Grab
Dissolved Manganese	530 ug/l	Annually	Grab
Dissolved Magnesium	200 mg/l	Annually	Grab
Dissolved Inorganic Mercury	0.0013 ug/l	Annually	Grab
Dissolved Nickel	52 ug/l	Annually	Grab
Dissolved Oxygen	mg/l	Annually	Grab
Dissolved Potassium	mg/l	Annually	Grab
Dissolved Selenium	5 ug/l	Annually	Grab
Dissolved Silver	0.2 ug/l	Annually	Grab
Dissolved Zinc	120 ug/l	Annually	Grab
Total Organic Carbon	mg/l	Annually	Grab
Phenols	mg/l	Annually	Grab
Hydrazine	10 ug/l	Annually	Grab
Ethanolamine	2 mg/l	Annually	Grab

C. Observation Monitoring Requirements

The permittee shall inspect the treatment and disposal facilities for the operational conditions required below at the minimum frequency specified. All inspections shall be documented in a logbook to be maintained at the on-site facility and shall be available for review by Department personnel at all times.

LOCATION	CONDITION	MEASUREMENT FREQUENCY	SAMPLE TYPE
Seepage Ponds (Outfall 00D)	Oil Sheen	Daily	Visual Observation
	Dike Inspection	Weekdays	Visual Observation
	Freeboard	2 feet minimum	Direst Measurement
Rapid Infiltration Basins (Outfall 00E)	Vegetation Control	Weekly	Visual Observation

D. Compliance Requirements If Permit Limits Are Exceeded

1. If a limit described in Section A.1 or B.1 is exceeded, the discharger shall comply with Rule 2227 and undertake the following within the specified timeframes indicated below:

   a. Provide written notification to the Department at the address in Section F.2 of this permit, within seven calendar days, that a limit has been exceeded. Such notification shall include the name of the substance(s), the concentration(s), and the location(s) that exceeded the limit(s).

   b. Resample and analyze for the parameter(s) of concern, within 14 days, at the location where a limit was exceeded.

   c. Submit a report to the Department at the address in Section F.2 of this permit, within 60 days. Such report shall include the results of confirmation sampling, an evaluation of the reasons for the limit being exceeded, and the steps taken or proposed to prevent recurrences.

   d. Complete additional activities as may be required by the Department pursuant to Rule 2227(1)(d).

E. Schedule of Activities – The permittee shall undertake the following activities by the dates specified.

1. Submit for review and receive approval for an Operation and Maintenance Manual by March 1, 2006 [Rule 2218(4)(b)].

2. The permitee is required to investigate the source of elevated levels of mercury found in monitoring well EW-8. A workplan, including a timeline, shall be submitted by April 3, 2006 for review and approval. Two copies of the final report shall be submitted by December 1, 2006.

F. Reporting Requirements – Rule 2225

1. The permittee shall submit self-monitoring data monthly on the Department of Environmental Quality's Compliance Monitoring Report (CMR) forms for each calendar month of the authorized discharge period to the following address:

   NMS-CMR Data Entry-Groundwater
   Water Bureau
   Michigan Department of Environmental Quality
   P.O. Box 30273
   Lansing, Michigan 48909-7773

   The forms shall be postmarked no later than the 15th day of the month following each month of the authorized discharge period(s).

   Electronic Environmental Discharge Monitoring Reporting (e2-DMR) System participants shall submit self-monitoring data for each month of the authorized discharge period(s). The electronic forms shall be submitted to the department no later than the 25th day of the month following each month of the authorized discharge period(s).

   Alternative Daily Discharge Monitoring Report formats may be used if they provide equivalent reporting details and are approved by the Department. For information on the electronic submittal of this information, contact the Department or visit the *e2-Reporting* website @ https://secure1.state.mi.us/e2rs/ - click on "about e-DMR" to download the Facility Participation Package.

2. All other notices, plans, reports, and other submissions required by and pursuant to this permit shall be submitted to the following:

   Kalamazoo District Office
   DEQ–Water Bureau
   7953 Adobe Rd.
   Kalamazoo, MI 49009-5026
   Phone: 269-567-3500

G. Other Conditions

1. Effluent shall be isolated from water supply wells as specified in Rule 2204(2)(d).
2. Effluent shall not be applied within 100 feet from property lines.
3. The permittee shall maintain all treatment or control facilities or systems installed or used by the discharger to achieve compliance with this permit in good working order and operate the facilities or systems as efficiently as possible.
4. Pursuant to Rule 2223(1), the Department may modify the effluent or groundwater monitoring parameters or frequency requirements of this permit, or they may be modified upon the request of the permittee with adequate supporting documentation.

5. Prior to any land application of bulk biosolids, the permittee shall submit to the Field Operation Section, Water Bureau, and receive approval of a Residuals Management Program (RMP) that complies with the requirements of the Part 24 Rules (R 323.2401 through R 323.2418 of the Michigan Administrative Code). The permittee is authorized to land apply bulk biosolids or prepare bulk biosolids for land application in accordance with an approved RMP.

H. Approved Documents – The following documents, previously submitted and approved are incorporated into this permit by reference. These documents, and those submitted and approved under Section E of this Permit, may be modified upon written approval of the Department.

1. Sampling and Analysis Plan – dated February 23, 2005.
2. Discharge Management Plan – dated July 18, 2005.

I. Permit Application – Issuance of this permit is based upon the information submitted on the Application for Groundwater Discharge (Application) and any subsequent amendments received by the Department. Any material or intentional inaccuracies found in this information, or omissions of material information, may be grounds for the revocation or modification of this permit or other enforcement action.

The permittee shall inform the Department's Water Bureau, Kalamazoo District Supervisor, of any known material or intentional inaccuracies in the information of the Application which would affect the permittee's ability to comply with the applicable rules or license conditions. The following documents were submitted to the Department as part of the Application:

Basis of Design, Rule 2218 – dated November, 1994.

1. Hydrogeological Report, Rule 2221 – dated February 23, 2005.
2. Waste Characterization, Rule 2220 – 2004 Effluent Data.
3. Discharge Management Plan, Rule 2233 – dated July 18, 2005.

J. Transfer of Ownership – The permittee shall notify the Department, in writing, no less than 30 days before a change in ownership of the facility. This permit may be transferred to the new owner by written approval of the Chief of the Permits Section, Water Bureau.

K. Change or Modification of Treatment or Discharge – Rule 2218 (3)(d) and (e)
The permittee, if proposing to modify the quantity or effluent characteristics of the discharge, if proposing to modify the monitoring program, or if proposing to modify the treatment process for the discharge, shall notify the Department of the proposed modification before it occurs. The Department shall determine if the proposed modification requires the permit to be modified to ensure that the terms of Rule 2204 are met. Modifications determined by the Department to be significant require that the permittee submit an application for and obtain a reissuance of the permit before such modification occurs. For modifications determined by the Department to be minor based on the quantity or quality of the discharge, the permit may be modified by the Department as requested by the permittee without obtaining a reissuance of the permit before such modification occurs.

L. By-Passing

Any diversion from or bypass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except where unavoidable to prevent loss of life, personal injury, or severe property damage. The permittee shall immediately notify the Department of any such occurrence by telephone at 1-800-292-4706. Such notice shall be supplemented by a written report with the next operation report detailing the cause of such diversion or bypass and the corrective actions taken to minimize adverse impact and eliminate the need for future diversion or bypass.

M. Cessation of Discharge-Related Activities

If all or any portion of the permitted treatment facilities and discharge areas is intended to be eliminated, the permittee shall comply with the requirements of Rule 2226.

NOTE:

IF THE PERMITTEE WISHES TO CONTINUE DISCHARGING BEYOND THE EXPIRATION DATE, THE PERMITTEE SHALL SUBMIT AN ADMINISTRATIVELY COMPLETE APPLICATION FOR REISSUANCE NO LATER THAN 180 DAYS PRIOR TO THE EXPIRATION DATE IN ACCORDANCE WITH RULE 2151 OF THE PART 21 ADMINISTRATIVE RULES. FAILURE TO SUBMIT AN ADMINISTRATIVELY COMPLETE APPLICATION FOR REISSUANCE BY THE REQUIRED DATE WILL RESULT IN TERMINATION OF THE AUTHORIZATION TO DISCHARGE ON THE EXPIRATION DATE.

ATTACHMENT 1
SITE MAP

ATTACHMENT 2
PROCESS FLOW DIAGRAM

ATTACHMENT 3
GROUNDWATER MONITORING WELL MAP

INDIANA MICHIGAN POWER

Indiana Michigan
Power Company
Cook Nuclear Plant
One Cook Place
Bridgman, MI 49106

Ms. Jeanette Bailey
Michigan Department of Environmental Quality
Groundwater Permits Unit
P. O. Box 30273
Lansing, Michigan 48909-7773

February 3, 2006

Dear Ms. Bailey:

Subject: Donald C. Cook Nuclear Plant
Groundwater Permit M00988

Per our conversation on January 31, 2006, we are sending you two copies of the Sequencing Batch Reactor Standard Operating Procedures, and our report on upgradient monitoring well #8.

Should you have any questions regarding this response, please contact me at (269) 465-5901, ext. 1153.

Sincerely,

John P. Carlson
Environmental Manager

Enclosure

2006-133

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this and all attached documents, and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

John P. Carlson
Environmental Manager

bc: J. P. Carlson
C. E. Hawk
J. N. Jensen
J. S. Miller
M. J. Scarpello
W. H. Schalk
R. J. Sieber
B. W. Watson
L. J. Weber
B. K. Zordell
MDEQ File
NDM (2006-133)

Upgradient Monitoring Well #8.

D.C. Cook Nuclear Plant

Bridgman, Michigan 49106

GW permit # M00988.

Monitoring Well #8 Mercury source identification.

Monitoring Well #8 is located at the Cook Nuclear Plant and is used as an upgradient well for Michigan Department of Environmental Quality Groundwater permit M00988, issued to Indiana Michigan Power.

Mercury uG/l

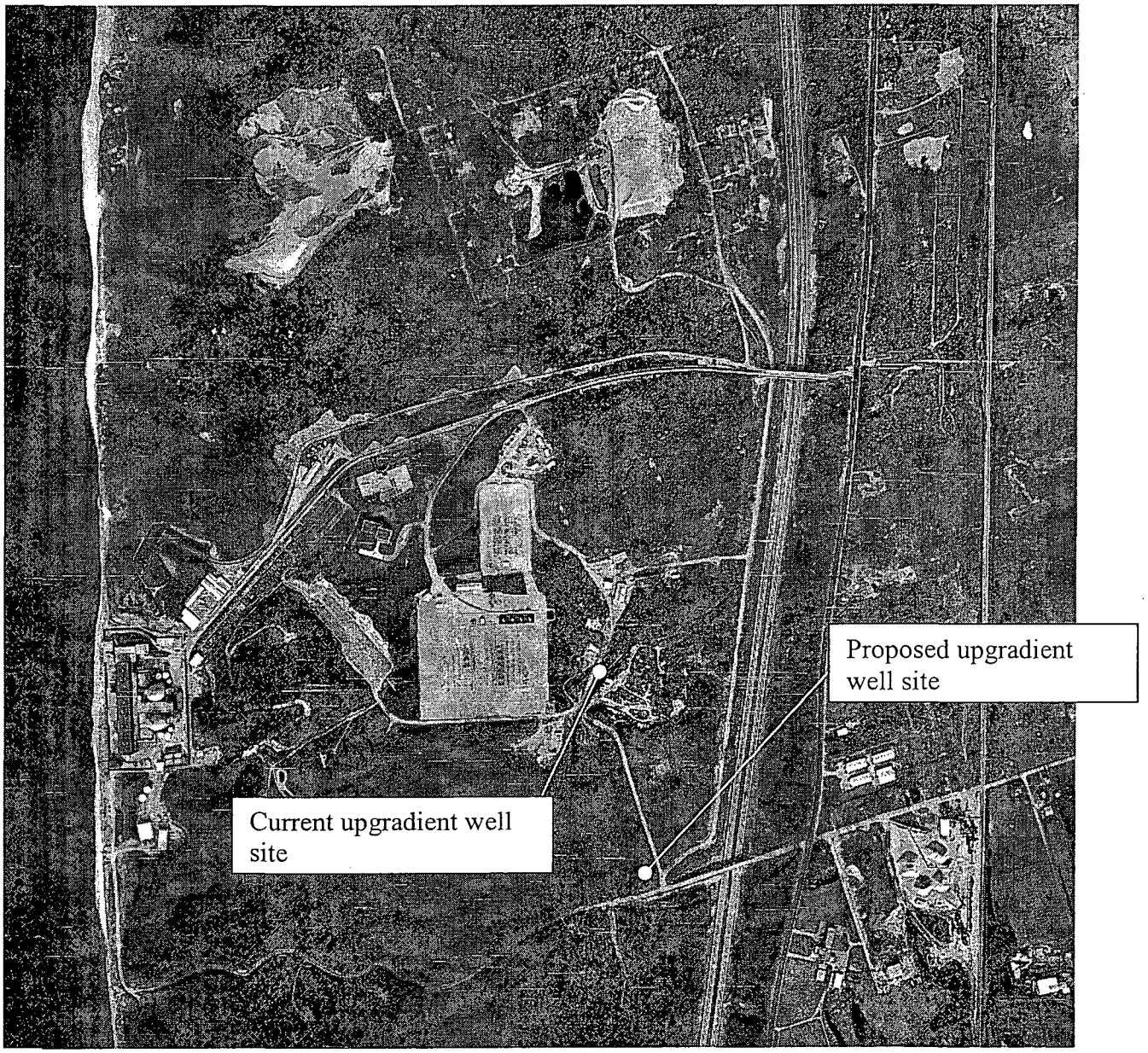
Method:SW846 7470 proposed 1631 — Detect Limit: 0.2 uG/l proposed 0.0005 — Permit Limit 0.0013 uG/l

Well #	1A	8	12	13	19		Replicate	Trip Blank		Field Blank
Date:										
08/01/00	0.0712	0.0694	0.0628	0.0599						
01/16/01	<0.0005	0.0009	<0.0005	<0.0005	<0.0005					
02/15/01	<0.0005			<0.0005						
02/28/01		0.0020	<0.0005		<0.0005					
03/13/01	0.0005	0.0024	<0.0005	0.0005	<0.0005					
04/24/01	<0.0005	0.0018	<0.0005	<0.0005	<0.0005					
05/17/01	<0.0005	0.0018	<0.0005	<0.0005	<0.0005					
06/05/01	<0.0005	0.0016	<0.0005	<0.0005	<0.0005					
07/12/01	<0.0005	0.0014	<0.0005	<0.0005	<0.0005	#8	0.0019	<0.0005	#8	<0.0005
07/24/02	0.0081	0.0072	0.0036	0.00211	0.0026	#8	0.0036	0.0037	#8	0.006
08/23/02	0.0015	0.0025	0.0006	0.0009	0.0007	#8	0.0023	<0.0005	#8	<0.0005
07/29/03	<0.0005	0.0035	<0.0005	0.0007	<0.0005	#8	0.0036	<0.0005	#8	0.0007
7/20/2004	<0.0005	0.0013	<0.0005	0.0012	0.0011			<0.0005	#8	<0.0005
7/19/2005	<0.0005	0.0018	<0.0005	<0.0005	<0.0005	#8	<0.0005	<0.0005		

The table above shows sample data for the Cook plant monitoring wells listed in the current groundwater permit. USEPA method 1664 was used for mercury analysis. Data analyzed on 8/01/00, and 7/24/02 should be disregarded due to sampling/laboratory contamination. Data from Well #8 is consistently above the limit of 0.0013 uG/l. Duplicates, field blanks and trip blanks were also performed at the well #8 site with similar results. The negative field blank eliminated an air source for mercury.

Cook Plant's historical effluent mercury discharge consists of a small amount of laboratory waste up until 1994, when the analysis for chloride was no longer required and the discharge was discontinued. No other industrial operations have occurred near this monitoring well based on historic reviews of the site. Literature review from the USEPA shows that mercury sources include septic systems. We have identified an abandoned septic tank and tile field 200 ft NE of the well location. This septic system was closed out and abandoned in the early 1990's. This septic system served a fish processing complex set up for fish studies, and a trailer to house employees in the 1970's. The septic system accepted domestic sewage, and fish processing waste. Fish processing waste is another suspected source of mercury. Cook Nuclear Plant believes that this is the source of mercury.

Cook Plant Environmental section proposes another site for an upgradient well that will provide accurate data of the upgradient water. The site is approximately 1000' east of the current well and is outside the influence of known septic systems. We will abandon the current upgradient well and begin using the new well by February of 2007. See attached photo.


Proposed upgradient well site
Current upgradient well site

INDIANA MICHIGAN POWER

Indiana Michigan
Power Company
Cook Nuclear Plant
One Cook Place
Bridgman, MI 49106

Mr. John Vollmer
Kalamazoo District Office
DEQ-Water Bureau
7953 Adobe Road
Kalamazoo MI 49009-5026

July 24, 2006

Dear Mr. Vollmer:

Subject: Donald C. Cook Nuclear Plant
Groundwater Permit GW 1810102

As required in Part E.2. of the Donald C. Cook Nuclear Plant's Groundwater Discharge Permit, we are providing you with an updated Operation and Maintenance Manual. We have added a section for Outfall OOD, and have updated Outfall OOE.

Should you have any questions regarding this response, please contact me at (269) 465-5901, ext. 2006.

Sincerely,

Blair K. Zordell
Environmental Specialist, Sr.

Enclosure

c: Ms. Jeanette Bailey - MDEQ
NDM 2006-794

Operation and Maintenance Manual. Supplement to include the Turbine Room Sump. (Outfall OOD) GW1810102

July 20, 2006

Prepared by: Blair Zordell
American Electric Power
Cook Nuclear Plant
One Cook Place
Bridgman, MI

Operation and Maintenance Manual. Supplement to include the Turbine Room Sump. (Outfall OOD)

I Background Information.

A Legal description of the discharge area, Mailing address of permittee, site location map.

Legal description:

Township 06S, Range 19W, Section Number 6, First Quarter section SW, Second Quarter Section SE. Latitude: 41 58' 30" Longitude: 86 34'30".

The mailing address of permittee:

Indiana Michigan Power – A fully owned subsidiary of American Electric Power
One Cook Place Mail zone 5A
Bridgman, Michigan 49106

Site location map: Tab #1

B Plant classification.

A-1f – Land surface disposal
A-1h – Non contact Cooling water
B-1b – Neutralization

C Certified Operator Information.

1 Operator Responsibilities defined.

- Review data for permit GW1810102 compliance.
- Prepare monthly reports to the State of Michigan.
- Report immediately of knowing of any permit exceedences.

a) Subordinate employees:

- Chemistry technicians
- Makeup plant operators
- Environmental technicians.

b) Training schedule:

- The subordinate employees attend quarterly training as a minimum.
- Continuing training for current Contract employees is determined by the job requirements or when deficiencies are noted. All site contract employees are required to attend training annually, in addition to bimonthly job observations.

- Training for AEP employees who hold wastewater treatment plant operator certifications attend Michigan Water Environment Association (MWEA) quarterly meetings which provide updates to process control, equipment updates, and permitting updates. Other training activities include: The Environmental Regulations Course presented by Lion Technologies, and attending conferences that are sponsored by the MWEA.

D Basis of Design Information

System description/basis of design attached:

- SD-12-SDTUR-100: "Station Drainage System – Turbine Room." (tab #3)
- SD-12-SDTUR-110: "Turbine Room Sump pH Neutralization System." (tab #4)
- SD-12-MUPNS-100: "Makeup Plant Neutralization System." (tab #4)

1 Basis of design documents:

a) Additional reference information is located in the current Groundwater permit application. Due to the size of the document, this is available for review, but not attached.

II The function, start-up, shutdown, and periodic maintenance procedures for each unit process and item of mechanical and electrical equipment

A Operational requirements

1 Plant Site map (tab #1) – attached.
Wastewater flow diagram (tab #2)– attached

a) Equipment operational requirements.
- 12-OHP-4021-062-001 "Demineralized Makeup Water System Regeneration (North and South Trains) (tab #5)
- 12-OHP-4021-062-002 "Third Train Makeup Plant Regeneration." (tab #6)
- 12-OHP-4021-062-009 "Regeneration Waste Neutralization." (tab #7)

The Plant Neutralization tank receives wastewater prior to discharge into the Turbine Room Sump. The waste is neutralized prior to pumping into the sump. It is then pumped to the onsite 6,000,000 gallon absorption pond. The surface area is approximately 92347 sq ft of discharge area.

b) Methods of wastewater flow control
- Flow is directly dependent on the amount of water the TRS receives. Pump operation is dependent on the water level in the sump. Higher levels of water will turn on additional pumps to keep up with the increased flow.

c) Electrical equipment, control panels

Operation of this type of equipment is covered in the following attached procedures.

- 12-OHP-4021-062-001 "Demineralized Makeup Water System Regeneration (North and South Trains) (tab #5)
- 12-OHP-4021-062-002 "Third Train Makeup Plant Regeneration." (tab #6)
- 12-OHP-4021-062-009 "Regeneration Waste Neutralization." (tab #7)
- Spare parts are kept in the storeroom/warehouse. A MIN/MAX inventory system maintains proper inventory.
- No equipment is under warranty due to the age of the plant.

d) Solid waste disposal requirements

- The Turbine Room Sump is inspected on a regular basis. Any material removed from the sump is evaluated and disposed of properly.

III A description of the appropriate response or facility adjustment to minimize the impact of emergency situations with the potential to affect the discharge or compliance with the permit so as to facilitate rapid implementation of a correct response during an emergency.

Emergency procedures have been developed to mitigate specific situations. Attached Haz Mat incident procedures SPP-2281-HAZ-001 "Hazardous Material Response Organization and Training" (Tab #9) has been developed to help to plant respond to chemical spills on or near the plant site. The emergency plan procedures are written to assist plant personnel in many different situations including chemical spills, security threats, severe weather, and nuclear emergencies. These documents are not attached due to their size. Previously listed operation's documents have sections dedicated to prevention of emergency situations. An overview of the plan is included under tab #8. The plant has developed interorganizational cooperative agreements with State and Local authorities. This agreement is attached as tab #10, "Appendix K – Agreements with Offsite Agencies."

A Measures to minimize upset of the treatment system – discussion of common operating problems and corrective measures

1 Containment provisions to prevent the accidental losses of polluting materials

- Attached procedure 12-PMP-6090-ADM-001, "Environmental Reviews" (tab #26) is implemented to ensure proper equipment storage at the site to prevent loss of polluting materials.
- The SWPPP (Storm Water Pollution Prevention Plan) is also used as a guide to protect nearby State waters and prevent spills. This is a large stand-alone document and is not included as an attachment.
- Current operating procedures listed in part II.A prevent unauthorized operation of equipment.
- Existing polluting material storage areas are designed to prevent spills from reaching the floor drains. This is accomplished with concrete berms,

plugged drains, raised drains, portable spill containments, portable drain covers and portable berms.

2 Inclement weather – In addition to severe weather response procedures, attached procedure PMP-5055-001-001 "Winterization/Summerization" (tab #27) contains information to prepare the site for anticipated inclement weather conditions. This procedure contains a checklist that site personnel can use to ensure that the site equipment is ready for inclement weather. Procedure 12-OHP-4022-001-010 "Severe Weather" (tab #24) is attached, in addition,12-OHP-4022-001-009 "Seiche" (tab #25) is also included. Both procedures are used during the outbreak of severe or unusual weather. They are used to prepare and protect plant equipment from damage caused by severe weather.

B Corrective Action and Reporting for Public Systems

1 Two procedures provide directions for reporting facility breakdowns, spills, or effluent exceedences. They are PMP-6090-PCP-100 "Spill Response – Oil, Polluting, and Hazardous Materials." (tab #12) 12-EA-6090-ADM-001 "Preparation and Submittal of Environmental Reports." (tab #11). Reporting requirements are described in Data Sheet #1.

IV Monitoring program to monitor process efficiency.

A Sampling Equipment used to perform test, sample location, Specific treatment process step applicable to sample collection, and sample handling.

1 Volume Monitoring locations and methods: Outfall 00D flow volume is measured by a magnetic flowmeter at the discharge piping. This meter is checked for calibration every six months. Monthly data review may also trigger a request to evaluate the calibration accuracy of the flowmeter.

2 Waste water quality bench testing is done on site by qualified laboratory technicians using approved analytical procedures. Other testing such as Nitrate, Nitrite, Ammonia and Chloride are sent off site to AEP's Corporate laboratory in Groveport Ohio. Procedures used at the site for both sampling and analysis are listed in the table below and attached for review at the tab listed in the right column.

Parameter	Procedure Number	Procedure Name	Associated Tab #
Reporting	12-THP-6020-ADM-010	Analytical Results	13
ICP/MS	CLG-127	Chem Lab Guide for ICP/MS	14
On –line instrumentation	THI-6020- ADM-003	On-Lne Instrument Quality Control	15
Oil and Grease analysis	12-THP-6020-ANA-006	Oil and Grease	16
Solids	12-THP-6020-ANA-005	Total Dissolved Solids	17
Sampling Procedure	12-THP-6020-CHM-311	Turbine Room Sump	18

Parameter	Procedure Number	Procedure Name	Associated Tab #
pH	CLG-104	pH	19
Solids	12-THP-6020-ANA.011	Suspended Solids	20
Ethanolamine, Hydrazine	CLG-103	Chem Lab Guide for Hach Spectrophotometer	21
Process pH	12-THP-6020-INS-210	TRS pH monitor	22
Quality control	THI-6020-ADM-001	Quality Control	23

3 Groundwater sampling and analysis plan. This document contains the schedule for groundwater permit compliance activities, and applicable groundwater sampling and analysis procedures. (Appendix A)

V Details of how inspections will be conducted and a schedule for the inspection of collection system and pump stations, where applicable.

This section is not applicable to the Turbine Room Sump outfall 00D. The system consists of a series of floor drains that are directly routed to the Turbine Room Sump. There are eight small volume sumps that also pump to the main Turbine Room Sump. Collection sumps where non-contact cooling water is drained are fitted with redundant pumps to ensure proper operation in case one should fail. Other smaller sumps designed to prevent equipment damage from flooding have a single pump. These systems are on the preventive maintenance schedule and are inspected at least every two years. Equipment is repaired or replaced as needed. System failures are detected and repaired in a timely manner using the Cook Plant Corrective Action Program. PMI-7030 "Corrective Action Plan." (Tab #32) There are no pump stations that are associated with this system.

A Observations of mechanical and electrical parts.

The Cook Plant Environmental Technicians conduct a weekly tour of the facility. A sign off in the NPDES book serves as documentation of the weekly tour. The tour is required by Environmental Guideline SUR-1 "Environmental Surveillance Guideline." (tab #29) Operations personnel conduct tours of applicable equipment under Operation procedure 12-OHP-5030-001-001, "Operations Plant tours." (tab # 28) PMP 5020-FLM-001 "Fluid Leak Management Plan" (tab #31)provides a plant policy for ensuring failed or malfunctioning equipment is promptly repaired and restored to its intended function.

B Gas accumulations and oxygen deficiency monitoring or observations.

Cook Plant Procedure PMP-2280-CSE-001 "Confined Space Entry" (tab #30) provides guidance to confined space sampling and entry at the site.

VI The periodic maintenance procedures for the collection system and pump stations, where applicable.

The Turbine Room Sump collection system consists of a network of floor drains that drain directly to the sump. Periodic cleaning of the floor drain system is done to ensure

that the drains do not become clogged. There are a small number of sumps that are used to control flooding in the 569' level of the turbine building. Water drains to these sumps from nearby floor drains and is then pumped into the Turbine Room Sump. The four discharge pumps are cycled regularly to ensure even run times.

VII Procedures for routine maintenance and inspection of lagoons and equipment used for irrigation, where applicable, and the documentation of maintenance and inspection.

The absorption pond dike condition is evaluated weekly. This information is recorded on SUR-1 data sheets. (tab #29) The inspections are recorded on the monthly data sheets and reports that are submitted to the State of Michigan as required under the groundwater discharge permit M000988. The Solar powered mixing pump in the absorption pond requires yearly brush replacement. This process is completed in the summer months when the weather allows access to the pump. There is no irrigation equipment used in this treatment process stream.

VIII A listing of environmental regulations, other than this part, that apply to operation of the wastewater treatment facility.

- 40 CFR 112, EPA Regulations on Oil Pollution Prevention, July 1, 1994.
- 40 CFR 110, EPA Regulations on Discharge of Oil, August 25, 1993.
- 40 CFR 239-282, Resource Conservation and Recovery Act (RCRA)
- 40 CFR 350-372, Emergency Planning and Community Right to Know Act (SARA Title III)
- 40 CFR 401-471, Clean Water Act
- 40 CFR 500-503, Clean Water Act
- 40 CFR 100-140, Clean Water Act
- 40 CFR 702-799, Toxic Substances Control Act (TSCA)
- Michigan Department of Environmental Quality Surface Water Quality Division NPDES Permit M0005827 (Stormwater Regulations)

A. Vegetation Control.

- The D.C. Cook Nuclear Plant herbicide application is regulated by 10 CFR 20.
- FIFRA Section 12, Pesticide label adherence.
- 40 CFR 171, Pesticide applicator certification.

Cook Nuclear Plant

Sequencing Batch Reactor

Standard Operating Procedures

Preparation Date: May 2001.
Revised June 2006.

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This document was prepared using The Michigan Department of Environmental Quality Guidesheet IV, "Operation and Maintenance manual." All aspects of the outline proposed in Guidesheet IV may not be relevant for the operation of the Cook Nuclear Plant Sequencing Batch Reactor, or the requirements may have been met in previous submittals. The table of contents is taken directly from the outline supplied to the Cook Nuclear Plant from the MDEQ.

Revision notification. Should any of the procedures contained in this SOP be revised for editorial contents or other non-operational changes, the Michigan Department of Environmental Quality-WMD will be sent the changes. If the change involves new Maintenance schedules, QA/QC changes, changes in chemical additives or other process change, the MDEQ-WMD will be handled via the current Groundwater Permit under Part I.D.1.5, Part I.D.1.6, and Part II.A.1.

Michigan Department of Environmental Quality, Guidesheet IV, "Operation and Maintenance Manual."

Part I.A: "Background information, legal description of the discharge area, site location map."

The mailing address of permittee, and site location map are not required to be submitted. These documents have been submitted in a previous correspondence and were not included based upon the recommendations of the MDEQ-WMD.

Part I. B: "Plant classification."

These documents have been submitted in a previous correspondence and were not included upon the recommendations of the MDEQ-WMD.

Part I.C.1. and Part 1.C.1.a, "Certified Operator Information, Operator Responsibilities defined, and Subordinate Employees."

John Carlson

American Electric Power
Environmental Manager
Certified Wastewater Operator.

Responsibilities:

- Oversight of compliance operations.
- Process monitoring and improvement.

Blair Zordell

American Electric Power
Senior Environmental Specialist
Certified Wastewater Operator.

Responsibilities:

- Manager of EarthTech Contract.
- Biosolids management.
- Process monitoring and improvement.
- System Maintenance, water collection system

Kent Trierweiller

Wastewater contract Operations Services
Operations Superintendent
Certified Wastewater Operator.

Responsibilities:

- Supervise Wastewater operations
- Report to Blair Zordell/John Carlson regarding improvements of maintenance items.

Wastewater contract Operations Services

Ed Hawks

Wastewater contract Operations Services
Certified Electrician

Responsibilities:

- All electrical maintenance
- Valve actuator maintenance
- Process controller maintenance
- Lift station pump maintenance

Pat Aird

Wastewater contract Operations Services
Wastewater Plant Operator

Responsibilities:

- Daily operation of the Wastewater Plant
- Routine mechanical maintenance and troubleshooting.
- Laboratory analysis of influent and effluent samples.
- Process analysis.
- Plant cleanliness

Kent Depuydt

Wastewater contract Operations Services
Backup Wastewater Plant Operator.

Responsibilities:

- Daily operation of the Wastewater Plant
- Routine mechanical maintenance and troubleshooting.
- Laboratory analysis of influent and effluent samples.
- Process analysis.
- Plant cleanliness

Part I.C.1.b: "Training Schedule."

Initial training of new wastewater contract employees consists of attending wastewater classes sponsored by the MDEQ as appropriate. The employees also are required to complete a self study course entitled: "A Field Study Training Program Prepared by The California State University at Sacramento." Employees also receive training as required by Safety and Health Regulations. In addition to standardized wastewater training, the employees attend site indoctrination (PMI 5080, "Administration of Contractors") training. This training covers topics specifically geared to the Cook Nuclear Site, such as Procedure Compliance, Emergency Response, Fitness for Duty, Confined Space Entry, and Chemical Control practices.

Continuing training for current wastewater contract employees is determined by the job requirements or when deficiencies are noted. All site contract employees are required to attend PMI 5080 training annually.

Regional, Operations and Plant Managers, Supervisors and Crew Leaders are responsible to ensure that employees have the proper training prior to work assignment. Employees without the proper training either shall receive the training prior to start of work, or shall not be assigned the task.

Training for AEP employees who hold wastewater treatment plant operator certifications attend Michigan Water Environment Association (MWEA) quarterly meetings which provide updates to process control, equipment updates, and permitting updates. Other training activities include: The Environmental Regulations Course presented by Lion Technologies, and attending conferences that are sponsored by the MWEA.

Part I.D: "Basis of Design Information"

These documents have been submitted in a previous correspondence when the waste water treatment plant was designed and built, and were not included upon the recommendations of the MDEQ-WMD.

Part II. "The function, start-up, shutdown, and periodic maintenance procedures for each process and item of mechanical and electrical equipment."

This section contains the procedures, guidelines, and system descriptions used in normal operation of the Sequencing Batch Reactor.

- Cook Wastewater Treatment Plant Overview (attached)
- Part II.A.1 Wastewater Flow Diagram. (attached)
- Cook Nuclear Plant System Description number SD-12-TERD-100, "Sewage Treatment System." (attached)

COOK WASTEWATER TREATMENT PLANT OVERVIEW

The Cook Sequencing Batch Reactor (SBR) Wastewater Treatment Facility is an activated sludge plant with a design flow of 0.050 MGD. Effluent quality is regulated by a Groundwater Discharge Permit #M00988.

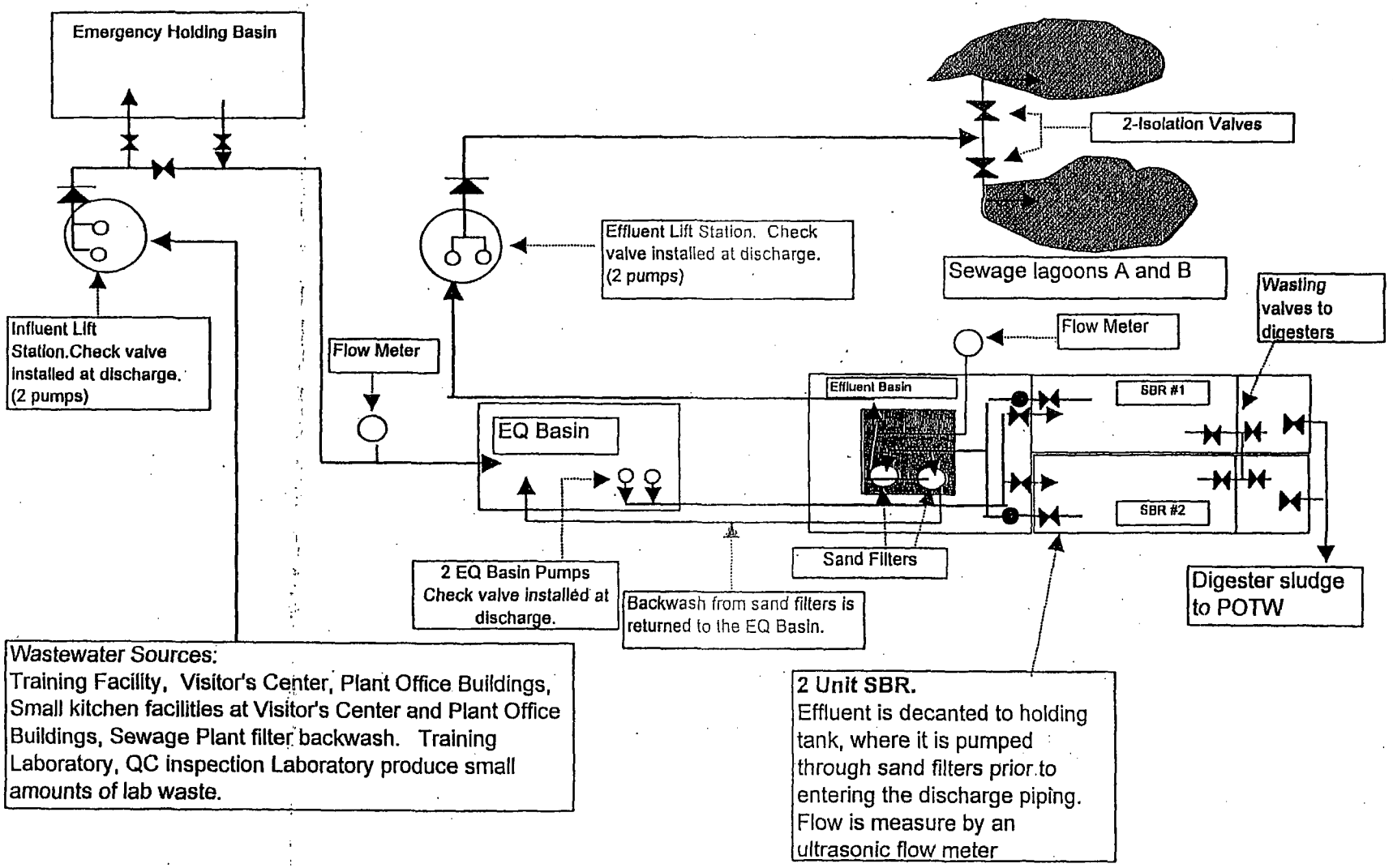
The collection system contains one influent liftstation equipped with two pumps. This liftstation pumps wastewater into the South Equalization Basin. The South Equalization Basin is equipped with an aeration system supplied by two blowers. The aeration system is operated to keep solids in suspension and the wastewater from turning septic. To boost alkalinity, magnesium hydroxide is added to the influent wastewater. To provide nutrients, a folic acid solution is also added. Within this basin are two submersible pumps that feed the SBR with wastewater.

The SBRs treat the wastewater by the activated sludge process. To aid in phosphorus removal, ferric chloride is added to the SBR tanks. To maintain an optimum mixed liquor concentration, sludge is wasted manually to either one of the two aerobic digesters. The sludge is removed by a licensed sludge hauler who delivers it to a POTW. The clear water may be returned to the Equalization Basin in a process to thicken the sludge.

As each SBR tank decants effluent water, the water flows into the effluent tank. From the effluent tank, two submersible pumps lift the water into the gravity sand filters. The effluent flows through the sand filters into a backwash tank. This backwash tank holds water needed to backwash the sand filters. During a backwash, the wastewater will flow back into the South Equalization Basin. Effluent will leave the backwash tank through a V-notch weir where the flow is measured by an ultrasonic flow meter. Effluent water will then flow into an effluent liftstation. Two pumps will pump the effluent water to either of the two seepage lagoons.

Composite samplers are located at the South EQ and Effluent tank to obtain regulatory samples. The influent collection system can be directed to a holding tank that can be aerated for maintenance or overflow conditions. The tank can then be fed to the influent lift station when conditions have returned to normal.

Sanitary Wastewater Flow Diagram
Cook Nuclear Plant, Brigman, MI 49106



Wastewater Sources:
Training Facility, Visitor's Center, Plant Office Buildings, Small kitchen facilities at Visitor's Center and Plant Office Buildings, Sewage Plant filter backwash. Training Laboratory, QC inspection Laboratory produce small amounts of lab waste.

2 Unit SBR.
Effluent is decanted to holding tank, where it is pumped through sand filters prior to entering the discharge piping. Flow is measure by an ultrasonic flow meter

Part II.A.2: Sanitary Wastewater Flow Diagram

NE-030
(03/95)

SYSTEM DESCRIPTION COVER SHEET

File No. M35

System Description No.	Preliminary [ ] Final [X]	Initial Approval Date	Revision No.	Revision Approval Date
SD-12-TERD-100		2/27/96	0	

PLANT: COOK NUCLEAR

Associated Flow Diag.: 12-5669-3
12-5669A-0

TITLE: SEWAGE TREATMENT SYSTEM

SCOPE OF REVISION:

Incorporates 12-PM-790: Construction of Sequencing Batch Reactor (SBR)

INTERNAL APPROVAL SIGNATURES

	ORIGINAL ISSUE		Rev. 1	Rev. 2	Rev. 3
	Preliminary	Final			
Author		[signature] 2/27/96			
Approved By		[signature]			
Approval Date		2/27/96			

SEWAGE TREATMENT SYSTEM

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SEWAGE TREATMENT SYSTEM

1.0 FUNCTION

The sewage treatment plant is designed to process raw sewage from various areas of the plant. The final effluent is discharged to the sewage absorption pond. The average flow capacity of the plant is 50,000 gallons per day (GPD) and maximum flow rate of 60,000 GPD. The effluent discharge limits are established by the Michigan Department of Natural Resources (MDNR) for the ground water discharge permit.

2.0 GENERAL DESCRIPTION

The sewage treatment plant is located at grade level on the South side of the Cook Nuclear Plant outside the protected area across from the fire protection water storage tanks.

Two (2) major structures house the majority of the equipment, tanks, valves and instrumentation. The South sewage treatment plant (SSTP) was furnished under Plant Modification 12-PM-541. The sequencing batch reactor (SBR) building was furnished under Plant Modification 12-PM-790.

The sewage treatment system is shown on flow diagrams 12-5669 and 12-5669A.

The major system sections are as follows:

2.1 Sewage Ejector (QS-700)

2.2 Sewage Influent Lift Station (QS-800)

2.3 Emergency Sewage Holding Tank (QS-200)

2.4 Equalization Basin (QS-300)

2.5 Sequencing Batch Reactor (SBR) System (QS-900)

2.6 Post Filtration System (QS-924)

2.7 Chemical Feed System (QS-925)

2.8 Effluent Lift Station (QS-600)

2.9 Sampling

2.1 Sewage Ejector (QS-700)

The sewage ejector is provided with 2 extended shaft pumps (QS-701 & QS-702) and is located in the basement of the office building. The basin is arranged to accept all sanitary drains from the office building basement and pumps to the influent lift station (QS-800).

2.2 Sewage Influent Lift Station (QS-800)

The sewage influent lift station is furnished with two (2) submersible grinder pumps (QS-801 & 802) and is designed to pump sewage to the equalization basin tank (QS-300). Pretreatment is provided by the strainer basket (QS-803) and the grinding action of the pumps. The pump station is located just West of the East sewage plant building.

2.3 Emergency Sewage Holding Tank (QS-200)

The emergency sewage holding tank is on the discharge of the influent lift station (QS-800) and can be valved into the system manually. A blower (QS-203) with distribution piping and diffusers is provided to mix the contents of the tank. Two pumps (QS-208 and QS-209) are provided to pump the sewage to the equalization basin. The emergency sewage holding tank is located in the East sewage plant building.

2.4 Equalization Basin (QS-300)

The equalization basin tank is equipped with two (2) air blowers (QS-301 & 302) to mix the contents of the tank. The air blowers discharge pressurized air in the tank through 1 1/4" air distribution piping routed to the bottom of the tank. The blowers and all items associated electrical and controls are located in the non hazardous area of the SSTP. A block wall divides the hazardous area and non hazardous area of the SSTP. The equalization basin tank is in the hazardous area of the SSTP.

The equalization basin pumps feed the SBR tanks through 4" influent piping. Pump #1 (QS-305) is dedicated to feed SBR tank #1 and pump #2 (QS-306) is dedicated to feed SBR tank #2. An influent sampler is furnished to obtain samples of the entering sewage.

2.5 Sequencing Batch Reactor (SBR) System (QS-900)

The sequencing batch reactor (SBR) is the heart of the sewage treatment process. The SBR receives sewage from the equalization basin (QS-300) and consists of 2 SBR process tanks (QS-919 and QS-920) and 2 aerobic digesters (QS-915 and QS-916). Each of these 4 tanks is provided with an aspirator/pump to mix and/or aerate the sewage or sludge. Both of the SBR tanks are provided with floating decaters that withdraw the effluent from the SBR tanks. The effluent flows to the effluent holding tank (QS-923). The remaining solids (sludge) is wasted to the aerobic digesters. The sludge is dewatered in the digesters via the thickener screens (QS-917 and QS-918). Sludge is removed from the digesters with the sludge transfer pumps (QS-903 and QS-904).

2.6 Post Filtration System (QS-924)

The post filtration system consists of filter feed pumps #1 (QS-901) and #2 (QS-902) located in the effluent holding tank (QS-923); filter #1 (QS-921) and #2 (QS-922) and the backwash tank (QS-914) (all skid mounted and located in the Mechanical area); and backwash pumps #1 (QS-905) and #2 (QS-906) located in the backwash tank.

Effluent from the SBR flows into the effluent holding tank. The filter feed pumps pump the effluent to the filters where it flows through the filter media and into the backwash tank. When the filters backwash, the backwash pumps pump clear effluent from the backwash tank through the filter media, which then flows to the equalization basin. Under normal flow conditions, the effluent flows out of the backwash tank through a

V-notch weir and then to the effluent lift station. The effluent flow meter (YFI-190) detects the water level behind the weir to determine the flow rate.

2.7 Chemical Feed System

An alum feed system automatically feeds alum to each SBR tank when called for by the SBR-Control Panel (CP). Alum metering pumps #1 (QS-907) and #2 (QS-905) feed SBR tanks #1 (QS-919) and #2 (QS-920) respectively. Each pump has an off-auto-run selector switch and an On pilot light located at the SBR-CP.

2.8 Effluent Lift Station (QS-600)

The effluent lift station is provided with 2 submersible pumps (QS-601 and QS-602) and is located South of the East sewage plant building. The pump station receives effluent from the post filtration system and pumps it to the sewage absorption pond.

2.9 Sampling

Samples of the effluent from the post filtration system are taken automatically by the effluent sampler (QS-913) with time sequence capability. The SBR system activates the sampler when either filter feed pump is started and turns off the sampler when the filter feed pump(s) stop operation. The influent sampler (QS-307) is programmed to take samples of the incoming sewage from the equalization basin (QS-300).

3.0 DESIGN BASIS AND EQUIPMENT DESCRIPTION

3.1 Design Parameters

3.1.1 INFLUENT RAW SEWAGE CONCENTRATIONS (15 MONTH GRAB SAMPLE AVERAGE OVER 4 YEARS)

	Average	Maximum (Avg Mthly)
BOD_5	240 mg/l	309 mg/l
TSS	295 mg/l	433 mg/l
Total Phosphorus	9.05 mg/l	10.45 mg/l
Ammonia	59.34 mg/l	70.03 mg/l
Total inorg. nitrogen	59.67 mg/l	70.45 mg/l

3.1.2 FLOWRATE

Design Average	50,000 gpd + 7,560 gpd backwash waste
Design Maximum	60,000 gpd + 7,560 backwash waste

3.1.3 EFFLUENT LIMITATIONS (as determined by the Michigan Department of Natural Resources)

BOD_5	25 mg/l
Total Dissolved Solids	500 mg/l
Chloride	250 mg/l
Dissolved Sodium	150 mg/l
Total Inorganic Nitrogen	5 mg/l
Total Phosphorus	1 mg/l
Sulfate	250 mg/l
Ph	6.5 - 8.5 s.u.

Purgeable aromatic	Non-detect at 1 ug/l
Purgeable halocarbons	Non-detect at 1 ug/l

3.2 Equipment Description

3.2.1 Sewage Ejector (QS-700)

a. Sewage ejector pumps (QS-701, QS-702)

Weil Model CSA extended shaft vertical centrifugal submerged sewage ejector pumps with cast iron casing, 4" discharge.

3.2.2 Sewage influent lift station (QS-800)

a. Influent grinder pumps (QS-801, 802)

Hydromatic model G2FX 500, submersible explosion proof grinder pumps with cast iron casing, stainless steel cutters, double carbon/ceramic seals, seal failure probes and motor winding high temperature sensors.

3.2.3 Equalization Basin (QS-300)

a. Air blowers (QS-301, QS-302)

Roots model RAI-45 rotary positive blowers with separate belt driven motor.

b. Equalization basin pumps (QS-305, QS-306)

Hydromatic model S4NX300, submersible explosion proof non-clog sewage pumps with cast iron casing, double carbon/ceramic seals, seal failure probes and motor winding high temperature sensors.

3.2.4 Sequencing Batch Reactor (SBR) System (QS-900)

a. SBR Aspirator pumps (QS-909, QS-910)

Pumpex Model KE102-3215 submersible explosion proof sewage pumps with double mechanical seals, seal failure probes and motor high winding temperature sensors.

b. SBR Tanks (QS-919, QS-920)

Reinforced, poured in place open top concrete tanks.

c. Filter feed pumps (QS-901, QS-902)

Hydromatic model SPD50H submersible effluent pumps with cast iron casing, double carbon/ceramic seals and seal failure probes.

d. Effluent holding tank (QS-923)

Reinforced, poured in place concrete tank with precast slab cover.

e. Digester aspirator pumps (QS-911, QS-912)

Pumpex Model KE102-3215 submersible explosion proof sewage pumps with double mechanical seals, seal failure probes and motor high winding temperature sensors.

f. Sludge transfer pumps (QS-903, QS-904)

Hydromatic model S4NX150 submersible explosion proof non-clog sewage pumps with cast iron casing, double carbon/ ceramic seals, seal failure probes and motor high winding temperature sensors.

3.2.5 Post filtration system

a. Sand filters (QS-921, QS-922)

Davco Model TES 2-4, 4' diameter filters with 3 gravel layers, 2 sand layers and 1 anthracite layer.

b. Backwash pumps (QS-905, QS-906)

Davis EMU; Model FA83-145.

3.2.6 Chemical feed system

a. Alum metering pumps (QS-907, QS-908)

Pulsafeeder; model 680C-S-E.

3.2.7 Effluent lift station (QS-600)

a. Submersible effluent lift pump (QS-601, QS-602)

Hydromatic model SPGF-500, submersible sewage pumps with cast iron casing, oil filled motor, double carbon/ceramic seals and stainless steel shaft.

3.2.8 Sampling

Influent and Effluent samplers (QS-307 and QS-913): American Sigma model 800SL refrigerated composite samplers.

3.2.9 Piping

a. Above grade piping: Sch. 80 PVC pressure pipe ASTM D1785 with Victaulic ductile iron grooved type fittings. ASTM A536. Couplings and flange adapters: Victaulic series 77, 307, 341 or 741.

b. Below grade piping and filter feed piping: Sch. 80 PVC pressure pipe, ASTM D1785 with socket type joints and fittings, ASTM F439. Socket connections joined with primer and solvent cement, ASTM D2564.

3.2.10 Valves

a. Plug Valves: Victaulic series 365 eccentric type with Buna-N plug facing and welded nickel seats.

b. Butterfly valves: Vitcaulic Vic-300 with ductile iron body and dual seal rubber coated ductile iron disc.

c. Check valves: Victaulic series 716 with ductile iron body, encapsulated ductile iron disc and stainless steel trim.

3.3 Regulatory Design Basis

Because the Sewage Treatment System is not required for plant safety related functions, there is no regulatory design basis applicable to this system. However, there are effluent limitations, as determined by the Michigan Department of Natural Resources, and those are listed in Section 3.1.3.

4.0 ELECTRICAL REQUIREMENTS

The electric power supply for the plant's sewage facilities is provided from the on-site 12kV source. This 12kV source is from transformer #7 (69kV to 12kV), located in the 765kV switchyard, which feeds the plant outbuildings (training center, warehouses, etc.) and is independent of the plant electrical system. This 12kV source has a backfeed connection (Livingston Road) to minimize downtime of the entire circuit in the event of an electrical fault on the line.

The sewage system facilities are provided power from three (3) motor control centers (MCC's): 12-SD-D, 12-SD-C, and 12-SBRSTP. MCC's 12-SD-C and 12-SBRSTP are connected to MCC 12-SD-D which is connected to the 12kV source through a 1000kVA transformer (12kV to 600v), 12-TR-SBRSTP. The operating AC voltages for the sewage facilities are: 600 (power), 120/208 (power and lighting/receptacles), 120 (instrumentation), 24/17 (control and instrumentation). See Section 6 for the electrical rating for each piece of equipment and/or system.

5.0 INSTRUMENTATION AND CONTROL

CAUTION: The set points indicated are provided only to assist in understanding the system. Refer to the appropriate set point control document for actual device set points.

5.1 Sewage Ejector (QS-700)

These pumps (QS-701 and 702) are operated automatically by the level switches (YLS-100 and YLS-101) located in the sump basin. The controls stop the pumps when the water level falls to 591'-1". The lead pump starts when the level reaches 591'-10". The lag pump starts at El. 592'-2". The high level alarm is brought in by level switch YLA-100 and is annunciated in the plant service annunciator (122).

5.2 Sewage Influent Lift Station (QS-800)

These pumps (QS-801 and 802) are operated automatically by level switches YLS-181, 182, and 183 located in the lift station. Level switch YLS-183 stops the pumps when the water level falls to El. 589'-6". Level switch YLS-182 starts the lead pump when the water level reaches El. 594'-6". Level switch YLS-181 starts the lag pump when water level reaches El. 595'-0". High water level alarm is brought in by level switch YLA-180 and annunciated in the sewage treatment annunciator (140) located in the SSTP.

5.3 Emergency Sewage Holding Tank (QS-200)

When the holding tank is in use, the holding tank blower (QS-203) is controlled by a time clock located in the QS-200 control panel. This can be adjusted for 15 minute run times. Blower failure alarm is brought in by pressure switch YPA-121 and is annunciated on the local sewage treatment annunciator. The surge pumps (QS-208 and QS-209) are controlled by level switches located in the tank, as follows:

At low level, YLS-121 turns both pumps off. As the level rises in the tank, YLS-122 brings the lead pump on. If the level continues to rise, YLA-121 brings both pumps on and gives a high level alarm on the local sewage treatment annunciator. Electrode YLA-120 provides a pump failure alarm on the annunciator.

5.4 Equalization Basin (QS-300)

The equalization basin pumps (QS-305, QS-306) are automatically controlled by a pressure transducer (YDS-130), located in the equalization basin. At low level (600'-6"), the pumps are prevented from running and the SBR influent valves (YMO-103 and YMO-104) are closed. Above 600'-6", the pumps and valves operate automaticaliy as controlled by the SBR control panel. Other setpoints signaled by YDS-130:

605'-0": stop lag equalization basin pump
605'-6": start lead equalization basin pump and open SBR influent valve
606'-3": start lag equalization basin pump

The blowers (QS-301 & 302) are controlled by timers and selector switches located in the SSTP (QS-300) control panel. The timers have 15 minute pins in them to control the time each blower is to run. A low level float switch (YLS-130) is located in the equalization basin to automatically stop the blowers from running if the water level drops below the float switch level (601'-0"). An emergency hi water level alarm (608'-2") is indicated on the SBR control panel from YLA-130. The local sewage treatment annunciator (#140), in the SSTP, is annunciated from the SBR control panel.

5.5 Sequencing Batch Reactor (SBR) System (QS-900)

Operation of the SBR system is automatic with motorized valves and aspirator pumps being controlled by the SBR control panel (SBR-CP). Each SBR tank is provided with pressure transducers, and motorized influent and effluent valves, air valves and waste sludge valves. The SBR-CP consists of a programmable controller which is interfaced to a PC with a printer. The pressure transducer settings (YDS-170, YDS-171) are as follows:

El. 613'-4" - allow/disallow SBR aspirator
El. 616"-9" - close SBR effluent valve
El. 622'-4" - close SBR influent valve, stop equalization basin pump

Each influent valve, effluent valve, and air valve has an Closed/Auto/Open selector switch and Open and Closed pilot lights located in the SBR-CP. Each pump/aspirator has a (off/auto/run) selector switch and an On pilot light located in the SBR-CP. Pilot lights that show valve position are activated through auxiliary relays from limit switches on the valves. Pilot lights that show pumps/aspirators "ON" are activated through auxiliary relays from contacts on the motor starters.

An emergency hi water float switch (YLS-170, 171) is provided in each SBR tank which will be indicated on the SBR control panel (SBR-CP), initiate the annunciator in the SSTP thru the programmable controller, will stop the equalization basin pump(s) (QS-305, QS-306) and will close the influent valve(s) (YMO-103, 104). Each pump/aspirator is equipped with

temperature overload and seal failure protection. If either of these conditions occurs, an alarm will be initiated from the SBR-CP and the process cycle failure annunciator light will be illuminated. The operator can determine specific alarm conditions by using the PC.

Each sludge transfer pump (QS-903, QS-904) is controlled by a start/stop push button station located outside at the Southwest corner to digester #2. The operation of each sludge transfer pump is indicated on pilot lights that are located on the SBR-CP. A low level-stop transfer pump float switch is located in each digester to stop the sludge transfer pump operation. Each digester is also equipped with an emergency hi water alarm float switch which is indicated on the SBR control panel and initiates the annunciator in the SSTP thru the programmable controller located in the SBR-CP. Each pump/aspirator and sludge transfer pump is equipped with temperature overload and seal failure protection. If either of these conditions occurs, an alarm will be initiated from the SBR-CP and the process cycle failure annunciator light will be illuminated. The operator can determine specific alarm conditions by using the PC.

5.6 Post Filtration System

The post filtration system is controlled by both the SBR-CP and by the post filtration system control panel (PFS-CP) which is located on the skid mounted post filtration system.

The effluent holding tank is equipped with a water level transducer (YDS-172) and a high level alarm float (YLS-172). The backwash tank is equipped with a high level float (YLS-191) and a time clock.

5.7 Chemical Feed System

Alum metering pump failure will be sensed by a limit alarm instrument. If the SBR-CP calls for an alum metering pump to start and the transformer does not detect current, an alarm signal will be sent as a part of the process cycle failure.

5.8 Effluent Lift Station (QS-600)

The operation of the South effluent pumps (QS-601, QS-602) is controlled by level switches as follows:

Level Switch	Set Point	Operation
YLS-160	599'-0"	Both Pumps off
YLS-161	601'-0"	Lead Pump on
YLS-162	601'-6"	Lag Pump on
YLA-160	602'-0"	Hi-water alarm

The high level alarm is annunciated in the sewage treatment annunciator (140) located in the SSTP.

5.9 Supervisory Software

The supervisory control and data acquisition system software will provide for operation access through the keypad for the following information which will be displayed on the CRT or recorded to the printer.

A. Mimic Diagram of the process.
B. Process cycle status and time remaining in cycle.
C. Plant Effluent Flow Rate

D. Water Levels in the following Tanks:
   1) Equalization Basin
   2) SBR #1
   3) SBR #2
   4) Effluent Holding Tank

E. Total run time of all chemical feed and process equipment including all pumps and aspirators.

F. SSTP Annunciator (#140), window #1: "SBR Sewage Plant QS-900 Abnormal" inputs:
   1) SBR #1 High Level (YLS-170, El. 623'-0")
   2) SBR #2 High Level (YLS-171, El. 623'-0")
   3) Digester #1 High Level (YLS-177, El. 621'-0")
   4) Digester #2 High Level (YLS-178, El. 621'-0")
   5) Equalization Basin High Level (YLA-130, El. 608'-2")
   6) Effluent Holding Tank High Level (YLS-172, El. 610'-8")
   7) Process Cycle Failure
      a. Equalization Basin Pump #1 (QS-305) seal failure.
      b. Equalization Basin Pump #1 (QS-305) high winding temperature.
      c. Equalization Basin Pump #2 (QS-306) seal failure.
      d. Equalization Basin Pump #2 (QS-306) high winding temperature.
      e. SBR #1 Aspirator/Pump (QS-909) seal failure.
      f. SBR #1 Aspirator/Pump (QS-909) high winding temperature.
      g. SBR #2 Aspirator/Pump (QS-910) seal failure.
      h. SBR #2 Aspirator/Pump (QS-910) high winding temperature.
      i. Digester #1 Aspirator/Pump (QS-911) seal failure.
      j. Digester #1 Aspirator/Pump (QS-911) high winding temperature.
      k. Digester #2 Aspirator/Pump (QS-912) seal failure.
      l. Digester #2 Aspirator/Pump (QS-912) high winding temperature.
      m. Sludge Transfer Pump #1 (QS-903) seal failure.
      n. Sludge Transfer Pump #1 (QS-903) high winding temperature.
      o. Sludge Transfer Pump #2 (QS-904) seal failure.
      p. Sludge Transfer Pump #2 (QS-904) high winding temperature.
      q. SBR #1 inlet valve (YMO-103) failure to open.
      r. SBR #1 inlet valve (YMO-103) failure to close.
      s. SBR #1 outlet valve (YMO-105) failure to open.
      t. SBR #1 outlet valve (YMO-105) failure to close.
      u. SBR #2 inlet valve (YMO-104) failure to open.
      v. SBR #2 inlet valve (YMO-104) failure to close.
      w. SBR #2 outlet valve (YMO-106) failure to open.
      x. SBR #2 outlet valve (YMO-106) failure to close.
      y. SBR #1 aspirator valve (YMO-107) failure to open.
      z. SBR #1 aspirator valve (YMO-107) failure to close.
      aa. SBR #2 aspirator valve (YMO-108) failure to open.
      bb. SBR #2 aspirator valve (YMO-108) failure to close.
      cc. SBR #1 effluent valve (YMO-101) failure to open.
      dd. SBR #2 effluent valve (YMO-101) failure to close.
      ee. SBR #2 effluent valve (YMO-102) failure to open.
      ff. SBR #2 effluent valve (YMO-102) failure to close.
      gg. Filter feed pump #1 (QS-901) seal failure.
      hh. Filter feed pump #2 (QS-902) seal failure.
      ii. Alum metering pump #1 (QS-907) failure to operate.
      jj. Alum metering pump #2 (QS-908) failure to operate.

G. The supervisory control and data acquisition system software/display will show change in status of valves, pump/aspirators, etc. All of the information will be transmitted via modem to remote pc as required.

5.10 Miscellaneous Failure Conditions

The following SBR failure conditions are alarmed at annunciator 140 in the Northeast corner of the South Sewage Treatment Plant (SSTP) Building:

A. SBR sewage plant (QS-900) abnormal
B. SBR Post filtration system (QS-924) failure
C. SBR exhaust fan motor failure
D. SBR sewage plant (QS-900) freeze protection abnormal
   - Pipe chase freeze protection failure
   - Sludge transfer line freeze protection failure

6.0 SYSTEM DESIGN AND OPERATING PARAMETERS

6.1 Sewage Ejector

6.1.1 Sewage Ejector Pumps (QS-701, QS-702)

Capacity, GPM	100
Total Dynamic Head (TDH), Ft.	22
Motor Speed, RPM	1150
Motor Horsepower	1.5
Voltage/Phase/Hertz	550/3/60

6.2 Sewage Influent Lift Station

6.2.1 Sewage Influent Pumps (QS-801, QS-802)

Capacity, GPM	160
Total Dynamic Head (TDH), Ft.	53
Motor Speed, RPM	1750
Motor Horsepower	5
Voltage/Phase/Hertz	575/3/60

6.2.2 Basket Strainer (QS-803)

Size (inches)	10x15 1/2x20 (deep)

6.3 Equalization Basin

6.3.1 Air Blowers (QS-301, QS-302)

Air Flow, CFM	130
Static Pressure, psi	4
Motor Speed, RPM	1760
Motor Horsepower	5
Voltage/Phase/Hertz	575/3/60

6.3.2 Equalization Basin Pumps (QS-305, QS-306)

Capacity, GPM	160
Total Dynamic Head (TDH), Ft.	24
Motor Speed, RPM	1750
Motor Horsepower	3
Voltage/Phase/Hertz	575/3/60

6.3.3 Equalization Basin Tank (QS-300)

Length	31'-0"
Width	12'-0"
Max. SW Depth	10'-0"
Max. Working Depth	7'-0"
Emergency overflow tank	
Volume, gallons	3,142

6.4 Sequencing Batch Reactor (SBR) System (QS-900)

6.4.1 SBR Aspirator/Pumps (QS-909, QS-910)

Capacity, GPM	440
Total Dynamic Head (TDH), Ft.	36
Motor Speed, RPM	1750
Motor Horsepower	8.5
Voltage/Phase/Hertz	575/3/60

6.4.2 Digester Aspirator/Pumps (QS-911, QS-912)

Capacity, GPM	440
Total Dynamic Head (TDH), Ft.	36
Motor Speed, RPM	1750
Motor Horsepower	8.5
Voltage/Phase/Hertz	575/3/60

6.4.3 Filter Feed Pumps (QS-901, QS-902)

Capacity, GPM	44
Total Dynamic Head (TDH), Ft.	21
Motor Speed, RPM	3450
Motor Horsepower	0.5
Voltage/Phase/Hertz	115/1/60

6.4.4 Sludge Transfer Pumps (QS-903, QS-904)

Capacity, GPM	200
Total Dynamic Head (TDH), Ft.	11
Motor Speed, RPM	1150
Motor Horsepower	1.5
Voltage/Phase/Hertz	575/3/60

6.4.5 SBR Tanks (QS-919, QS-920)

Number of tanks	2
Length	23'-6"
Width	9'-9"
Max. SW depth	16'-0"
Max. volume	27,421 gallons ea.
Effluent decant rate	291 GPM

6.4.6 Effluent Holding Tank (QS-923)

Number of tanks	1
Length	19'-0"
Width	18'-0"

Max. working depth	3'-6"
Working volume (gallons)	8,950

6.4.7 Aerobic Digester Tanks (QS-915, QS-916)

Number of tanks	2
Holding time	30 days per tank
Length	14'-6"
Width	9'-9"
Max. SW Depth	14'-7"
Min. SW Depth	1'-6"
Volume	13,924 gallons ea.

6.4.8 Digester Thickener Screens (QS-917, 918)

Number per tank	1
Screen size	4' wide x 12'-6" high
Screen slot size	0.03"

6.5 Post Filtration System (QS-924)

6.5.1 Sand Filters (QS-921, QS-922)

Number of sand filters	2
Diameter	4"-0" ea.
Height, media	3'-0" ea.
Total Filter Area, sq. ft.	25.1
Loading @ design flow; gal/s.f. (one filter operating)	3.5
Filter efficiency, Percentage	75-85

6.5.2 Backwash Tank (QS-914)

Capacity, gallons	1890
Backwash recycle to equalization tank	7560 gal. per day

6.5.3 Backwash Pumps (QS-905, QS-906)

Capacity, gpm	189
Total Dynamic Head (TDH), ft.	20
Motor Speed, rpm	1740
Motor Horsepower	2
Voltage/Phase/Hertz	575/3/60

6.6 Chemical Feed System (QS-925)

6.6.1 Alum

Alum usage (avg)	83 lbs per day
Alum storage	(3) 55-gallon drums

6.6.2 Alum Feed Pumps (QS-907, QS-908)

Capacity, gph (max.)	3.8
Total Dynamic Head (TDH), psig	60
Motor Speed, rpm	1750

Motor Horsepower	0.16
Voltage/Phase/Hertz	120/1/60

6.7 Effluent Lift Station (QS-600)

6.7.1 Effluent Pumps (QS-601, QS-602)

Capacity, gpm	80
Total Dynamic Head (TDH), ft.	65
Motor Speed, rpm	1750
Motor Horsepower	5
Voltage/Phase/Hertz	575/3/60

6.8 Sampling

6.8.1 Influent Flow Measurement (YFI-103)

Measurement device	3" mag meter
Transmitter output	4-20 mA (0-500 gpm)

6.8.2 Effluent Flow Measurement (YFI-190)

Measurement device	45 degree V-notch weir
Level sensor type	Ultrasonic
Sensor output	4-20 mA (0-100 gpm)

7.0 OPERATION

The normal operation of the system is summarized as follows:

The influent lift station (QS-800) receives all sanitary drains including washrooms, toilets, drinking fountains, cafeteria, visitor center and shower rooms. The lift station pumps raw sewage into equalization basin tank located in SSTP. Mixing of the equalization basin contents is accomplished by the air blowers (QS-301, QS-302) by discharging air to the bottom of the basin.

Normal operation of the SBR system consists of 5 steps in each batch, with each tank going through 3 batches per day as indicated below:

Step 1 SBR Tank Fill
Step 2 React Phase
Step 3 Settle Phase
Step 4 Decant Phase
Step 5 Idle Phase

In the first step, the influent valve (YMO-103) to SBR #1 is called to open and equalization pump #1 is called to start if there is water in the equalization basin. Filling of the SBR tank begins. Step 1 will last for no longer than 1 hour. Step 2 begins when the SBR tank level transducer indicates filling of the SBR tank is complete. Pump #1 will be stopped and influent valve (YMO-103) will be closed. At this time, pump/aspirator #1 will begin operation and air valve YMO-107 will open. During Step 2, air valve (YMO-107) will be closed for a period of time to achieve anoxic mixing which is necessary for denitrification. Approximately one (1) hour before the end of the Step 2, alum pump #1 (QS-907) will be started. Step 3 consists of stopping pump/aspirator #1 (QS-305), closing air valve (YMO-107) and stopping alum pump #1 (QS-107), allowing the tank contents to settle. Step 4 consists of opening effluent valve (YMO-101) causing the SBR decanter to open with effluent flowing to effluent holding tank. At completion of Step

4, effluent valve (YMO-102) closes. Step 5 is an idle period which takes place before starting at Step 1 again. SBR #2 begins with its Step #1 approximately 4 hours after SBR #1 begins its Step #1.

Near the end of Step 3, sludge wasting is performed. This can be performed automatically through the SBR-CP based on time control, or manually by the operator. For automatic control, the operator can select when and for how long the waste sludge valve (YMO-105) will be open during Step 3 based upon volume of sludge to be wasted. In lieu of automatic sludge wasting, manual wasting is accomplished by opening waste sludge valve (YMO-105) through the Open/Close/Auto selector switches with Open and Closed pilot lights that are located in the SBR-CP and by observing the level indicator for SBR #1. If influent valve (YMO-103) is open, the SBR-CP will not allow waste sludge valve (YMO-105) to be opened. SBR #2 operates similarly.

An alum feed system will automatically feed alum to each SBR tank when called for by the SBR-CP. Each SBR tank is provided with a dedicated alum metering pump.

SBR treated effluent flows into the effluent holding tank. SBR #1 effluent valve (YMO-102) opens to fill the effluent holding tank. Filter feed pump #1 directs flow to both filters #1 and #2. Normally, the level will rise in the effluent holding tank until the SBR effluent decant is complete, and then the continuing operation of the filter feed pump will lower the water level until the effluent holding tank transducer signals the filter feed pump to stop. Should the level rise high enough in the effluent holding tank, the second filter feed pump will be signaled to run. Flow passes by gravity through filters #1 and #2 in parallel and into the backwash tank. From the backwash tank flow passes over a 45 degree V-North weir through which all effluent flows. The weir contains an ultrasonic depth/flow meter. From the effluent weir, flow continues by gravity to the existing effluent lift station (QS-600), from which it is pumped to the existing sewage effluent absorption ponds.

At least once per day, each filter is backwashed by the backwash pumps. Backwash pumps #1 and #2 are each dedicated to backwash filter #1 and #2 respectively. Each backwash pump is controlled automatically by its 24-hour timer located in the Post Filter Control Panel. Also, each filter is equipped with a start backwash float switch that signals the backwash pump to start if the water level builds to this level on the upstream side of the filter media. The backwash pumps backwash each filter by pumping filtered effluent from the backwash tank through the filter media for 10 minutes. The backwash waste flows by gravity to the equalization basin.

The filters can be bypassed in emergency conditions by manually closing the filter feed valves (ST-124) and (ST-125), and by opening valve (ST-126).

Two (2) aerobic digesters are provided for treatment of the solids (sludge) generated by the SBR. Each digester is sized to hold 30 days of sludge.

Sludge wasting can be controlled automatically through the SBR-CP. Automatic wasting will occur near the end of the settle phase (Step 3). Based upon volume of sludge to be wasted from each SBR, the operator can adjust when and for how long the motorized waste sludge valves (YMO-105, 106) should remain open. Automatic wasting will occur during each batch of sewage processed in the SBR tanks. Alternatively, the operator can select to manually waste sludge. At least once per day, the plant operator will waste sludge from each SBR tank to one of the aerobic digesters. Wasting occurs by opening the motorized waste sludge valves (YMO-105, 106) located in the SBR tanks. By observing the SBR tank water level indicator on the SBR-CP, the operator determines the correct amount of sludge to waste. Upon reaching the permissive water level on a float switch in each digester, the digester pump/aspirator can be started. The digester pump/aspirator is periodically stopped to allow sludge thickening with decant to take place in the digester thickeners. When the digesters are full or as determined by the plant operator, thickened sludge is transferred out of the digester to sludge hauling vehicles

by the sludge transfer pumps. Each sludge transfer pump is controlled by a start/stop push button station located at the Southwest corner of Digester #2.

8.0 INSPECTION AND TESTING

8.1 Tech. Spec. Required Testing

None

8.2 Periodic Non-Tech. Spec. Inspections

The necessary inspection, maintenance and testing for the various equipment is performed in accordance with the preventive maintenance program.

Part III.: "A description of the appropriate response or facility adjustment to minimize the impact of emergency situations with the potential to affect the discharge of compliance with the permit so as to facilitate rapid implementation of a correct response during an emergency."

Part III.A: "Measures to minimize upsets of the treatment system-discussion of common operating problems and corrective measures."

Fire Protection and Prevention Plan: In the event of a fire, employees shall not attempt to extinguish the fire, but shall notify the local fire department at extension 1911. When properly trained to use, fire extinguishing systems shall be utilized if they can be used safely. Combustible material shall be dept away from spark sources. This includes keeping paper away from transformers and motors, and keeping sparks away from flammable materials. Also, make sure that systems are not overloaded, such as trying to draw too much power from an electrical system.

Severe Weather Emergencies: Severe weather includes tornadoes, lightning, and flooding. Some of thee conditions, such as tornadoes, can come upon the work site suddenly, with little to no warning. The following actions shall be implemented for each situation:

- Tornadoes-radio stations will provide continual updates when conditions are right for tornado formation. The Plant Manager/Supervisor will listen to the continual updates, and if conditions worsen, personnel will either be sent to their homes (if time and conditions allow), or to pre-designated shelters. In the event of being outside when a tornado forms, personnel shall evacuate all equipment and lay flat in the nearest low point in the ground. (unless time permits evacuation to the designated shelter). the following locations are designated as shelters: SBR inner hallway away from lab door.
- Lightning-In the event of lightning during outside jobs, all equipment shall be shut off, and personnel shall enter the nearest structure. Under no circumstances stand under a solitary tree. If a structure is not nearby, either remain in an enclosed vehicle, or locate to a low area.
- Flooding-When flooding is expected, take all equipment to the highest ground level possible. Then workers shall proceed to the highest available point (i.e. multi story building).

Other emergency procedures.

- WWT-2 "Annunciator Panel Number 140 Sewage Treatment." (attached)
- A troubleshooting guide is used by the operators to optimize the treatment process. (attached)

Part III.A.1: The Cook Nuclear Plant has procedures and guidelines to prevent or minimize the potential for the wastewater treatment and collection system contents to be spilled into the environment.

- WWT-5 "Cook Wastewater Treatment Plant Emergency Procedures." provides guidance to prevent system overflow during a high flow event, or power failure. This procedure also provides guidance to prevent system upset during abnormal system loadings. (attached)

Procedures are also in place to provide emergency response to polluting material spills, which are used to mitigate any spill that occurs on the site.

- PMP 2230 HMT.001 "Hazardous Material Response Organization and Training." (attached)
- PMP 2230 HMT.005 "Hazardous Materials Spill Pre-Plans." (attached)
- PMP 6090 PCP.100 "Spill Response - Oil, Polluting, and Hazardous Materials." (attached)

Part III.B: "Corrective action and reporting for public systems."

This system is not a public system. All corrective actions and reporting for this system is covered under Part II.A.8, Part II.A.9, Part II.A.10 of the Authorization to Discharge Permit M000988, issued September 28, 2000.

AMERICAN ELECTRIC POWER	Environmental Affairs Guideline	Number: WWT - 2
Effective Date: 10-15-97	Title: Anunciator Panel Number 140 Sewage Treatment	Rev. No.: 0

Revision Record

Revision 0: Initial Issue

Originator: _____ Date: 10-15-97

Approved by: _____ Date: 10-15-97

ANNUNCIATOR PANEL NUMBER 140

SEWAGE TREATMENT

SEWAGE TREATMENT NO. 140

1 SBR SEWAGE PLANT 12-QS-900 ABNORMAL	2 INFLUENT LIFT STATION 12-QS-800 LEVEL HIGH	3 EQUALIZATION BASIN 12-QS-300 BLOWER FAIL
4 SBR POST-FILTRATION SYSTEM 12-QS-924 ABNORMAL	5 INFLUENT LIFT STATION PUMP #1 12-QS-801 SEAL FAIL/HI WINDING TEMP	6 EFFLUENT LIFT STATION QS-600 LEVEL HIGH
7 SBR EXHAUST FAN MOTOR FAILURE	8 INFLUENT LIFT STATION PUMP #2 12-QS-802 SEAL FAIL/HI WINDING TEMP	9 EMERGENCY HOLDING TANK 12-QS-200 ABNORMAL
10 SBR SEWAGE PLANT 12-QS-900 FREEZE PROT ABNORMAL	11 BUS SDD GROUNDED	12

CONTROL ROOM PANEL "ST"
REFERENCE DRAWINGS: NONE

ANNUNCIATOR PANEL NUMBER 140

SEWAGE TREATMENT

SETPOINT: N/A

INITIATING DEVICE: SBR Sewage Plant
Allen Bradley Programmable
Logic Controller (PLC)

SBR SEWAGE PLANT
12-QS-900
ABNORMAL

1.0 PROBABLE CAUSE

1.1 SBR #1 High Level (YLS-170 @ 623'-0")

1.2 SBR #2 High Level (YLS-171 @ 623'-0")

1.3 Aerobic Digester #1 High Level (YLS-177 @ 621'-0")

1.4 Aerobic Digester #2 High Level (YLS-178 @ 621'-0")

1.5 Equalization Basin High Level (YLA-130 @ 608'-2")

1.6 Effluent Holding Tank High Level (YLS-172 @ 610'-8")

1.7 Process Cycle Failure

2.0 IMMEDIATE ACTION

2.1 Automatic

2.1.1 Equalization Basin High Level (YLA-130) will shorten the SBR Treatment Cycle.

2.1.2 Effluent Holding Tank High Level (YLS-172) closes 12 YMO-101 and 102, "SBR Effluent from decanter to effluent holding tank regulating valve"

2.1.3 Process Cycle Failure will cause SBR system shutdown.

2.2 Manual

2.2.1 None

3.0 SUBSEQUENT ACTION

3.1 Acknowledge alarm.

South Sewage Treatment building, annunciator Panel 140.

> Note:
> Record all entries in the SBR Logbook located in the SBR Laboratory.

3.2 Record any Jet Tech Panel alarm lights - LIT.

Located in SBR building, North Entrance, in SBR lab. Alarms on left side.

White Lights	SBR #1 HIGH LEVEL	SBR #2 HIGH LEVEL	DIGESTER #1 HIGH LEVEL	DIGESTER #2 HIGH LEVEL	EFF TANK HIGH LEVEL	EQ BASIN HIGH LEVEL
Red Light	D.C. CONTROL POWER					
Red light	SYSTEM ALARM					

3.2.1 IF one of the following alarms is LIT, THEN record level.

Located on the right side of Jet Tech Panel.

- SBR #1 High Level
- SBR #2 High Level
- EFF Tank High Level
- EQ Basin High Level

3.3 Press ACKNOWLEDGE ALARM button on the Jet Tech Panel.

3.4 IF any alarm is NOT CLEARED, THEN perform the following on the SBR process computer:

3.4.1 Click on "Alarm History".

On computer, in upper left-hand corner of screen.

3.4.2 IF box marked ALL does not contain a red dot, THEN click on ALL for alarm history.

On computer, in lower left-hand corner of screen.

3.4.3 Record the following information given under the "Alarm and Event History" screen:

	EXAMPLE
• Date and Time of Alarm	MM/DD HH:MM:SS
• Type of Alarm ("EVT") Operator	ALM - Operator (NONE)
• Comment	Influent Equalization Tank at ETWL
• Value/Limit Alrm State	ON/UNACK_ALM

3.4.4 Click on "Done" box.

3.4.5 Notify wastewater contractor personnel on duty to determine cause of alarm.

3.5	IF any alarm is - CLEARED, THEN reset by pressing the ALARM ACKNOWLEDGE button on the Jet Tech Panel..	Located on left side of Jet Tech panel.
3.6	Ensure all alarms and actions taken are documented in the SBR logbook.	In the SBR Lab.

4.0 REFERENCES

4.1 AEP Electrical Diagram:

4.1.1 OP-12-98761 (Annunciator)

4.2 Jet Tech O&M Manual.

4.3 12-PM-790

ANNUNCIATOR PANEL NUMBER 140

SEWAGE TREATMENT

SETPOINT: 595' 6"

INITIATING DEVICE: 12-YLA-180

INFLUENT LIFT
STATION 12-QS-800
LEVEL HIGH

1.0 PROBABLE CAUSE

1.1 Lift Pump Failure

1.2 Flow greater than available pumps can handle

1.3 Float(s) stuck or tangled

2.0 IMMEDIATE ACTION

2.1 Automatic

2.1.1 None

2.2 Manual

2.2.1 None

3.0 SUBSEQUENT ACTION	LOCATION
3.1 Acknowledge alarm.	South Sewage Treatment building, annunciator Panel 140.
3.2 Observe Lift Station level and float positions.	Outside the East Sewage Treatment Plant building, under single hatch labeled 12-QS-800.
3.2.1 Verify level is at the strainer basket. (Approx 18' below top of lift station hatch)	
3.2.2 Ensure that floats are not tangled. Untangle floats if necessary.	
3.3 Check Lift Pump Availability:	
3.3.1 Verify Control Switch - ON.	East Sewage Treatment Plant building on panel 12-SD-8, Influent Lift Station 12-QS-800 Control Panel.
a. If level is above basket, both pumps should be running. Go to step 3.3.4	
b. If level is above basket and no pumps are running go to step 3.3.2.	
c. If level is normal, pumps may have caught up with the flow, observe level to ensure that pumps turn on once adequate level is reached in the lift station. Go to step 3.3.4.	
3.3.2 Have all lift pump thermal overloads reset by qualified personnel (Operations, Maintenance, or Wastewater contractor).	East Sewage Treatment Plant building on panel 12-SD-7, Auxiliary Relay Annunciator Panel (600VAC).
a. IF a pump trips on thermal overload, THEN attempt at least (3) resets of the pump before proceeding to 3.3.2 b.	
b. IF pumps do not start, THEN notify wastewater contractor duty Personnel.	
3.3.3 IF pump(s) start, THEN perform the following:	
a. Switch pump - OFF.	Inside in Panel 12-SD-8.
b. Switch other pump to HAND and monitor running pump for 5 minutes.	
c. Stop running pump and switch idle pump to HAND.	
d. Monitor for 5 minutes.	
e. Continue to run one pump until level returns to - NORMAL.	Approximately 18' below top of lift station.

f. Return panel controls to - AUTO.

3.3.4 Monitor lift station pumps to ensure proper operation.

3.3.5 Ensure influent is being pumped to the Equalization Basin — South door-South sewage treatment building.

3.3.6 Document actions taken during the event in the SBR logbook. — In SBR office.

4.0 REFERENCES

4.1 AEP Electrical Diagram:

4.1.1 OP-12-98761 (Annunciator)

4.1.2 OP-12-98765 (Control)

4.2 12-PM-790

ANNUNCIATOR PANEL NUMBER 140

SEWAGE TREATMENT

SETPOINT: 1 psi

INITIATING DEVICE: 12-YPA-130

EQUALIZATION BASIN
12-QS-300
BLOWER FAIL

1.0 PROBABLE CAUSE

1.1 Blower Failure.

1.1.1 Motor thermal overload.

1.1.2 Blower pipe airflow restricted.

2.0 IMMEDIATE ACTION

2.1 Automatic

2.1.1 None

2.2 Manual

2.2.1 None

3.0 SUBSEQUENT ACTION	LOCATION
3.1 Acknowledge alarm.	South Sewage Treatment building, annunciator Panel 140.
3.2 Inspect motor thermal overload indicators. IF blower motor tripped due to overload, THEN:	South Sewage Treatment Bldg, North entrance. Panel 12-SD-3, 12-QS-300 Control Panel (208VAC).
3.2.1 Place the failed blower - OFF.	
3.2.2 Place opposite blower - HAND.	
3.2.3 Go to step 3.4.	
3.3 Inspect running blower. Determine if air flow restriction causes alarm, note reading on 12-YPI-130:	South Sewage Treatment building, North entrance, South Wall.
3.3.1 Place the running blower in - OFF.	
3.3.2 Place opposite blower in - HAND	
• Alarm should CLEAR.	
3.3.3 If alarm does not CLEAR, THEN:	
• Possible pipe restriction exists.	
3.4 Notify wastewater contractor duty personnel.	

4.0 REFERENCES

4.1 AEP Electrical Diagram:

4.1.1 OP-12-98761 (Annunciator)

4.1.2 OP-12-98765 (Control)

4.2 12-PM-790

ANNUNCIATOR PANEL NUMBER 140

SEWAGE TREATMENT

SETPOINT: N/A

INITIATING DEVICE: SBR Sewage Plant Square D Programmable Logic Controller (PLC)

SBR
POST-FILTRATION
SYSTEM 12-QS-924
ABNORMAL

1.0 PROBABLE CAUSE

1.1 Backwash Pump #1 (12-QS-905) Failure to Operate.

1.2 Backwash Pump #2 (12-QS-906) Failure to Operate.

2.0 IMMEDIATE ACTION

2.1 Automatic

2.1.1 None

2.2 Manual

2.2.1 None

3.0 SUBSEQUENT ACTION

3.1 Acknowledge alarm.

LOCATION

South Sewage Treatment building, annunciator Panel 140.

3.2 Identify failed backwash pump.

Post Filtration Panel is located on the west side of the SBR plant located inside SBR building, up the stairs, near the roll-up door.

3.2.1 Verify pump switch(es) is (are) in AUTO position.

3.2.2 If pump starts, then proceed to step 3.3.

3.2.3 Place failed pump in RUN.

3.2.4 If pump starts, place pump back to AUTO and proceed to step 3.5.

3.2.5 If pump fails to start

a. Deenergize cabinet.

Turn Off switch in upper right corner of cabinet.

b. Reset thermal overloads in cabinet.

c. Close door and reenergize cabinet.

d. IF a pump trips on thermal overload, THEN attempt at least (3) resets of the pump before proceeding to 3.2.5 e.

e. If pump does not start, remove filter skid from service by opening 12 ST - 126 "Filtered Feed Pumps to Backwash Tank Filter Bypass Valve" and turning off the filter control panel breaker.

f. Notify Wastewater duty personnel of event.

3.3 If pump starts, monitor pump for 4 minutes, (the pump should run for approximately 4 minutes if in AUTO). The second pump should start approximately 20 minutes later depending on water level and condition of filters.

At the North end of the backwash tank, 6 feet from the floor.

3.4 Verify controls set to AUTO.

3.5 Document actions taken during the event in the SBR Logbook.

In SBR lab.

3.6 Notify wastewater contractor duty personnel of event.

4.0 REFERENCES

4.1 AEP Electrical Diagram:

4.1.1 OP-12-98761 (Annunciator)

4.2 Jet Tech O&M Manual.

4.3 DAVCO Instruction Manual.

4.4 12-PM-790

ANNUNCIATOR PANEL NUMBER 140

SEWAGE TREATMENT

SETPOINT: N/A

INITIATING DEVICE: 39X-SF1, 26X-OL1

INFLUENT LIFT STATION PUMP #1 12-QS-801 SEAL FAIL/HI WINDING TEMP

1.0 PROBABLE CAUSE

1.1 Pump/Motor Seal Failure (SF1).

1.2 Motor Winding Temperature High (OL1).

2.0 IMMEDIATE ACTION

2.1 Automatic

2.1.1 None

2.2 Manual

2.2.1 None

3.0 SUBSEQUENT ACTION	LOCATION
3.1 Acknowledge alarm.	South Sewage Treatment building, annunciator Panel 140.
3.2 Open Panel door to 12-SD-8.	East Sewage Treatment Plant building, West Wall, North Side, Panel 12-SD-8, Influent Lift station 12-QS-800 Control Panel (600VAC).
3.3 Inspect the following conditions:	Inside Panel 12-SD-8 (600VAC).
3.3.1 If Pump #1 Seal Leak Light is - ON, THEN 39X-SF1 initiated the alarm.	
3.3.2 If no indicating lamp is - LIT, THEN 26X-OL1 initiated the alarm.	
3.3.3 Place Influent Lift Station Pump #1 in OFF.	
3.4 Close Panel 12-SD-8.	
3.5 Notify wastewater contractor duty personnel of event.	
3.6 Record findings in the SBR Logbook	IN SBR Lab.

4.0 REFERENCES

4.1 AEP Electrical Diagram:

4.1.1 OP-12-98761 (Annunciator)

4.1.2 OP-12-98765 (Control)

4.2 12-PM-790

ANNUNCIATOR PANEL NUMBER 140

SEWAGE TREATMENT

SETPOINT: 602'-0"

INITIATING DEVICE: 12-YLA-160

EFFLUENT LIFT STATION QS-600 LEVEL HIGH

1.0 PROBABLE CAUSE

1.1 Effluent Lift Pump Failure

1.2 Flow greater than capacity of available pump(s)

1.3 Float(s) stuck or tangled

2.0 IMMEDIATE ACTION

2.1 Automatic

2.1.1 None

2.2 Manual

2.2.1 None

3.0 SUBSEQUENT ACTION	LOCATION
3.1 Acknowledge alarm.	South Sewage Treatment building, annunciator Panel 140.
3.2 Observe Lift Station level and float positions.	100 ft. South of the East Sewage Treatment Plant building, under double hatch labeled 12-QS-600.
3.2.1 Verify level is approx. 12' below top of lift station.	
3.2.2 Ensure that floats are not tangled. Untangle floats if necessary.	
3.3 Check Lift Pump Availability:	
3.3.1 Verify Control Switch - ON.	East Sewage Treatment Plant building on panel 12-SD-6, Influent Lift Station 12-QS-600 Control Panel.
a. If lift stations level is above normal, and SBR is discharging through V notch, pumps should be running. Go to step 3.3.4	V notch is in SBR building one level up from the building entrance.
b. If level is above normal and no pumps are running go to step 3.3.2.	Normal lift station level is approximately 12' from the top of the hatch.

> NOTE:
> The SBR Decants effluent approximately every 3 - 4 hours. It may not be possible to wait for the level in the effluent lift station to start the pumps again.

c. If level is normal, pumps may have caught up with the flow, observe level to ensure that pumps turn on once adequate level is reached in the lift station. Go to step 3.3.4.	
3.3.2 Have all pump lift pump thermal overloads reset by qualified personnel (Operations, Maintenance, or Wastewater contractor).	East Sewage Treatment Plant building on panel 12-SD-6, Sewage Treatment Sys South Effluent Lift Station QS-600 Control Panel (600VAC).
a. IF a pump trips on thermal overload, THEN attempt at least (3) resets of the pump before proceeding to 3.3.2 b.	
b. IF pumps do not start, THEN notify wastewater contractor duty Personnel.	
3.3.3 IF pump(s) start, THEN perform the following:	

	a. Switch pump - OFF.	Inside Panel 12-SD-6.
	b. Switch other pump to HAND and monitor running pump for 5 minutes.	
	c. Stop running pump and switch idle pump to HAND.	
	d. Monitor for 5 minutes.	
	e. Continue to run one pump until level returns to - NORMAL.	Approximately 12' below top of lift station.
	f. Return panel controls to - AUTO.	
3.3.4	Monitor lift station pumps to ensure proper operation.	
3.3.4	Document actions taken during the event in the SBR logbook.	In SBR office.

4.0 REFERENCES

4.1 AEP Electrical Diagram:

4.1.1 OP-12-98761 (Annunciator)

4.1.2 OP-12-98765 (Control)

ANNUNCIATOR PANEL NUMBER 140

SEWAGE TREATMENT

SETPOINT: N/A

INITIATING DEVICE: Alarm and current devices which monitor the SBR Exhaust Fan/Monitor Operation.

SBR EXHAUST FAN MOTOR FAILURE

1.0 PROBABLE CAUSE

1.1 SBR Exhaust Fan Motor Failure.

2.0 IMMEDIATE ACTION

2.1 Automatic

2.1.1 None

2.2 Manual

2.2.1 None

3.0 SUBSEQUENT ACTION	LOCATION
3.1 Acknowledge alarm.	South Sewage Treatment building, annunciator Panel 140.
3.2 Check control switch and fan.	On West Wall of SBR building, up stairs on platform south of SBR plant.
3.3 If unable to clear alarm, notify Wastewater contractor duty personnel.	
3.4 Document all actions in SBR Logbook.	In SBR Lab.

4.0 REFERENCES

4.1 AEP Electrical Diagram:

4.1.1 OP-12-98761 (Annunciator)

4.2 Jet Tech O&M Manual.

ANNUNCIATOR PANEL NUMBER 140

SEWAGE TREATMENT

SETPOINT: N/A

INITIATING DEVICE: 39X-SF2, 26X-OL2

INFLUENT LIFT STATION PUMP #2 12-QS-802 SEAL FAIL/HI WINDING TEMP

1.0 PROBABLE CAUSE

1.1 Pump/Motor Seal Failure (SF2).

1.2 Motor Winding Temperature High (OL2).

2.0 IMMEDIATE ACTION

2.1 Automatic

2.1.1 None

2.2 Manual

2.2.1 None

3.0 SUBSEQUENT ACTION	LOCATION
3.1 Acknowledge alarm.	South Sewage Treatment building, annunciator Panel 140.
3.2 Open Panel 12-SD-8 door.	East Sewage Treatment Plant building, on Panel 12-SD-8 (600VAC), Influent Lift station 12-QS-800 Control Panel.
3.3 Inspect the following conditions:	Inside Panel 12-SD-8.
3.3.1 If Pump #2 Seal Leak Light - ON, THEN 39X-SF2 initiated the alarm.	
3.3.2 If no indicating lamp - LIT, THEN 26X-OL2 initiated the alarm.	
3.3.3 Place Influent Lift Station Pump #2 - OFF.	
3.4 Close Panel 12-SD-8.	
3.5 Notify wastewater contractor duty personnel of event.	
3.6 Document all actions in SBR Logbook.	In SBR Lab.

4.0 REFERENCES

4.1 AEP Electrical Diagram:

4.1.1 OP-12-98761 (Annunciator)

4.1.2 OP-12-98765 (Control)

4.2 12-PM-790

ANNUNCIATOR PANEL NUMBER 140

SEWAGE TREATMENT

SETPOINT: N/A

INITIATING DEVICE: 12-YLA-120 (Electrode)
12-YLA-121
12-YPA-121
Electrode Relay (ER)

EMERGENCY
HOLDING TANK
12-QS-200
ABNORMAL

1.0 PROBABLE CAUSE

1.1 Extreme Surge Tank level (High or Low)

1.2 Surge Pump(s) Failure

1.3 Flow greater than capacity of available pump(s)

1.4 Surge Blower Failure

Note:
This system is normally not in service. It is to be used as an emergency holding area for raw sewage during periods when the SBR is undergoing maintenance activities, or power failures have caused the lift stations to become inoperable. It may also be used during high flows when the SBR can't handle the volumes.

2.0 IMMEDIATE ACTION

2.1 Automatic

2.1.1 None

2.2 Manual

2.2.1 None

3.0 SUBSEQUENT ACTION	LOCATION
3.1 Acknowledge alarm.	South Sewage Treatment building, annunciator Panel 140.
3.2 Reset surge pump(s) and surge blower(s) thermal overloads. Voltage: 208 VAC.	East sewage Treatment Plant building, in Panel 12-SD-2, 6,000 Gallon Per Day Sewage Treatment Pkg QS-200 Control Panel.
3.2.1 IF a pump trips on thermal overload, THEN attempt at least (3) resets of the pump before proceeding to 3.2.2.	
3.2.2 If Pump(s) or blower(s) do not start, THEN notify wastewater contractor duty personnel.	
3.3 If Surge Pump(s) or Surge Blower(s) start, THEN notify wastewater contractor duty personnel.	Panel 12-SD-2.

4.0 REFERENCES

4.1 AEP Electrical Diagram:

4.1.1 OP-12-98861 (Annunciator)

4.1.2 OP-12-98760 (Control)

ANNUNCIATOR PANEL NUMBER 140

SEWAGE TREATMENT

SETPOINT: 40°F Decreasing

INITIATING DEVICE: 23-1-OYCPCL (Pipe Chase Lines)
23-1-OYCSTL (Sludge Transfer Lines)

SBR SEWAGE PLANT
12-QS-900
FREEZE PROT
ABNORMAL

1.0 PROBABLE CAUSE

1.1 SBR Pipe Chase Lines Freeze Protection Failure.

1.2 SBR Sludge Transfer Lines Freeze Protection Failure

2.0 IMMEDIATE ACTION

2.1 Automatic

2.1.1 None

2.2 Manual

2.2.1 None

3.0 SUBSEQUENT ACTION	LOCATION
3.1 Acknowledge alarm.	South Sewage Treatment building, annunciator Panel 140.
3.2 Inspect the 120 VAC circuit breakers that provide power to the freeze protection circuits.	SBR Building, North entrance, East wall, Control Panel 12-SBR-DP, circuits #21 and #34.

3.2.1 If panel circuit breaker(s) are tripped, THEN perform the following:

a. Reset circuit breaker and monitor for 5 minutes.

b. IF a circuit breaker trips, THEN attempt at least (3) resets of the pump before proceeding to 3.2.1 d.

c. Monitor breaker for 5 minutes.

d. IF circuit breaker(s) do not RESET, initiate an action request under the NPM system.

4.0 REFERENCES

4.1 AEP Electrical Diagram:

4.1.1 OP-12-98761 (Annunciator)

4.2 Jet Tech O&M Manual.

ANNUNCIATOR PANEL NUMBER 140

SEWAGE TREATMENT

SETPOINT: 82 Volts Increasing

INITIATING DEVICE: 64-SDD-01
64-SDD-02
64-SDD-03

BUS SDD GROUNDED

1.0 PROBABLE CAUSE

1.1 Component grounded.

2.0 IMMEDIATE ACTION

2.1 Automatic

2.1.1 None

2.2 Manual

2.2.1 None

3.0 SUBSEQUENT ACTION

3.1 Acknowledge alarm.

3.2 Determine which bus phase is groundedby checking AC voltmeter in upper left hand section of MCC 12-SD-D. Place AC voltmeter to L1-N, and note the voltage. Repeat for L2-N and L3-N. Located on the MCC cabinet, upper left corner.

3.3 Determine the time when the alarm was initiated.

3.4 Attempt to correlate any equipment (pumps) starting that may have caused the alarm.

3.4 Document events in the SBR Logbook.

3.5 Notify wastewater contractor duty personnel of event.

3.6 Initiate Action Request as necessary to troubleshoot the cause of the alarms.

4.0 REFERENCES

4.1 AEP Electrical Diagram:

4.1.1 OP-12-98861 (Annunciator)

4.1.2 OP-12-98760 (Control)

ANNUNCIATOR PANEL NUMBER 140

SEWAGE TREATMENT

SETPOINT: N/A

INITIATING DEVICE: No input to this drop.

BLANK

1.0 PROBABLE CAUSE

1.1 None

2.0 IMMEDIATE ACTION

2.1 Automatic

2.1.1 None

2.2 Manual

2.2.1 None

3.0 SUBSEQUENT ACTION

3.1 None

4.0 REFERENCES

4.1 None

ACTIVATED SLUDGE PROCESS

TROUBLE-SHOOTING GUIDES

Jet Tech SBR Plants

Sludge Identification

	Type of Sludge:	Identified by:
1.	Normal (floc formers)	Golden brown, musty odor, supernatant is slightly turbid with a light brown or golden color. Characterized by good settling; SVI = 90 - 120, settlometer (SV_{30}) best is 30% to 40%.
2.	Pin-Point Floc (excessive solids in effluent and not hitting the sludge blanket)	May occur from time to time as small suspended sludge particles in the supernatant. There are two kinds: 1. Grayish ash-like, inert- has low BOD. Sludge is old. 2. Like normal sludge, brown but a portion does not settle or rise. Has high BOD. Sludge is young.
3.	Billowing (sludge solids washout)	Normal sludge which can not settle because of hydraulic overloading.
4.	Anaerobic	Septic sludge - dark brown to black chunks. Formed by allowing settled sludge enough time to produce CO_2 gas which becomes entrapped in the sludge.
5.	Over-aerated	Normal sludge with entrapped air bubbles. Problem is usually caused if grease or some type of oil prevents air bubble release.
6.	Dispersed Growth	Color - white brown, gray or black. Does not settle. Particles will remain uniform in suspension after 30 minutes. Shows a lack of bacterial buildup in the mixed liquor. Occurs when the concentration of soluble organic matter is extremely high.
7.	Deflocculation	This is normal sludge which has undergone some type of shock. Supernatant extremely turbid and cells will not settle. Usually temporary and sludge will form when shock has passed.
8.	Rising Sludge	Settles well in 30 minutes, but due to the entrapment of gas bubbles

	(denitrification)	formed by denitrification, the sludge becomes lighter than water and rises to the surface with large chunks of light brown sludge floating on the water surface. Denitrification is temperature-dependent and most noticeable during the warmer months, May - September. A rise in chlorine demand along with a decrease in pH usually accompanies denitrification. Many Jet Tech SBR's have a denitrification step in the process in order to meet strict effluent limits. Denitrification is not a problem unless it is occurring during the *Settle* or *Decant* portions of the cycle.

9.	Floating Sludge	Usually temporary, and small amounts can be considered normal. This type of sludge can be quite filamentous. Can be a large number of dead stalked ciliates. Can be dead rotifer or nematodes killed by fungi. May also be nocardia.

10.	Bulking Sludge	Two types: 1. A flocculated sludge with a high SVI and a low settling rate. Sludge floc has a large area and probably contains bound water. It is generally an under-oxidized sludge. 2. Filamentous sludge - light brown, gray, or white in color. Odor is sweet or fruit-like. Settles slowly with an SVI of 180 or more. Supernatant is clear but very little of it. Sludge particles have filaments extending from clumps.

ACTIVATED SLUDGE PROCESS
JET TECH SBR PLANTS

JET TECH AERATION SYSTEM PROBLEMS

TROUBLE-SHOOTING GUIDE #1

AERATION SYSTEM PROBLEMS

OBSERVATION	PROBABLE CAUSE	NECESSARY CHECK	REMEDIES
1. Boiling action. Violent turbulence throughout surface of Jet Tech basin. Mixing plume is present.	A. Over-aerating resulting in high D.O. and floc shearing.	1. D.O. levels are getting up to 8 and 9 ppm routinely by the end of Jet Tech *React* cycle.	1. Reduce Jet Tech **Omniflo®** air time.
2. Uneven surface aeration pattern. Dead spots, inadequate mixing in some areas of Jet Tech SBR basin, or air rising straight above the jets.	A. Pump airbound.	1. Check pump for gravely sound. Open air bleedoff on pump. Check for air.	1. Shut down blower, then pump. Bleed off air from pump. Restart pump. Check mixing. Start blower.
	B. Diffusers plugged	1. Check maintenance records for last cleaning. 2. Spot-check air diffusers in Jet Tech SBR basin.	1. If diffusers have not been cleaned in last 12 months, do so. 2. If several are plugged, clean all diffusers in Jet Tech SBR basin.
3. Excessive air rates being used with no apparent change in organic or hydraulic loading. Difficult to maintain adequate D.O. level in Jet Tech SBR basin.	A. Leaks in aeration system piping.	1. Check air pipe and joint connection. Listen for air leakage or soap test flanges and watch for bubbling.	1. Tighten flange bolt and/or replace flange gasket.
	B. Plugged diffusers. Air discharging from blow-off.	1. Check Jet Tech Trouble-Shooting Guide #2B above.	1. Try to replace chemical with a more compatible one.

	C. Insufficient or inadequate oxygen transfer.	1. Check for chemical additions which would inhibit oxygen transfer, i.e., kerosene-based defoamers, surfactant...	
	D. High organic loadings from in-plant side stream flows.	1. Check to see if organic loading from side stream flows contribute significantly to overall process loading, i.e. returning digester supernatant.	1. Optimize operation of performance, i.e. slowing rate, frequency of returning digester supernatant.
4. Jet Tech SBR basin contents turn dark.	A. Inadequate aeration, dead zones, and septic sludge.	1. Aeration cycle D.O.'s and amount of air time.	1. Increase Jet Tech Omniflo® air time. 2. Increase aeration by placing another blower in service. 3. Decrease loading by placing another basin in service. 4. Check air piping for leaks. 5. Clean any plugged diffusers.
5. While one Jet Tech SBR basin is aerating, another Jet Tech SBR basin that is not aerating has small amounts of air still rising up in it. Air is in the area above the jets and interferes with settling.	A. Non-aerating Jet Tech SBR basin air valves is not seating. B. Air valve is worn or damaged.	1. Try to manually seat valve with handwheel, or if possible, use an additional manual valve and isolate tank. 2. Try to manually seat valve with handwheel, or if possible, use an additional manual valve and isolate tank.	1. Reset valves' travel stop where air bubbles stop. 2. Remove air valve and visually inspect.

TROUBLE-SHOOTING GUIDE #2
FOAMING PROBLEMS

OBSERVATIONS	PROBABLE CAUSE	NECESSARY CHECK	REMEDIES
1. White, thick, billowing, or sudsy foam on jet Tech SBR basin surface.	A. Overloaded Jet Tech SBR basin (low MLSS) due to process start-up. Do not be alarmed. This problem usually occurs during process start-up.	1. Check Jet Tech basin loading (lbs./day) and lbs/ MLVSS in SBR basin. Calculate F/M ratio to determine lbs/day MLVSS inventory for current BOD loading. 2. Check D.O. levels during aeration cycles.	1. After calculating the F/M and lbs. MLVSS needed, you will find that the F/M ratio is high and the MLVSS is low: Do not waste sludge from the Jet Tech SBR process until sufficient solids level have been built up. 1. Make sure you have enough Jet Tech Omniflo® air time and that you are reaching a D.O. of 4 or 5 at the end of *React*. If you are going up to saturation and stay there for long periods, you are providing more air than is needed.
	B. Excessive sludge wasting from process causing overloaded Jet Tech SBR basins, (low MLSS).	1. Check and monitor for trend changes which occur in the following: a. Decrease in MLVSS b. Decrease in SRT. c. Increase in F/M ratio. d. D.O. levels maintained with less air time. e. Increase in WAS rates. f. Rise in effluent ammonia levels.	1. Decrease WAS rate. Decrease rate gradually so as not to upset the system. 2. If another Jet Tech SBR basin has enough extra solids, try wasting some of the excess solids to the problem basin.
	C. Present of non-biodegradable surface active material.	1. If MLSS level is appropriate, surfactants may be a probable cause.	1. Decrease sludge wasting which will increase MLSS & SRT. 2. Monitor industrial discharges.

		1. Take MLSS sample and test for toxins, i.e. metals, bactericide, temperature and pH.	1. Re-establish a new culture of activated sludge. If possible, waste sludge without returning it to other in-plant systems. Obtain seed sludge from other plant if possible.
		2. Monitor plant influent for significant temperature variations.	2. Actively enforce industrial waste ordinance.
2. Shiny, dark tan foam on Jet Tech SBR basin surface. May be crusty.	A. SBR basin is approaching under-loaded (high MLSS) condition due to insufficient sludge wasting from the process.	1. Check and monitor for trend changes in the following: a. Increase in MLVSS. b. Increase in SRT. c. Decrease in F/M. d. D.O. levels maintained with increasing air rates. e. Decrease in WAS rates.	1. Increase WAS rate slowly so as not to upset the process. Do this until a small amount or no light tan foam is observed on the Jet Tech SBR basin surface. 2. Refer to Jet Tech Trouble-Shooting Guide #6.
3. Shiny, tan foam on Jet Tech SBR basin surface. No crust present.	A. Filamentous organism induced foaming. The most common is <u>*Nocardia spp.*</u>	1. Perform microscopic examination of the foam to check for *Nocardia*. 2. If bacteria are identified, use the type of filament to identify the causative conditions, then correct as necessary. 3. If no *Nocardia or other Filaments* are present ***do not*** follow chlorination instructions of this section. Investigate other causes of the foam.	1. Eliminate Fats, Oils and Greases from the influent as much as possible. 2. Chlorinate foam in settle. Chlorine should be sprayed or broadcast <u>lightly</u> on the <u>surface</u> of the foam. The chlorination must be light enough to not significantly penetrate the foam layer. This can take up to 3 weeks before Nocardia are under control. <u>Use caution when chlorinating!!</u>

4. Thick, scummy dark tan foam on Jet Tech SBR basin surface. May be crusty.	A. Jet Tech SBR basin is critically underloaded (MLSS too high) due to improper WAS control program.	1. Check and monitor trend changes in the following: a. Increase in MLVSS b. Increase in SRT. c. Decrease in F/M d. Increase in sludge blanket during *settle/decant*. e. Decrease in WAS rates. f. Increase in effluent chlorine demand. g. Increase in settleable solids test. h. Increase in suspended solids in effluent.	1. Refer to Remedy #1 above. 2. See Jet Tech Trouble-Shooting Guide #6 and #7 for additional checks and remedies.

5. Dark brown, almost blackish sudsy foam on Jet Tech SBR basin tank surface. Mixed liquor color is very dark brown to almost black. Detection of septic or sour odor from Jet Tech SBR basins.	A. Anaerobic conditions occurring in Jet Tech SBR basin.	1. Check D.O. levels during aeration cycle. They should be coming up to at least 4.0 - 5.0 ppm by the end of *React*.	1. If D.O. levels are insufficient, increase air time. 2. Refer to Jet Tech Trouble-Shooting Guide #2 and #3.

TROUBLE-SHOOTING GUIDE #3

BILLOWING SOLIDS

OBSERVATIONS	PROBABLE CAUSE	NECESSARY CHECK	REMEDIES
1. Localized clouds of homogeneous sludge solids rising in certain area during *Settle* and *Decant*. Mixed liquor in settleability tests settles fairly well with a clear supernatant.	A. Equipment mal-functions.	1. Refer to Jet Tech Trouble-Shooting Guide #1, Observations 1-A, 2-A, and 2-B.	
	B. Air or gas entrapment in sludge floc or denitrification occurring.	1. Perform sludge settleability tests and gently stir sludge when settling. 2. If bubbles are released, check nitrate mg/l in effluent.	1. If the process is not nitrifying, refer to Probable Cause A above and Jet Tech Trouble-Shooting Guide #7, Observation 2. 2. If process is nitrifying, and nitrifying is required, look at shortening *Settle* time, increasing WAS rate. 3. If process is nitrifying, see Jet Tech Trouble-Shooting Guide #5, Probable Cause A.
2. Localized clouds of fluffy homogenous sludge rising in certain areas of the Jet Tech SBR basin. Mixed liquor settle fairly well with a clear supernate.	A. Floc denitrificaiton is occurring.	1. Perform sludge settleability and gently stir sludge when settling to see if bubbles are released. If bubbles are released, check nitrate level in effluent.	1. Increase WAS rate by not more than 10% per day, if possible. 2. Increase aeration time. Make sure D.O. levels are coming up to 4, 5, or 6 by the end of *React.*
	B. Air or gas entrapment in sludge floc.	1. Perform an oil and grease on MLSS.	1. If grease amount is excessive, implement an industrial waste monitoring and enforcement program.

. Localized clouds of fluffy homogenous sludge rising in certain areas of the Jet Tech SBR basin. Mixed liquor settles slowly, leaving behind stragglers.	A. Overloaded Jet Tech SBR basin (low MLSS) resulting in a young, low-density sludge.	1. Check and monitor trend changes which occur in the following: a. Decrease in MLVSS. b. Increase in F/M ratio. c. Increase in D.O. levels.	1. Decrease WAS rates by not more than 10% per day to bring Jet Tech SBR process back to optimum parameters.

TROUBLE-SHOOTING GUIDE #4

BULKING SLUDGE

OBSERVATIONS	PROBABLE CAUSE	NECESSARY CHECK	REMEDIES
1. Clouds of billowing homogenous sludge rising and extending throughout the Jet Tech SBR basin. Mixed liquor settles slowly and compacts poorly in settleability tests, but supernatant is fairly clear.	A. Improper organic loading or D.O. level.	1. Check and monitor trend changes in the following: a. Decrease in MLVSS. b. Decrease in SRT. c. Increase in F/M ratio. d. Change in D.O. levels. e. Sudden SVI increased from normal.	1. Decrease WAS rate by not more than 10% per day until Jet Tech SBR process approaches normal operating parameters.
	B. Filamentous organisms.	1. Perform microscopic examination of mixed liquor. If possible, try to identify type of filamentous organisms. 2. If fungi are identified, check industries for wastes which may cause problems. Check for low pH <6.5. 3. If bacteria are identified, use the type of filament to identify the causative conditions, then correct as necessary.	1. If no filaments are observed, refer to Probable Cause A above. 2. Enforce industrial waste ordinance to eliminate wastes. 3. Chlorinate MLSS during the latter one-half of *React* when D.O. levels are high. Base this on a daily dosage of 1 to 8 lbs (5lbs maximum for nitrifying plants) of chlorine per 1,000 lbs. of MLSS. Start low and increase daily for up to 4 days. Examine filaments for damage frequently and quit when damage is apparent. Use caution when chlorinating!! 4. Optimize Jet Tech SBR plant operational parameters, i.e. decrease amount of *Aerated Fill*, make sure D.O.'s are near zero during *Anoxic Fill*, and are high enough during *React*.

C. Wastewater nutrient deficiencies.	1. Check nutrient levels in influent wastewater. The BOD-to-nutrient ratios should be: 100 parts BOD to 5 parts total nitrogen to one part phosphorus to 0.5 parts iron. 2. Perform hourly ML settleability tests.	1. If nutrient levels are less than average ratio, field tests should be performed on the influent wastewater for the addition in the form of anhydrous ammonia -- Phosphorus in the form of tri-sodium phosphate and/or iron in the form of ferric chloride. 2. Observe tests for improvement in sludge settling characteristics with the addition of nutrients.

D. pH in Jet Tech SBR basin is less than 6.5.	1. Monitor plant influent pH.	1. If pH is less than 6.5, conduct industrial survey to identify source. If possible, stop or neutralize discharge at source. 2. If the above is not possible, raise the pH by addition an alkaline agent such as caustic soda or lime to the Jet Tech SBR influent.

TROUBLE-SHOOTING GUIDE #5

CLOUDY EFFLUENT

1. Effluent from Jet Tech SBR is cloudy and contains suspended matter. Mixed liquor in settleability tests poorly, leaving a cloudy supernatant.	A. MLSS in Jet Tech SBR basin low due to process start-up.	1. Refer to Trouble-Shooting Guide #2, Observation #1.	
	B. Increase inorganic loading to the Jet Tech SBR.	1. Perform micro-scopic examination on mixed liquor. Check for presence of protozoa. 2. Check organic loading to the Jet Tech basins. 3. Check. D.O. level in Jet Tech basins during *Aeration* cycle.	1. If no protozoa are present, possible shock organic loading has occurred. 2. Reduce WAS rate by not more than 10% per day to bring Jet Tech plant back to proper loading parameters. 3. Adjust Jet Tech **Omniflo®** air time to ensure proper amount of D.O. during *Aeration* cycle.
	C. Toxic shock loading.	1. Perform microscopic examination on mixed liquor. Check for presence of inactive protozoa.	1. If protozoa are inactive, possibility of recent toxic load on process. 2. Refer to Jet Tech Trouble-Shooting Guide #2, Observation 1-D.
	D. Over-aeration causing mixed liquor floc to shear.	1. Perform microscopic examination on mixed liquor. Check for dispersed or fragmented floc and presence of protozoa.	1. Refer to Jet Tech Trouble-Shooting Guide #1, Observation 1-A.
	E. Improper D.O. levels maintained in Jet Tech SBR basins.	1. Refer to Jet Tech Trouble-Shooting Guide #1, Observation #2.	

TROUBLE-SHOOTING GUIDE #6

ASHING AND PINPOINT/STRAGGLER FLOC

1. Fine, dispersed floc (about the size of a pinhead). Dispersed throughout the supernatant with possible little islands of sludge accumulating on the surface. Mixed liquor in settleability tests settles fairly well. Sludge is dense at bottom of Jet Tech SBR basin with fine particles of floc suspended in fairly clear supernatant.	A. Jet Tech SBR basins approaching underloaded conditions (high MLSS) because of old sludge in system.	1. Check and monitor trend changes which occur in the following: a. Increase in MLVSS. b. Increase in SRT. c. Decrease in F/M. d. D.O. levels maintained with increasing **Omniflo®** air times. e. Decrease in WAS rates. f. Decrease in organic loading (BOD/COD) to Jet Tech SBR plant.	1. Increase WAS rate by not more than 10% per day to bring Jet Tech SBR process back to optimum control parameters for average organic loading.
		2. Check for foaming in Jet Tech SBR basins.	2. Refer to Jet Tech Trouble-Shooting Guide #2 for any foaming which may be occurring in SBR basins. 3. Refer to Jet Tech Trouble-Shooting Guide #1 for additional observations.
2. Small particles of ash-like material floating on upper layers of Jet Tech basins.	A. Excessive amounts of grease in MLSS.	1. Perform a grease analysis on MLSS and raw wastewater.	1. If grease content is excessive, implement an industrial waste monitoring and enforcement program.

3. Particles of straggler floc about 1/4" or larger, extending throughout the supernatant and possible discharge with the effluent. Mixed liquor in settleability tests settles fairly well. Sludge does not compact well at the bottom with chunks of floc suspended in fairly clear supernatant.	A. Excessive amounts of grease in MLSS.	1. Check and monitor trend changes in the following: a. Decrease in MLVSS. b. Decrease in SRT. c. Increase in F/M. d. Less Jet Tech **Omniflo®** air time used to maintain D.O. levels. e. Increase in WAS rates. f. Increase or decrease in organic loading.	2. Refer to Jet Tech Trouble-Shooting Guide #2 for any foaming which may be occurring on Jet Tech SBR basins. 3. Decrease Jet Tech Omniflo® air time to maintain minimum D.O. of 3-4 ppm during end of *React.* 4. Refer to Jet Tech Trouble-Shooting Guide #1 for additional observations.

TROUBLE-SHOOTING GUIDE
REFERENCES

1. Betros, Betsy, "Activated Sludge Process Trouble-Shooting Guides", The Kansas Water Pollution Control Association.

2. Hayes, Joe, "Operator's Pocket Guide to Activated Sludge," Straam Engineers, Inc., Portland, Oregon, 1978.

3. Tsugita, Ronald A., "Process Control Manual for Aerobic Biological Wastewater Treatment Facilities,". Environmental Protection Agency, Municipal Operations, Branch Office of Water Program Operations, Washington, D.C.

AMERICAN ELECTRIC POWER	Environmental Affairs Guideline	Number: WWT-5
Effective Date: 12-06-00	Title: Cook Wastewater Treatment Plant Emergency Procedures	Revision: 0

Revision Record

Revision 0: Initial Issue

Originator: _____ Date: 12-5-00

Approved by: _____ Date: 12/5/00

AMERICAN ELECTRIC POWER
DONALD C. COOK NUCLEAR PLANT

1.0 TITLE

Cook Wastewater Treatment Plant Emergency Procedures

2.0 OBJECTIVE

2.1 The WWTP is equipped with an alarm system that will notify personnel of many emergency situations. The alarm system notifies personnel in the following order:

- Control Room
- Wastewater Operators
- Environmental Personnel

2.2 To aid in troubleshooting alarms, refer to WWT-2 "Annuciator Panel Number 140 Sewage Treatment".

3.0 REFERENCES

3.1 None.

4.0 DETAILS

4.1 Power Outage.

4.1.1 The WWTP is not equipped with back-up power. Therefore, the Plant is equipped with a 2" trash pump for the purpose pumping excess wastewater from the liftstation into the East Plant (emergency holding tank). A local septic hauler can also be notified to haul away excess wastewater.

4.2 Influent Liftstation Failure

4.2.1 If the influent liftstation were to fail, refer to step 4.1.1.

4.3 High Flow and Loadings

4.3.1 If the Plant was to experience influent flows or loadings that were above plant treatment capabilities, the flow can be diverted to the East Plant. A local septic hauler could also be notified to haul some of the excess away. The closing of the bathrooms could be used as the last resort.

4.4 Spill

4.4.1 If a wastewater spill were to occur outside the treatment system, impact to the surroundings will be minimized by diking storm drains (if needed) and containing the spill by diking. A local septic hauler will be called to clean up the spill.

4.4.2 If the spill was within the collection system, flow will be diverted to the East Plant until the wastewater is determined safe to treat. If the spill made it through the liftstation into the South EQ, the EQ Basin should be isolated by turning the EQ pumps off. A local septic hauler, or industrial waste hauler, if applicable, should be called to pump the contaminated wastewater out of the South EQ.

AMERICAN ELECTRIC POWER COMPANY

DONALD C. COOK NUCLEAR PLANT
INSTRUCTION AND PROCEDURE CHANGE SHEET

INSTRUCTION OR PROCEDURE NO. PMP 2230 HMT.001 REVISION NO. 0 CHANGE SHEET NO. 1

TITLE: HAZARDOUS MATERIAL RESPONSE ORGANIZATION AND TRAINING PAGE 1 OF 1

ORIGINATED BY:	Paul Jaeger	DATE:	2-18-97
MANAGEMENT STAFF:	[illegible]	DATE:	2-18-97
SENIOR REACTOR OPERATOR:		DATE:	
50.59 REVIEWS COMPLETED:	Paul Jaeger	DATE:	2-18-97
P.P.A. SUPERINTENDENT: (PMI,PMP only)	M. L. HORVATH	DATE:	2/20/97
PNSRC:	#3056	DATE:	2-27-97
APPROVED BY:	John [illegible]	DATE:	2/27/97

EXPIRATION DATE: N/A

DESCRIPTION OF CHANGE

Change reference from PMI 2230 to 12 PMP 6090 PCP.100.

REASON(S) FOR CHANGE

Cancellation of PMI 2230 and initiation of 12 PMP 6090 PCP.100.

INSTRUCTIONS FOR INCORPORATING CHANGE

Replace List of Effective Pages, Rev. 0, with List of Effective Pages, Rev 0, CS-1.

Replace Page 1 of 15, Rev. 0, with Page 1 of 15, Rev. 0, CS-1.

Replace Page 10 of 15, Rev. 0, with page 10 of 15, Rev. 0, CS-1.

Replace Attachment 2, Rev. 0 with Attachment 2, Rev. 0, CS-1.

eplace Attachment 5, Rev. 0, with Attachment 5, Rev. 0, CS-1.

INDIANA MICHIGAN POWER

DONALD C. COOK NUCLEAR PLANT
PLANT MANAGER PROCEDURE COVER SHEET

Procedure No.	PMP 2230 HMT.001
Revision No.	0

TITLE HAZARDOUS MATERIAL SPILL RESPONSE ORGANIZATION AND TRAINING

SCOPE OF REVISION

Rev. 0 - Initial issue.

REFERENCE PMI 2011
THIS PROCEDURE IS CLASSIFIED AS

INFORMATION USE

SIGNATURES	REVISION NUMBER			
******	REVISION 0			
PREPARED BY	Rocky Beem			
QUALITY ASSURANCE SUPERINTENDENT APPROVAL				
PLANT NUCLEAR SAFETY COMMITTEE	Meeting #2668			
PLANT MANAGER APPROVAL				
APPROVAL DATE	12-17-92			
EFFECTIVE DATE	12-31-92			

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INDIANA MICHIGAN POWER COMPANY
DONALD C. COOK NUCLEAR PLANT

TITLE: HAZARDOUS MATERIAL RESPONSE ORGANIZATION AND TRAINING

1.0 OBJECTIVES:

1.1 Provide a document that fulfills the Michigan Hazardous Waste Operations and Emergency Response (HAZWOPER) requirements for a written emergency response plan.

1.2 Describe the Cook Nuclear Plant personnel roles, lines of authority, communications, and training requirements for responses to hazardous material spills.

1.3 Describe primary and augmenting procedures that may be used during a response to a hazardous material spill.

1.4 Describe the coordination of emergency spill responses with outside agencies.

2.0 REFERENCES

2.1 Hazardous Waste Operations and Emergency Response (Michigan HAZWOPER), Department of Public Health, Occupational Health Standards Commission, October 15, 1991.

2.2 D. C. Cook Nuclear Plant Emergency Plan.

2.3 I&M Spill Response Guidance Manual.

2.4 12 PMP 6090 PCP.100 | CS-1

3.0 GENERAL INFORMATION

3.1 The Cook Nuclear Plant Emergency Response Plan for hazardous material spills consists of a series of integrated procedures and pre-plans that are implemented by trained Cook Plant personnel. Personnel roles, lines of authority, and communication flows are depicted in Attachment 1. The procedures used to fulfill Michigan HAZWOPER requirements are shown in Attachment 2. The efforts of Cook Plant personnel guided by these procedures constitute our primary response to a hazardous material spill.

3.2 Additional offsite assistance may also be requested from American Electric Power Service Corporation (AEPSC), the I&M General Office, and local, state and federal agencies. This assistance is requested through guidance in PMI-2230 and our Emergency Plan.

3.3 This procedure is not intended to detail all personnel roles or procedures that may be involved in an emergency spill response. Assistance will be requested and procedures implemented as needed to safely and quickly mitigate a spill.

3.4 The information contained in this procedure is to be used primarily for meeting program description requirements. The steps need not be followed in any particular sequence, and the whole procedure does not have to be completed at the same time.

4.0 INCIDENT COMMAND SYSTEM

4.1 The Cook Plant Incident Command System consists of first responders, the Incident Commander, and the HAZMAT Team. Generic spill response flow diagrams are presented in Attachments 3 and 4. Onsite and offsite assistance is described in Sections 5.0 and 6.0.

> **CAUTION**
>
> First Responders - Awareness and Operations Level, are not qualified to wear Level A and Level B chemical suits.

4.2 First Responders - Awareness Level

4.2.1 All plant personnel, whether I&M or contractors, are considered to be First Responders - Awareness Level.

4.2.2 Their primary role is to report spills to the Shift Supervisor or affected Unit's Control Room as required by PMI-2230. They are to take only those actions needed to safely prevent other personnel from entering the spill exposure area unless directed otherwise by the Shift Supervisor or designee.

CAUTION

First Responders - Operations Level should perform only those actions which do not jeopardize their own health and safety.

4.3 First Responders - Operations Level

4.3.1 Chemistry Technicians handle hazardous materials on a regular basis, and therefore, have a higher risk of being involved in a spill event.

4.3.2 Chemistry Technician roles include those listed in Step 4.2 and the following:

- Don appropriate personal protective equipment for the material, provided the individual is qualified to wear the equipment.
- Establish security around the spill exposure area to prevent entry by other plant personnel.
- Perform limited offensive and defensive response actions to contain and confine the spill. These actions may include rolling a drum over, shutting off a pump, or placing absorbent socks around an open drain.
- Remain in the area at a safe distance from the spill until relieved or directed to leave by Plant supervision.

4.4 Hazardous Material Technicians/HAZMAT Team

4.4.1 The Hazardous Material Technicians make up the HAZMAT Team with the following groups designated as team members:

- Safety and Assessment Fire Brigade including the Fire Protection Coordinators
- Designated members of the Environmental Section
- Other individuals trained and qualified as Hazardous Material Technicians who may be needed to augment the team. Training Department personnel who teach HAZWOPER training would be an example.

4.4.2 The Fire Brigade members are the primary spill response group with Environmental, Training and other qualified personnel assisting with support duties such as decontamination. However, all qualified HAZMAT Team members may be asked to assume any role depending upon available resources.

4.4.3 The HAZMAT Team response efforts are controlled and supervised by the HAZMAT Team Safety Officer (Step 4.5).

4.4.4 The HAZMAT Team will typically respond to a hazardous material spill as shown in Attachment 4.

4.4.5 The HAZMAT Team roles include the following:

- Respond immediately to hazardous material spills as requested by the Incident Commander or designee.
- Use the guidance provided in spill pre-plans to safely and quickly mitigate the event.
- Don appropriate personal protective equipment for the spill as directed by the Safety Officer.
- Perform any rescue operations needed to remove victims from the scene with assistance from Emergency Medical Technicians (EMTs), if available.
- Evacuate or ensure exposure areas are evacuated with assistance from Plant Security.
- Establish operational zones (hot, warm, and cold) to prevent personnel exposure and to limit the spread of chemical contamination.
- Perform initial actions needed to determine the identity of the spilled material, exposure levels, area affected, and extent of the hazard.
- Perform those actions necessary to contain and confine the spill.
- Decontaminate all equipment, personnel, and plant areas as needed.

- Clean up and dispose of the spilled product and cleanup debris.

- Complete a debriefing immediately following the event and participate in a follow-up critique immediately upon termination of the event.

4.5 HAZMAT Team Safety Officer

4.5.1 The Safety Officer will normally be the Fire Brigade Leader. The Incident Commander may delegate the position to other HAZMAT Team members, if a less experienced person has assumed the position of Fire Brigade Leader.

4.5.2 The Safety Officer communicates directly with the Incident Commander and acts as the on-scene coordinator for emergency spill response efforts.

4.5.3 The HAZMAT Team Safety Officer is trained and qualified to the same level as other team members.

4.5.4 The primary roles of the Safety Officer are to ensure the health and safety of spill responders and to continuously provide the Incident Commander with up-to-date information on the event. Specifically, the Safety Officer is delegated the following roles and responsibility:

- Establish and maintain communications with the Incident Commander.

- Determine which sections of the HAZMAT pre-plans are applicable to the event.

- Ensure adequate personnel are dispatched to respond to the event.

- Select personnel to fulfill the various roles needed to respond to the event.

- Select the personal protective equipment to be worn for the initial response to the spill.

- Direct the actions of the HAZMAT Team based on feedback from the Incident Commander, initial assessment of the event, and guidance in the pre-plans.

- Direct the actions of skilled support personnel.
- Control access and egress to/from the operational zones.
- Ensure adequate safety briefings are conducted and appropriate personal protective equipment is worn by previously untrained personnel prior to entering the exposure zone. The safety briefing shall include the hazards associated with the spill, personal protective equipment hazards, communications, decontamination procedures, and medical surveillance requirements.
- Ensure adequate decontamination procedures are performed.
- Make recommendations to the Incident Commander for protecting plant personnel and equipment.
- Request assistance as needed to respond to the spill.
- Ensure a debriefing is conducted immediately upon termination of the event.
- Participate in the follow-up critique and ensure it is properly documented.
- Initiate requests to replace equipment and supplies used during the event.

4.6 Incident Commander

4.6.1 The Incident Commander will initially be the Shift Supervisor. The Shift Supervisor may transfer the position to a qualified Environmental Section person at his discretion.

4.6.2 The Incident Commander communicates directly or indirectly with the plant, offsite agencies and Environmental contractors to mobilize needed resources, and to meet regulatory requirements for spill reporting.

4.6.3 Environmental personnel acting as the Incident Commander shall report to the following:

- Non-Emergency Plan Events-to the Shift Supervisor or designee.
- Emergency Plan Implemented - to the Technical Support Center Director.

4.6.4 The Incident Commander is responsible for ensuring the following emergency response procedures are adhered to through communications with the HAZMAT Team Safety Officer:

- The spilled material is positively identified and the hazards associated with the spill assessed.
- Engineering controls and plant equipment operations needed to confine and contain the spill are implemented.
- Spill responders are adequately protected by the personal protective equipment selected, the established operational zones, exposure and medical monitoring methods, and the decontamination methods.
- Entry into the operational zones is limited to qualified HAZMAT Team members whenever possible.
- Support personnel who must enter the warm and hot zones don appropriate personal protective equipment and receive the required safety briefing prior to entering the area.
- The buddy system is used for entry into the warm and hot zones and adequate backup personnel are available.
- Decontamination procedures are performed.
- Waste product and debris from the spill cleanup are disposed of properly.
- The required debriefing and follow-up critique are conducted.

5.0 ONSITE ASSISTANCE

5.1 Skilled Support Personnel

5.1.1 Individuals who perform specialized work may be requested to assist in the spill response by the Incident Commander. Their actions at the spill scene are coordinated and directed by the HAZMAT Team Safety Officer.

5.1.2 Examples of skilled support personnel include:

- Plant Equipment Operators (ROs/AEOs/MUP Operators)
- Chemistry Technicians
- Construction Heavy Equipment Operators
- Radiation Protection Technicians
- Maintenance Personnel
- Emergency Medical Technicians (EMTs)

NOTE

- Chemistry Technicians meet the Michigan HAZWOPER definition of Specialist Employees. Our accredited training program meets or exceeds the training requirements for this classification.
- EMT training is controlled by state regulations which include draft requirements for HAZWOPER training. EMTs shall meet these requirements if they become effective.

5.1.3 Skilled support personnel are not required to meet HAZWOPER training requirements but must receive an initial safety briefing and don appropriate personal protective equipment before entering a spill exposure area.

5.1.4 Skilled support personnel must possess a current Respirator Qualification Card for the type of respirator needed for entry.

5.2 Emergency Planning Organization

5.2.1 The Emergency Plan may be implemented in response to a hazardous material spill, or as part of a larger event involving hazardous materials. Once implemented, the Emergency Plan Response Organization is available to assist in the emergency spill response.

5.2.2 The Emergency Plan shall be the primary procedure for a large scale evacuation of the plant. Evacuation of selected plant site areas will be accomplished by a combination of PA announcements, isolation by Security, and inspection by the HAZMAT Team.

6.0 OFFSITE ASSISTANCE

6.1 HAZMAT Teams

6.1.1 The Berrien County HAZMAT Team shall be the primary source of offsite assistance.

6.1.2 The Berrien County HAZMAT Team shall follow the direction of the Cook Nuclear Plant Incident Commander.

6.2 The Environmental contractors listed in the I&M Spill Response Guidance Manual may be contacted for initial response or cleanup assistance.

6.3 PMI-2230 has guidance for notifying the following agencies in the event of actual or potential offsite exposure from the spill:

- National Response Center
- State Emergency Response Commission (SERC)
- Local Emergency Planning Committee (LEPC)

6.4 Assistance from local fire departments for fire fighting shall be requested according to fire protection procedures.

6.5 Emergency Medical Treatment

6.5.1 Mercy Memorial Medical Center shall provide the primary emergency treatment facilities for treating injured or exposed personnel.

6.5.2 Pawating Hospital shall provide backup emergency medical treatment.

6.5.3 Medic 1 may be called upon for EMT assistance and ambulance service.

6.6 I&M Environmental Affairs - General Office will provide technical assistance and ensure environmental reporting requirements are met.

7.0 PROCEDURES

7.1 12 PMP 6090 PCP.100 Spill Response-Oil, Polluting, and Hazardous Materials, provides guidance for classifying the spill event and initiating the spill response. The immediate actions of the Incident Commander are contained in this instruction. | CS-1

7.2 Cook Nuclear Plant Hazardous Material Spill Response Manual.

7.2.1 A manual shall be developed for use by the HAZMAT Team and Incident commander that contains the majority of infomation needed to respond to a hazardous material spill.

7.2.2 The manual shall contain the following as a minimum:

* 12 PMP 6090 PCP.100 | CS-1
* PMP 2230 HMT.001, Hazardous Material Spill Response Organization and Training
* PMP 2230 HMT.002, Medical Surveillance, Treatment, and First Aid
* PMP 2230 HMT.003, Maintenance and Storage of Hazardous Material Response Equipment
* PMP 2230 HMT.004, Critique of Response and Follow-Up
* PMP 2230 HMT.005, Hazardous Material Spill Pre-Plans
* A list of offsite emergency facilities, environmental contractors, and others who may be contacted for assistance.
* Plant and site maps showing general hazardous material storage and use areas.

- The D. C. Cook Nuclear Plant Hazardous Waste Contingency Plan.

7.2.3 Complete copies of the manual shall be maintained in the following locations:

- Shift Supervisor's Office
- HAZMAT Team Personal Protective Equipment Staging Areas (2)
- Technical Support Center
- Emergency Operations Facility
- Operations Staging Area

7.2.4 The response manual shall be updated to incorporate revised procedures, significant changes in hazardous material storage or use areas, and changes in onsite response personnel and offsite assistance.

7.2.5 Copies of the response manual shall be reviewed annually to ensure they are being maintained current. Attachment 5 may be used to document the review.

7.2.6 The response manual shall be developed within 3 months of the effective date of this procedure.

7.2.7 The Fire Brigade Coordinator, with assistance from the Environmental Section, has responsibility for ensuring the requirements of Step 7.2 are met.

7.3 Various Cook Plant procedures may be implemented on an as needed basis to augment the primary spill response procedures. These may include procedures on:

- Chemical Waste Management
- Radiation Protection
- Fire Protection
- Plant Operations
- Plant Maintenance
- Emergency Plan Implementation
- Safety

- Plant Chemistry
- Asbestos
- Spill Prevention

7.4 The following state and local emergency plans contain sections for responding to hazardous material spills:

- Michigan Emergency Management Plan
- Berrien County Emergency Operations Plan

These plans may be implemented through implementation of our Emergency Plan or through notification of the SERC or LEPC.

8.0 TRAINING

8.1 Content of Initial Training for first Responders - Awareness Level

8.1.1 Understanding what hazardous materials are and the risks associated with them in an incident.

8.1.2 Understanding the potential outcomes associated with an emergency created when hazardous materials are present.

8.1.3 The ability to recognize the presence of hazardous materials in an emergency.

8.1.4 The ability to identify the hazardous materials in an emergency, if possible.

8.1.5 Understanding the role of the first responder as listed in Step 4.2.2.

8.2 Content of Initial Training for First Responders - Operations Level

8.2.1 The training listed in Step 8.1.

8.2.2 Hazard and risk assessment techniques.

8.2.3 Knowing how to select and use personal protective equipment needed to safely perform the roles listed in Step 4.3.2.

8.2.4 Understanding basic hazardous material terms.

8.2.5 Knowing how to perform basic control, containment, and confinement operations within the capabilities of the resources, personal protective equipment, and training provided.

8.2.6 Knowing how to implement basic decontamination procedures.

8.2.7 Understanding the Cook Plant hazardous material response organization and procedures relevant to the roles listed in Step 4.3.2.

8.2.8 A minimum of 8 hours of initial training is required <u>or</u> the documented equivalent training and experience necessary to achieve the listed competencies.

8.3 Content of Initial Training for HAZMAT Team Members/Safety Officer

8.3.1 The training listed in Step 8.2.

8.3.2 Knowing how to implement the Cook Plant hazardous material response procedures listed in Step 7.2.

8.3.3 Knowing how to classify, identify, and verify known and unknown materials by using reference materials and monitoring instruments and equipment.

8.3.4 Being able to function in any of the assigned roles of the HAZMAT Team. This may include:

- Hot Zone Entry
- Decontamination
- Air Monitoring and Safety Officer Assistant
- Safety Officer

8.3.5 Knowing how to select and use the proper chemical personal protective equipment to include Level A and Level B chemical suits.

8.3.6 Understanding hazard and risk assessment techniques.

8.3.7 Being able to perform advanced control, containment, and confinement operations.

8.3.8 Understanding and implementing Cook Plant decontamination procedures.

8.3.9 Understanding spill event termination procedures.

8.3.10 Understanding basic chemical and toxicological terminology and behavior.

8.3.11 A minimum of 24 hours of training is required that covers the specified content.

8.4 Content of Initial Training for Incident Commander

8.4.1 The training listed in Step 8.2 or equivalent.

8.4.2 Knowing and being able to implement the Cook Plant Incident Command System and Hazardous Material Response Plan.

8.4.3 Knowing and being able to implement the D. C. Cook Nuclear Plant Emergency Plan.

8.4.4 Knowing and understanding the risks associated with employees who work in chemical protective clothing.

8.4.5 Knowing how to contact local, state, and federal emergency response agencies for assistance.

8.4.6 Knowing and understanding the importance of decontamination procedures.

8.5 Trainers shall have completed training at least to the level they teach. The training may consist of offsite or onsite training. In addition, instructors shall meet the requirements of PMI-2070.

8.6 Annual Refresher Training

8.6.1 All groups identified in Section 4.0 shall receive sufficient annual refresher training to remain competent in their assigned roles <u>or</u> shall demonstrate competency in those areas annually.

8.6.2 Annual refresher training requirements may be fulfilled by participation in hazardous material spill response drills.

8.6.3 The following should be considered for annual training topics:

- New response equipment
- New or revised procedures
- Changes in the plant hazardous material inventory
- Spill response drills
- Weaknesses identified in drills

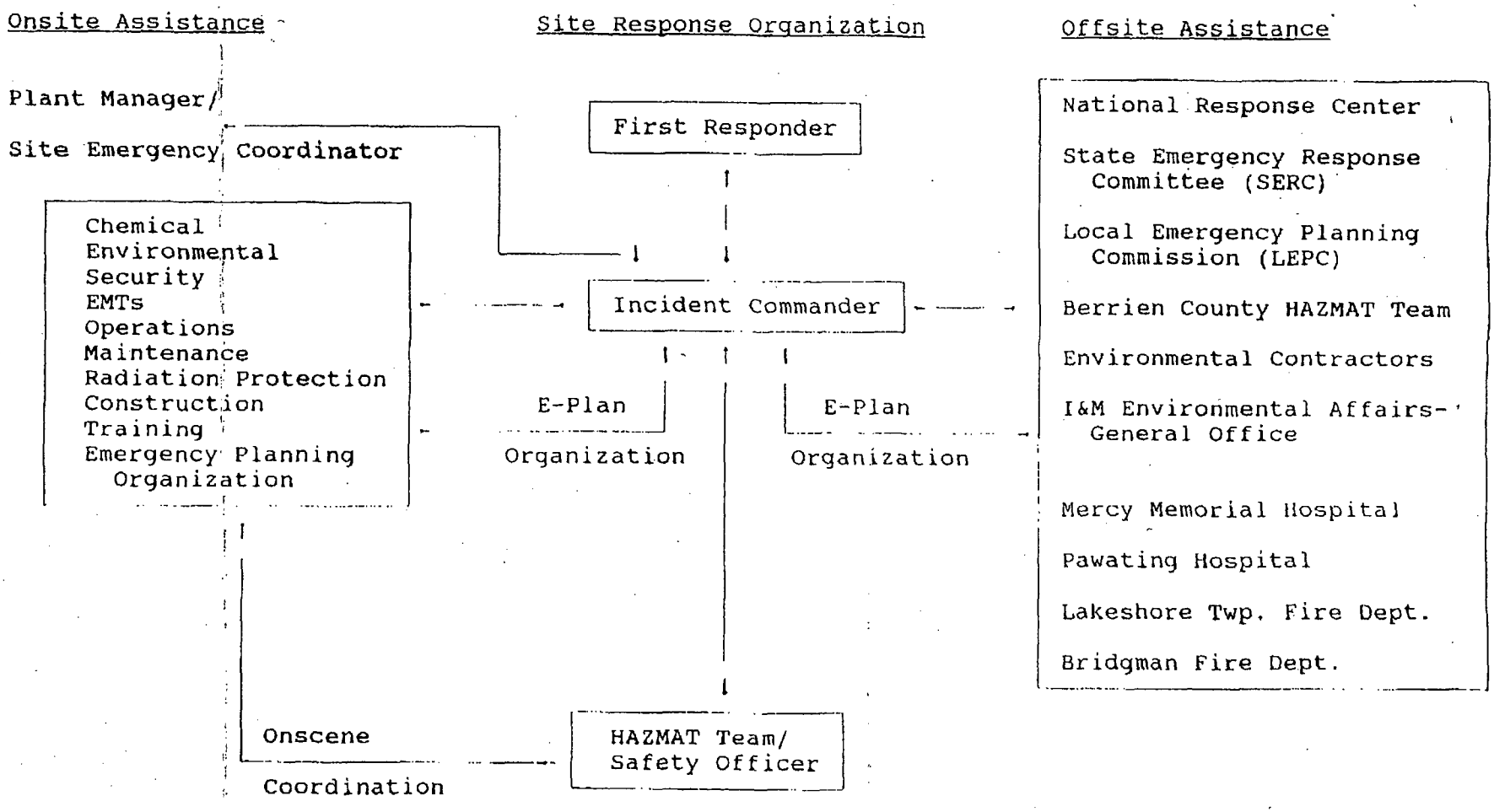
8.7 Hands-on training should be emphasized whenever possible using actual plant equipment and realistic scenarios for exercises and drills.

8.8 All training shall be documented and retained per the Records Retention Schedule. Documented completion of training may be in the form of a written examination grade or a certification form signed by the training instructor.

8.9 The General Supervisor - Environmental has responsibility for selecting and approving the content of training designed to meet the requirements of Michigan HAZWOPER.

8.10 The Training Superintendent is responsible for the development and conduct of HAZWOPER training.

AUTHORITY AND COMMUNICATIONS FLOWPATHS



Note: Authority and communications flowpaths may be modified if the Emergency Plan is implemented.

HAZARDOUS MATERIAL SPILL RESPONSE
PRIMARY, AUGMENTING, AND ADMINISTRATIVE PROCEDURES

Onsite Augmenting Procedures

Fire Protection Pre-Plans
Emergency Plan Implementing
I&M Spill Response Guidance Manual
Radiation Protection
Operations
Maintenance
Safety Manual and Procedures
Chemistry
Chemical Waste Management

Hazardous Material Response Manual

12 PMP 6090 PCP.100 |CS-1

HAZMAT Team Procedures
- PMP 2230 HMT.001
- PMP 2230 HMT.002
- PMP 2230 HMT.003
- PMP 2230 HMT.004
- PMP 2230 HMT.005

Offsite Augmenting Procedures

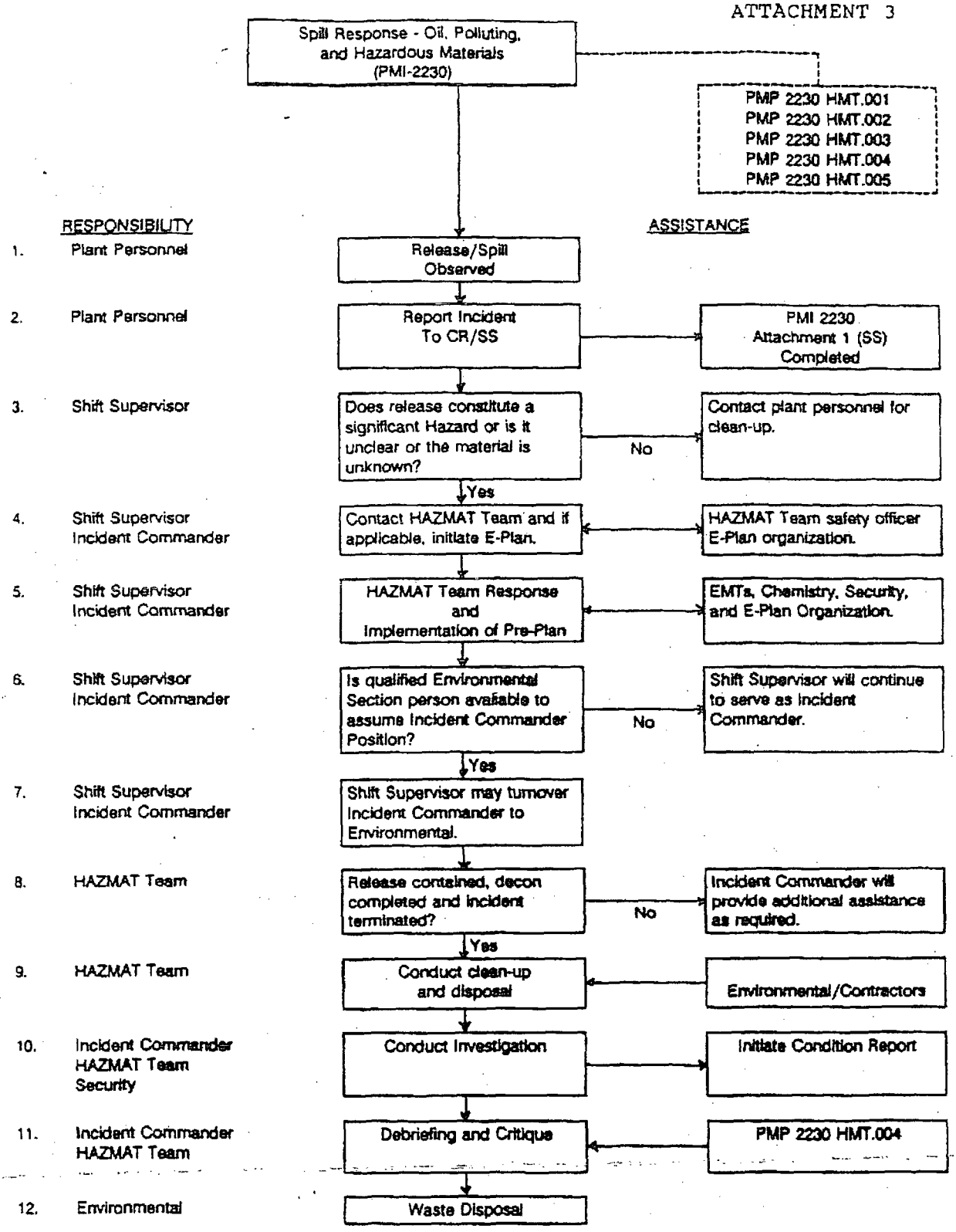
Environmental Contractor Procedures

Berrien County Emergency Operations Plan

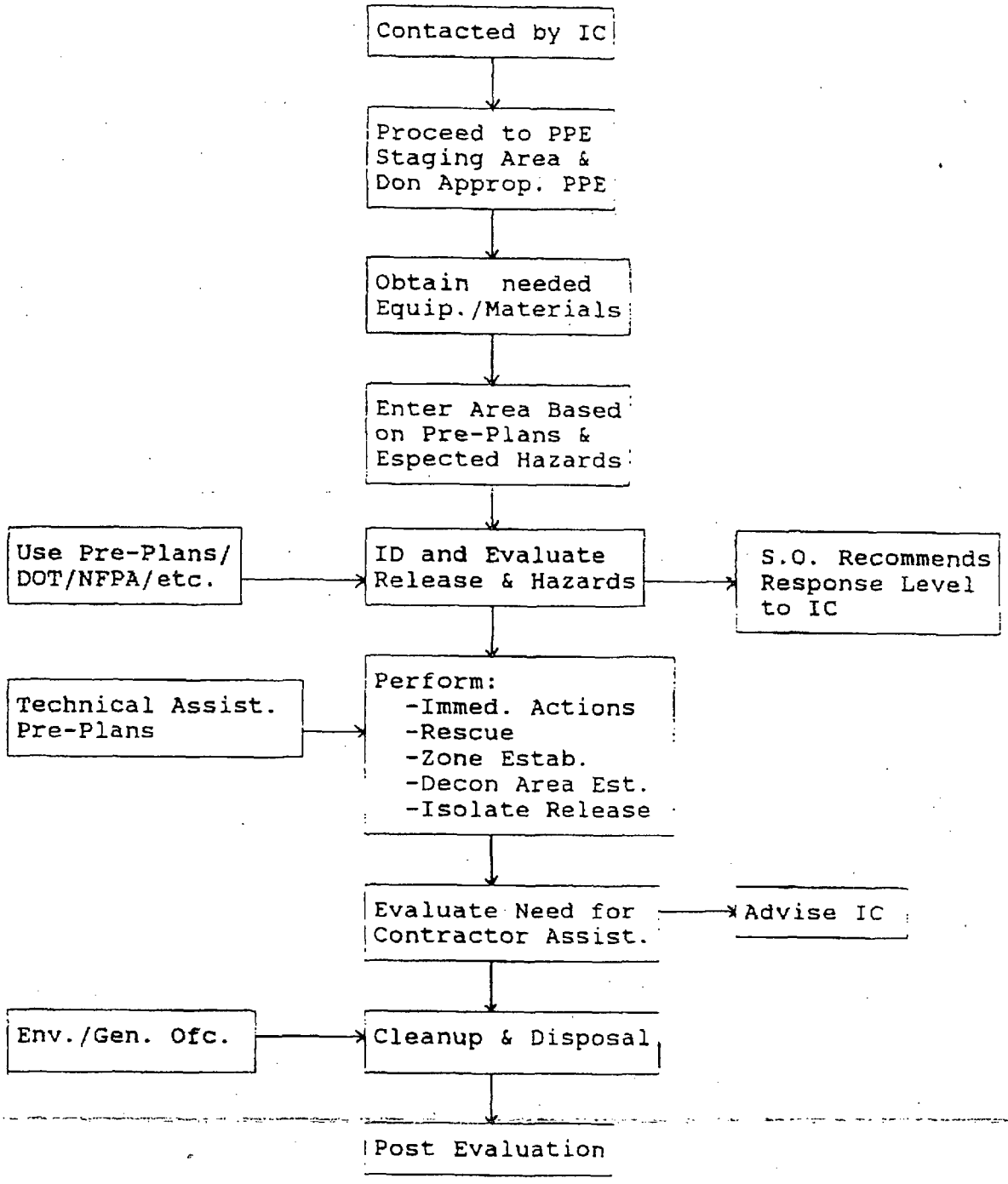
Michigan Emergency Management Plan

Related Administrative Procedures

Chemical Control
Spill Prevention and Control
Chemical Waste Management
Fire Protection
Training
Asbestos Management
Chemical Hygiene
Radiation Protection
Safety Program Procedures
Condition Reports


Spill Response - Oil, Polluting, and Hazardous Materials (PMI-2230)
PMP 2230 HMT.001
PMP 2230 HMT.002
PMP 2230 HMT.003
PMP 2230 HMT.004
PMP 2230 HMT.005
RESPONSIBILITY
ASSISTANCE
1. Plant Personnel
Release/Spill Observed
2. Plant Personnel
Report Incident To CR/SS
PMI 2230 Attachment 1 (SS) Completed
3. Shift Supervisor
Does release constitute a significant Hazard or is it unclear or the material is unknown?
No
Contact plant personnel for clean-up.
Yes
4. Shift Supervisor Incident Commander
Contact HAZMAT Team and if applicable, initiate E-Plan.
HAZMAT Team safety officer E-Plan organization.
5. Shift Supervisor Incident Commander
HAZMAT Team Response and Implementation of Pre-Plan
EMTs, Chemistry, Security, and E-Plan Organization.
6. Shift Supervisor Incident Commander
Is qualified Environmental Section person available to assume Incident Commander Position?
No
Shift Supervisor will continue to serve as Incident Commander.
Yes
7. Shift Supervisor Incident Commander
Shift Supervisor may turnover Incident Commander to Environmental.
8. HAZMAT Team
Release contained, decon completed and incident terminated?
No
Incident Commander will provide additional assistance as required.
Yes
9. HAZMAT Team
Conduct clean-up and disposal
Environmental/Contractors
10. Incident Commander HAZMAT Team Security
Conduct Investigation
Initiate Condition Report
11. Incident Commander HAZMAT Team
Debriefing and Critique
PMP 2230 HMT.004
12. Environmental
Waste Disposal

HAZMAT TEAM RESPONSE



ANNUAL REVIEW OF THE COOK NUCLEAR PLANT HAZARDOUS MATERIAL RESPONSE MANUAL

MANUAL #:_____

1. Procedures	Current Revision	As Found Revision
*12 PMP 6090 PCP.100		
*PMP 2230 HMT.001		
*PMP 2230 HMT.002		
*PMP 2230 HMT.003		
*PMP 2230 HMT.004		
*PMP 2230 HMT.005		

CS-1

2. Uncontrolled Documents✧	Information Current	
*List of IC Qualified Personnel	Yes_____	No_____
*List of HAZMAT Team Qualified	Yes_____	No_____
*Personnel		
*List of Environmental Contractors	Yes_____	No_____
*List of Emergency Facilities	Yes_____	No_____
*Plant and Site Maps	Yes_____	No_____
*Hazardous Waste Contingency Plan	Yes_____	No_____

✧ Uncontrolled documents should be reviewed to ensure changes in training status, employment, I&M Spill Response Guidance Manual, material use and storage locations, and emergency facility agreements are incorporated.

COMMENTS:_____

REVIEWER SIGNATURE_____

DATE_____

AMERICAN ELECTRIC POWER COMPANY

DONALD C. COOK NUCLEAR PLANT
INSTRUCTION AND PROCEDURE CHANGE SHEET

INSTRUCTION OR PROCEDURE NO. PMP 2230 HMT.005 REVISION NO. 0 CHANGE SHEET NO.: 2

TITLE: Hazardous Materials Spill Pre-Plans PAGE 1 OF 1

ORIGINATED BY:	Paul Jaques	DATE:	2-18-97
MANAGEMENT STAFF:	M A Wurdonnel	DATE:	2-18-97
SENIOR REACTOR OPERATOR:		DATE:	
50.59 REVIEWS COMPLETED:	Paul Jaques	DATE:	2-18-97
P.P.A. SUPERINTENDENT: (PMI,PMP only)	M. L. HORVATH	DATE:	2/20/97
PNSRC:	#3056	DATE:	2-27-97
APPROVED BY:	John R Sharp	DATE:	4/27/97

EXPIRATION DATE: N/A

DESCRIPTION OF CHANGE

Change reference from PMI 2230 to 12 PMP 6090 PCP.100.

REASON(S) FOR CHANGE

Cancellation of PMI 2230 and initiation of 12 PMP 6090 PCP.100

INSTRUCTIONS FOR INCORPORATING CHANGE

Replace List of Effective Pages, Page 1 of 3, Rev. 0, CS-1 with List of Effective Pages, Page 1 of 3, Rev. 0, CS-2.

Replace Page 1 of 5, Rev. 0, with Page 1 of 5, Rev. 0, CS-2.

INDIANA MICHIGAN POWER COMPANY

DONALD C. COOK NUCLEAR PLANT

INSTRUCTION AND PROCEDURE CHANGE SHEET

INSTRUCTION OR PROCEDURE NO.: 12 PMP 2230 HMT.005 REVISION NO.: 0 CHANGE SHEET NO.: 1

TITLE HAZARDOUS MATERIAL SPILL PRE-PLANS PAGE 1 OF 1

ORIGINATED BY:	Pal Jos	DATE: 7-27-94
MANAGEMENT STAFF:	[illegible]	DATE: 7-27-94
SENIOR REACTOR OPERATOR:	Larry Boose	DATE: 7-27-94
50.59 REVIEWS COMPLETED:	[illegible]	DATE: 7-27-94
Q.A. SUPERINTENDENT:	Gail L. Wade	DATE: 8/3/94
PNSRC:	Meeting No. 3804	DATE: 8/4/94
APPROVED BY:	[illegible]	DATE: 8/4/94

EXPIRATION DATE: N/A

DESCRIPTION OF CHANGE

Added reference to the Plant road west of the screenhouse and chemicals stored in this area.

REASON(S) FOR CHANGE

Temporary sulfuric acid and sodium hypochlorite tanks are located on the road.

INSTRUCTIONS FOR INCORPORATING CHANGE

Replace LOEP Page 1 of 3, Appendix A Pages 9, 10 and 11 of 22, Revision 0, Drawings HMPP-4 and 5, Revision 1 with attached pages.

INDIANA MICHIGAN POWER

DONALD C. COOK NUCLEAR PLANT
PLANT MANAGER PROCEDURE COVER SHEET

Procedure No.	PMP 2230 HMT.005
Revision No.	0

TITLE HAZARDOUS MATERIALS SPILL PRE-PLANS

SCOPE OF REVISION

Revision 0: Initial Issue.

REFERENCE PMI 2011
THIS PROCEDURE IS CLASSIFIED AS

INFORMATION USE

SIGNATURES	REVISION NUMBER			
******	REVISION 0			
PREPARED BY	M Guendouzi			
QUALITY ASSURANCE SUPERINTENDENT APPROVAL	Bruce Panich			
PLANT NUCLEAR SAFETY COMMITTEE	MTG #2668			
PLANT MANAGER APPROVAL	[illegible]			
APPROVAL DATE	12/31/92			
EFFECTIVE DATE	1/4/93			

LIST OF EFFECTIVE PAGES

PAGE NUMBER	REVISION NUMBER, EFFECTIVE CHANGE SHEET
Page 1 of 5	Revision 0, CS-2
Page 2 of 5	Revision 0
Page 3 of 5	Revision 0
Page 4 of 5	Revision 0
Page 5 of 5	Revision 0
ATTACHMENT NO. 1	
Page 1 of 1	Revision 0
APPENDIX A	
Page 1 of 22	Revision 0
Page 2 of 22	Revision 0
Page 3 of 22	Revision 0
Page 4 of 22	Revision 0
Page 5 of 22	Revision 0
Drawing No. HMPP-1	
Drawing No. HMPP-2	
Page 6 of 22	Revision 0
Page 7 of 22	Revision 0
Page 8 of 22	Revision 0
Drawing No. HMPP-3	
Page 9 of 22	Revision 0, CS-1
Page 10 of 22	Revision 0, CS-1
Page 11 of 22	Revision 0, CS-1
Drawing No. HMPP-4	Revision 0, CS-1
Drawing No. HMPP-5	Revision 0, CS-1
Drawing No. HMPP-6	Revision 0
APPENDIX A Con't	
Page 12 of 22	Revision 0

LIST OF EFFECTIVE PAGES

PAGE NUMBER	REVISION NUMBER, EFFECTIVE CHANGE SHEET
APPENDIX A Con't	
Page 13 of 22	Revision 0
Page 14 of 22	Revision 0
Drawing No. HMPP-7	
Drawing No. HMPP-8	
Page 15 of 22	Revision 0
Page 16 of 22	Revision 0
Drawing No. HMPP-9	
Page 17 of 22	Revision 0
Page 18 of 22	Revision 0
Drawing HMPP-10	
Page 19 of 22	Revision 0
Page 20 of 22	Revision 0
Drawing No. HMPP-11	
Page 21 of 22	Revision 0
Page 22 of 22	Revision 0
Drawing No. HMPP-12	
APPENDIX B	
Page 1 of 33	Revision 0
Page 2 of 33	Revision 0
Page 3 of 33	Revision 0
Page 4 of 33	Revision 0
Page 5 of 33	Revision 0
Page 6 of 33	Revision 0
Page 7 of 33	Revision 0
Page 8 of 33	Revision 0

LIST OF EFFECTIVE PAGES

PAGE NUMBER	REVISION NUMBER, EFFECTIVE CHANGE SHEET
APPENDIX B Con't	
Page 9 of 33	Revision 0
Page 10 of 33	Revision 0
Page 11 of 33	Revision 0
Page 12 of 33	Revision 0
Page 13 of 33	Revision 0
Page 14 of 33	Revision 0
Page 15 of 33	Revision 0
Page 16 of 33	Revision 0
Page 17 of 33	Revision 0
Page 18 of 33	Revision 0
Page 19 of 33	Revision 0
Page 20 of 33	Revision 0
Page 21 of 33	Revision 0
Page 22 of 33	Revision 0
Page 23 of 33	Revision 0
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Page 32 of 33	Revision 0
Page 33 of 33	Revision 0

INDIANA MICHIGAN POWER COMPANY
DONALD C. COOK NUCLEAR PLANT

1.0 TITLE Hazardous Materials Spill Pre-Plans

2.0 OBJECTIVES

2.1 Provide guidelines for Hazardous Material Spill Response (HAZMAT) Team responses to hazardous material releases at the D.C. Cook Nuclear Plant.

2.2 Provide a summary of known hazardous materials located at the Plant and associated information required to safely respond to a release.

2.3 Provide readily accessible information on specific hazardous material storage, use and transportation areas pertinent to hazardous material releases.

2.4 Provide generic guidelines for responding to releases in areas not previously covered by Objectives 2.2 and 2.3.

3.0 REFERENCES

3.1 12 PMP 6090 PCP.100 | CS-2

3.2 Department of Transportation Guidelines.

3.3 Material Safety Data Sheets.

3.4 I&M Spill Response Guidance Manual.

3.5 Michigan Hazardous Waste Operations and Emergency Response Rules (HAZWOPER), Michigan Department of Public Health, Occupational Health Standards Commission, October 15, 1991.

4.0 GENERAL INFORMATION

This procedure is to be used once the Incident Commander or designee has requested assistance from the HAZMAT Team. The procedure consists of three sections: Generic Response Guidelines, Appendix A, Areas and Appendix B, Hazardous Material Data Sheets. These sections are intended to be used in conjunction with each other by matching the appropriate Appendix B sheet with an Appendix A sheet or the Generic Response Guidelines depending on the release scenario.

5.0 PRECAUTIONS AND LIMITATIONS

5.1 Any personnel who are not qualified HAZMAT Team members must receive a safety briefing and don appropriate PPE prior to entering the area. They must possess a valid Respirator Qualification Card if wearing a respirator is part of the PPE.

5.2 Only qualified HAZMAT Team members are allowed to perform cleanup and disposal operations unless a qualified contractor performs the work.

5.3 Radiation Protection personnel shall be contacted for guidance for spills in radiologically controlled areas.

6.0 GENERIC RESPONSE GUIDELINES

The actions of the following guidelines will occur very quickly and at times simultaneously. The order in which these guidelines may be performed is at the discretion of the Safety Officer.

6.1 The Safety Officer shall establish communications with the Shift Supervisor or designee who is fulfilling the role as Incident Commander (IC).

6.1.1 Prior to proceeding to the release area, permanent communications shall be established.

6.1.2 Obtain the following information, if known, and complete Attachment 1.

- Name of spilled material
- Location of spill and exposure area
- Quantity of material spilled
- Status of release (isolated/in progress)
- Injuries, if any
- Impacting environmental conditions

6.2 The Safety Officer shall select the appropriate appendix sheets for responding to the release.

6.3 The HAZMAT Team shall proceed to the designated equipment assembly area identified in PMP 2230 HMT.003 and gather the necessary response equipment.

6.4 The Safety Officer shall determine the appropriate level of personnel protective equipment (PPE) required to be worn by the HAZMAT Team and instruct the team to don the PPE.

6.5 The Safety Officer shall designate HAZMAT Team individuals to act as initial entry personnel, backup personnel or decon personnel prior to entry into the release area.

6.6 The Safety Officer may request the Incident Commander to contact various organizations for assistance such as: Environmental Section personnel, Emergency Medical Technicians, Radiation Protection personnel or Security personnel.

6.7 The Safety Officer shall ensure the medical monitoring and surveillance requirements of PMP 2230 HMT.002 are initiated.

6.8 The Safety Officer shall specify the initial areas for staging equipment, personnel safety zones and a decontamination area.

6.9 Security personnel shall isolate the area as instructed by the Safety Officer and/or the Incident Commander.

6.10 The HAZMAT Team shall proceed to the designated staging area with the required equipment.

6.11 The HAZMAT Team shall begin air monitoring once they have reached the staging area.

6.12 Safety Zones (i.e., hot, warm and cold zones) shall be established by the Safety Officer as soon as possible.

6.13 Those HAZMAT Team members designated as decon personnel shall set up the decontamination area once a safe area has been located.

6.14 An initial entry into the spill area shall be made with the following conditions established:

6.14.1 Initial entry personnel shall wear two-way radios with the ability to communicate with the Safety Officer at all times. The radios shall be tested prior to entry.

6.14.2 The buddy system shall be used for all entries into the spill area.

6.14.3 Backup personnel shall be on stand-by, capable of rescuing the initial entry team before any entry is made. They will stay on stand-by until all personnel have exited the area or they are instructed to enter the area.

6.15 If possible, the following shall be completed by the Initial Entry Team:

6.15.1 Search and rescue any known or suspected victims.

6.15.2 Continue periodic air monitoring, as appropriate.

6.15.3 Positively identify spilled material.

6.15.4 Continually report information to the Safety Officer.

6.15.5 Confine and contain spill.

> CAUTION
>
> Operation's Department personnel must perform all Plant equipment operations unless the Shift Supervisor has granted permission to the HAZMAT Team.

6.16 The Safety Officer shall recommend further actions to the Incident Commander based on the findings of the initial entry team. Such actions could include, but are not limited to:

6.16.1 Evacuation.

6.16.2 Additional Plant announcements.

6.16.3 Additional assistance required.

6.16.4 System/equipment operation needed.

6.17 The Safety Officer may change the safety zones, level of PPE required, air monitoring requirements and any additional factors to ensure the safety of the HAZMAT Team is maintained.

6.18 All personnel entering the Hot Zone shall be decontaminated prior to returning to the Cold Zone.

6.18.1 Material decontamination methods recommended in the pre-plans or MSDS sheets shall be used unless conditions dictate otherwise.

6.18.2 Decontaminated equipment shall be left in the decon area including PPE worn by entry personnel.

7.0 ISOLATION, CONTAINMENT AND CLEANUP

7.1 Assistance shall be requested from appropriate Plant departments to isolate or repair leaks.

7.2 Materials compatible with the spilled material shall be used for isolation, containment and neutralization of the spill.

7.3 Cleanup debris and waste product shall be disposed of in accordance with Plant procedures and Environmental Section guidance.

7.4 The spill area shall be decontaminated and clean prior to allowing general Plant access.

7.5 Equipment shall be cleaned and stored in accordance with PMP 2230 HMT.003.

8.0 FINAL CONDITIONS

8.1 A response debriefing and evaluation shall be conducted in accordance with PMP 2230 HMT.004.

8.2 Appropriate requests are initiated to replace used or contaminated supplies and equipment.

SPILL INFORMATION

Name of spilled material: _____

Name of individual reporting spill: _____

Location of spill and exposure area: _____

_____

_____

Quantity of material spilled: _____

Status of spill (i.e., isolated, in progress, etc.): _____

_____

Injuries (if any): _____

_____

Impacting environmental conditions: _____

_____

_____

_____

Additional information: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

APPENDIX A

D.C. COOK PLANT

HAZARDOUS MATERIAL SPILL PRE-PLANS

TABLE OF CONTENTS

D.C. COOK PLANT

HAZARDOUS MATERIAL SPILL PRE-PLAN

PRE-PLAN NO.: 1 DRAWINGS: HMPP-1 and HMPP-2

1.0 LOCATION

Plant Protected Area Outside Power Block
West Side Turbine Building Truck Park Locations
Warehouse Area

2.0 ACCESS

2.1 Primary

a. Outside Turbine Building west side: From main Security Gate either along north road (next to Service Building) or south on east road around Unit 2 Turbine Building.
b. Warehouse Area: Through Main Security Gate east on main access road to Warehouse area on north side of the main access road.

2.2 Secondary

None

3.0 EGRESS

Power Block perimeter road to Security Building.

4.0 ACCESS/EGRESS PROBLEMS

None

5.0 HAZARDS

5.1 Hazardous Materials in Area

5.1.1 Outside Turbine Building West Side (along lake shore)

a. Sodium Hypochlorite (10,000 gallon tank or tank truck)
b. Sodium Hydroxide (tank truck)
c. Sulfuric Acid (10,000 gallon tank or tank truck)
d. Mixed Hazardous Wastes in 55 gallon drums in yard area outside west wall of Unit 1 Turbine-Service Buildings

PRE-PLAN NO.: 1 (continued)

5.1.2 Warehouse Area

a. Warehouse 1

- Shipping/Receiving of 55 gallon drums of hazardous materials

b. Warehouse 2 (Temporary Staging)

- Acetone (55 gallon drums)
- Isopropyl Alcohol (55 gallon drums)
- Miscellaneous Paints, lubricants, etc.

c. Warehouse 3 (General Area)

- LCS-60/Sodium Nitrite (55 gallon drums)

d. Warehouse 3 (Chemical Storage Room)

- Hydrazine (55 gallon drums)
- Sodium Hydroxide (55 gallon drums)
- Ammonium Hydroxide (55 gallon drums)

5.2 Physical/Health Hazards

a. Toxic and Corrosive liquids and fumes
b. Suspected Carcinogen (Hydrazine)

5.3 Radiation

None

5.4 Confined Spaces

None

5.5 Fire

a. General Warehouse contents are, themselves, a fire hazard
b. Flammable/combustible liquids
c. Class A (wood, paper, etc.) combustibles

5.6 Electrical

None

PRE-PLAN NO.: 1 (continued)

6.0 VENTILATION:

6.1 Air Flow Direction

Turbine Building intake ventilation is adjacent to the truck unloading area and Sulfuric Acid Tank areas.

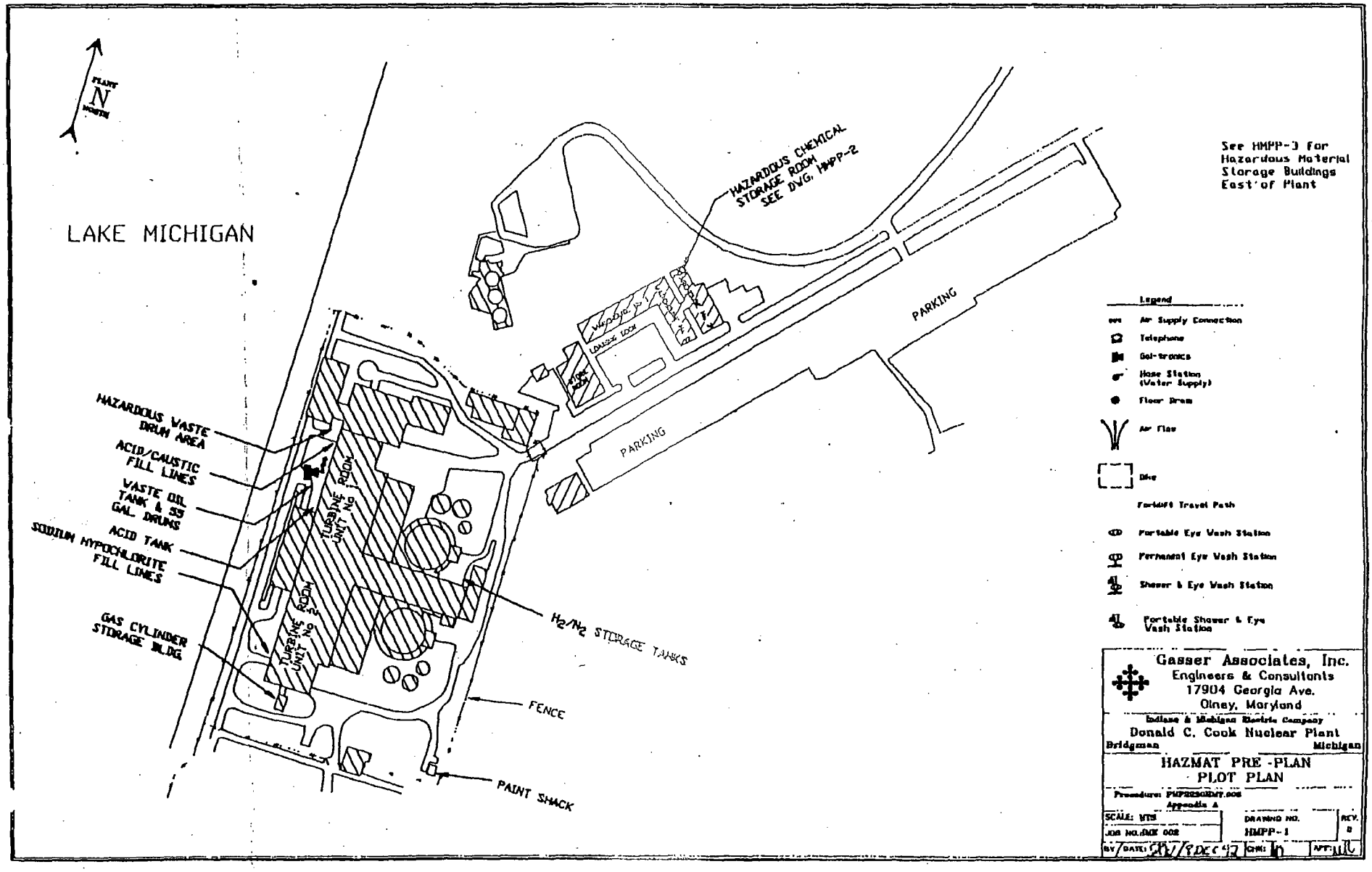
6.2 Fixed Equipment in Area

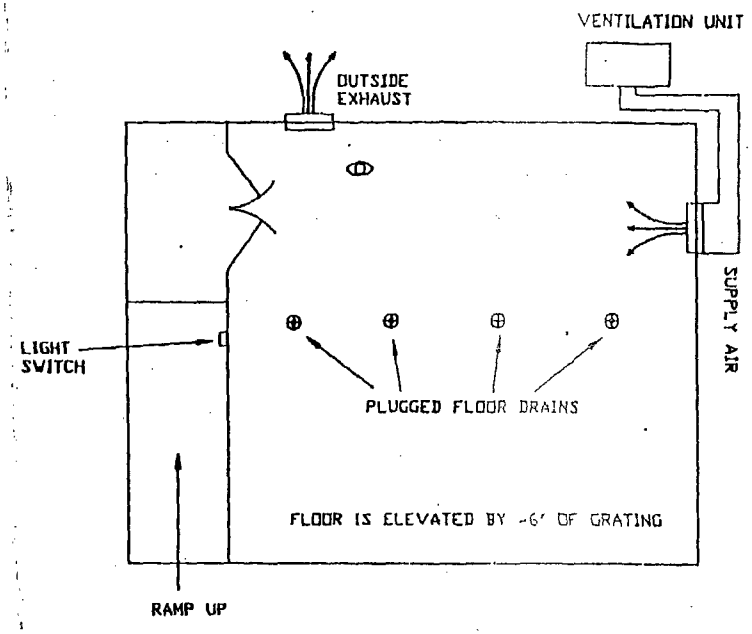
6.2.1 Supply

6.2.2 Exhaust

6.3 Immediate Actions

Shut off Turbine Building fans.


N
PLANT NORTH
LAKE MICHIGAN
HAZARDOUS CHEMICAL STORAGE ROOM SEE DWG. HMPP-2
See HMPP-3 for Hazardous Material Storage Buildings East of Plant
PARKING
PARKING
HAZARDOUS WASTE DRUM AREA
ACID/CAUSTIC FILL LINES
WASTE OIL TANK & 55 GAL. DRUMS
ACID TANK
SODIUM HYPOCHLORITE FILL LINES
GAS CYLINDER STORAGE BLDG.
TURBINE ROOM UNIT No 2
TURBINE ROOM UNIT No 1
H_2/N_2 STORAGE TANKS
FENCE
PAINT SHACK
Legend
Air Supply Connection
Telephone
Gai-tronics
Hose Station (Water Supply)
Floor Drain
Air Flow
Dike
Forklift Travel Path
Portable Eye Wash Station
Permanent Eye Wash Station
Shower & Eye Wash Station
Portable Shower & Eye Wash Station
Gasser Associates, Inc.
Engineers & Consultants
17904 Georgia Ave.
Olney, Maryland
Indiana & Michigan Electric Company
Donald C. Cook Nuclear Plant
Bridgman Michigan
HAZMAT PRE-PLAN
PLOT PLAN
Procedure: PMP2250EMT.005
Appendix A
SCALE: NTS
DRAWING NO. HMPP-1
REV. 0
JOB NO. EMX 002
BY/DATE: 8 DEC 87
CHK:
APP:



Legend

- Air Supply Connection
- Telephone
- Gai-tronics
- Hose Station (Water Supply)
- Floor Drain
- Air Flow
- Door
- Forklift Travel Path
- Portable Eye Wash Station
- Permanent Eye Wash Station
- Shower & Eye Wash Station
- Portable Shower & Eye Wash Station

Gasser Associates, Inc.
Engineers & Consultants
17904 Georgia Ave.
Olney, Maryland

Indiana & Michigan Electric Company
Donald C. Cook Nuclear Plant
Bridgman Michigan

HAZMAT PRE-PLAN

HAZARDOUS CHEMICAL STORAGE RM WAREHOUSE #9

Procedure: PMP2230DMT.006
Appendix A

SCALE: NTS	DRAWING NO.	REV.
JOB NO.: GAE 002	HMPP-2	0
BY/DATE: SKN/2 DEC 92	CHK: RB	APP: MJL

D.C. COOK PLANT

HAZARDOUS MATERIAL SPILL PRE-PLAN

PRE-PLAN NO.: 2 DRAWINGS: HMPP-3

1.0 LOCATION

East of Plant, Outside Protected Area

Oil Storage Building (Oil Barn)
Construction Paint Storage Building (Paint Barn)
Flammable and Solvent Storage and Dispensing Area
Waste Storage Building
Flammable Liquids Storage Building
Blast Shop
Paint Shop

CAUTION ***CAUTION*** ***CAUTION***

Waste Storage Building contains multiple 55 gallon drums of industrial wastes in which specific substances and concentrations are UNKNOWN.

2.0 ACCESS

2.1 Primary

Main access road east, past training center, right turn onto dirt road towards 354KV yard.

2.2 Secondary

Main access road east, right turn towards new Radwaste Facility (behind Training Center), follow road towards 345KV yard.

3.0 EGRESS

Main access road.

4.0 ACCESS/EGRESS PROBLEMS

a. Oil Barn Locked - ONLY keys are in warehouse
b. Waste Storage Building - Locked Door
c. Flammable Liquids Storage Building - Locked Door

PRE-PLAN NO.: 2 (continued)

5.0 HAZARDS

5.1 Hazardous Materials in Area

5.1.1 Oil Storage Building (Oil Barn) - 55 gallon drums

a. Ethylene Glycol
b. Stoddard Solvent
c. Acetone
d. Isopropyl Alcohol
e. Fyrquel
f. Freon TF
g. Miscellaneous Lubricants

5.1.2 Construction Paint Storage Building (Paint Barn)

a. Paints, Sealants, Thinners and Coatings
b. Cadweld

5.1.3 Construction Flammable Liquid Storage and Dispensing Area (Primarily 55 gallon drums)

a. MEK
b. Stoddard Solvent
c. Xylene
d. Mineral Spirits
e. Carboline/Phenoline Thinners (15 gallon containers)

5.1.4 Waste Storage Building (55 gallon drums)

a. Industrial waste of UNKNOWN quantities and concentrations
b. Waste Oil
c. Waste Glycol
d. Waste Diesel Fuel
e. Waste EHC (Fryquel) Fluid
f. Waste Solids

5.1.5 Flammable Liquids Storage Building

a. Primarily Waste Solvents and Primers

5.2 Physical/Health Hazards

a. EXTREME Fire Hazard
b. Toxic liquids and fumes
c. Potentially Explosive Waste Mixtures

PRE-PLAN NO.: 2 (continued)

5.3 Radiation

None

5.4 Confined Spaces

None

5.5 Fire

a. EXTREME Fire Hazard
b. Flammable and Combustible Liquids
c. Building Collapse

5.6 Electrical

None

6.0 VENTILATION

6.1 Air Flow Direction

No HVAC systems installed.

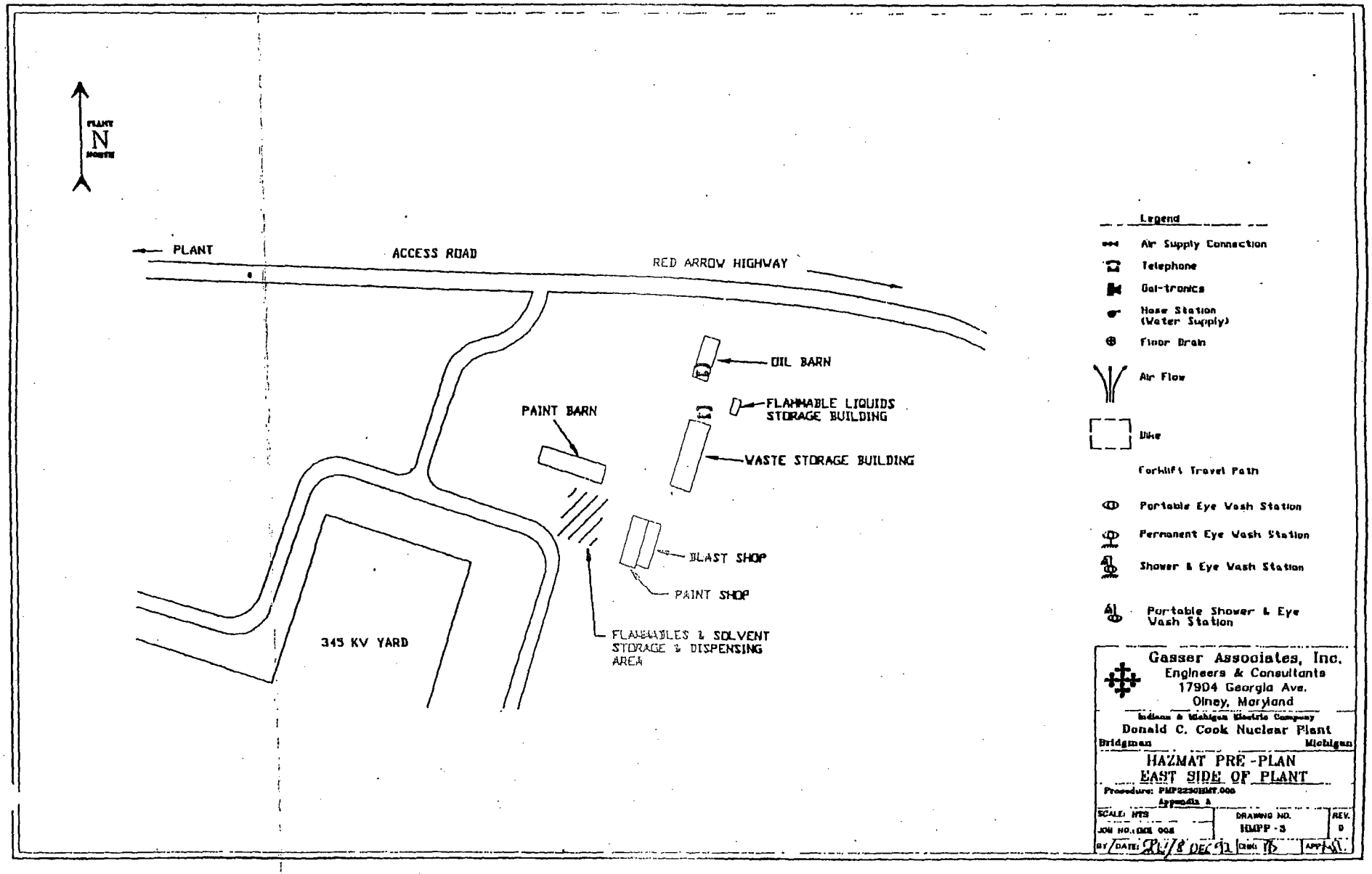
6.2 Fixed Equipment in Area

6.2.1 Supply: None

6.2.2 Exhaust: None

6.3 Immediate Actions

Identify wind direction and coordinate actions with Emergency Planning.


PLANT
N
NORTH
PLANT
ACCESS ROAD
RED ARROW HIGHWAY
OIL BARN
FLAMMABLE LIQUIDS STORAGE BUILDING
PAINT BARN
WASTE STORAGE BUILDING
BLAST SHOP
PAINT SHOP
FLAMMABLES & SOLVENT STORAGE & DISPENSING AREA
345 KV YARD
Legend
Air Supply Connection
Telephone
Gai-tronics
Hose Station (Water Supply)
Floor Drain
Air Flow
Dike
Forklift Travel Path
Portable Eye Wash Station
Permanent Eye Wash Station
Shower & Eye Wash Station
Portable Shower & Eye Wash Station
Gasser Associates, Inc.
Engineers & Consultants
17904 Georgia Ave.
Olney, Maryland
Indiana & Michigan Electric Company
Donald C. Cook Nuclear Plant
Bridgman
Michigan
HAZMAT PRE-PLAN
EAST SIDE OF PLANT
Procedure: PMP2230HMT.006
Appendix A
SCALE: NTS
DRAWING NO.
HMPP-3
REV.
0
JOB NO.: DCK 006
BY/DATE: 8 DEC 92
CHK:
APP:

D.C. COOK PLANT

HAZARDOUS MATERIAL SPILL PRE-PLAN

PRE-PLAN NO.: 3 DRAWINGS: HMPP-4, -5, and -6

NOTE: See PRE-PLAN NO. 7 for Additional Information Regarding Acid/Caustic Tank and Truck Spill Response

1.0 LOCATION

Unit 1 and 2
Turbine Building Elevation 591'
Turbine Building Basement (Sodium Hydroxide Tank Room)
General Area Around the Condensate Chemical Feed Tanks and Pumps, the Make-Up System Area including the Regeneration Cabinet, and the Sodium Hypochlorite Tank
Plant Road West of Screenhouse

CS-1

2.0 ACCESS

2.1 Primary

Turbine Building Elevation 609' or 633' down east stairwell to Elevation 591', then either down Unit 1 south corridor or Unit 2 north corridor to either Unit 1 or 2 west corridor.

Around outside of Plant to west side of Screenhouse.

2.2 Secondary

From outside of west side of Turbine Building Elevation 591' down either Unit 1 or Unit 2 ramp entrance.

3.0 EGRESS

Exit out of Turbine Building Elevation 591' through either Unit 1 or 2 ramp entrances on the west side or through west wall into Circ. Water Pump Area.

4.0 ACCESS/EGRESS PROBLEMS

Turbine Building/Screenhouse ventilation air intakes are on the west wall immediately adjacent to potential spill areas (both inside and outside the Turbine Building and Screenhouse). Rapid transportation of hazardous gases and fumes would be expected to occur.

PRE-PLAN NO.: 3 (continued)

5.0 HAZARDS

5.1 Hazardous Materials in Area

a. Sodium Hypochlorite (10,000 gallon tank or tank truck - Temporary 2000 gallon Tank in Roadway)
b. Sodium Hydroxide (10,000 gallon tank or tank truck)
c. Sulfuric Acid (10,000 gallon tank or tank truck - Temporary 2000 gallon Tank in Roadway)
d. Hydrazine (55 gallon drum)
e. Ammonium Hydroxide (55 gallon drum)
f. Mixed Hazardous Wastes in 55 gallon drums in yard area outside west wall of Unit 1 Turbine-Service Buildings

CS-1

5.2 Physical/Health Hazards

a. Highly toxic and corrosive liquids and fumes
b. Suspected Carcinogen (Hydrazine)

5.3 Radiation

None

5.4 Confined Spaces

Turbine Building Sump Pits

5.5 Fire

a. Unit 2 Miscellaneous Oil Storage Room (south-west)
b. Unit 1 and 2 Hydrogen Seal Oil Units
c. Hydrogen Gas cylinders
d. Lube Oil Storage Rooms

5.6 Electrical

Miscellaneous Motor Control Centers and electrical motors

6.0 VENTILATION

6.1 Air Flow Direction

Outside air into Turbine Building and Screenhouse through air intakes along west wall. Air flow through each intake is approximately 20,000 cfm.

PRE-PLAN NO.: 3 (continued)

6.2 Fixed Equipment in Area

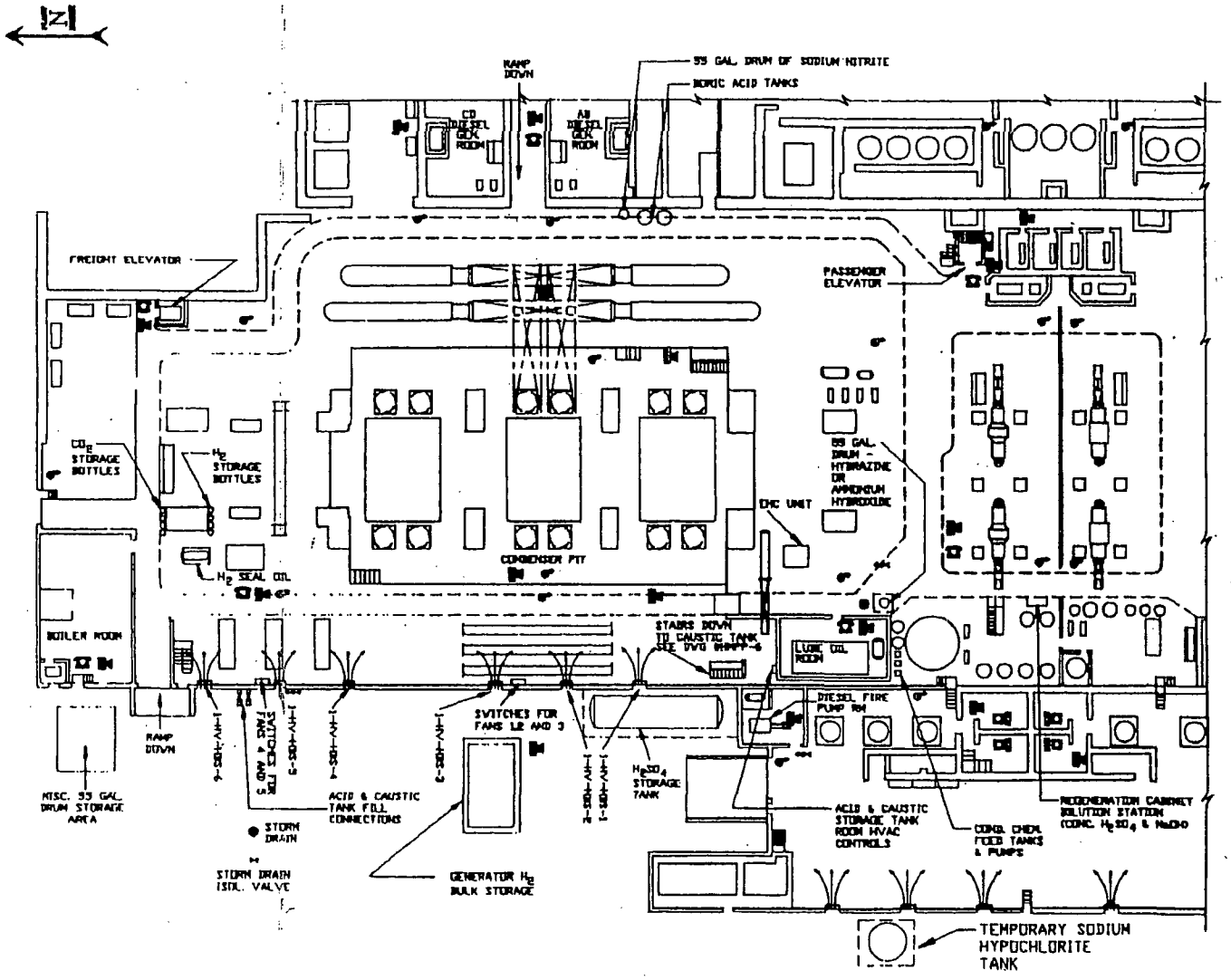
6.2.1 Supply: Air intakes along west wall.

6.2.2 Exhaust: None

6.3 Immediate Actions

For large spill, evacuate all Turbine Building elevations and Screenhouse due to spread of corrosive and toxic fumes. Maintain ventilation system operable to disperse and exhaust fumes. Shutdown Turbine Building and Screenhouse intake fans along west wall if warranted. CS-1

NOTE: See Drawing HMPP-6 for ventilation information.



Legend

- Air Supply Connection
- Telephone
- Gai-tronics
- Hose Station (Water Supply)
- Floor Drain
- Air Flow
- Dike
- Forklift Travel Path
- Portable Eye Wash Station
- Permanent Eye Wash Station
- Shower & Eye Wash Station
- Portable Shower & Eye Wash Station

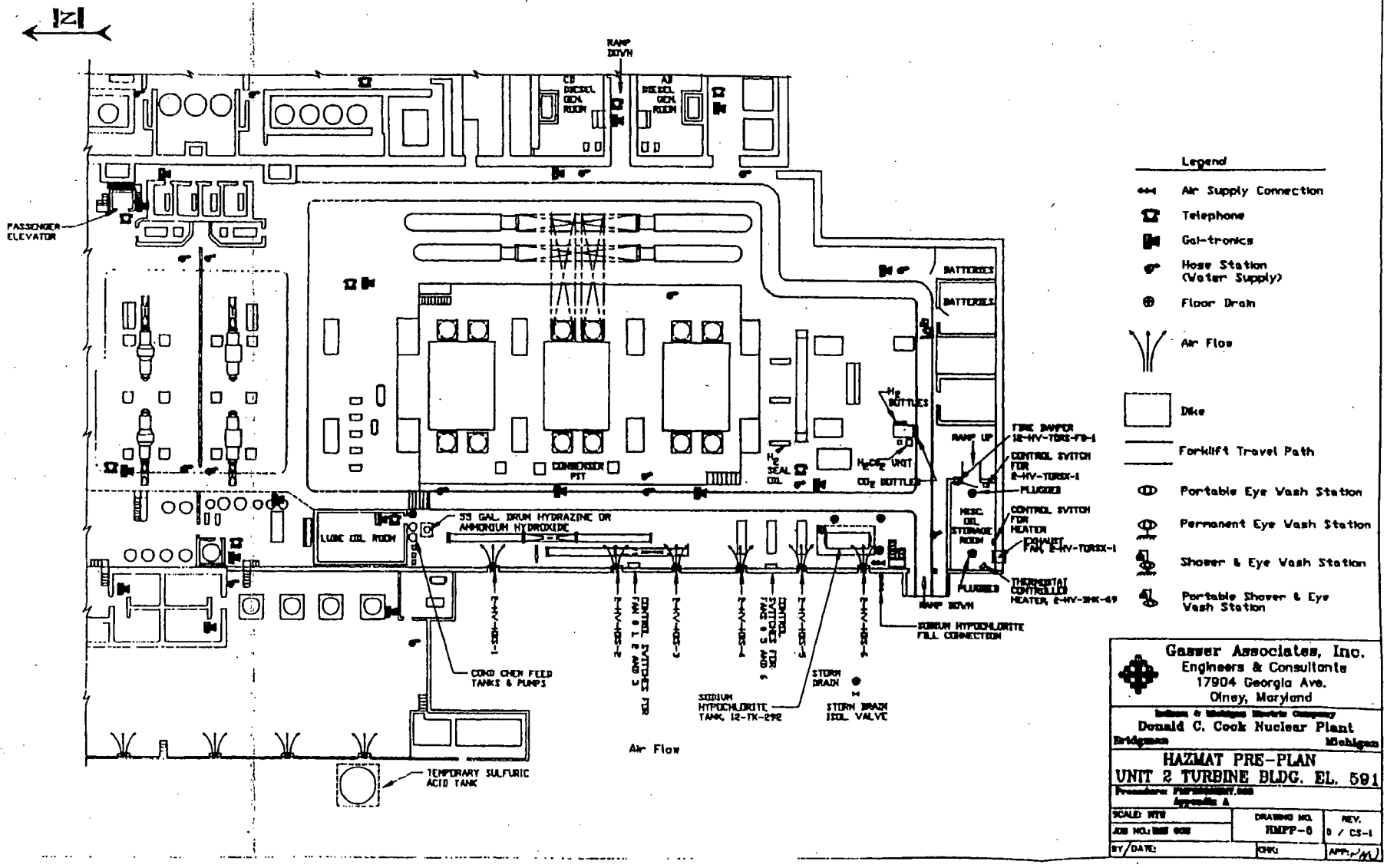
Gasser Associates, Inc.
Engineers & Consultants
17904 Georgia Ave.
Olney, Maryland

Indiana & Michigan Electric Company
Donald C. Cook Nuclear Plant
Bridgman Michigan

HAZMAT PRE-PLAN
UNIT 1 TURBINE BLDG. EL. 591

Procedure: PMPPMMMT.000
Appendix A

SCALE: NTS	DRAWING NO.	REV.
JOB NO.: [illegible]	HMPP-4	0/CS-1
BY/DATE:	CHKD:	APPD:


N
RAMP DOWN
CD DIESEL GEN. ROOM
AD DIESEL GEN. ROOM
PASSENGER ELEVATOR
BATTERIES
BATTERIES
CONDENSER PIT
H_2 SEAL OIL
H_2 BOTTLES
H_2CO_2 UNIT
CO_2 BOTTLES
RAMP UP
FIRE DAMPER 12-HV-TURX-FD-1
CONTROL SWITCH FOR 2-HV-TURX-1
PLUGGED
MISC. OIL STORAGE ROOM
CONTROL SWITCH FOR HEATER
EXHAUST FAN 2-HV-TURX-1
THERMOSTAT CONTROLLER HEATER, 2-HV-SHK-49
PLUGGED
RAMP DOWN
SODIUM HYPOCHLORITE FILL CONNECTION
LUBE OIL ROOM
55 GAL. DRUM HYDRAZINE OR AMMONIUM HYDROXIDE
COND CHEM FEED TANKS & PUMPS
CONTROL SWITCHES FOR 1 2 AND 3
CONTROL SWITCHES FOR 4 5 AND 6
SODIUM HYPOCHLORITE TANK 12-TK-292
STORM DRAIN
STORM DRAIN ISOL. VALVE
Air Flow
TEMPORARY SULFURIC ACID TANK
Legend
Air Supply Connection
Telephone
Gai-tronics
Hose Station (Water Supply)
Floor Drain
Air Flow
Dike
Forklift Travel Path
Portable Eye Wash Station
Permanent Eye Wash Station
Shower & Eye Wash Station
Portable Shower & Eye Wash Station
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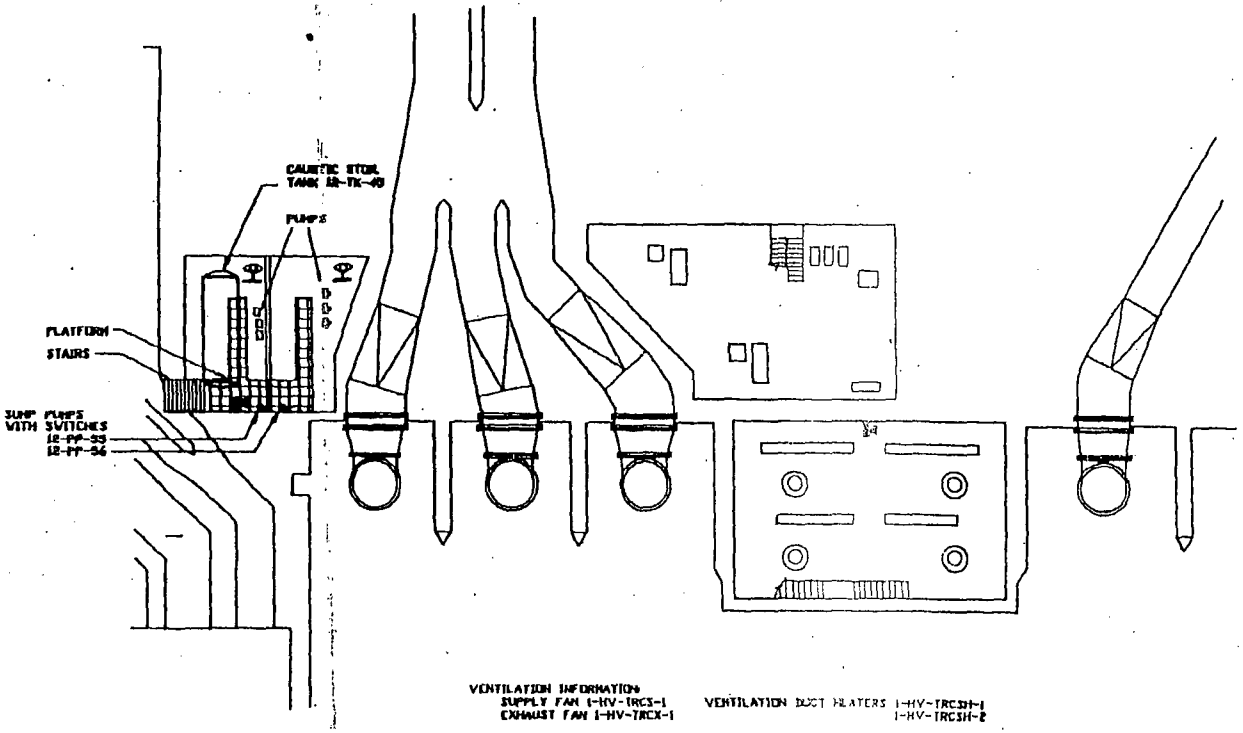
HAZMAT PRE-PLAN
UNIT 2 TURBINE BLDG. EL. 591
Procedure Attachment
Appendix A
SCALE: NTS
DRAWING NO. HMPP-6
REV. 0 / CS-1
BY/DATE:
CHK:
APP:



VENTILATION INFORMATION
SUPPLY FAN 1-HV-TRCS-1
EXHAUST FAN 1-HV-TRCX-1
VENTILATION DUCT HEATERS 1-HV-TRCSH-1
1-HV-TRCSH-2

CONTROL SWITCHES FOR EACH ARE LOCATED ON THE 591' ELEVATION ON THE NORTH WALL OF THE LUBE OIL STORAGE ROOM. SEE DRAWING NO. HMPP-4

Legend

- Air Supply Connection
- Telephone
- Gai-tronics
- Hose Station (Water Supply)
- Floor Drain
- Air Flow
- Dike
- Forklift Travel Path
- Portable Eye Wash Station
- Permanent Eye Wash Station
- Shower & Eye Wash Station
- Portable Shower & Eye Wash Station

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HAZMAT PRE-PLAN
TURB. BLDG. BELOW BASEMENT

Procedure: [illegible] Appendix A

SCALE: NTS	DRAWING NO.	REV.
JOB NO: DCC 008	HMPP-8	0

BY/DATE: CRN/[illegible]DEC92 CHK: [illegible] APP: [illegible]

D.C. COOK PLANT

HAZARDOUS MATERIAL SPILL PRE-PLAN

PRE-PLAN NO.: 4 DRAWINGS: HMPP-7 and HMPP-8

1.0 LOCATION

Unit 1/2 Turbine Building (Fire Pre-Plans say Aux. Bldg)
Elevation 591' East
Feedwater Chemical Feed Rooms

2.0 ACCESS

2.1 Primary

Turbine Building Elevation 609' or 633' down east stairwell to Elevation 591', then north along east corridor to Unit 1 FW Chemical Feed Area; or south along east corridor to Unit 2 FW Chemical Feed Area.

2.2 Secondary

From outside of west side of Turbine Building Elevation 591' down either Unit 1 ramp entrance, then along the north corridor to the east corridor and the Unit 1 Feedwater Chemical Feed Area, or Unit 2 ramp entrance, then along south corridor past UPS Battery Rooms to the east corridor and the Unit 2 Feedwater Chemical Feed Area.

3.0 EGRESS

Exit out of Turbine Building Elevation 591' through either Unit 1 or 2 ramp entrances on the west side or up east stairwell.

4.0 ACCESS/EGRESS PROBLEMS

There is only a single access and egress path for each Feedwater Chemical Feed Area.

PRE-PLAN NO.: 4 (continued)

5.0 HAZARDS

5.1 Hazardous Materials in Area

a. Hydrazine (55 gallon drums)
b. Ammonium Hydroxide (55 gallon drums)
c. Sodium Nitrite (55 gallon drums)
d. Boric Acid tanks

5.2 Physical/Health Hazards

a. Suspected Carcinogen (Hydrazine)
b. Toxic liquids and fumes (Hydrazine)
c. Corrosive liquids and fumes (Ammonium Hydroxide)

5.3 Radiation

None

5.4 Confined Spaces

None

5.5 Fire

Hydrogen Cylinders

5.6 Electrical

None

6.0 VENTILATION

6.1 Air Flow Direction

Air flow is east into Auxiliary Building (due to Aux. Bldg. negative pressure)

6.2 Fixed Equipment in Area

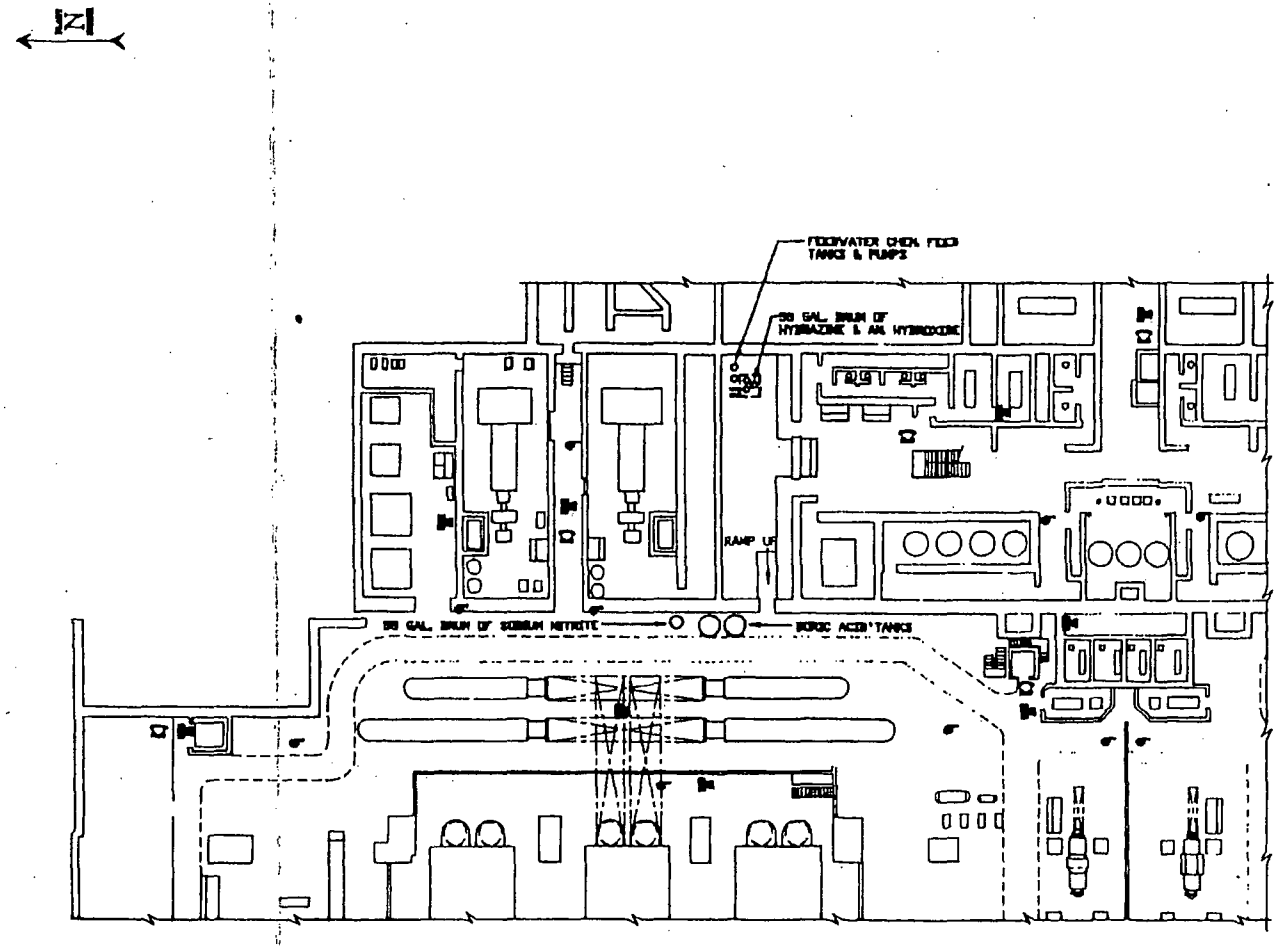
6.2.1 Supply: None

6.2.2 Exhaust: None

PRE-PLAN NO.: 4 (continued)

6.3 Immediate Actions

For large spill, evacuate or reduce personnel in the Auxiliary Building elevations due to spread of corrosive and toxic fumes. Establish exclusion area on Turbine Building Elevation 591' and monitor upper Turbine Building elevations for spread of fumes.



Legend

- Air Supply Connection
- Telephone
- Gai-tronics
- Hose Station (Water Supply)
- Floor Drain
- Air Flow
- Dike
- Forklift Travel Path
- Portable Eye Wash Station
- Permanent Eye Wash Station
- Shower & Eye Wash Station
- Portable Shower & Eye Wash Station

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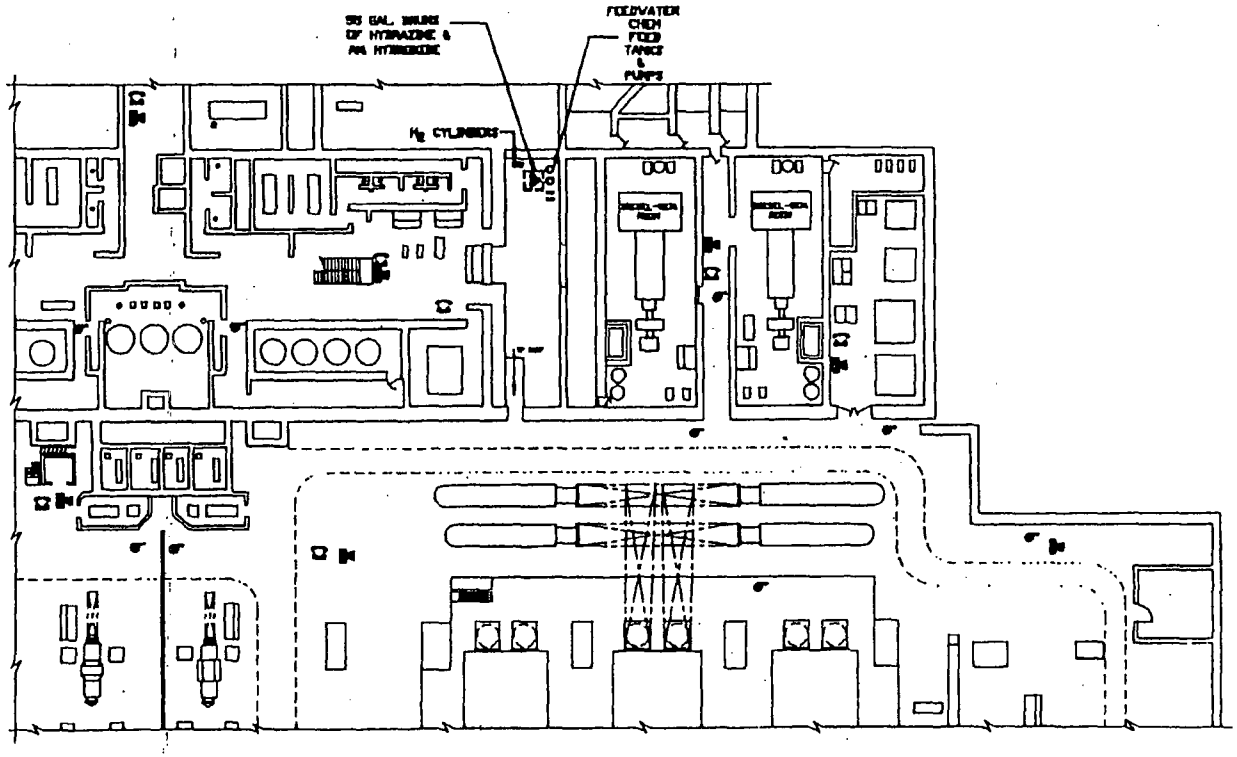
HAZMAT PRE-PLAN
UNIT 1 TURBINE BLDG. EL. 591

Procedure: [illegible] Appendix A

SCALE: NTS	DRAWING NO.	REV.
JOB NO.: [illegible] 002	HMPP-7	0

BY/DATE: JRW/8DEC92 CHK: [illegible] APP: [illegible]



Legend

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- Dike
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HAZMAT PRE-PLAN
UNIT 2 TURBINE BLDG. EL. 591

Procedure: PMP2250EMT.006
Appendix A

SCALE: NTS	DRAWING NO. HMPP--8	REV. 0
JOB NO.: DCC 002		
BY/DATE: SKV/FEB 92	CHK: AB	APP: NG

D.C. COOK PLANT

HAZARDOUS MATERIAL SPILL PRE-PLAN

PRE-PLAN NO.: 5 DRAWINGS: HMPP-9

1.0 LOCATION

Service Building (North side of Unit 1 Turbine Building)
Elevation 595'
Miscellaneous Oil Storage Room

2.0 ACCESS

2.1 Primary

Access from outside through door on west wall into the room.

2.2 Secondary

Unit 1 Turbine Building, up ramp (next to Boiler Room) on north wall, into Service Building, then west to door into Miscellaneous Oil Storage Room.

3.0 EGRESS

Through east door of Oil Storage Room into the Service Building or through west door to the outside area.

4.0 ACCESS/EGRESS PROBLEMS

None

5.0 HAZARDS

5.1 Hazardous Materials in Area

5.1.1 55 gallon drums

a. Acetone
b. Isopropyl Alcohol
c. Stoddard Solvent
d. Mineral Spirits
e. Mixed Waste Solvents
d. Clam-Trol
e. Fyrquel EHC Fluid

PRE-PLAN NO.: 5 (continued)

5.1.2 1 - 5 gallon containers

a. Ethyl/Methyl Alcohol
b. Xylene
c. MEK
d. 1,2-Dichloroethane
e. Misc. Paints, Coatings, Additives and Lubricants
f. Gasoline

5.2 Physical/Health Hazards

a. EXTREME Fire hazard
b. Toxic liquids and fumes
c. Small Enclosed Room

5.3 Radiation

None

5.4 Confined Spaces

None

5.5 Fire

a. EXTREME Fire hazard
b. High Concentration of Flammable/Combustible Solvents, Lubricants, Paints, etc.

5.6 Electrical

None

6.0 VENTILATION: (See Drawing HMPP-9)

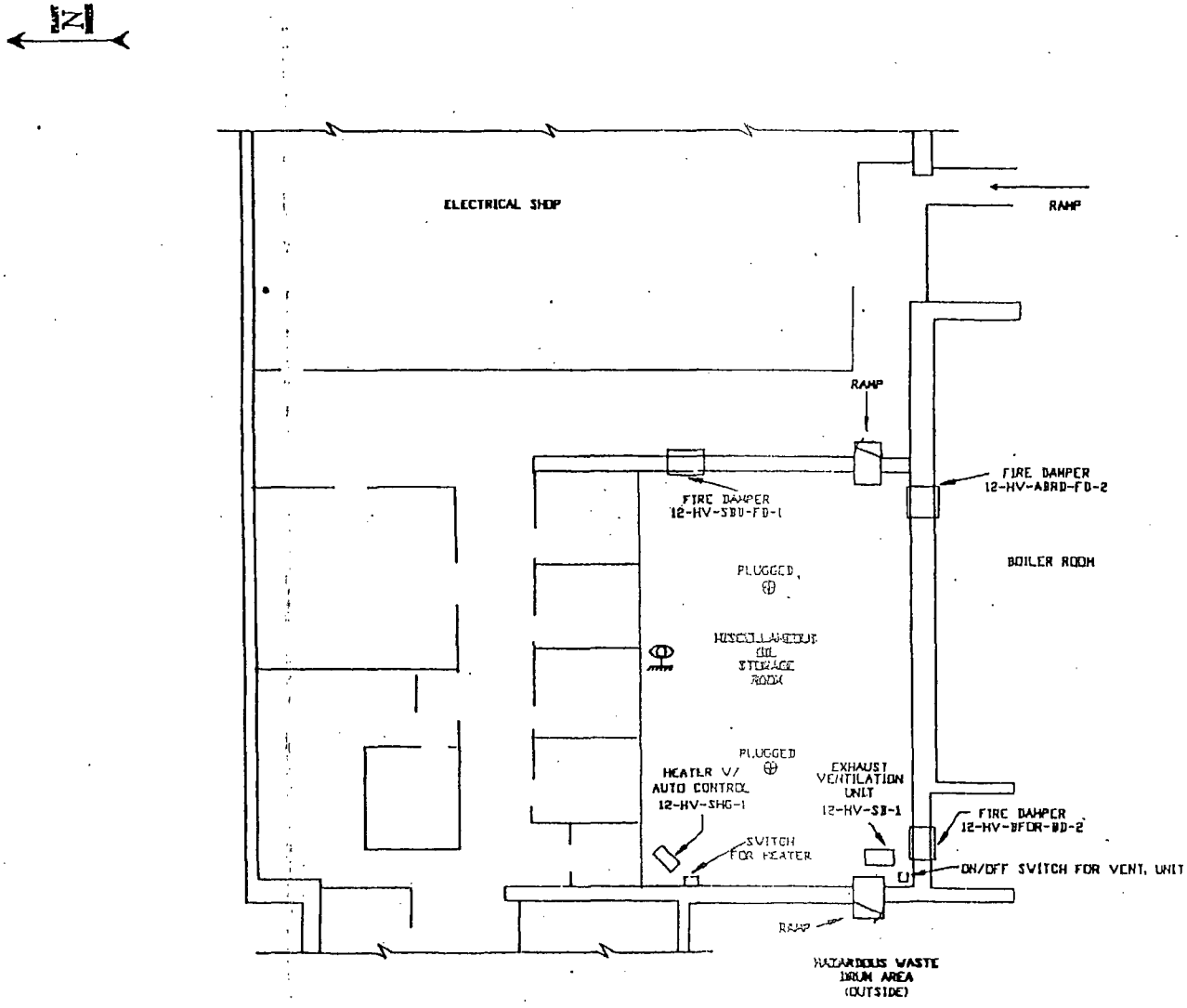
6.1 Air Flow Direction

6.2 Fixed Equipment in Area

6.2.1 Supply

6.2.2 Exhaust

6.3 Immediate Actions



Legend

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- Telephone
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HAZMAT PRE--PLAN
SERVICE BLDG. EL. 591

Procedure PMP[illegible]MAT.000
Appendix A

SCALE: NTS	DRAWING NO. HMPP-9	REV. 0
JOB NO.: [illegible]		
BY/DATE: [illegible]/8DEC92	CHK: [illegible]	APP: [illegible]

D.C. COOK PLANT

HAZARDOUS MATERIAL SPILL PRE-PLAN

PRE-PLAN NO.: 6 DRAWINGS: HMPP-10

1.0 LOCATION

Unit 1 Turbine Building
Elevation 633'
Chemistry Laboratory

2.0 ACCESS

2.1 Primary

Turbine Building 633' across turbine deck to Personnel Door NE corner of Chemistry Lab.

2.2 Secondary

Turbine Building 633' across turbine floor to Personnel Door SE corner of Chemistry Lab.

3.0 EGRESS

Personnel doors NE and SE corners to Unit Turbine Floor.

4.0 ACCESS/EGRESS PROBLEMS

None

5.0 HAZARDS

5.1 Hazardous Materials in Area: (quart and gallon glass containers)

a. Variety of laboratory reagents and solvents including Hydrazine, MEK, Hexane, Xylene, Chloroform, Nitrites, Acetone, Petroleum Ether, etc.
b. Acids and caustics, including Nitric Acid, conc. Hydrochloric Acid, Sodium Hydroxide, etc.

PRE-PLAN NO.: 6 (continued)

5.2 Physical/Health Hazards: (relatively small quantities of substances)

a. Multiple variety of solvents, acids and caustics could result in reactions from mixed spills
b. Suspected Carcinogen (Hydrazine)
c. Toxic and Corrosive liquids and fumes

5.3 Radiation

None

5.4 Confined Spaces

None

5.5 Fire

a. Significant Fire Hazard
b. Concentration of various solvents (Class B flammable liquids)
c. Class A (paper, wood, etc.) combustibles

5.6 Electrical

None

6.0 VENTILATION

6.1 Air Flow Direction

Most of the air in lab is recirculated and mixed with makeup air from outside. Chemistry Hood is exhausted directly outside. Chemical/Flammable Cabinets are vented outside.

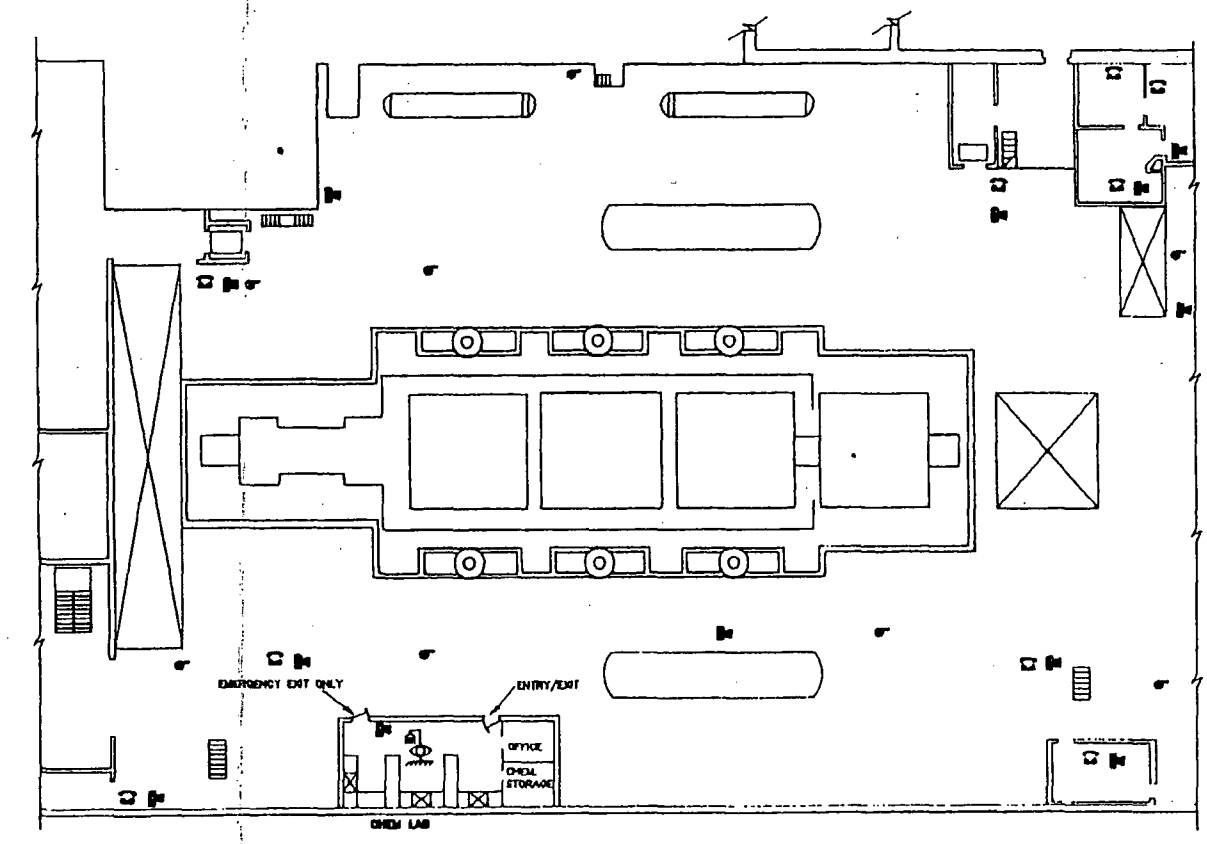
6.2 Fixed Equipment in Area

6.2.1 Supply: Primary Air Handling Unit 12-HV-TCHLAH (Supply) is located on Chemistry Lab roof.

6.2.2 Exhaust: Hood exhaust fan 12-HV-TCHEX-1 is also located on Lab roof.

6.3 Immediate Actions

Shutdown Primary supply fan. Maintain hood exhaust fan operating to provide minimal exhaust capabilities for fumes/vapors.



Legend

- Air Supply Connection
- Telephone
- Gai-tronics
- Hose Station (Water Supply)
- Floor Drain
- Air Flow
- Dike
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HAZMAT PRE-PLAN
UNIT 1 TURBINE BLDG. EL. 633

Procedure PMP2050RMT.008
Appendix A

SCALE: NTS	DRAWING NO.	REV
JOB NO.: DCC 002	HMPP-10	0

BY/DATE: SKW/8 Dec 92 CHK: RS APP: MJ

D.C. COOK PLANT

HAZARDOUS MATERIAL SPILL PRE-PLAN

PRE-PLAN NO.: 7 DRAWINGS: HMPP-11

1.0 LOCATION

Auxiliary Building
Elevation 587'
Spray Additive Tank Room

2.0 ACCESS

2.1 Primary

633' Turbine Building via east stairwell to 609', Unit 1 east corridor, Control Access Point to Auxiliary Building, north/south corridor, east/west corridor, center stairwell to 587', east/west corridor to personnel door center east wall Spray Additive Tank Room.

2.2 Secondary

None

3.0 EGRESS

Tank Room personnel door to east/west corridor to center stairwell to 587'.

4.0 ACCESS/EGRESS PROBLEMS

Radiological control area with restricted access.

5.0 HAZARDS

5.1 Hazardous Materials in Area

a. Sodium Hydroxide Tanks (2)

5.2 Physical/Health Hazards

None

PRE-PLAN NO.: 7 (continued)

5.3 Radiation

Restricted Area

5.4 Confined Spaces

None

5.5 Fire

Cable insulation and possible transient combustibles.

5.6 Electrical

Electrical outlets and panels.

6.0 VENTILATION

6.1 Air Flow Direction

(Not known)

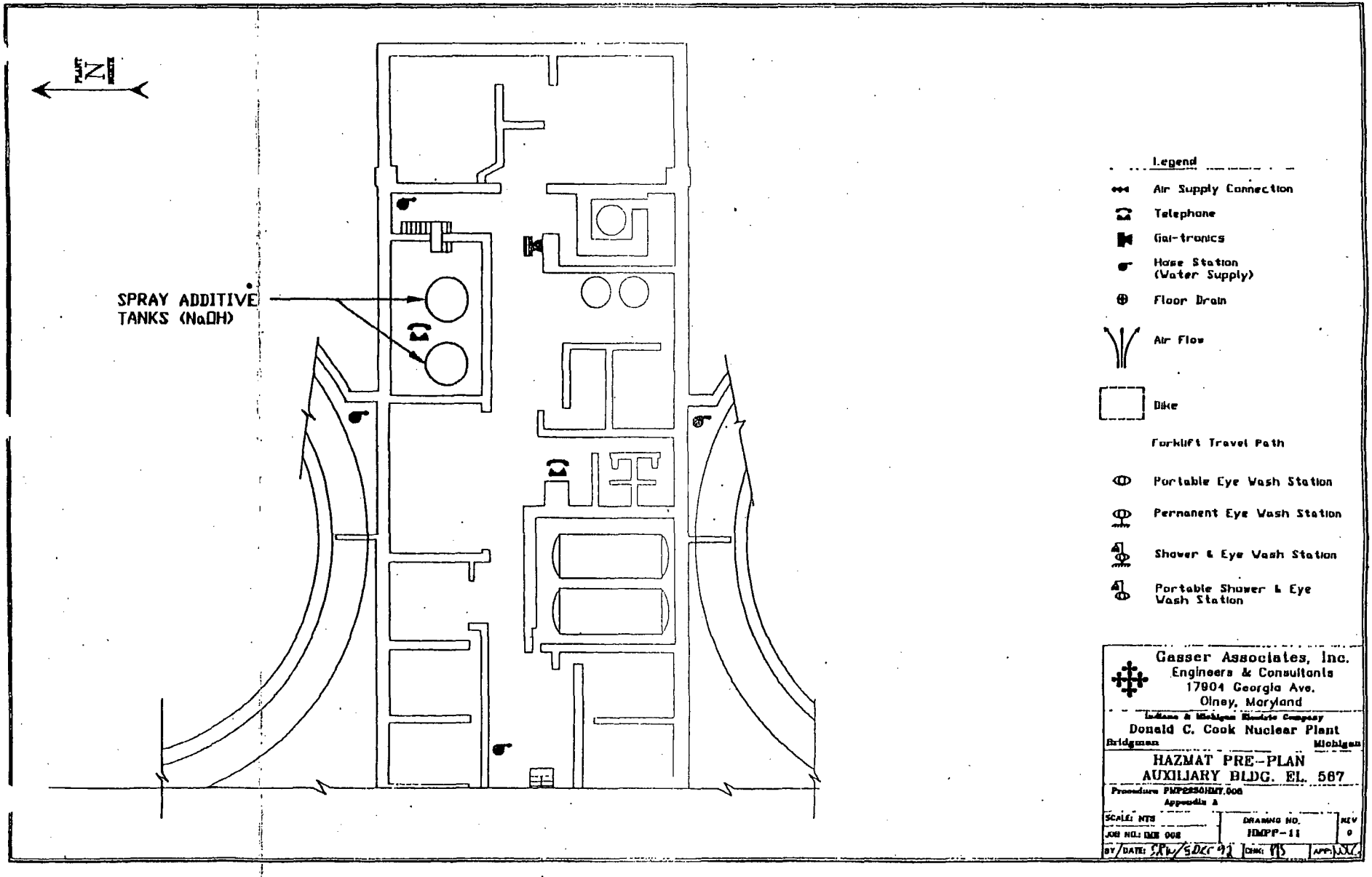
6.2 Fixed Equipment in Area

6.2.1 Supply: Fans 1-HV-AS-1 and 2, and 2-HV-AS-1 and 2

6.2.2 Exhaust: 1-HV-AX-1 and 2

6.3 Immediate Actions

Isolate dampers to room, if possible. Contact Control Room for assistance in reducing airflow.


PLANT NORTH
SPRAY ADDITIVE TANKS (NaOH)
Legend
Air Supply Connection
Telephone
Gai-tronics
Hose Station (Water Supply)
Floor Drain
Air Flow
Dike
Forklift Travel Path
Portable Eye Wash Station
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Michigan
HAZMAT PRE-PLAN
AUXILIARY BLDG. EL. 587
Procedure PMPE2550HMT.006
Appendix A
SCALE: NTS
DRAWING NO.
HMPP-11
REV
0
JOB NO.: IME 008
BY/DATE: SRW/9DEC92
CHK: MS
APP: WJC

D.C. COOK PLANT

HAZARDOUS MATERIAL SPILL PRE-PLAN

PRE-PLAN NO.: 8 DRAWINGS: HMPP-12

1.0 LOCATION

Auxiliary Building
Elevation 609'
Hot and Cold Laboratory

2.0 ACCESS

2.1 Primary

Turbine Building 633' to east stairwell to elevation 609', Unit 1 east corridor to Control Access Point and Plant Personnel Facilities Area to Personnel Door SW corner of Cold Lab.

2.2 Secondary

Turbine Building 633' to east stairwell to elevation 609', Unit 1 east corridor to Control Access Point and Plant Personnel Facilities Area to Personnel Door center west wall of Hot Lab.

3.0 EGRESS

a. Personnel door SW corner of Cold Lab to Access Control Area.
b. Personnel door center west wall of Hot Lab to Access Control Area.
c. Personnel door center south wall of Hot Lab to North/South corridor.

4.0 ACCESS/EGRESS PROBLEMS

None

5.0 HAZARDS

5.1 Hazardous Materials in Area: (quart and gallon glass containers)

a. Variety of laboratory reagents and solvents including Hydrazine, MEK, Hexane, Xylene, Chloroform, Nitrites, Acetone, Petroleum Ether, etc.

b. Acids and caustics, including Nitric Acid, conc. Hydrochloric Acid, Sodium Hydroxide, etc.

PRE-PLAN NO.: 8 (continued)

5.2 Physical/Health Hazards: (relatively small quantities of substances)

a. Multiple variety of solvents, acids and caustics could result in reactions from mixed spills
b. Suspected Carcinogen (Hydrazine)
c. Toxic and Corrosive liquids and fumes

5.3 Radiation

a. Hot Lab: Restricted Area
b. Cold Lab: None

5.4 Confined Spaces

None

5.5 Fire

a. Significant Fire Hazard
b. Concentration of various solvents (flammable/combustible liquids)
c. Class A (paper, wood, etc.) combustibles

5.6 Electrical

None

6.0 VENTILATION

6.1 Air Flow Direction

(Not known)

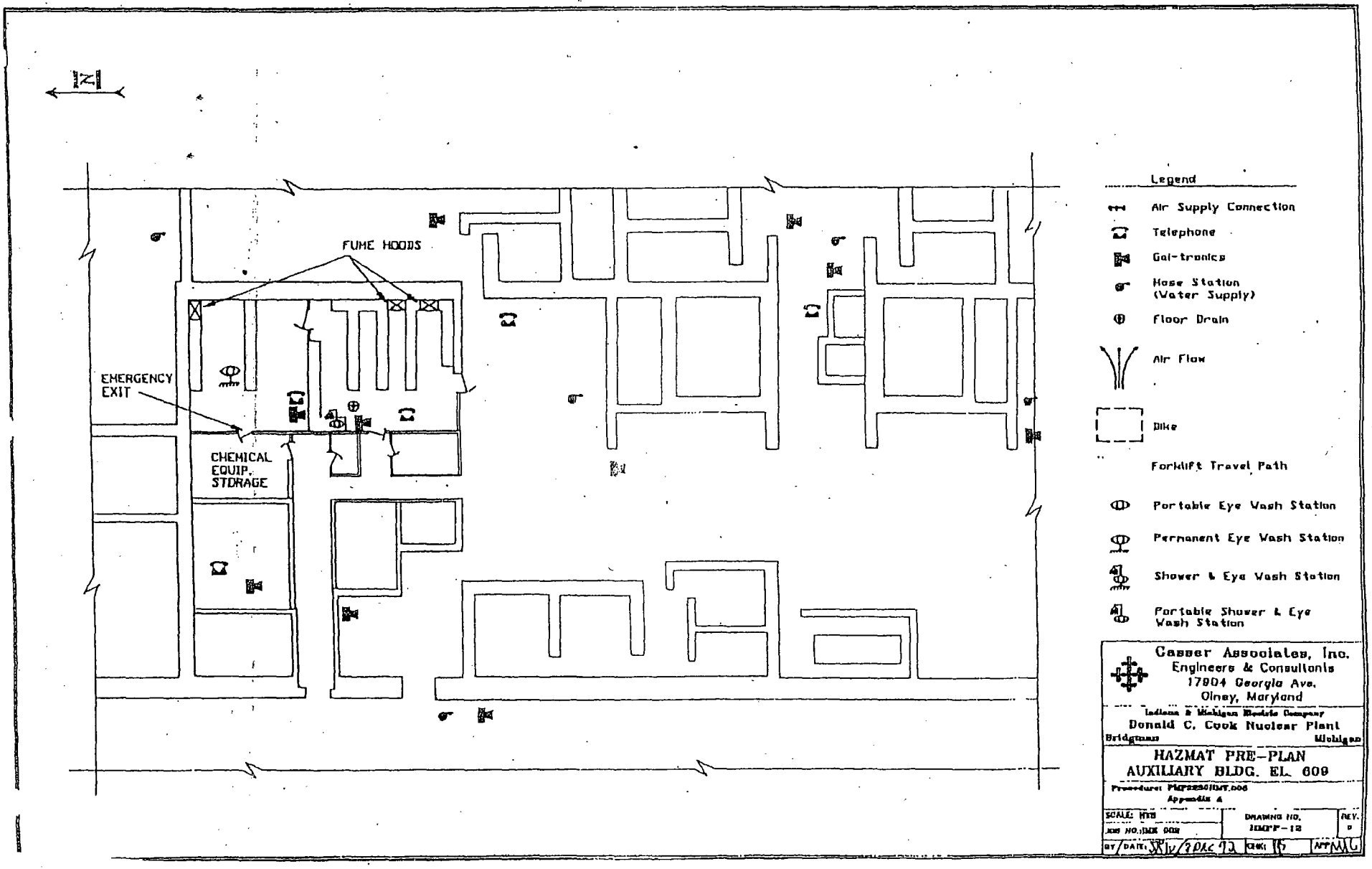
6.2 Fixed Equipment in Area

6.2.1 Supply: Fans 1-HV-AS-1 and 2, and 2-HV-AS-1 and 2.

6.2.2 Exhaust: Fans HV-AHLX1, X2, X3, X4, and X5.

6.3 Immediate Actions

Request assistance from the Control Room regarding HVAC operation and control.


N
FUME HOODS
EMERGENCY EXIT
CHEMICAL EQUIP. STORAGE
Legend
Air Supply Connection
Telephone
Gai-tronics
Hose Station (Water Supply)
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Air Flow
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Michigan
HAZMAT PRE-PLAN
AUXILIARY BLDG. EL. 609
Appendix A
SCALE: NTS
DRAWING NO.
REV.
DATE:
CHK:
APP:

APPENDIX B

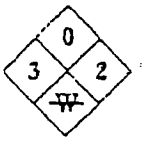
D.C. COOK PLANT

HAZARDOUS MATERIAL DATA SHEET

EMERGENCY RESPONSE REQUIRED

TABLE OF CONTENTS

HAZARDOUS MATERIAL DATA SHEET



NUMBER: 01

Hazardous Substance: Sulfuric Acid (93%)

Synonyms: H_2SO_4, Oil of Vitriol, Battery Acid, Chamber Acid, Fertilizer Acid, Hydrogen Sulfate

Emergency Response Required: (X) YES* ( ) NO

* For any spills greater than 10 gallons.

HAZARDS

Will it Burn? ( ) YES (X) NO

( ) Explosive: No

(X) Health: Yes - May be fatal if inhaled or swallowed.

(X) Corrosive: Yes - Causes severe eye and skin burns.

( ) Combustible: No

( ) Flammable: No, but may cause ignition of combustible materials (wood, paper, oil, etc.) on contact.

PERSONAL PROTECTIVE EQUIPMENT

For large spills, positive pressure SCBA and Level A chemical protective clothing due to the highly corrosive nature of the chemical and the presence of toxic fumes.

For small spills, chemical-resistant splash suits and gloves, eye protection and SCBA should be used as a minimum. Respiratory protection not needed when less than PEL.

RECOMMENDED EXTINGUISHING AGENT

( ) Water ( ) Foam (X) Dry Chemical (X) CO_2

Response: Stay upwind, out of low areas, and ventilate closed spaces before entering.
Small Fires: Dry chemical or CO_2
Large Fires: Do not apply water directly to chemical. Flood fire area with water from a distance.

EXPOSURE LIMITS

8 Hr. Permissible Exposure Limit (TWA): 0.25 ppm (1 mg/m^3)
15 Min. Short-Term Exposure Limit (STEL): 0.74 ppm (3 mg/m^3)
Momentary Ceiling Limit (C): None

Monitoring Methods: Drager Tube (Sulfuric Acid 1/A)

CHEMICAL/THERMAL PROPERTIES

Boiling Point (BP): 626(F) 330(C)
Melting Point (MP): 50 (F) 10 (C)
Specific Gravity: 1.84
Vapor Density: N/A
Gas Expansion Ratio: N/A

Ignition Temperature: N/A(F) N/A(C)
Flashpoint (FP): N/A (F) N/A (C)

Flammable/Explosive Limits (% by volume): Lower N/A Upper N/A

Water Soluble: (X) Yes ( ) No

DECOMPOSITION PRODUCTS

At Room Temperature: N/A

From Heat: Oxides of Sulfur in presence of metals

From Water: Heat

INCOMPATIBILITIES/REACTIVITIES

Reacts violently with alkalies (hydrazine, sodium hydroxide and sodium hypochlorite) to produce heat. Reacts with water to form vapor cloud. Reacts with metals, forming hydrogen gas.

TRANSPORTATION

Methods: Tank Truck
Fork Lift (Carboys)

STORAGE QUANTITIES

Container (type/volume): 10,000 gallon tank truck, 55 gallon drums, 15 gallon carboys, 1 gallon glass bottles
Max. Quantity Onsite: 10,000 gallon
Avg. Quantity Onsite: 10,000 gallon

Reportable Quantities: ≥65 gallon

STORAGE/USE AREAS

General Locations: Turbine Building El. 591, Acid Vault Room (pumps/piping), Warehouse No. 3 Chemical Storage Room, Chemistry Labs/Regeneration Cabinet in Make-Up Plant area Bulk Storage Tank

Reference HAZMAT Pre-Plan No.:

ON-SITE EXPOSURE CONCERNS

a. Large spills will create a vapor cloud in immediate area.
b. Turbine Building El. 591 personnel from tank truck spill because TB ventilation intakes are adjacent to the potential area.
c. Warehouse No. 3 Chemical Storage Room split into acid/base storage areas.

OFF-SITE EXPOSURE CONCERNS

Potential exists from tank truck spill to storm drain system on access road or at refill location west side of the Unit 1 Turbine Building. Primary off-site exposure includes lake shore and people in nearby areas from toxic/corrosive fumes.

FIRST AID TREATMENT

Inhalation: Move victim to fresh air immediately and call emergency medical care.

Eyes: Immediately flush with warm running water for at least 15 minutes. Call emergency medical care.

Skin: Immediately flush with warm running water for at least 15 minutes.

Ingestion: Move victim to fresh air and call emergency medical care. Do not induce vomiting. Drink as much water as possible.

DECONTAMINATION METHODS

Decon with mild detergent-water solution. Rinse with water.

CLEANUP AND DISPOSAL

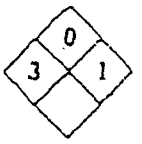
Small Spill: Methods: Apply acid neutralizer to spill.

Equipment: ANSUL Spill-X-A Acid Neutralizer

Large Spill: Methods: Water spray can be used to reduce vapors. Do not put water directly on spill.
1. Acid Neutralizer
2. Use VAC System
3. Flush to TRS-Neutralizer

Equipment: Dike materials/Vacuum System/Neutralizer

HAZARDOUS MATERIAL DATA SHEET



NUMBER: 02

Hazardous Substance: Sodium Hydroxide - 50% and 35%

Synonyms: NaOH, Caustic Soda, Soda Lye, Lye, Sodium Hydrate

Emergency Response Required: (X) YES* ( ) NO

* For any spills greater than 10 gallons.

HAZARDS

Will it Burn? ( ) YES (X) NO

( ) Explosive:

(X) Health: Harmful, if swallowed or inhaled.

(X) Corrosive: Causes severe burns to skin and eyes.

( ) Combustible:

( ) Flammable: No, but may ignite combustibles (wood, paper, oil, etc.)

PERSONAL PROTECTIVE EQUIPMENT

For large spills, positive pressure SCBA and Level A chemical protective clothing should be worn due to the highly corrosive nature of the chemical and the presence of toxic fumes.

For small spills, chemical-resistant splash suits and gloves, eye protection and SCBA should be used as a minimum.

RECOMMENDED EXTINGUISHING AGENT

(X) Water (X) Foam (X) Dry Chemical (X) CO_2

Response: Stay upwind and keep out of low areas.
Small Fires: Dry chemical, CO_2, water spray or regular foam.
Large Fires: Water spray, fog or regular foam.

EXPOSURE LIMITS

8 Hr. Permissible Exposure Limit (TWA): None
15 Min. Short-Term Exposure Limit (STEL): None
Momentary Ceiling Limit (C): (2 mg/m^3)

Monitoring Methods:

CHEMICAL/THERMAL PROPERTIES

Boiling Point (BP): 2534(F) 1390(C)
Melting Point (MP): 604(F) 318(C)
Specific Gravity: 2.13
Vapor Density: N/A
Gas Expansion Ratio: N/A

Ignition Temperature: N/A(F) N/A(C)
Flashpoint (FP): N/A (F) N/A (C)

Flammable/Explosive Limits (% by volume): Lower N/A Upper N/A

Water Soluble: (X) Yes ( ) No

DECOMPOSITION PRODUCTS

At Room Temperature: None

From Heat: None

From Water: Heat

INCOMPATIBILITIES/REACTIVITIES

Reacts with moisture to release heat. Reacts with metals to release hydrogen. Also incompatible with flammable liquids, acids, sodium hypochlorite.

TRANSPORTATION

Methods: Tank Truck
Fork Lift

STORAGE QUANTITIES

Container (type/volume): 10,000 gallon tank truck; 10,000 gallon tank; two 4,400 gallon tanks, 55 gallon drums, 1 gallon bottles
Max. Quantity Onsite: 20,000 gallons

Avg. Quantity Onsite: est. 20,000 gallons
Reportable Quantities: ≥56 gallons

STORAGE/USE AREAS

General Locations: 1) Turbine Building El. 591, Regeneration Cabinet in Make-Up Area, 2) Auxiliary Building El. 587, Spray Additive Tanks, 3) Acid/Caustic Vault, 4) Warehouse #3 Chemical Room, 5) Chemistry Lab

Reference HAZMAT Pre-Plan No.:

ON-SITE EXPOSURE CONCERNS

a. Turbine Building El. 591 personnel from tank truck spill because TB ventilation intakes are adjacent to the potential area.

b. Chemical Storage Room (Acid/Caustic Split) Warehouse #3.

OFF-SITE EXPOSURE CONCERNS

Potential exists from tank truck spill to storm drain system on access road or at refill location west side of the Unit 1 Turbine Building. Primary off-site exposure includes lake shore and people in nearby areas.

FIRST AID TREATMENT

Inhalation: Move victim to fresh air and call emergency medical care.

Eyes: Immediately flush with running water for at least 15 minutes.

Skin: Immediately wash with soap and water.

Ingestion: Move victim to fresh air and call emergency medical care.

DECONTAMINATION METHODS

Decon with mild detergent-water solution. Flush/rinse with large amounts of water.

CLEANUP AND DISPOSAL

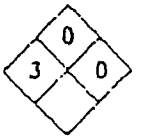
Small Spill: Methods: Apply caustic neutralizer or sand to spill.

Equipment: ANSUL Spill-X-C Caustic Neutralizer

Large Spill: Methods:
1. Spill Neutralizer
2. Vacuum recovery system
3. Flush to floor drain and neutralize TRS/hold-up tank

Equipment: Dike materials/Vacuum System/Neutralizer

HAZARDOUS MATERIAL DATA SHEET



NUMBER: 03

Hazardous Substance: Liquid Nitrogen

Synonyms: N_2, NXX, LN

Emergency Response Required: (X) YES* ( ) NO

* For tank truck rupture.

HAZARDS

Will it Burn? ( ) YES (X) NO

(X) Explosive: Yes - Container may explode in heat of fire, due to expansion of gas.

(X) Health: Yes - Vapors may cause dizziness or suffocation.

(X) Corrosive: Yes - Contact with vapors may cause frostbite and severe skin burns.

( ) Combustible: No

( ) Flammable: No

PERSONAL PROTECTIVE EQUIPMENT

SCBA

RECOMMENDED EXTINGUISHING AGENT

(X) Water ( ) Foam (*) Dry Chemical ( ) CO_2

Response: Stay upwind and out of low areas. Ventilate closed spaces before entering. Apply cooling water to sides of container that are exposed to flames until well after fire is out.

EXPOSURE LIMITS

8 Hr. Permissible Exposure Limit (TWA): None
15 Min. Short-Term Exposure Limit (STEL): None
Momentary Ceiling Limit (C): None

Monitoring Methods: Monitor for oxygen concentration in affected areas.

CHEMICAL/THERMAL PROPERTIES

Boiling Point (BP): -320(F) -196(C)
Melting Point (MP): -346(F) -210(C)
Specific Gravity: 0.81
Vapor Density: 0.967
Gas Expansion Ratio: N/A

Ignition Temperature: N/A(F) N/A(C)
Flashpoint (FP): N/A (F) N/A (C)

Flammable/Explosive Limits (% by volume): Lower N/A Upper N/A

Water Soluble: ( ) Yes (X) No

DECOMPOSITION PRODUCTS

At Room Temperature: _____

From Heat: NO and NH_3 on sparking with O_2 and H_2

From Water: _____

INCOMPATIBILITIES/REACTIVITIES

May react vigorously with lithium, titanium, neodymium, zerconium and other reactive metals.

TRANSPORTATION

Methods: Tank Truck
Cylinder Truck

STORAGE QUANTITIES

Container (type/volume):

Max. Quantity Onsite:

Avg. Quantity Onsite:

Reportable Quantities: N/A

STORAGE/USE AREAS

General Locations: North of U-1 Containment (Truck Trailer) Compressed Gas Storage Area (Cylinder) Chemistry Hot Lab

Reference HAZMAT Pre-Plan No.:

ON-SITE EXPOSURE CONCERNS

1. May displace oxygen in release area and other areas where wind and ventilation transport the gas.

2. Materials contacted by liquid nitrogen will become extremely cold creating a contact hazard.

OFF-SITE EXPOSURE CONCERNS

N/A

FIRST AID TREATMENT

Inhalation: Move victim to fresh air and call emergency medical care.

Eyes: Immediately flush eyes thoroughly with water for at least 15 minutes.

Skin: In case of frostbite, thaw frosted parts with water.

Ingestion: N/A

DECONTAMINATION METHODS

CLEANUP AND DISPOSAL

Small Spill: Methods: Stop leak and ventilate.

Equipment:

Large Spill: Methods: Stop leak and ventilate.

Equipment:

HAZARDOUS MATERIAL DATA SHEET

NUMBER: 04

Hazardous Substance: Hydrazine Hydrate (35%)

Synonyms:

Emergency Response Required: (X) YES ( ) NO

HAZARDS

Will it Burn? (X) YES ( ) NO - Does not ignite readily

( ) Explosive:

(X) Health: Poisonous if inhaled or swallowed. Suspected human carcinogen.

(X) Corrosive: Causes severe eye and skin burns.

(X) Combustible:

( ) Flammable:

PERSONAL PROTECTIVE EQUIPMENT

For large spills, positive pressure self-contained breathing apparatus (SCBA) and Level A protective clothing which is specifically recommended by the shipper or manufacturer should be worn.

For small spills, Level C protective clothing with SCBA should be used as a minimum.

RECOMMENDED EXTINGUISHING AGENT

(X) Water (X) Foam (X) Dry Chemical (X) CO_2

Response: Stay upwind.
Small Fires: Dry chemical, CO_2, water spray, or alcohol-resistant foam.
Large Fires: Water spray, fog or alcohol-resistant foam to cool, disperse vapors and dilute.

EXPOSURE LIMITS

8 Hr. Permissible Exposure Limit (TWA): 0.1 ppm (0.1 mg/m^3)
15 Min. Short-Term Exposure Limit (STEL): None
Momentary Ceiling Limit (C): None

Monitoring Methods: Drager Tube (Hydrazine 0.2/a)

CHEMICAL/THERMAL PROPERTIES

Boiling Point (BP): 234(F) 113(C)
Melting Point (MP): 34 (F) 2 (C)
Specific Gravity: 1.00
Vapor Density: 1.1
Gas Expansion Ratio: _____

Ignition Temperature: 518(F) 270(C)
Flashpoint (FP): 126 (F) 52 (C)

Flammable/Explosive Limits (% by volume): Lower 2.9 Upper 98

Water Soluble: (X) Yes ( ) No

DECOMPOSITION PRODUCTS

At Room Temperature: Hydrogen gas

From Heat: H2 and ammonia

From Water: N/A

INCOMPATIBILITIES/REACTIVITIES

Oxidizers, hydrogen peroxide, nitric acid, metallic oxides, acids.

TRANSPORTATION

Methods: Fork lift carrying 55 gallon drums

STORAGE QUANTITIES

Container (type/volume): 55 gallon drums
Max. Quantity Onsite: 1,000 - 10,000 gallons
Avg. Quantity Onsite: Est. 1,000 gallons
Reportable Quantities: ≥1 pint

STORAGE/USE AREAS

General Locations: Turbine Building El. 591 Unit 1/2 Condensate Chemical Feed areas; Turbine Building El. 587 Unit 1/2 Feedwater Chemical Feed areas

Reference HAZMAT Pre-Plan No.:

ON-SITE EXPOSURE CONCERNS

1. Vapors will be carried throughout area by ventilation system. Strong ammonia odor.

OFF-SITE EXPOSURE CONCERNS

Transport of hydrazine drums from Warehouse to Turbine Building.

FIRST AID TREATMENT

Inhalation: Move victim to fresh air and call emergency medical care.

Eyes: Immediately flush with running water for at least 15 minutes.

Skin: Immediately flush with running water for at least 15 minutes.

Ingestion: Move victim to fresh air and call emergency medical care.

DECONTAMINATION METHODS

Flush/rinse with large amounts of water.

CLEANUP AND DISPOSAL

Small Spill: Methods: Remove ignition sources. Apply sand to spill.

Equipment: Sand

Large Spill: Methods: Remove ignition sources. Isolate leak if it can be done without risk. Dike spill area immediately in all directions. Clean up with vacuum to 55 gallon drum. May be flushed with water to the TRS.

Equipment: Dike materials, vacuum and 55 gallon drums

HAZARDOUS MATERIAL DATA SHEET

NUMBER: 05

Hazardous Substance: Sodium Hypochlorite (12% Solution)

Synonyms: NaOCl

Emergency Response Required: (X) YES ( ) NO

HAZARDS

Will it Burn? ( ) YES (X) NO

( ) Explosive: No - But anhydrous salt is highly explosive.

(X) Health: Yes - If inhaled or ingested, may be harmful.

(X) Corrosive: Yes - Contact causes burns to skin and eyes.

( ) Combustible:

( ) Flammable: No, but flammable gas may be produced on contact with some metals when moist.

PERSONAL PROTECTIVE EQUIPMENT

For large spills, positive pressure SCBA and Level B chemical protective clothing.

For small spills, chemical-resistant splash suits and gloves, eye protection and SCBA should be used as a minimum.

RECOMMENDED EXTINGUISHING AGENT

( ) Water (X) Foam (X) Dry Chemical (X) CO_2

Response: Stay upwind and out of low areas.
Small Fires: Dry chemical, CO_2, water spray or regular foam.
Large Fires: Water spray, fog or regular foam. Apply cooling water to sides of containers that are exposed to flames until well after fire is out.

EXPOSURE LIMITS

8 Hr. Permissible Exposure Limit (TWA): None
15 Min. Short-Term Exposure Limit (STEL): None
Momentary Ceiling Limit (C): 0.5 ppm (1.5 mg/m^3)

Monitoring Methods: Drager Tube (Chlorine)

CHEMICAL/THERMAL PROPERTIES

Boiling Point (BP): 2534 (F) 1390 (C)
Melting Point (MP): 604 (F) 318 (C)
Specific Gravity: 2.13
Vapor Density: _____
Gas Expansion Ratio: N/A

Ignition Temperature: ____ (F) ____ (C)
Flashpoint (FP): N/A (F) N/A (C)

Flammable/Explosive Limits (% by volume): Lower N/A Upper N/A

Water Soluble: (X) Yes ( ) No

DECOMPOSITION PRODUCTS

At Room Temperature: _____

From Heat: Cl_2 gas; O_2 gas

From Water: May generate enough heat to ignite combustibles.

INCOMPATIBILITIES/REACTIVITIES

Reacts with some metals such as aluminum, tin and zinc to release hydrogen. Reacts with acids and flammable liquids.

TRANSPORTATION

Methods: Tank Truck
Fork lift movement of 55 gallon drums

STORAGE QUANTITIES

Container (type/volume): 4,200 gallon tank, 55 gallon drums
Max. Quantity Onsite: 5,000 gallons
Avg. Quantity Onsite: 4,200 gallons

Reportable Quantities: ≥5 gallons

STORAGE/USE AREAS

General Locations: Turbine Building El. 591 Unit 2 west side (tank location); piping along Turbine Building El. 591 Make-Up Water Area; Warehouse #3 Chemical Storage Room.

Reference HAZMAT Pre-Plan No.:

ON-SITE EXPOSURE CONCERNS

a. A spill will release chlorine vapor at low concentrations. Extended exposure without respiratory protection may be harmful.

OFF-SITE EXPOSURE CONCERNS

Potential exists from tank truck spill on access road or at refill location west side of the Unit 1 Turbine Building. Primary off-site exposure includes lake shore and people in nearby areas from toxic/corrosive fumes.

FIRST AID TREATMENT

Inhalation: Move victim to fresh air and call emergency medical care.

Eyes: Immediately flush with running water for at least 15 minutes.

Skin: Immediately flush with running water for at least 15 minutes.

Ingestion: Call emergency medical care. Give large quantities of water or milk to drink. Induce vomiting.

DECONTAMINATION METHODS

Flush/rinse with large amounts of water.

CLEANUP AND DISPOSAL

Small Spill: Methods: Apply Chlorine Control Powder. Decontaminate by flushing with water.

Equipment: Chlorine Control Powder

Large Spill: Methods: Dike immediately around area. Clean up spill with vacuum into 55 gallon drums. Decontaminate by flushing with water.

Equipment: Dike material, vacuums, 55 gallon drums.

HAZARDOUS MATERIAL DATA SHEET

NUMBER: 06

Hazardous Substance: Ammonia Hydroxide (28-30%)

Synonyms: H_4N-HO, Ammonium Hydroxide, Aqua Ammonia

Emergency Response Required: (X) YES* ( ) NO

*For any spills greater than 10 gallons.

HAZARDS

Will it Burn? (X) YES ( ) NO

( ) Explosive: No

(X) Health: Yes - May be harmful if ingested or inhaled.

(X) Corrosive: Contact causes burns to skin and eyes.

( ) Combustible:

( ) Flammable:

PERSONAL PROTECTIVE EQUIPMENT

For large spills, positive pressure SCBA and Level B chemical protective clothing.

For small spills, chemical-resistant splash suits and gloves, eye protection and SCBA should be used as a minimum.

RECOMMENDED EXTINGUISHING AGENT

(X) Water (X) Foam (X) Dry Chemical (X) CO_2

Response: Stay upwind and out of low areas. Use any means suitable for extinguishing surrounding fire. Use water spray to blanket fire and cool fire-exposed containers.

EXPOSURE LIMITS

8 Hr. Permissible Exposure Limit (TWA): 25 ppm (18 mg/m^3) - for Ammonia
15 Min. Short-Term Exposure Limit (STEL): 35 ppm (27 mg/m^3) - for Ammonia
Momentary Ceiling Limit (C): None

Monitoring Methods: Drager Tube

CHEMICAL/THERMAL PROPERTIES (For Ammonia)

Boiling Point (BP): -28(F) -33(C)
Melting Point (MP): -107(F) -77(C)
Specific Gravity: 0.9
Vapor Density: 1.2
Gas Expansion Ratio: N/A

Ignition Temperature: 1204(F) 651(C)
Flashpoint (FP): _____(F)_____(C)

Flammable/Explosive Limits (% by volume): Lower_____ Upper 27

Water Soluble: (X) Yes ( ) No

DECOMPOSITION PRODUCTS

At Room Temperature: _____

From Heat: Toxic fumes → NH_3 and NO_x

From Water: _____

INCOMPATIBILITIES/REACTIVITIES

Incompatible with acids and halogens.

TRANSPORTATION

Methods: Fork lift carrying 55 gallon drums.

STORAGE QUANTITIES

Container (type/volume): 55 gallon drums
Max. Quantity Onsite: Est. 500 gallons
Avg. Quantity Onsite: Est. 400 gallons
Reportable Quantities: ≥130 gallons

STORAGE/USE AREAS

General Locations: Turbine Building El. 591 Condensate, Feedwater Chemical Feed areas (Unit 1 and 2) and Warehouse #3 Chemical Storage Room.

Reference HAZMAT Pre-Plan No.:

ON-SITE EXPOSURE CONCERNS

a. Ventilation system will move vapors throughout the plant. A strong odor will be detected at low concentrations.

OFF-SITE EXPOSURE CONCERNS

Fork lift accident on access roadway from Warehouse to Turbine Building.

FIRST AID TREATMENT

Inhalation: Move victim to fresh air and call emergency medical care.

Eyes: Immediately flush with running water for at least 15 minutes. Call emergency medical care.

Skin: Immediately flush with running water for at least 15 minutes. Call emergency medical care.

Ingestion: Do not induce vomiting. Give several glasses of water. Call emergency medical care.

DECONTAMINATION METHODS

Flush/rinse with large amounts of water.

CLEANUP AND DISPOSAL

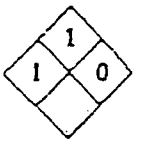
Small Spill: Methods: Apply caustic neutralizer or sand to spill.

Equipment: ANSUL Spill-X-C Caustic Neutralizer

Large Spill: Methods: Isolate leak. Dike spill area immediately in all directions. Use vacuums to clean up spill. May be flushed down the drain to TRS in small quantities.

Equipment: Vacuum, 55 gallon drums, dike materials

HAZARDOUS MATERIAL DATA SHEET



NUMBER: 07

Hazardous Substance: Clamtrol
(Ingredients: ethylene glycol, alkyl dimethyl benzyl ammonium chloride, isopropyl alcohol and ethanol)
See other HAZMAT Data Sheets for information on the specific ingredients.

Synonyms:

Emergency Response Required: (X) YES* ( ) NO

*For tank truck rupture.

HAZARDS

Will it Burn? (X) YES ( ) NO

( ) Explosive:

(X) Health: Yes - Inhalation of vapors may cause eye, nose, throat and lung irritation.

(X) Corrosive: Yes - Corrosive to skin and eyes. Potential skin sensitizer. Contact may cause severe burns to skin and eyes.

(X) Combustible: Yes

( ) Flammable:

PERSONAL PROTECTIVE EQUIPMENT

For small spills, chemical-resistant splash suits, gloves and eye protection should be worn. For large spills, SCBA and chemical splash suit should be worn.

RECOMMENDED EXTINGUISHING AGENT*

(X) Water (X) Foam (X) Dry Chemical (X) CO_2

Response: Stay upwind and out of low areas.
Small Fires: Dry chemical, CO_2, foam or water spray
Large Fires: Water spray or foam

EXPOSURE LIMITS - Based on most restrictive limits of ingredients

8 Hr. Permissible Exposure Limit (TWA): 0.05 ppm (0.31 mg/m³-Skin)
15 Min. Short-Term Exposure Limit (STEL): None
Momentary Ceiling Limit (C): 50 ppm (125 mg/m³-Vapor and Mist)

Monitoring Methods: Drager Tube for Alcohols

CHEMICAL/THERMAL PROPERTIES

Boiling Point (BP):____(F)____(C)
Melting Point (MP): <-30(F) <-34(C)
Specific Gravity: 1.022
Vapor Density: >1
Gas Expansion Ratio:_____

Ignition Temperature:____(F)____(C)
Flashpoint (FP): 116 (F) 47 (C)

Flammable/Explosive Limits (% by volume): Lower_____ Upper_____

Water Soluble: (X) Yes ( ) No

DECOMPOSITION PRODUCTS

At Room Temperature:_____

From Heat: Elemental oxides

From Water:_____

INCOMPATIBILITIES/REACTIVITIES

May react with strong oxidizers.

TRANSPORTATION

Methods: Tank Trucks
Barge

STORAGE QUANTITIES

Container (type/volume): 55 gallon drums, 4,000 gallon tank trucks, 400-600 gallon semi-bulks on barge
Max. Quantity Onsite: 12,000 gallons
Avg. Quantity Onsite: Est. 550 gallons
Reportable Quantities: N/A

STORAGE/USE AREAS

General Locations: Warehouse #3, Circulating Water System, Service Water Systems, Fire Protection Systems, tankers park on west side of Screen House and barge intake structure.

Reference HAZMAT Pre-Plan No.:

ON-SITE EXPOSURE CONCERNS

See general use locations.

OFF-SITE EXPOSURE CONCERNS

1. Tanker rupture to storm drain system.
2. Semi-bulk container rupture on barge

FIRST AID TREATMENT

Inhalation: Move victim to fresh air. Call emergency medical care.

Eyes: Immediately flush with running water for at least 15 minutes. Call emergency medical care.

Skin: Immediately wash with soap and water for at least 15 minutes. Call emergency medical care.

Ingestion: Do no induce vomiting. Give victim 3-4 glasses of water. Call emergency medical care immediately.

DECONTAMINATION METHODS

Flush/rinse with water.

CLEANUP AND DISPOSAL

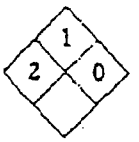
Small Spill: Methods: Remove ignition sources. Apply adsorbent or sand to spill.

Equipment: ANSUL Spill-X-S adsorbent

Large Spill: Methods: Dike area around spill. Apply adsorbent. Use vacuum to clean up spill.

Equipment: Vacuum, 55 gallon drums, dike material

HAZARDOUS MATERIAL DATA SHEET



NUMBER: 08

Hazardous Substance: Fyrquel
(O- and M-Compounds are liquids; P-Compound is a solid)

Synonyms: $C_{21}H_{21}O_4P$, EHC, Tritolyl or Tricresyl Phosphate, Trixylenyl/Triaryl

Emergency Response Required: (X) YES* ( ) NO

*For EHC System Rupture

HAZARDS

Will it Burn? ( ) YES (X) NO

( ) Explosive:

(X) Health: Yes - May be poisonous if inhaled or ingested.

(X) Corrosive: Yes - Contact with skin or eyes may produce irritation.

(X) Combustible: May burn, but does not readily ignite.

( ) Flammable:

PERSONAL PROTECTIVE EQUIPMENT

Small Spills: Chemical-resistant splash suits and gloves, eye protection.
Large Spills: Level C with SCBA is recommended.

RECOMMENDED EXTINGUISHING AGENT

( ) Water (X) Foam (X) Dry Chemical ( ) CO_2

Response: Keep fire-exposed containers cool with a water spray to prevent rupture due to excessive heat.
Small Fires: Dry chemical, water spray or regular foam.
Large Fires: Water spray, fog or regular foam.

EXPOSURE LIMITS

8 Hr. Permissible Exposure Limit (TWA): None
15 Min. Short-Term Exposure Limit (STEL): None
Momentary Ceiling Limit (C): None

Monitoring Methods:

CHEMICAL/THERMAL PROPERTIES

Boiling Point (BP): * (F) * (C)
Melting Point (MP): * (F) * (C)
Specific Gravity: 1.15
Vapor Density: _____
Gas Expansion Ratio: _____

Ignition Temperature: 665(F) 352(C)
Flashpoint (FP): 455 (F) 235 (C)

Flammable/Explosive Limits (% by volume): Lower _____ Upper _____

Water Soluble: ( ) Yes (X) No

		MP	BP
*	O-Compound-Liquid	-	410°C
	M-Compound-Liquid	-	273°C
	P-Compound-Solid	77°C	-

DECOMPOSITION PRODUCTS

At Room Temperature: _____

From Heat: Toxic fumes of Pox; toluene

From Water: _____

INCOMPATIBILITIES/REACTIVITIES

TRANSPORTATION

Methods: Fork lift with 55 gallon drums

STORAGE QUANTITIES

Container (type/volume): 55 gallon drums, 2500 gallon tank
Max. Quantity Onsite: 1040-10400 gallons
Avg. Quantity Onsite: 5050 gallons

Reportable Quantities: N/A

STORAGE/USE AREAS

General Locations: Unit 1 (TB El. 591) and 2 (TB El. 609) EHC Systems, Unit 2 (TB El. 609) Feed Pump Turbine EHC, Service Building Miscellaneous Oil Storage Room and Oil Barn

Reference HAZMAT Pre-Plan No.:

ON-SITE EXPOSURE CONCERNS

Primarily Unit 1 Turbine Building El. 591 and 609 (east side) and areas adjacent to Service Building Miscellaneous Oil Storage Room.

a. Spills on 609' Turbine Building may drain to 591' and contaminate plant personnel.
b. EHC may be treated the same as lube oil by plant personnel without the proper PPE.
c. Fyrquel is heavier than water and will sink to the bottom of the TRS and absorption pond.

OFF-SITE EXPOSURE CONCERNS

Oil Barn and surrounding area (east side of plant, outside the protected area) if involved in a fire.

FIRST AID TREATMENT

Inhalation: Move victim to fresh air. Call emergency medical care.

Eyes: Immediately flush with running water for at least 15 minutes.

Skin: Immediately flush with running water for at least 15 minutes.

Ingestion: Give several glasses of water and induce vomiting. Call emergency medical care.

DECONTAMINATION METHODS

Decon with mild detergent-water solution. Flush/rinse with water.

CLEANUP AND DISPOSAL

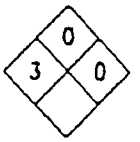
Small Spill: Methods: Apply sand.

Equipment:

Large Spill: Methods: Dike surrounding area. Apply sand. Use vacuums to clean up spill.

Equipment: Vacuums, 55 gallon drums, dike materials

HAZARDOUS MATERIAL DATA SHEET



NUMBER: 09

Hazardous Substance: Conc. Hydrochloric Acid

Synonyms: HCL, Muriatic Acid

Emergency Response Required: (X) YES* ( ) NO

*For spills greater than 10 gallons.

HAZARDS

Will it Burn? ( ) YES (X) NO

(X) Explosive: Yes - Contact with metals produces hydrogen which may form explosive mixtures with air.

(X) Health: Yes - If inhaled may be harmful. Fire may produce irritating and poisonous gases.

(X) Corrosive: Yes - Contact causes burns to skin and eyes.

( ) Combustible:

(X) Flammable: No, but may ignite combustibles (wood, paper, oil, etc.)

PERSONAL PROTECTIVE EQUIPMENT

For large spills, positive pressure SCBA and Level A chemical protective clothing.

For small spills, chemical-resistant splash suits and gloves, eye protection and SCBA should be used as a minimum.

RECOMMENDED EXTINGUISHING AGENT

( ) Water (X) Foam (X) Dry Chemical (X) CO_2

Response: Stay upwind and out of low areas.
Small Fires: Dry chemical, CO_2, water spray or regular foam.
Large Fires: Water spray, fog or regular foam. Apply cooling water to sides of containers that are exposed to flames until well after fire is out.

EXPOSURE LIMITS

8 Hr. Permissible Exposure Limit (TWA): None
15 Min. Short-Term Exposure Limit (STEL): None
Momentary Ceiling Limit (C): 5 ppm (7.0 mg/m^3)

Monitoring Methods: Drager Tube

CHEMICAL/THERMAL PROPERTIES

Boiling Point (BP): 230(F) 110(C)
Melting Point (MP): -101(F) -74(C)
Specific Gravity: 1.19
Vapor Density: 1.24
Gas Expansion Ratio: N/A

Ignition Temperature: N/A(F) N/A(C)
Flashpoint (FP): N/A (F) N/A (C)

Flammable/Explosive Limits (% by volume): Lower N/A Upper N/A

Water Soluble: (X) Yes ( ) No

DECOMPOSITION PRODUCTS

At Room Temperature: Contact with metal releases H_2 gas

From Heat:

From Water: Heat, Hcl fumes

INCOMPATIBILITIES/REACTIVITIES

Contact with metals produces Hydrogen which may form explosive mixtures with air. Also reacts with bases, alkalies and amines.

TRANSPORTATION

Methods:

STORAGE QUANTITIES

Container (type/volume): 1 gallon, quart and pint glass containers, 55 gallon drums
Max. Quantity Onsite: Est. 10 gallons
Avg. Quantity Onsite: Est. 5-10 gallons
Reportable Quantities: ≥500 gallons

STORAGE/USE AREAS

General Locations: Plant and Training Center Chemistry Labs

Reference HAZMAT Pre-Plan No.:

ON-SITE EXPOSURE CONCERNS

Chemistry Lab areas.

OFF-SITE EXPOSURE CONCERNS

N/A

FIRST AID TREATMENT

Inhalation: Move victim to fresh air and call emergency medical care.

Eyes: Immediately flush with running water for at least 15 minutes.

Skin: Immediately flush with running water for at least 15 minutes.

Ingestion: Call emergency medical care. Do not induce vomiting. Give milk or water if conscious.

DECONTAMINATION METHODS

Decon with mild detergent-water solution. Flush/rinse with large amounts of water.

CLEANUP AND DISPOSAL

Small Spill: Methods: Apply acid neutralizer to spill.

Equipment: ANSUL Spill-X-A Acid Neutralizer

Large Spill: Methods: Isolate (dike) spill area immediately in all directions. Apply acid neutralizer. Use vacuum system. Water spray can be used to reduce vapors. Do not put water directly on spill.

Equipment: Neutralizer, vacuum system

HAZARDOUS MATERIAL DATA SHEET

NUMBER: 10

Hazardous Substance: Hazardous Waste

Synonyms: Solvents, Mercury, etc.

Emergency Response Required: (X) YES ( ) NO

HAZARDS

Will it Burn? (X) YES ( ) NO

(X) Explosive: Yes - Containers may explode from heat.

(X) Health: Yes - Fire may produce irritating or poisonous gases.

(X) Corrosive: Yes - Contact may cause burns to skin and eyes.

(X) Combustible: Yes - Some of these materials may burn, but none ignites easily.

(X) Flammable: Yes

PERSONAL PROTECTIVE EQUIPMENT

Due to the unknown substances in the 55 gallon drums of mixed hazardous wastes, SCBA and Level A protective equipment is recommended.

RECOMMENDED EXTINGUISHING AGENT

(X) Water (X) Foam (X) Dry Chemical (X) CO_2

Response: Small Fires: Dry chemical, CO_2, water spray or regular foam.
Large Fires: Water spray, fog or regular foam.

EXPOSURE LIMITS

8 Hr. Permissible Exposure Limit (PEL):
15 Min. Short-Term Exposure Limit (STEL):
Momentary Ceiling Limit (C):

Monitoring Methods: Drager Tube

CHEMICAL/THERMAL PROPERTIES

Boiling Point (BP):____(F)____(C)
Melting Point (MP):____(F)____(C)
Specific Gravity:_____
Vapor Density:_____
Gas Expansion Ratio:_____

Ignition Temperature:____(F)____(C)
Flashpoint (FP):_____(F)_____(C)

Flammable/Explosive Limits (% by volume): Lower_____ Upper_____

Water Soluble: ( ) Yes ( ) No

DECOMPOSITION PRODUCTS

At Room Temperature:_____

From Heat:_____

From Water:_____

INCOMPATIBILITIES/REACTIVITIES

TRANSPORTATION

Methods:

STORAGE QUANTITIES

Container (type/volume): 55 gallon drums
Max. Quantity Onsite: Est. 7,000 gallons
Avg. Quantity Onsite: Est. 5,500 gallons
Reportable Quantities: N/A

STORAGE/USE AREAS

General Locations: Various buildings located on the east side of the plant, outside the protected area. Satellite Waste Accumulation Areas.

Reference HAZMAT Pre-Plan No.:

ON-SITE EXPOSURE CONCERNS

Minimal

OFF-SITE EXPOSURE CONCERNS

East side of plant, outside the protected area.

FIRST AID TREATMENT

Inhalation: N/A

Eyes: Flush with running water for at least 15 minutes.

Skin: Wash with soap and water.

Ingestion: Call emergency medical care.

DECONTAMINATION METHODS

Decon with mild detergent-water solution. Flush/rinse with large amounts of water.

CLEANUP AND DISPOSAL

Small Spill: Methods: Apply solvent adsorbent. Follow vendor instructions when using adsorbent.

Equipment: ANSUL Spill-X-S

Large Spill: Methods: Dike area. Use vacuums to clean up spill.

Equipment: Vacuums, 55 gallon drums, dike material

HAZMAT DATA SHEET REFERENCES

1. National Fire Protection Association, Fire Protection Guide to Hazardous Materials, Tenth Edition, NFPA, Quincy, MA, 1991.

2. U.S. Department of Transportation, 1990 Emergency Response Guidebook, U.S. Government Printing Office, Washington, D.C., 1990.

3. U.S. Department of Health and Human Services, National Institute for Occupational Safety and Health, Pocket Guide to Chemical Hazards, U.S. Government Printing Office, Washington, D.C., 1990.

4. Office of the Federal Register, National Archives and Records Administration, 29 CFR, Part 1910, U.S. Government Printing Office, Washington, D.C., 1991.

5. American Conference of Government Industrial Hygienists, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, Second Printing, ACGIH, Cincinnati, OH, 1991-1992.

6. Sax, Irving N., Dangerous Properties of Industrial Materials, Sixth Edition, Van Nostrand Reinhold Company, New York, 1984.

7. ANSUL Spill-X Spill Control Treatment Guide.

8. Forsberg, Krister, and Mansdorf, S.Z., Quick Selection Guide to Chemical Protection Clothing, Van Nostrand Reinhold, New York. 1989.

9. National Fire Protection Association, National Fire Codes - NFPA 49 Hazardous Chemicals Data, NFPA, Quincy, MA, 1991.

10. National Fire Protection Association, National Fire Codes - NFPA 325M Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids, NFPA, Quincy, MA, 1991.

REVIEW AND APPROVAL TRACKING FORM

Procedure Information:

Number: **PMP-6090.PCP.100** Revision: **2** Change: **0**

Title: **Spill Response - Oil, Polluting, and Hazardous Materials**

Category (Select One Only):

- ☐ Correction (Full Procedure)
- ☐ Correction (Page Substitution)
- ☐ Cancellation
- ☐ Superseded (list superseding procedures): _____
- ☒ Change (Full Procedure) with Review of Change Only
- ☐ Change (Page Substitution) with Review of Change Only
- ☐ New Procedure or Change with Full Review

Required Reviews:

Cross-Discipline Reviews:

- ☐ Chemistry
- ☐ Maintenance
- ☐ NDM
- ☒ Operations
- ☐ PA/PV
- ☒ Reg Affairs
- ☐ RP
- ☒ Training
- ☒ Work Control
- ☒ Site Protective Services
- ☒ AEP Env. Services
- ☐ _____
- ☐ None Required

Programmatic Reviews:

- ☐ ALARA
- ☒ Bus. Services Proc Grp
- ☐ Component Engineering
- ☐ Design Engineering
- ☐ Emerg Oper Proc Grp
- ☐ Environmental
- ☐ ISI/IST Coordinator
- ☐ Performance Assurance
- ☐ Reactivity Mgmt Team
- ☐ Surveillance Section
- ☐ System Engineering
- ☐ _____
- ☐ _____
- ☐ None Required

☒ Cognizant Org Review: Jon H. Harner / Jon H. Harner Date: 12/05/00

☒ Technical Review: Blair Zordell / Blair Zordell Date: 12/08/00

Concurrence:

☐ Ops Mgr Concurrence: N/A Date: / /

☒ Owner Concurrence: Douglas Noble / Douglas Noble Date: 12/08/2000

Package Check:

Updated Revision Summary attached? ☒ Yes

Safety Screening complete? SS/SE Tracking No.: _____ ☐ Yes ☒ Exempt ☐ N/A

Implementation Plan developed? (Ref. Step 3.4.16) ☒ Yes ☐ N/A

Package Complete: Eric Mallen / Eric Mallen Date: 12/11/00

Approvals:

PORC Review Required: ☒ Yes ☐ No Mtg. No.: 3832

Administrative Hold Status: ☐ Released ☐ Reissued ☒ N/A CR No.: _____

Approval Authority Review/Approval: E Pollock Date: 12/14/00

Expiration Date/Ending Activity N/A Effective Date: 12/15/00

Periodic Review:

Periodic Review conducted? (Data Sheet 5 Complete) ☒ Yes ☐ No

NDM Use Only

Office Information For Form Tracking Only – Not Part of Form

This form is derived from the information in PMP-2010.PRC.002, Procedure Correction, Change, and Review, Rev. 7, Data Sheet 1, Review and Approval Tracking Form.

REVISION SUMMARY

Number: PMP-6090.PCP.100 Revision: 2 Change: 0

Title: Spill Response - Oil, Polluting, and Hazardous Materials

Section or Step	Change/Reason For Change	Correction Criteria
Global	Change: Entire procedure re-formatted IAW PMP-2010.PRC.001. As the majority of the changes were numerous corrections due to formatting, department title, and position changes, marginal markings were not included. Reason: Station Requirement.	K
1.4	Change: Added Step 1.4 from Policy Statement in Rev. 1 Section 3.0. Reason: New formatting requirements state that this policy statement should be included in Section 1, Purpose and Scope	K
1.5	Change: Added Step 1.5 that a determination was made that the procedure is outside the scope of 10 CFR 50.59. Reason: PMP-1040.SES.001 requires that this statement be included into the "scope" of an exempted procedure.	Change
Section 2	Change: Separate definitions and abbreviations sections from Sections 2.2 and 2.3 in Rev. 1 were combined and alphabetized into new Rev. 2 Section 2. Reason: New formatting requirements.	K
Section 2	Change: Expanded the definition of the HAZMAT Team to describe its make-up. Reason: Cognizant organizational review recommendation.	R
Section 2	Change: Added definition of a "Large Quantity Generator" in regard to spills of hazardous waste. Reason: Definition supports decision in Data Sheet 2, Part 1 as to when a follow-up report is required for a hazardous waste spill.	R
Caution After Section 4.0 of Rev. 1	Change: Removed Caution and added the actions in Rev. 2 Steps 3.1.1 and 3.1.6b. Reason: New procedure writing requirements state that actions in NOTES and CAUTIONS must be incorporated into	k

	procedural steps.	
Step 3.1.1	Change: Expanded step to include actions that were in Caution after step 4.0 of Rev. 1. Reason: New procedure writing requirements state that actions in NOTES and CAUTIONS must be incorporated into procedural steps.	k
Step 3.1.2, 1st bullet	Change: Added "1911" as an additional number where the Shift Manager can be reached. Reason: Cross-discipline review from Training recommended that this number be added for emergencies.	e
Note before Step 3.1.3,	Change: Attachment 1 changed to Data Sheet 1. Deleted directions as to when to complete Data Sheet 1. Reason: New formatting requirements. Data are now recorded on data sheets, not attachments. This information was redundant as Step 3.1.3 Rev. 2 (Step 4.1.3 Rev. 1) requires the Environmental Superintendent, the Shift Manager, or designee to complete Data Sheet 1 for all reported spills.	K
Step 3.1.3	Change: Environmental Supervisor changed to Environmental Superintendent, Attachment 1 changed to Data Sheet 1, Condition Report changed to Action Request. The multiple actions within the step were bulleted. Step re-written to only require the recording of the Action Request number on Data Sheet 1. Reason: Changes made due to departmental title change, formatting requirements and advent of new eSAT system. These are corrections. A technical change is being made which alleviates the need for attaching a copy of the condition report to the Data Sheet 1. The Action Request is now easily retrievable by the AR number using today's electronic systems.	E, k, o, Change
Step 3.1.4	Change: Environmental Supervisor changed to Environmental Superintendent. Attachment 2 changed to Data Sheet 2. Step rewritten in IF/THEN format. Added requirement to notify Shift Manager if spill is deemed to be reportable to offsite agencies.	K, Change

REVISION SUMMARY

Number: PMP-6090.PCP.100 Revision: 2 Change: 0

Title: Spill Response - **Oil, Polluting, and Hazardous Materials**

	Reason: Formatting changes and position title changes are corrections. Requirement to notify the Shift Manager if spill is reportable to offsite agencies is a technical change so Shift Manager is aware that offsite agencies will be notified.	
Note before Step 3.1.5	Change: Eliminated the words Fire Brigade in the note. Reason: The HAZMAT Team is not limited to Fire Brigade members.	r
Step 3.1.5	Change: Steps 2.3.7 and 4.2 referred to in Rev. 1 were changed to Section 2 and 3.2 in Rev. 2. Statement rewritten in IF/THEN format. Bolded the key word "Emergency Response" and included title of Section 2. Reason: New procedure formatting requirements changed step numbering and required the use of IF/THEN structure. Keyed the user in on the word "Emergency Response".	k
Rev. 1 Steps 4.1.6 thru 4.1.10 re-organized into new Section 3.1.6 in Rev. 2	Change: Rev. 1 Steps 4.1.6 thru 4.1.10 reorganized into new Section 3.1.6 named Spill Clean-up. Added steps 3.1.6a. to obtain a pre-job brief and 3.1.6b. to don the appropriate personal protective equipment. Step 3.1.6e is restructured in IF/THEN format and Environmental Affairs changed to Environmental. Environmental Supervisor is changed to Environmental Superintendent in 3.1.6f. In 3.1.6g the Condition Report is changed to an Action Request. Reason: New procedure formatting requirements called for the actions contained in CAUTION after 4.0 DETAILS of Rev. 1 to be incorporated into procedural steps in Rev. 2 as steps 3.1.6a and 3.1.6b. Conversion to IF/THEN format and dept. title change in Step 3.1.6e. Position title change in 3.1.6f. The new eSAT system refers to the initiating document as an "Action Request" in 3.1.6g.	K,e,o
CAUTION & NOTE before Step 4.2 in Rev. 1 consolidated	Change: CAUTION and NOTE before Step 4.2 in Rev. 1 was consolidated into one NOTE before Step 3.2 in Rev. 2. Reason: New formatting requirements call for actions in NOTES and CAUTIONS to be placed in action steps. The	k

into one NOTE before Step 3.2 in Rev. 2.	NOTE has been made informational and the actions have been incorporated into Section 3.2.	
Step 3.2.1, 1st bullet	Change: Shift Manager (SM) and qualified personnel changed to Shift Manager or qualified personnel. Reason: The Incident Commander (IC) can be the Shift Manager or qualified plant personnel.	r
Step 3.2.3	Change: Step 2.3.7 referred to in Rev. 1 was changed to Section 2 in Rev. 2. The word Emergency Responses was capitalized. Reason: Procedure format changes resulted in changes to paragraph numbers. Capitalization keys user onto word.	k
Step 3.2.7	Change: Changed the last phrase in step from training or briefing to training and briefing. Reason: Provides more clarification that HAZMAT persons are trained and briefed.	r
Step 3.2.9	Change: Step 4.1.8 referred to in Rev. 1 was changed to 3.1.6e in Rev. 2. Reason: Procedure format changes resulted in changes to paragraph numbers.	k
Step 3.2.11	Change: Attachment 2 changed to Data Sheet 2. Statement restructured in IF/THEN format. Reason: Data are now recorded on data sheets, not attachments. Format rules call for the use of IF/THEN statements.	k
Step 3.2.14	Change: Last sentence placed in parenthesis as information. Reason: Procedure formatting rules.	k
Step 3.2.15	Change: Environmental Supervisor changed to Environmental Superintendent. Reason: Position title change.	e
Step 3.2.17	Change: Plant Protection Superintendent changed to Site Protective Services Manager.	e

REVISION SUMMARY

Number: PMP-6090.PCP.100 Revision: 2 Change: 0

Title: Spill Response - Oil, Polluting, and Hazardous Materials

	Reason: Position title change.	
Step 3.2.18	Change: Condition Report changed to Action Request Reason: Cook Plant has acquired the eSAT system. The initial document is now called an Action Request.	o
Steps 3.3 & 3.4	Change: Steps 3.3 and 3.4 of Rev. 2 correspond to steps 5.0 and 6.0 of Rev. 1. The steps have been reformatted with new numbers and bullets per new formatting requirements. Reason: New procedure formatting requirements.	k
Step 3.3.1, 1st bullet	Change: Step 4.1.1 referred to in Rev. 1 was changed to Step 3.1.1 in Rev. 2. The word "instruction" was changed to the word "procedure". Reason: New procedure formatting requirements change the paragraph numbers and nomenclature.	k
Step 3.3.2, 3rd bullet	Change: Changed the word "instruction" to "procedure". Reason: PMPs are called procedures.	m
Step 3.3.3	Change: Environmental Manager changed to Environmental Superintendent. Reason: Position title change.	e
Step 3.3.4	Change: Deleted first sentence describing make-up of HAZMAT Team. This is now defined in Section 2. Reason: Definitions belong in Section 2.	m
Step 3.3.5, 1st bullet	Change: Changed the word "instruction" to "procedure" Reason: PMPs are called procedures.	m
Step 3.3.7	Change: Plant Protection Superintendent changed to Site Protective Services Manager. Reason: Position title change.	e
Step 3.4.1	Change: Steps 4.1, 2.1.12, and 2.1.19 referred to in Rev. 1 were changed to steps 3.1, 5.2.2g, and 5.2.2j in Rev. 2. Reason: Procedure reformatting resulted in renumbering of steps.	k

REVISION SUMMARY

Number: PMP-6090.PCP.100 Revision: 2 Change: 0

Title: Spill Response - **Oil, Polluting, and Hazardous Materials**

Step 3.4.2	Change: Step 2.1.19 referred to in Rev. 1 was changed to step 5.2.2j in Rev. 2. Reason: Procedure reformatting resulted in renumbering of steps.	k
Step 3.4.3	Change: Step 2.1.6 referred to in Rev. 1 was changed to step 5.1.2 in Rev. 2. Reason: Procedure reformatting resulted in renumbering of steps.	k
Step 4	Change: "Final Conditions" step added. Reason: Step added per new formatting requirements. This action was being performed in other steps in old revision and is included in this section under the new revision.	k
Section 5, References	Change: Deleted dates from regulations, permits, plans, and procedures. References in Rev. 1 Section 2.0 were divided up into 5.1 Use References, and 5.2 Writing References in Rev. 2. Reason: With the advent of the internet and Cook Plant NDIS, the latest reference is very accessible. New procedure rules require new classification of references into Use and Writing references.	k
Rev. 1 Ref. 2.1.24 deleted	Change: Step 2.1.24 in Rev. 1 referencing the MDNR Stormwater General Permit was deleted. Reason: The stormwater requirements are now in the Plant's NPDES Permit (ref. 5.2.1a).	o
Ref. 5.1.5, 5.1.9 & 5.1.10	Change: Reference titles changed. Reason: Agency changed names of titles.	o
Ref. 5.2.1e.	Change: Added AEP Environmental Principles as a reference. Reason: AEP Environmental Principles address clean-up and reporting of spills to the environment.	o
Ref. 5.2.2g.	Change: Added reference for Small Quantity Generators of Hazardous Waste	o

REVISION SUMMARY

Number: PMP-6090.PCP.100 Revision: 2 Change: 0

Title: Spill Response - **Oil, Polluting, and Hazardous Materials**

	Reason: For the most part, Cook Plant is a small quantity generator of hazardous waste.	
Ref. 5.2.2, I, j, k, l, n.	Change: Reference titles changed. Reason: Agency changed names of titles.	o
Figure 1	Change: Attachment 3 in Rev. 1 became Figure 1 in Rev. 2. Reason: New procedure formatting requirements	k
Figure 1	Change: Deleted trade name (LCS-60) leaving generic name Sodium Nitrite. Concentration changed to a range of 10-15%. Reason: Conforms to other generically listed chemicals in table. Concentration can range from 10-15% depending on vendor.	K,m
Figure 1	Change: In the second to last paragraph on attachment the "Environmental Section" on Rev. 1 was changed to "Environmental" on Rev. 2. Reason: Department name change.	e
Data Sheet 1	Change: "Condition Report Number" blank was renamed "Action Request Number" Reason: Change in nomenclature to be consistent with new eSAT system.	o
Data Sheet 1, Directions	Change: Environmental Supervisor changed to Environmental Superintendent. Reason: Position title change.	e
Data Sheet 1, sentence after PART 2	Change: Step 2.3.7 referred to in Rev. 1 changed to Section 2 in Rev. 2. Reason: Change in format caused steps to be renumbered.	k
Data Sheet 1, Part 2d.	Change: Attachment 2 changed to Data Sheet 2. Reason: Change in procedure formatting.	k
Data Sheet 1, Part 3, Call one of the following..a.	Change: Environmental Supervisor changed to Environmental Superintendent. Environmental weekend duty person changed to Environmental duty person. Weekend Duty Roster changed to Plant Duty Roster.	e

	Reason: Position title changes, roster title changes.	
Data Sheet 1, Part 3, Call one of the following..c. Rev. 1	Change: Deleted Environmental Manager from Rev. 1. Reason: The Environmental Superintendent and Environmental Manager are one in the same.	m
Data Sheet 1, Part 4, first sentence	Change: Reference to Step 4.1.8 in Rev. 1 was changed to Steps 3.1.6d &e Reason: Procedure formatting requirements resulted in renumbering steps.	K
Data Sheet 1, Part 5 added.	Change: Added Part 5 for decision to call offsite agencies and notify Shift Manager if offsite agencies are called. Reason: Step documents decision to call offsite agencies and ensures that Shift Manager is aware that offsite agencies are being contacted so he can make appropriate notifications to the NRC via other procedures. This is a technical change noted by Licensing cross discipline review.	Change
Data Sheet 2, Directions	Change: Environmental Supervisor renamed Environmental Superintendent. Environmental weekend duty person renamed Environmental duty person. Environmental Affairs renamed Environmental. AEPSC changed to AEP. Remove reference to AEPSC Environmental. Reason: Position and department title changes. AEPSC Environmental only handles legislative issues now.	e
Data Sheet 2, names and phone numbers	Change: Remove Diane Fitzgerald, Bruce Abbgy, Eric Mallen, Blair Zordell James Weber, and James Pappas from names and phone numbers. Change Environmental Weekend Duty person to Environmental Duty Person. Reason: Persons either do not work in support of Cook or can now serve as the Environmental duty person. AEPSC Environmental only handles legislative affairs now.	e
Data Sheet 2, Part 1,	Change: MDEQ Plainwell District Office changed to MDEQ Kalamazoo District Office and phone number changed	e

REVISION SUMMARY

Number: PMP-6090.PCP.100 Revision: 2 Change: 0

Title: Spill Response - **Oil, Polluting, and Hazardous Materials**

Required Notifications, b.	to 616-567-3500. Added "or Spill to Air". Reason: MDEQ personnel moved to a new office location. Spills to air are reportable to the same number as the Air Quality Division is in the same office.	
Data Sheet 2, Part 1, follow-up reports required, b.	Change: Restructured sentence into IF/THEN format. Rewrote step to require a follow-up report if Cook Plant's hazardous waste generator status is "Large Quantity". Reason: A follow-up letter per 40 CFR 265.56 is only required if Cook Plant's hazardous waste generator status is "Large Quantity". For the most part, Cook Plant's hazardous waste generator status is "Small Quantity".	Change
Data Sheet 2, Part 2, Criteria:	Change: Step 2.3.2 referred to in Rev. 1 changed to Section 2 in Rev. 2. Reason: Format change resulted in renumbering step.	k
Data Sheet 2, Part 2, Required Notifications, b.	Change: MDEQ Plainwell District Office changed to MDEQ Kalamazoo District Office and phone number changed to 616-567-3500. Added "or Spill to Air". Reason: MDEQ personnel moved to a new office location. Spills to air are reportable to the same number as the Air Quality Division is in the same office.	e
Data Sheet 2, Part 3, NOTE	Change: Added NOTE that if more than 5 gallons of oil is spilled to the pervious ground it is reportable regardless if it can be recovered. Reason: Per discussions with the MDEQ Plainwell District office, this is the threshold quantity of oil spilled that needs to be reported.	Change
Data Sheet 2, Part 3, Required Notifications, a.	Change: MDEQ Plainwell District Office changed to MDEQ Kalamazoo District Office and phone number changed to 616-567-3500. Added "or Spill to Air". Reason: MDEQ personnel moved to a new office location. Spills to air are reportable to the same number as the Air Quality Division is in the same office.	e

TABLE OF CONTENTS

1 PURPOSE AND SCOPE

1.1 Establish a system for reporting non-radioactive oil, polluting and hazardous material spills.

1.2 Establish guidelines for responding to various types of spills.

1.3 Delineate responsibilities for reporting and cleaning up of spills.

1.4 It is the policy of the Cook Nuclear Plant to use all reasonable safeguards to prevent inadvertent damage to the environment and to respond safely and quickly should a spill occur.

1.5 A Safety Screening was performed for this procedure. A determination was made that this procedure is outside the scope of 10 CFR 50.59.

2 DEFINITIONS AND ABBREVIATIONS

Term	Meaning
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Emergency Response	A response by the HAZMAT Team that is required to safely control an actual or potential hazardous material spill to limit personnel exposure and/or protect plant equipment. HAZMAT procedure spill pre-plans may be consulted for guidance on quantities which would initiate an emergency response. Excluded are responses to incidental spills of hazardous materials where the material can be safely isolated, absorbed, neutralized or otherwise controlled at the time of the spill by employees in the immediate spill area, or by trained plant personnel wearing proper protective equipment. Responses to spills of hazardous materials where there are no potential safety or health hazards (i.e., fire, explosion, or chemical overexposure) are not considered to be emergency responses. HAZMAT Team members may be called upon to evaluate and assist with the spill containment and cleanup in a non-emergency capacity. (Ref. 29 CFR 1910.120)

Environment	The navigable waters of the United States and any other surface water, ground water, drinking water supply, land surface, subsurface strata or ambient air. (Ref. 40 CFR 302.3) The Turbine Room Sump, containment structures, roadways, impervious surfaces, etc. are not part of the "environment". The material may subsequently come into contact with the environment due to evaporation, flushing, discharging, or by other means.
EPA	Environmental Protection Agency
Hazardous Material	Any substance designated below which may result in adverse effects on the health and safety of employees: • Any substance listed in 40 CFR 116, 40 CFR 302, 40 CFR 355, 49 CFR 172.101, or 29 CFR 1910.1000 Tables Z-1 and Z-2. • Any biological agent or disease-causing agent as defined in CERCLA. • Any hazardous waste as defined in 40 CFR 261.3, 49 CFR 171.8 or the Michigan Hazardous Waste Rules. • Other materials as determined by on-site hazard assessment techniques. "Oils" are not considered to be hazardous materials unless they are flammable (FP<100 F) or mixed with a hazardous material.
HAZMAT Team	Hazardous Material Response Team. The HAZMAT team is made up of individuals from the Site Protective Services Department and other qualified plant personnel.
IC	Incident Commander
ICS	Incident Command System
LEPC	Local Emergency Planning Committee
Large Quantity Generator	A site which produces greater than 1,000 kilograms of hazardous waste in a calendar month.
MDEQ	Michigan Department of Environmental Quality

Navigable Waters	The waters of the U.S. including the territorial seas which includes waters used in interstate or foreign commerce, wetlands, lakes, rivers and their tributaries, streams, mudflats, and sandflats. Waters from which fish or shellfish could be taken and sold in interstate or foreign commerce, or used for industrial purposes are also included. Waste treatment systems, e.g., the Cook Nuclear Plant on site absorption pond and sewage ponds are not navigable waters of the U.S.. (Ref. 40 CFR 110.1, 112.2, 116.3, 117.1, 302.3, and 49 CFR 171.8)
NPDES	National Pollutant Discharge Elimination System
Oil	Oil of any kind or in any form, including but not limited to petroleum, gasoline, fuel oil, grease, sludge, oil refuse, and oil mixed with waste, other than dredged spoil. EHC (Fyrquel) is a "polluting material", not an oil. (Ref. 33 CFR 153.103, 40 CFR 110.1, 112.2 and 300.5)
OSHA	Occupational Safety and Health Administration
PEAS	MDEQ Pollution Emergency Alert System
Polluting Material	Salt and any material listed on the Critical Materials Register or in 40 CFR 122.21 Appendix D in solid or liquid form.
RCRA	Resource Conservation and Recovery Act
Reportable Quantities	Quantities of hazardous substances that may be harmful are set forth in 40 CFR 117.3 and 40 CFR 302, whose discharge is forbidden and is reportable. A list of some of the known hazardous substances contained on-site and their reportable quantities are listed in Figure 1
RQ	Reportable Quantity
SARA	Superfund Amendments and Reauthorization Act
SERC	State Emergency Response Commission
Shift Manager	Refers to the Operations Department Shift Manager.

Spill	A loss or release of any product, by-product, intermediate product, oils, solvents, waste material, hazardous materials, or any other polluting material. This includes spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping (e.g. compressed gasses), leaching, dumping, or disposing of any of these substances on the plant site. Excluded are those discharges of materials authorized by the Plant's surface water, ground water, storm water, and air quality permits. Also excluded are discharges of oil from a properly functioning vessel engine, but discharges of such oil from vessel bilges are not excluded. The regulatory impact of these spills for reporting purposes will be determined by Environmental. (Ref. 33 CFR 153.103, 40 CFR 110.1, 112.2, 116.3, and 355.2).

3 DETAILS

NOTE:	Minor spills or material condition concerns that occur during normal work activities are <u>not</u> reportable to the Shift Manager provided they can be cleaned up safely and quickly, and do not endanger surface water or ground water. Any spill that may result in exceeding MSDS exposure limits, or reportable quantity levels, must be reported.

3.1 Initial Actions

3.1.1 Safely identify the following, if possible, and it is within your own abilities:

- name of material
- approximate quantity spilled
- spill location
- direction of spill movement
- cause of spill and equipment involved

3.1.2 Immediately report the information to the Shift Manager or affected Unit's Control Room.

- Shift Manager 1911/1231/1232
- U-1 Control Room 1210/1211
- U-2 Control Room 1220/1221

NOTE: The intention of Data Sheet 1, Initial Oil, Pollutant, and Hazardous Material Report and Notification is to ensure immediate outside agency notifications are made, if required, and outside assistance is obtained, if needed, to respond to a spill. The Environmental duty person can always be contacted for guidance.

3.1.3 The Environmental Superintendent, the Shift Manager, or designee, shall complete Data Sheet 1, Initial Oil, Pollutant, and Hazardous Material Report and Notification for all reported spills.

- N/A sections of the Data Sheet that do not apply providing initials, date, and recording justification, and return to Environmental for review and records transmittal.
- Record the Action Request number when written.

3.1.4 **IF** the spill is determined to be reportable to offsite agencies, **THEN** the Environmental Superintendent, or designee, shall immediately complete <u>all</u> parts of Data Sheet 2, Outside Agency Notifications, and notify the Shift Manager.

NOTE: The HAZMAT Team may be called upon to perform an initial assessment of a spill incident if it is unclear whether the spill constitutes an emergency response (e.g. unknown material).

3.1.5 **IF** an **Emergency Response** to a hazardous material spill is required as defined in Section 2, Definitions and Abbreviations, **THEN** go to Step 3.2. Emergency Responses to Hazardous Material Spills.

3.1.6 Spill Clean-up

a. Obtain a pre-job brief by the Shift Manager or designee.

b. Don the appropriate personal protective equipment

c. Isolate, contain, and clean up the spill.

d. The Shift Manager or designee shall contact additional plant personnel to assist in isolating, containing, and cleaning up the spill as needed.

e. **IF** offsite contractor assistance is deemed necessary to safely and quickly control and clean up the spill, **THEN** contact Environmental for call-out of contractors.

f. Dispose of spilled material, absorbents, and cleanup debris as directed by the Environmental Superintendent or designee.

g. Initiate an Action Request for all spills required to be reported to the Shift Manager.

NOTE:	If at any time the Fire Brigade is needed, or may be needed for fire protection duties, this will have precedence over hazardous material responses. The Fire Brigade must be available to return to the Protected Area at all times. Offsite assistance can be requested if remaining HAZMAT Team members are insufficient to safely handle the incident. Refer to HAZMAT procedures for detailed implementation of the Emergency Response Plan.

3.2 Emergency Responses to Hazardous Material Spills

3.2.1 The following assignments are in effect for all emergency responses to hazardous material spills as part of the Incident Command System (ICS):

- Incident Commander (IC) - Shift Manager (SM) or qualified plant personnel
- Safety Officer - Fire Brigade Leader
- HAZMAT Team - Fire Brigade supplemented by qualified plant personnel

3.2.2 The SM acting as the Incident Commander (IC) shall assume initial control of the incident and may transfer the duties to qualified plant personnel once they are available.

3.2.3 The IC, or designee, shall contact the HAZMAT Team for all Emergency Responses as defined in Section 2.

3.2.4 The IC, or designee, shall contact the Shift Security Supervisor to assist in isolating the exposure zone.

3.2.5 The IC, or designee, shall make a preliminary announcement over the Plant PA system informing plant personnel of the incident and warning personnel to avoid the area.

3.2.6 The HAZMAT Team shall respond to the incident using hazardous material response guidelines (pre-plans) if appropriate. These guidelines may be supplemented by Fire Brigade pre-plans as necessary.

3.2.7 Access to areas of potential or actual exposure hazards shall be limited to members of the HAZMAT Team, support personnel, and specialist employees who have donned appropriate personal protective equipment, and who have received the required training and briefing.

3.2.8 The Safety Officer shall assess the hazards associated with the incident and advise the IC on the appropriate course of action.

3.2.9 The IC, or designee, shall contact additional plant personnel, or offsite contractors as prescribed in 3.1.6e, for assistance.

3.2.10 The IC shall initiate appropriate emergency actions which may include:

- additional plant announcements
- evacuation of plant personnel
- implementation of the Emergency Plan

3.2.11 **IF** required, **THEN** the IC, or designee, shall make the emergency outside agency notifications listed in Part 1 of Data Sheet 2, Outside Agency Notifications. These are in addition to the Emergency Plan notifications.

3.2.12 The Safety Officer has the authority to suspend or alter HAZMAT Team response activities if judged to compromise the safety of the team members.

3.2.13 Decontamination procedures shall be implemented for all hazardous material spills requiring an emergency response.

3.2.14 Cleanup of hazardous material spills by site personnel following an emergency response is restricted to members of the HAZMAT Team. (Offsite contractors can be contacted if additional assistance is needed.)

3.2.15 All hazardous materials, absorbents, and contaminated cleanup debris shall be disposed of as directed by the Environmental Superintendent or designee

3.2.16 The HAZMAT Team shall conduct a critique of the response activities at the conclusion of the incident.

3.2.17 A security investigation shall be conducted as directed by the Site Protective Services Manager to investigate for evidence of tampering and sabotage.

3.2.18 An Action Request shall be initiated for all emergency spill responses.

3.3 Responsibilities

3.3.1 Every employee, whether AEPNG or contractor, is responsible for:

- The prompt reporting of spills to the Shift Manager and providing the information required in Step 3.1.1 of this procedure.
- Responding to spills as directed by the Shift Manager, Incident Commander, or HAZMAT Team.
- Preventing spills through good work practices and maintenance of equipment.

3.3.2 The Shift Manager is responsible for:

- Coordinating responses to all spills onsite.
- Acting as the initial IC in the event that an emergency response to a hazardous material spill is required.
- Making immediate reports and notifications as required in this procedure.

3.3.3 The Environmental Superintendent or designee is responsible for:

- Developing necessary procedures for spill prevention, cleanup, and disposal.
- Collecting technical information and making verbal and written notifications and reports.
- Determining training requirements for Plant personnel who respond to spills.
- Providing technical assistance to spill response personnel.

3.3.4 The HAZMAT Team is responsible for responding to spills of hazardous materials or unknown substances as directed by the IC.

3.3.5 The Training Superintendent or designee is responsible for:

- Providing training to meet the requirements of this procedure and applicable state and federal regulations.
- Revising Training procedures to incorporate requirements of this instruction.

3.3.6 The Nuclear Licensing Manager, or designee, is responsible for sending copies of outside agency reports to the Region III NRC Administrator.

3.3.7 The Site Protective Services Manager, or designee, is responsible for:

- Maintenance of the HAZMAT Team, their equipment, and program procedures.
- Enforcing the safety zone restrictions during a hazardous material spill.
- Assigning a Nuclear Security Investigator to assist the HAZMAT Team investigation for the purpose of ruling out tampering and sabotage.

3.4 Training:

3.4.1 All plant personnel shall receive training via GET and GET Requal, on their initial spill response actions (Step 3.1), and the awareness requirements contained in references 5.2.2g and 5.2.2j.

3.4.2 Personnel involved in emergency responses to hazardous material spills shall receive initial and continuing training as specified in reference 5.2.2j.

3.4.3 Non-Licensed Operators (NLOs), Reactor Operators (ROs), and Senior Reactor Operators (SROs) shall receive training at least every two years on the oil spill prevention procedures, recent spill events, and malfunctioning equipment as required by reference 5.1.2.

4 FINAL CONDITIONS

4.1 Written reports have been made to offsite agencies and Data Sheet 1 and Data Sheet 2 have been filed in the NDM.

5 REFERENCES

5.1 Use References:

5.1.1 29 CFR 1910 Subpart Z, OSHA Regulations on Toxic and Hazardous Substances.

5.1.2 40 CFR 112, EPA Regulations on Oil Pollution Prevention.

5.1.3 40 CFR 117, EPA Regulations on Determination of Reportable Quantities for Hazardous Substances.

5.1.4 40 CFR 122.21, Appendix D, NPDES Permit Application Testing Requirements.

5.1.5 40 CFR 261, EPA Regulations for Identification and Listing of Hazardous Waste.

5.1.6 40 CFR 302, EPA Designation, Reportable Quantities, and Notification Requirements for Hazardous Substances under CERCLA.

5.1.7 40 CFR 355, EPA Regulations for Emergency Planning and Notification under CERCLA.

5.1.8 49 CFR 171 General Information, Regulations, and Definitions on Hazardous Material.

5.1.9 49 CFR 172, Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, and Emergency Response Information, and Training Requirements.

5.1.10 Michigan Critical Materials Register.

5.2 Writing References:

5.2.1 Source References:

a. National Pollutant Discharge Elimination System (NPDES) Permit No. MI0005827.

b. Technical Specifications, Appendix B, Environmental Technical Specifications, Environmental Protection Plan (Non-radiological).

c. D. C. Cook Plant Emergency Plan.

d. AEP System Environmental Organizations Roles and Responsibilities. Cherry Valley Partnering Meeting, March 26, 1997.

e. AEP Environmental Principles.

5.2.2 General References

a. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 Title I - Hazardous Substance Releases, Liability, and Compensation; Sections 102 and 103(a).

b. 29 CFR 1910.120, OSHA Regulations on Hazardous Waste Operations and Emergency Response (HAZWOPER).

c. 33 CFR 153, Coast Guard Regulations on the Control of Pollution by Oil and Hazardous Substances, Discharge Removal.

d. 40 CFR 110, EPA Regulations on Discharge of Oil.

e. 40 CFR 116, EPA Regulations on Designation of Hazardous Substances Under the Federal Water Pollution Control Act.

f. 40 CFR 262, EPA Regulations for Hazardous Waste Generators.

g. 40 CFR 262.34d, EPA Standards for Small Quantity Generators of Hazardous waste.

h. 40 CFR 300, EPA National Oil and Hazardous Substances Pollution Contingency Plan Under CERCLA, Subparts B, C and D.

i. Michigan Public Act 451 of 1994, Natural Resources and Environmental Protection Act (NREPA) Part 201.

j. Hazardous Waste Operations and Emergency Response (Michigan HAZWOPER), Consumer and Industry Services Part 432.

k. MDEQ Rules, Part 5, Spillage of Oil and Polluting Materials.

l. MDEQ Hazardous Waste Rules.

m. PMI-2080, Emergency Plan and Implementing Procedures.

n. 40 CFR 265, EPA Regulations on Interim Status TSDFs.

A. The following is a list of the hazardous chemicals, routinely on the plant site that may be in sufficient quantities to exceed the reportable quantity threshold, if spilled into the environment.

Hazardous Chemical	Approx. Qty. on site (lb/gal)	Reportable Quantity (lb/gal)
Asbestos (friable)	Tons	1
Ethylene Glycol	41,508/4,651	5,000/560
Gasoline (4% Benzene)	6,250/1,000	10/1.6
*Hydrazine (35%)	9,926/1,160	1/0.2
Lead	120,000	10
Mercury	7.52	1
Polychlorinated biphenyl's (PCB's)	4	1
*Sodium Hydroxide (50% solution)	127,465/10,055	1,000/79
*Sodium Hydroxide (34% solution)	97,758/8,800	1,000/90
*Sodium Hypochlorite (12.5% solution)	66,053/6,600	100/10
*Sulfuric Acid (93% solution)	153,269/10,015	1,000/65
*Sulfuric Acid (35% solution)	3,482/330	1,000/95
Sodium Nitrite solution (10%-15%)	6,416/715	100/11
*Hazardous Waste	Varies	Potentially reportable

B. A spill into the environment of any hazardous substance listed on the Michigan Critical Materials Register, must be reported immediately as required by NPDES Permit MI0005827. The following is a list of the Critical Materials routinely used on the plant site.

1. Asbestos
2. Cadmium
3. Chloroform
4. Di-n-octyl phthalate
5. *Hydrazine
6. Hydroquinone
7. Lithium
8. Lead
9. Mercury
10. PCB's
11. Phenol
12. Sodium hypochlorite
13. Toluene
14. *Triaryl phosphate esters (EHC fluid)
15. Xylene

C. Every chemical involved in a spill into the environment shall be checked for current reportability threshold under:

- 40 CFR 302, Table 302.4
- 40 CFR 355, Appendices A and B
- 40 CFR 117, Table 117.3
- Michigan Critical Materials Register
- 40 CFR 122.21, Appendix D
- NPDES Permit
- Michigan Hazardous Waste Rules

Environmental may be contacted for assistance in determining total quantities of materials spilled when the spill is a mixture or part of a plant effluent.

*Refer to HAZMAT procedure hazardous material spill pre-plans for guidance on quantities which would initiate an emergency response.

_____
Action Request Number

DIRECTIONS: The Environmental Superintendent, Shift Manager, or designee, is responsible for completing this Data Sheet when a spill is reported. Enter "Unknown" for any information that is not immediately available and update when information becomes available.

PART 1

Obtain the following information for all reported spill events:

a. Name of person calling/department: _____
b. Name of person receiving call: _____
c. Location of spill: _____
d. Size/estimated gallons/lbs: _____
e. Material: _____
f. Cause/equipment involved: _____
g. Where did it go? _____
h. Time/date observed: _____

PART 2

Is an emergency response required or suspected as defined in Section 2?
Yes _____ No _____

If yes, check the following actions taken:

a. _____ HAZMAT team paged.
b. _____ Plant PA announcement made that includes type of material spilled, location of spill, and instructions for avoiding area and/or evacuation routes, as necessary.
c. _____ HAZMAT team informed of information recorded in Part 1.
d. _____ Emergency notifications listed in Data Sheet 2 are made within 15 minutes, if offsite impact occurs or has the potential to occur.
e. _____ Emergency Plan implemented.

PART 3

Call one of the following in the order listed:

a. Environmental Superintendent or Environmental duty person as listed on the current Plant Duty Roster.
b. Other Environmental personnel who are on the list of designated HAZMAT Team members.

Name of person receiving call: _____
Time/date of call: _____

PART 4

Contact additional plant personnel or offsite contractors for assistance (see Steps 3.1.6d & e) if needed for isolation, containment, cleanup, or disposal.

Name of plant person(s) contacted: _____
_____
_____

Name of offsite contractor contacted: _____
Name of person contacted: _____
Time/date contacted: _____

PART 5

Is the spill reportable to offsite government agencies?
Yes _____ No _____

IF the spill is reportable to offsite government agencies **THEN** notify the Shift Manager, and complete the applicable sections of Data Sheet 2.

Directions:

Part 1 of this form shall be completed by the Incident Commander or designee for emergency responses to hazardous material spills that expose, or are likely to expose, offsite persons to the hazard(s). These emergency notifications in Part 1 shall be completed within 15 minutes of the event, but are subordinate to those notifications required by the Plant's Emergency Plan. The remaining parts of this form are normally completed by Environmental. The Environmental Superintendent or Environmental duty person shall notify the AEP Environmental Services Division in the event of a major spill that affects the public and/or is likely to draw media attention as soon as practicable. The phone numbers are listed below.

	Office	Home	Organization
Environmental Duty Person	616-807-1630 (pager)	See Plant Duty Roster	Environmental
John Carlson	1153	[redacted]	Environmental
Chris Hawk	200-1253	[redacted]	AEP Env Services
Alan Wood	200-1233	[redacted]	AEP Env Services

Contact the agencies listed under each part if the criteria question(s) is answered "yes" and the agency has not been contacted in previous parts. Relay the information required to each agency once the criteria are confirmed. Follow-up reports are the responsibility of Environmental.

Part 1 - Emergency Notifications (SARA/RCRA)

Criteria: Is the spill likely to adversely affect the health and safety of offsite persons?
Yes _____ No _____

Information to be provided:

a. Name of person calling and plant name/location.
b. The chemical name or identity of the material involved in the spill and its source.
c. An indication of whether the substance is an extremely hazardous substance (see 40 CFR 355 Appendix A).
d. An estimate of the quantity of substance that was released into the environment.
e. The time and duration of the spill.
f. The medium or media into which the spill occurred (i.e. soil, groundwater, surface water, air).
g. Any known or anticipated acute or chronic health risks associated with the emergency and, where appropriate, advice regarding medical attention necessary for exposed individuals.
h. Proper precautions to take as a result of the spill, including evacuation (unless such information is readily available to the LEPC pursuant to their emergency plan).

i. The name(s) and telephone number(s) of the person(s) to be contacted for further information.

Required Notifications: Phone Number

a. Local Emergency Planning-Committee (LEPC) Emergency Coordinator (Lake Township Fire Department). 911
Name of person receiving call: _____
Time/date of call: _____

b. MDEQ Kalamazoo District Office
Surface or Groundwater Spill or Spill to Air 616-567-3500
Or if no answer or outside of normal working hours contact:
State Emergency Response Commission (SERC) 800-292-4706 or
(MDEQ Pollution Emergency Alert System – PEAS) 517-373-7660
Name of person receiving call: _____
Time/date of call: _____

c. National Response Center 800-424-8802
Name of person receiving call: _____
Time/date of call: _____

**********End of Immediate Notifications**********

Follow-up reports required:

a. As soon as additional information becomes available following initial notifications, a written update shall be provided to the above agencies which includes the following information:
- Any changes to the information provided in the initial notification.
- Actions taken to respond to and contain the release.
- Any known or anticipated acute or chronic health risks associated with the release.
- Where appropriate, advice regarding medical attention necessary for exposed individuals.

b. Did the spill involve hazardous waste?
Yes _____ No _____

IF yes, and Cook Plant's hazardous waste generator status is "Large Quantity", **THEN** a full written report is due to the EPA Region V Administrator as described in 40 CFR 265.56 within 15 days of the event.

Part 2 – CERCLA Spill

Criteria: Did the quantity spilled exceed the reportable quantity (RQ) listed in Figure 1 or 40 CFR 302, Table 302.4?

And

Was the material spilled to the environment as defined in Section 2?

Yes _____ No _____

Information to be provided:

a. The chemical name or identity of any material involved in the spill.
b. An indication as to whether the chemical is an extremely hazardous substance (40 CFR 355 Appendix A).
c. An estimate of the quantity of any such substance that was spilled into the environment.
d. The time and duration of the spill.
e. The medium or media into which the spill occurred (soil, groundwater, surface water or air).
f. The name(s) and telephone number(s) of the person(s) to be contacted for further information.

Required Notifications:	Phone Number
a. National Response Center (NRC)	800-424-8802
Name of person receiving call: _____	
Time/date of call: _____	
b. MDEQ Kalamazoo District Office Surface or Groundwater Spill or Spill to Air	616-567-3500
Or if no answer or outside of normal working hours contact: MDEQ Pollution Emergency Alert System – PEAS	800-292-4706 or 517-373-7660
Name of person receiving call: _____	
Time/date of call: _____	

**********End of Immediate Actions**********

Follow-up report:

As soon as additional information becomes available following initial notifications, a written update shall be provided to the above agencies which includes the following information:

- any changes to the information provided in the initial notification.
- actions taken to respond to and contain the release.

Part 3 – NPDES Spill

> **NOTE**: If more than 5 gallons of oil is spilled to the pervious ground, it is a spill to the groundwaters of the State regardless if it can all be recovered.

Criteria: Did this event result in any spill or loss of any oil, polluting material, hazardous material or waste material to surface waters or groundwaters of the State **or** is the spill likely to result in a spill to these waters?

Polluting and hazardous materials are those listed in:

- The Michigan Critical Materials Register
- 40 CFR 122.21, Appendix D
- 40 CFR 302, IF they exceed the Reportable Quantity.

Yes _____ No _____

Information to be provided:

a. Name and telephone number of reporter.
b. Name and address of facility.
c. Time and type of incident (e.g. fire, spill).
d. Name and quantity of spilled material.
e. Extent of injuries, if any.
f. Possible hazards to human health or environment outside the facility, if any.

Required Notifications: Phone Number

a. MDEQ Kalamazoo District Office
Surface or Groundwater Spill or Spill to air — 616-567-3500
Or if no answer or outside of normal working hours contact:
MDEQ Pollution Emergency Alert System (PEAS) — 800-292-4706 or 517-373-7660

Name of person receiving call: _____
Time/date of call: _____

*****************End of Immediate Actions*****************

Follow-up reports required:

Within 10 days of the spill or less, submit to the Plainwell District Supervisor of the Surface Water Quality Division a full written explanation as to the cause and discovery of the spill or loss, cleanup and recovery measures taken, preventative measures to be taken, and schedule of implementation.

Part 4 – 40 CFR 110 and 112 Spill

Criteria: Did this spill result in the discharge of oil to Lake Michigan or its shoreline?
Yes _____ No _____

Information to be provided:

a. Name and telephone number of reporter.
b. Name and address of facility.
c. Time and type of incident (e.g. fire, spill)
d. Name and estimated quantity of spilled material.
e. Extent of injuries, if any
f. Possible hazards to human health or environment outside the facility, if any.

Required Notifications: Phone Number

a. National Response Center — 800-424-8802
Name of person receiving call: _____
Time/date of call: _____

b. MDEQ Pollution Emergency Alert System (PEAS) 800-292-4706 or 517-373-7660

Name of person receiving call: _____

Time/date of call: _____

**********End of Immediate Actions**********

Was the quantity of oil discharged in this event more than 1,000 U.S. gallons, or was this the second occurrence in the last twelve months?

Yes _____ No _____

If yes, a full written report is due to the EPA Region V Administrator as described in 40 CFR 112.4, within 60 days of this event.

Part IV: "A Monitoring program to monitor process efficiency."

The wastewater treatment plant monitors the influent and effluent samples daily for process improvement, and also for the regulatory compliance requirements listed in the Authorization for Discharge Permit #M000988. Influent and effluent samplers (QS 307 and QS 913) are American Sigma model 800SL refrigerated composite samplers. Samples of the effluent from the post filtration system are taken automatically by the effluent sampler (QS-913) with time sequence capability. The SBR activates the sampler when either filter feed pump is started and turns off the sampler when the filter feed pump(s) stop operation. The influent sampler (QS-307) is programmed to take samples of the incoming sewage from the equalization basin.

A list of tanks and their associated volumes can be found in the System Description found in Part II of this Standard Operating Procedure.

Flow monitoring for the sewage influent is accomplished by the use of a 3" mag meter (YFI-103). The range of this meter is 0-500 gpm. The sewage effluent is measured using an ultrasonic flow meter with a 45-degree V notch weir. The range of this meter is 0-100 gpm. Both meters are calibrated on a yearly basis.

Sampling for permit compliance is scheduled as follows:

Sample location	Parameter	USEPA Method	Frequency	Sample Type
ef-2 (effluent)	Flow		Daily	Direct Measurement
			Annually	Calculation
EQ-2 (effluent)	BOD5	405.1	Weekly	Grab
	TIN		Weekly	Calculation
	NH3 Nitrogen	350.3	Weekly	Grab
	Nitrite Nitrogen	354.1	Weekly	Grab
	Nitrate Nitrogen	353.2	Weekly	Grab
	Phosphorus	365.4	Weekly	Grab
	pH	150.1	Weekly	Grab
	Total Suspended Solids	160.2	Weekly	Grab
	Chloride	Std meth 4500-CLB	Weekly	Grab
	Dissolved Oxygen	360.1	Weekly	Grab
	Sodium	200.7	Weekly	Grab

The following Laboratory Standard Operating Procedures are used at the wastewater plant for compliance analysis.

COOK WASTEWATER TREATMENT PLANT
LABORATORY PROCEDURES MANUAL INDEX

COOK WASTE WATER TREATMENT PLANT
LABORATORY PROCEDURES INTRODUCTION

The Cook Wastewater Treatment Plant is required by Groundwater Permit #M00988 to conduct lab analyses on the plant influent and effluent for the following parameters. Sampling for these parameters must be conducted at least weekly. The sampling types including the associated discharge limits are stated below.

Parameter	Type	Permit Limit
1. pH	Grab	6.0—9.0 s.u.
2. Ammonia Nitrogen	Grab	None
3. Nitrate Nitrogen	Grab	None
4. Biochemical Oxygen Demand	Grab	35 mg/L Max
5.Total Phosphorus	Grab	15 mg/L
6.Total Inorganic Nitrogen	Grab	85 mg/L Max
7.Dissolved Oxygen	Grab	None
8. Chloride	Grab	None
9. Sodium	Grab	None

All laboratory procedures except Nitrate-Nitrogen used by the Cook WWTP are EPA approved. The Cook WWTP follows lab procedures found in the DEQ Laboratory Training Manual for WWTP Operators and the Hach Company procedures manual for the DR/2010 spectrophotometer. To ensure proper operations, the Cook WWTP may perform laboratory analysis more frequently than is required by the permit. Samples are sent to a contract Lab to perform EPA approved analysis for Sodium and Nitrate.

COOK WASTEWATER TREATMENT PLANT
TOTAL SUSPENDED SOLIDS TESTING PROCEDURES

The Cook WWTP routinely performs Suspended Solids testing on the plant influent, effluent, SBR #1's mixed liquor, and SBR #2's mixed liquor. The Cook WWTP follows the DEQ Manual for the Suspended Solids Test. This procedure is based on USEPA Method 160.2. Some specific procedures for the Cook facility are listed below.

1. Because influent solids are high, use the buchner funnel along with appropriately sized glass fiber filter discs without organic binder.

2. Use approximately ~~200~~ 50 ml of sample for influent sample.

3. Use approximately 300 to 500 ml for the effluent sample.

4. Also run volatile solids on the mixed liquor samples.

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SOLIDS DETERMINATIONS

The determination of solids may be important for several different reasons. Discharges of wastewater into the environment are monitored for solids content because of their impact on aquatic life and usefulness of the water being affected. Solids are also monitored at various locations in wastewater treatment plants so that process control may be optimized and efficiency determined.

Solids are classified into two general types; the particulate material and the material that is dissolved in the liquid. The particulate material is called "Suspended Solids" and may be defined as solids which will not pass through a filter of specific pore size and is not volatilized at 103° - 105° C. The second type is called "Dissolved Solids" and may be defined as those solids which are in solution and will therefore pass through the filter. The sum of these two are called "Total Solids" and may be defined as all of the solids present whether suspended or dissolved.

It is often of interest to determine the organic content of the solids. This can be approximated by igniting the dried solids at 550°C in a muffle furnace. The weight loss on ignition is called "Volatile Solids" and is taken to be the organic portion. "Fixed Solids" is the term applied to the solids left (ash) after this ignition and is considered to be inorganic. Thus there are sub-categories called "Volatile Suspended Solids", "Volatile Dissolved Solids", and "Total Volatile Solids". The term "Total Suspended Solids" (TSS) therefore refers to all of the suspended solids present whether volatile or not. These should not be confused with "Total Solids" which, as defined above, refers to all of the solids present or the sum of the "TSS" and the "TDS".

Another term that is often used in the wastewater field is "Settleable Solids". This refers to material that will settle out of suspension in a specified time period. Much of the material that will not settle consists of very fine particles that may or may

not be separated out by the filters used in the suspended solids procedure. These are called "Colloidal Solids" and may be seen as turbidity or cloudiness in a sample.

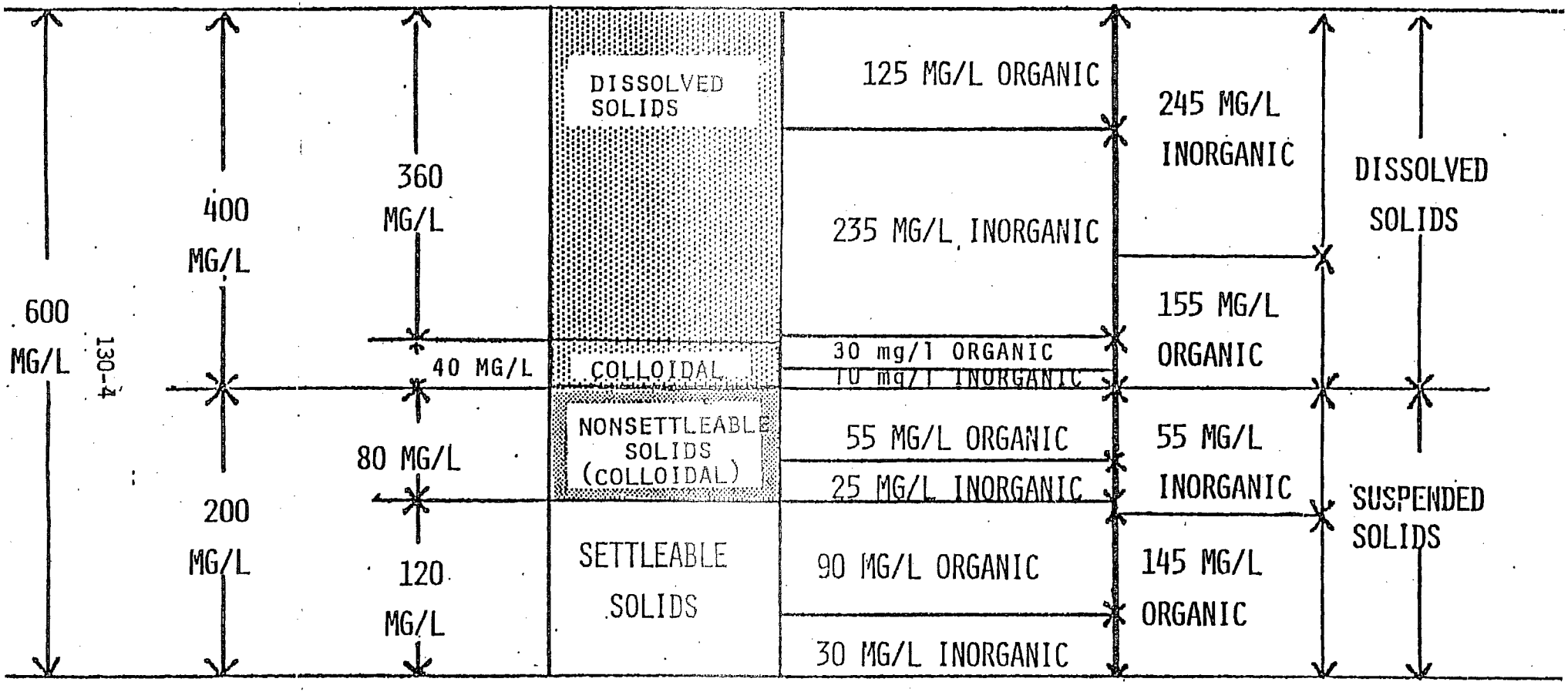
Solids are removed throughout the wastewater treatment plant using several different processes depending on the type of solids present. The first solids removal usually occurs at the bar screens where large objects are screened out to prevent damage to pumps and other down-stream equipment. After this the heavier non-organic materials, such as sand, are removed by settling in the grit chamber. The flow then continues on to the primary clarifiers where settleable material is removed. The solids which remain in the wastewater after the primary clarifiers include about 50% of the influent suspended solids and almost all of the dissolved solids, much of which is organic. Biological secondary treatment processes remove the soluble solids as they are absorbed into the cells of microorganisms. These microorganisms also remove suspended solids by first adsorbing the solids onto the outside of the cell. An enzyme is then secreted which breaks the solids down into soluble matter which can be absorbed by the cell. Secondary clarifiers then settle out the microorganisms and the solids which they have removed from the wastewater. Some wastewater treatment plants make use of tertiary treatment systems to remove any solids which escape from the secondary system. This often includes filtration of the flow through screens or sand filters. Such plants typically exceed 90% removal of influent suspended solids.

Solids which are removed in the wastewater treatment plant are treated to reduce the volume that must be disposed of, to provide a material which will not readily undergo further biological decomposition, and to destroy pathogenic bacteria. Sludge treatment might include aerobic digestion, anaerobic digestion, or less commonly, lime stabilization. The solids are then dewatered and disposed of in the

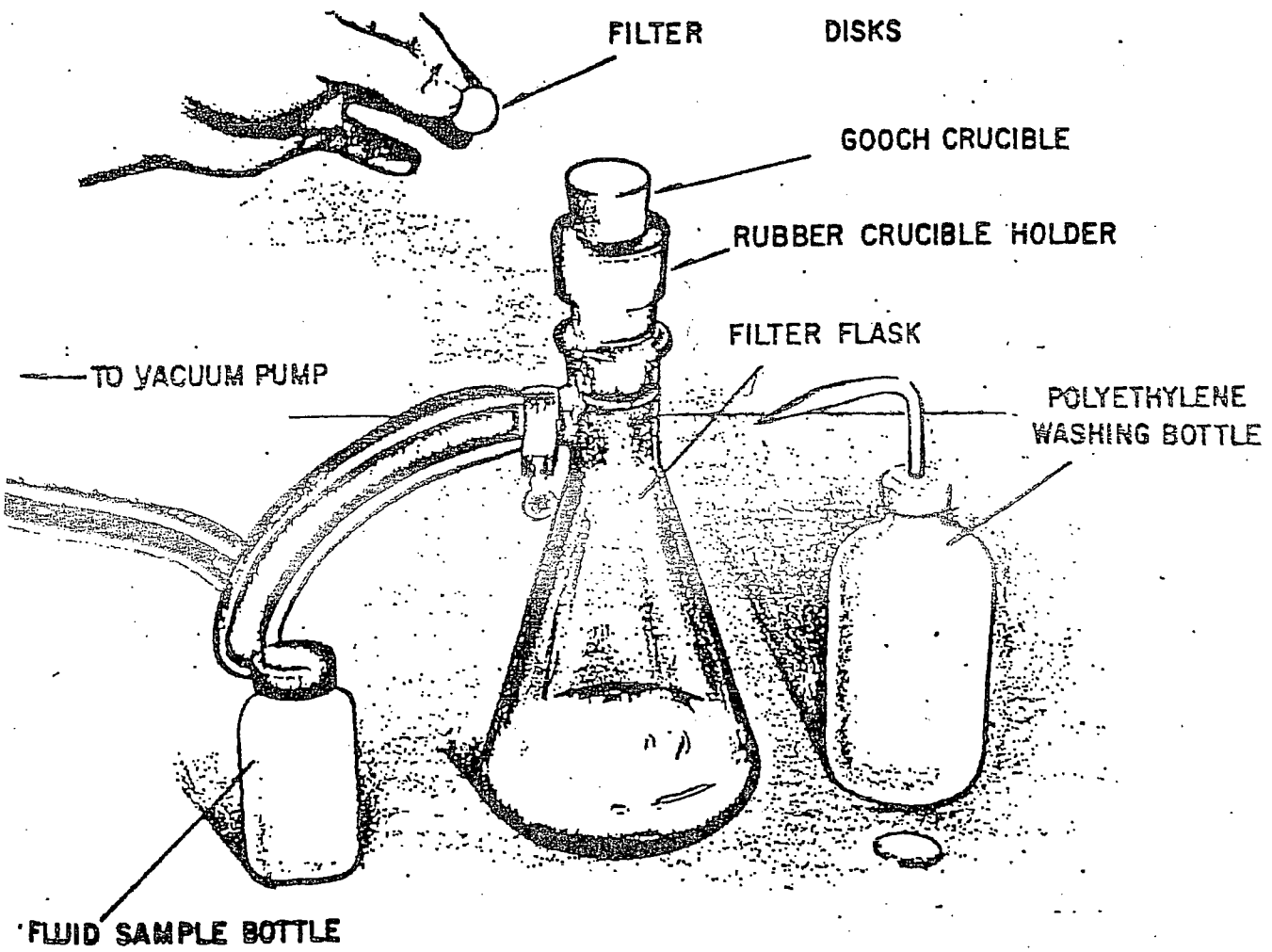
environment, often on agricultural land to take advantage of the nutrient value of the sludge.

Suspended and volatile suspended solids concentrations are generally determined in the wastewater treatment plant on the influent flow, primary effluent, secondary effluent, tertiary effluent, and activated sludge and return sludge samples. Total and total volatile solids are usually determined on raw, digesting and digested sludge, digester supernatant, and dewatered sludge. Methods for suspended, volatile suspended, total, and total volatile solids are included. A method is also included for approximating the suspended solids concentration of samples with high amounts of solids such as activated sludge and return activated sludge.

COMPOSITION OF SOLIDS IN AVERAGE DOMESTIC SEWAGE



SUSPENDED SOLIDS FILTRATION APPARATUS



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NPDES
APPROVED
METHOD

TOTAL SUSPENDED AND VOLATILE SUSPENDED SOLIDS

The following outlined procedure is intended to be used in accordance with the current edition of Standard Methods for the Examination of Water and Wastewater. Use of a Gooch crucible and filter combination is described. Other glass-fiber filters of proper pore size and appropriate filtration apparatus may also be used. If this second technique is used, the filter should be placed in an aluminum or stainless steel weighing dish for support during drying, igniting, and desiccating.

1. APPARATUS

   1.1 Vacuum pump

   1.2 Vacuum flasks (500 ml), with crucible holders

   1.3 Gooch crucibles, size #4 (40 ml)

   1.4 Glass fiber filters, 2.4 cm (Whatman 934 AH, Gelman type A/E, Millipore type AP 40, or equivalent)

   1.5 Analytical balance, capable of weighing to 0.1 mg

   1.6 Muffle furnace, capable of maintaining a temperature of 550°C +/- 50°C

   1.7 Drying oven, capable of maintaining a temperature of 103°C to 105°C

   1.8 Desiccator, cabinet or jar type, with indicating desiccant

2. PROCEDURE

   2.1 Crucible preparation

      2.11 Place a glass fiber filter, rough side up, in a Gooch crucible

      2.12 Wet the filter with three successive 20 ml portions of distilled water while applying a gentle vacuum.

      2.13 Dry the crucible in the drying oven and place in the muffle furnace at 550°C for 15 minutes.

2.14 Remove the crucible from the furnace and place in the drying oven for partial cooling. Place in the desiccator for cooling to room temperature.

2.15 Using tongs to handle the crucible, determine the weight of the crucible on an analytical balance and record on a bench sheet.

2.16 Crucibles which are not to be used immediately should be stored in the drying oven and weighed just before use.

2.2 Suspended solids analysis

2.21 Periodically duplicate analyses should be done following the quality assurance program schedule.

2.22 The volume of sample to be filtered will depend on the concentration of suspended matter, but should be as large as practical. Volumes less than 50 ml should not be used.

2.23 Measure out a well mixed sample with a graduated cylinder. Record the volume used on the bench sheet.

2.24 Place a prepared and weighed crucible on the vacuum flask, turn on the vacuum, wet filter with a small volume of distilled water to seat it, and filter the sample through.

2.25 Leaving the vacuum on, rinse the graduated cylinder twice with distilled water, adding each to the crucible.

2.26 After all of the water has passed through the crucible, place it in the drying oven at 103°C for 1 hour. Remove from oven and allow to cool to room temperature in a desiccator before weighing on an analytical balance. Handle the crucible with tongs.

2.27 Dry and weigh crucible again as in step 2.26 to be sure all of the moisture is evaporated.

2.28 Record weights on bench sheet.

2.3 Volatile suspended solids analysis

2.31 After recording the weight of the crucible from step 2.28, place it in the muffle furnace at 550°C for 15 minutes.

2.32 Place the crucible in the drying oven to allow it to partially cool, and then cool it to room temperature in the desiccator.

2.33 Weigh the crucible with ash on an analytical balance.

2.34 Record weight on the bench sheet

3. CALCULATIONS

3.1 Suspended Solids:

A. Subtract weight of empty crucible from weight of crucible with dry solids to get weight of dry solids.

B. $$\text{Sus. Sol. mg/L} = \frac{\text{grams dry solids}}{\text{mls sample filtered}} \times \frac{1000\text{ ml}}{\text{liter}} \times \frac{1000\text{ mg}}{\text{gram}}$$

--OR--

$$\text{Sus. Sol. mg/L} = \frac{\text{grams dry solids}}{\text{mls sample filtered}} \times 1{,}000{,}000$$

3.2 Volatile suspended solids

A. Subtract weight of crucible with ash from weight of crucible and dry to obtain weight of volatile solids.

B. $$\text{Vol. Sus. Sol., mg/L} = \frac{\text{grams volatile solids}}{\text{mls sample filtered}} \times 1{,}000{,}000$$

3.3 Example

Calculate the concentration of suspended and volatile suspended solids from the data below:

Volume of sample filtered	100 mls
Wt. crucible	15.5817 g
Wt. crucible with dry solids	15.5999 g
Wt. crucible with ash	15.5869 g

Suspended solids (mg/L)

A.

Wt. crucible + dry	15.5999 g
- Wt. crucible	- 15.5817 g
Wt. dry solids	00.0182 g

B. $$\text{Sus. Sol. mg/L} = \frac{0.0182\ g}{100\ ml} \times 1{,}000{,}000$$

Suspended Solids = 182 mg/L

Volatile Suspended Solids (mg/L)

A.

Wt. crucible + dry	15.5999 g
- Wt. crucible + ash	- 15.5869 g
Wt. volatile solids	00.0130 g

B. $$\text{Vol. Sus. Sol.} = \frac{0.0130\ g}{100\ ml} \times 1{,}000{,}000$$

Volatile Suspended Solids = 130 mg/L

Demonstration of Times for proper Weighing.

Desiccation Time

		Record Weights				
	DATE	10 Min.	15 Min.	20 Min.	25 Min.	30 Min.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Initial Ignition Time

		Record Weights			
	DATE	1st 15 Min.	2nd 15 Min.	3rd 15 Min.	4th 15 Min.
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Demonstration of Times for proper Weighings (cont.)

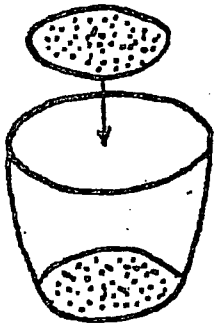
Drying Time

		Record Weights			
	DATE	1st hour	2nd hour	3rd hour	4th hour
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Sample Ignition Time

		Record Weights			
	DATE	1st 15 Min.	2nd 15 Min.	3rd 15 Min.	4th 15 Min.
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

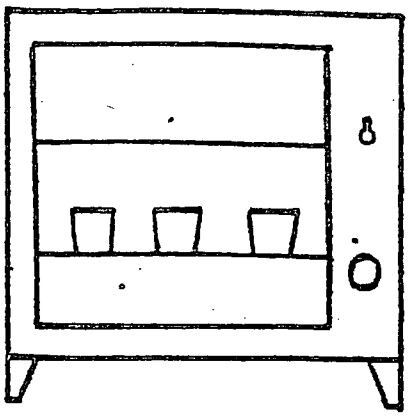
OUTLINE OF SUSPENDED SOLIDS PROCEDURE



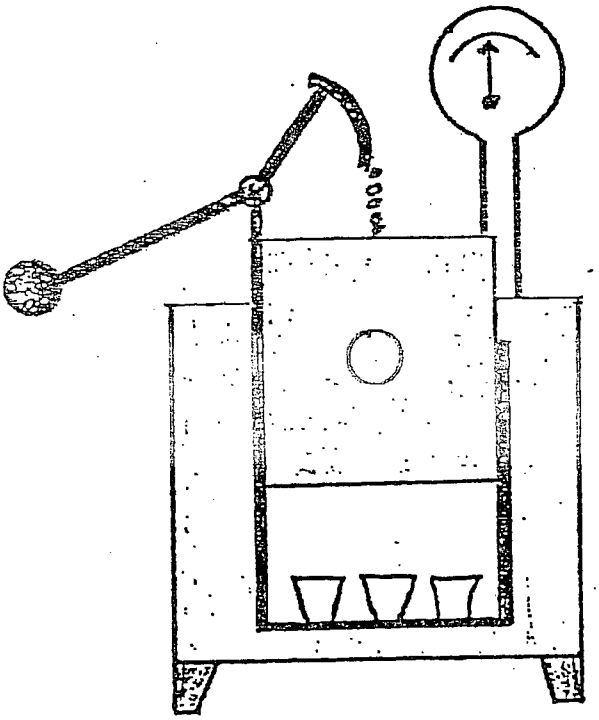
1. Insert glass fiber filter.

FILTERING FLASK

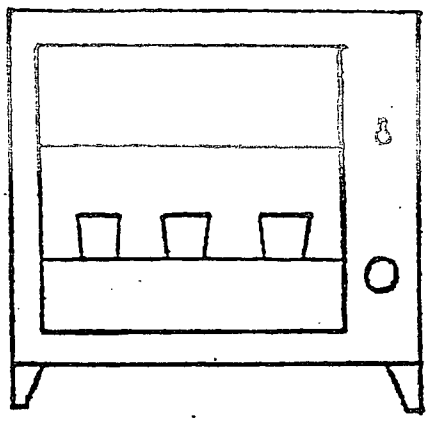
2. Seat filter by adding distilled water and applying vacuum.



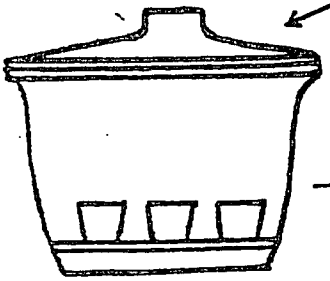
3. Dry briefly in drying oven at 103 deg. C.



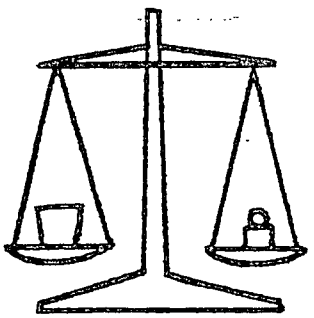
4. Ignite in muffle furnace at 550 deg. C for 15 minutes.



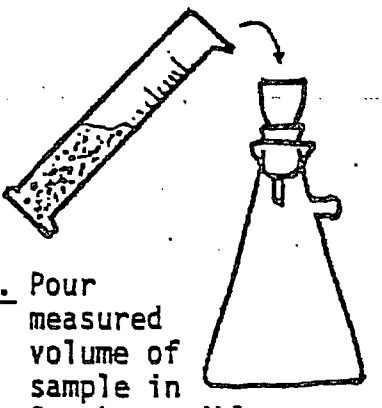
5. Cool in drying oven briefly.



6. Cool in desiccator to room temp.



7. Weigh crucible

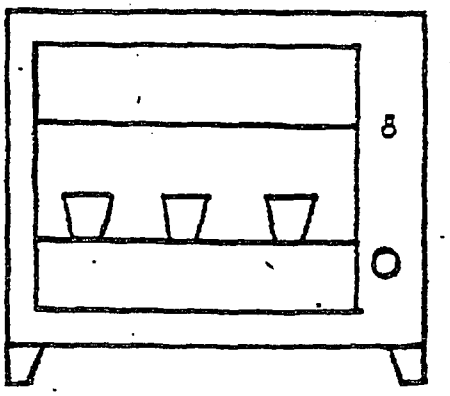


8. Pour measured volume of sample in Gooch crucible.

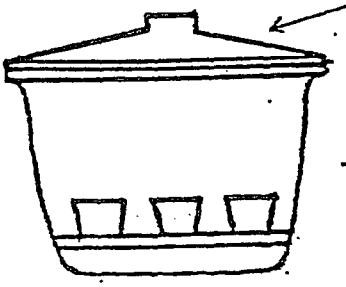
OUTLINE OF SUSPENDED SOLIDS PROCEDURE (CON'T)

9. Filter out suspended solids with vacuum.

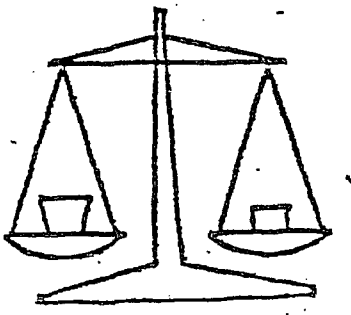
10. Wash graduate, crucible, and filter with distilled water to complete solids transfer.



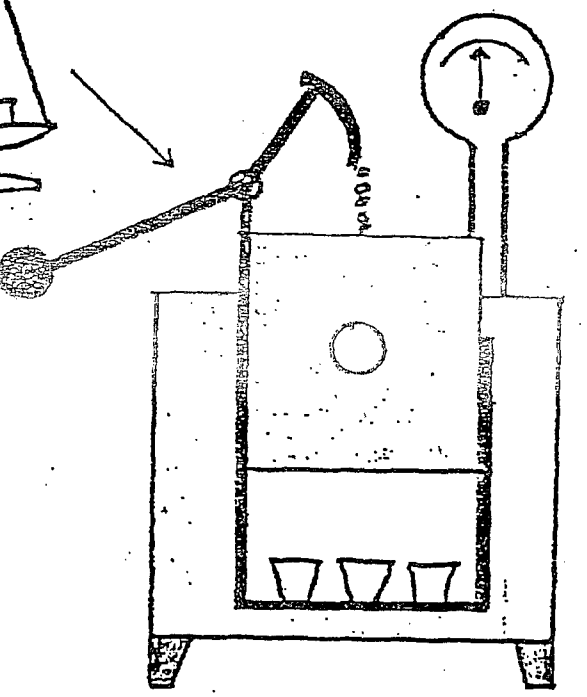
11. Dry crucibles plus suspended solids at 103°C.



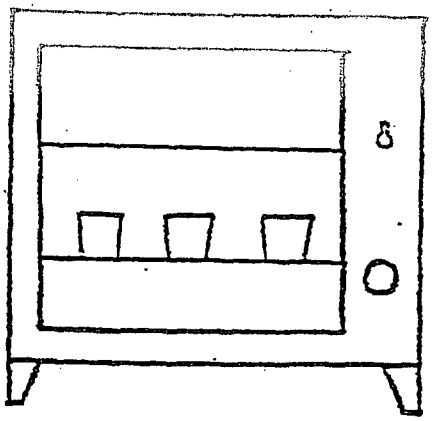
12. Cool to room temperature.



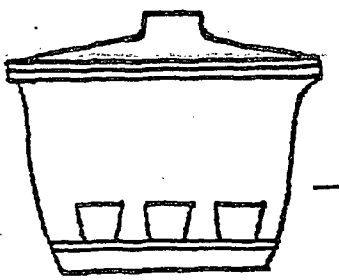
13. Weigh crucible plus suspended solids.



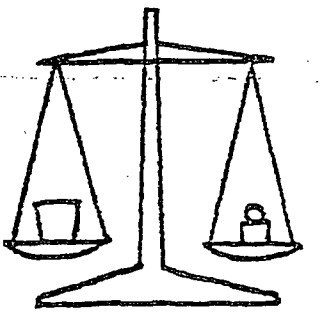
14. Ignite in muffle furnace at 550 deg. C for 15 minutes.



15. Cool in drying oven briefly.



16. Cool in desiccator to room temp.



17. Weigh crucible plus ash.

LABORATORY BENCH SHEET
SUSPENDED SOLIDS (TOTAL AND VOLATILE)

Sheet No. _____

Date 2-31-80

Wastewater Treatment Plant Your Town, Michigan

Analyst ABC

Date of Sampling 2-30-80

Date of Analysis 2-31-80

Item No.		Raw	Final
1	Crucible Number	21	22
2	Sample Volume (mls)	50 ml	200 ml
3	Weight of Crucible & Dry Solids (grams)	21.0599	20.1840
4	Weight of Crucible (grams)	21.0516	20.1830
5	Weight of Dry Solids (grams)	0.0083	0.0010
6	Suspended Solids (mg/L)	166	5
7	Percent Removal Total Suspended Solids		97%
8	Weight of Crucible & Dry Solids (grams)	21.0599	20.1840
9	Weight of Crucible & Ash (grams)	21.0527	20.1834
10	Weight of Volatile Suspended Solids (grams)	0.0072	0.0006
11	Volatile Suspended Solids (mg/L)	144	3

Item 6 -

Suspended Solids (mg/L) = $\frac{\text{Wt. of Dry Solids (grams)} \times 1{,}000{,}000}{\text{ml of Sample}}$

Crucible No.

21 $\frac{(0.0083)\text{ Grams} \times 1{,}000{,}000}{(50)\text{ mls Sample}}$ = (166) mg/L

22 $\frac{(0.0010)\text{ Grams} \times 1{,}000{,}000}{(200)\text{ mls Sample}}$ = (5) mg/L

Item 7 -

% Removal = $\frac{\text{Raw Sus. Sols.(mg/L)} - \text{Final Sus.Sols. (mg/L)}}{\text{Raw Sus. Sols. (mg/L)}} \times 100$

Crucible Nos.

21 & 22 $\frac{(166)\text{ mg/L} - (5)\text{ mg/L}}{(166)\text{ mg/L}} \times 100$ = (97) % removal

Item 11 -

Vol Sus Sols (mg/L) = $\frac{\text{Wt. of Vol Sus Sols (grams)} \times 1{,}000{,}000}{\text{ml sample}}$

Crucible No.

21 $\frac{(0.0072)\text{ grams} \times 1{,}000{,}000}{(50)\text{ mls sample}}$ = (144) mg/L

22 $\frac{(0.0006)\text{ grams} \times 1{,}000{,}000}{(200)\text{ mls sample}}$ = (3) mg/L

LABORATORY BENCH SHEET
SUSPENDED SOLIDS (TOTAL AND VOLATILE)

Sheet No. _____

Date _____

stewater Treatment Plant _____, Michigan

Analyst _____

e of Sampling _____

Date of Analysis _____

em o.		Raw	Final
	Crucible Number		
	Sample Volume (mls)		
	Weight of Crucible & Dry Solids (grams)		
	Weight of Crucible (grams)		
	Weight of Dry Solids (grams)		
	Suspended Solids (mg/L)		
	Percent Removal Total Suspended Solids		
	Weight of Crucible & Dry Solids (grams)		
	Weight of Crucible & Ash (grams)		
)	Weight of Volatile Suspended Solids (grams)		
	Volatile Suspended Solids (mg/L)		

Item 6 -

Suspended Solids (mg/L) = $\frac{\text{Wt. of Dry Solids (grams)} \times 1{,}000{,}000}{\text{ml of Sample}}$

Crucible No.

_____ $\frac{(\quad\quad)\text{ Grams} \times 1{,}000{,}000}{(\quad)\text{ mls Sample}}$ = ( ) mg/L

_____ $\frac{(\quad\quad)\text{ Grams} \times 1{,}000{,}000}{(\quad)\text{ mls Sample}}$ = ( ) mg/L

Item 7 -

% Removal = $\frac{\text{Raw Sus. Sols.(mg/L)} - \text{Final Sus.Sols. (mg/L)}}{\text{Raw Sus. Sols. (mg/L)}} \times 100$

Crucible Nos.

_____ & _____ $\frac{(\quad)\text{ mg/L} - (\quad)\text{ mg/L}}{(\quad)\text{ mg/L}} \times 100$ = ( ) % removal

Item 11 -

Vol Sus Sols (mg/L) = $\frac{\text{Wt. of Vol Sus Sols (grams)} \times 1{,}000{,}000}{\text{ml sample}}$

Crucible No.

_____ $\frac{(\quad\quad)\text{ grams} \times 1{,}000{,}000}{(\quad)\text{ mls sample}}$ = ( ) mg/L

_____ $\frac{(\quad\quad)\text{ grams} \times 1{,}000{,}000}{(\quad)\text{ mls sample}}$ = ( ) mg/L

TOTAL AND VOLATILE SLUDGE SOLIDS

The following procedure is designed to be used in accordance with the current edition of Standard Methods. Total solids in sludge is a measure of all material present in sludge both in suspension and in solution. This method is recommended for sewage sludges and sludge cakes.

1. APPARATUS

   1.1 Evaporating dishes, regular form, Coors porcelain (Coors series 430), size No. 00A or equivalent.

   1.2 Steam bath

   1.3 Drying oven, capable of maintaining a temperature of 103°C to 105°C

   1.4 Muffle furnace, capable of maintaining a temperature of 550°C ± 50°C

   1.5 Balance, accurate to 0.01 gram

   1.6 Desiccator and indicating desiccant

2. PROCEDURE

   2.1 Preparation of evaporating dishes

      2.11 Ignite evaporating dishes for 20 minutes at a temperature of 550°C.

      2.12 Allow to cool in a drying oven and then transfer to a desiccator until cooled to room temperature.

      2.13 Immediately before use, weigh the dish to the nearest 0.01 g and record on a bench sheet.

      2.14 Dishes which are not to be used immediately should be stored in the drying oven following step 2.11

Total Solids

2.2 Sludge samples - See Illustration

2.21 If sample contains enough moisture to flow, mix well by shaking.

2.22 Pour a portion of the well mixed sample into the prepared evaporating dish until it is about half full.

2.23 Weigh sample immediately to avoid loss of moisture and record wet weight. Subtract the weight of the dish from the wet weight to determine grams of wet sludge.

2.24 Evaporate to dryness on a steam bath.

2.25 Dry at 103°C for one hour.

2.26 Cool in a desiccator, weigh and record dry weight. Subtract the weight of the dish from the dry weight to determine grams of dry solids.

2.27 Place sample in muffle furnace at 550°C for 20 minutes.

2.28 Remove the dish from the furnace and, after partial cooling in the drying oven, place it in a desiccator until it is at room temperature.

2.29 Weigh and record results (ignited weight). Subtract the weight of the dish from the ignited weight to determine grams of ash.

2.3 Dewatered sludge samples

2.31 Break up cake into small pieces and place about 50 grams into the evaporating dish.

2.32 Weigh sample immediately to avoid loss of moisture and record wet weight. Subtract the weight of the dish from the wet weight to determine grams of wet sludge.

2.33 Dry at 103°C for 16 hours (overnight).

2.34 Cool in a desiccator, weigh and record dry weight. Subtract the weight of the dish from the dry weight to determine grams of dry solids.

2.35 Place sample in muffle furnace at 550°C for 20 minutes.

2.36 Remove the dish from the furnace and after partial cooling in the drying oven, place it in the desiccator until at room temperature.

2.37 Weigh and record results (ignited weight). Subtract weight of dish from the ignited weight to determine grams of ash.

3. CALCULATIONS - See bench sheet for example.

3.1 $$\% \text{ Total Solids} = \frac{\text{Weight of dry solids}}{\text{Weight of wet sludge}} \times 100$$

3.2 $$\% \text{ Volatile Solids} = \frac{\text{Weight of volatile solids}}{\text{Weight of dry solids}} \times 100$$

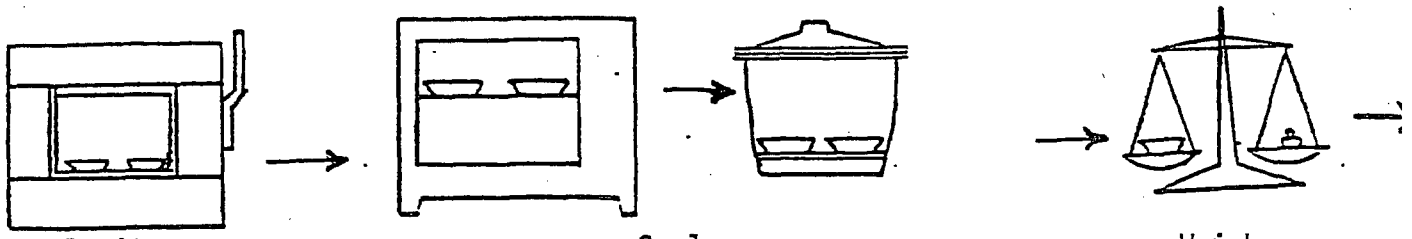
--OR--

$$\% \text{ Volatile Solids} = \frac{(\text{weight of dry solids - weight of ash})}{\text{weight of dry solids}} \times 100$$

3.3 Percent Ash = 100% - % Volatile Solids

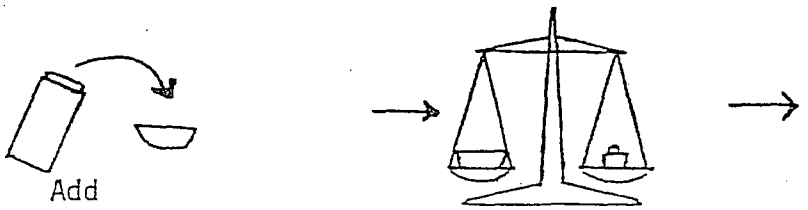
SLUDGE SOLIDS PROCEDURE

Evaporating Dish Preparation

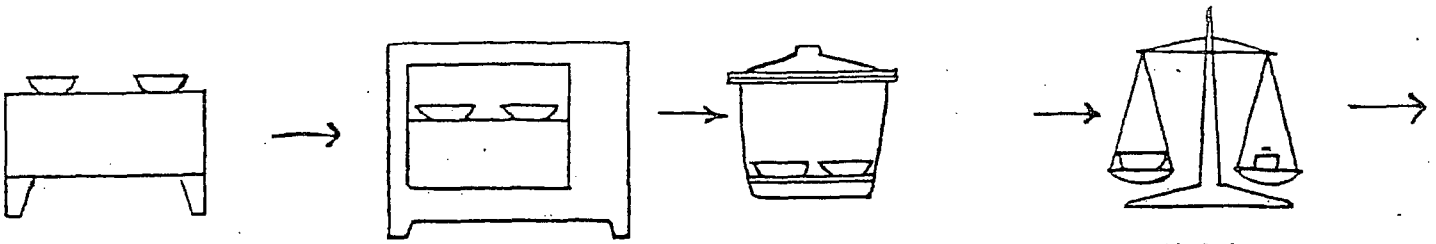


Ignite 2.11 → Cool 2.12 → Weigh 2.13 →

Total Solids Analysis

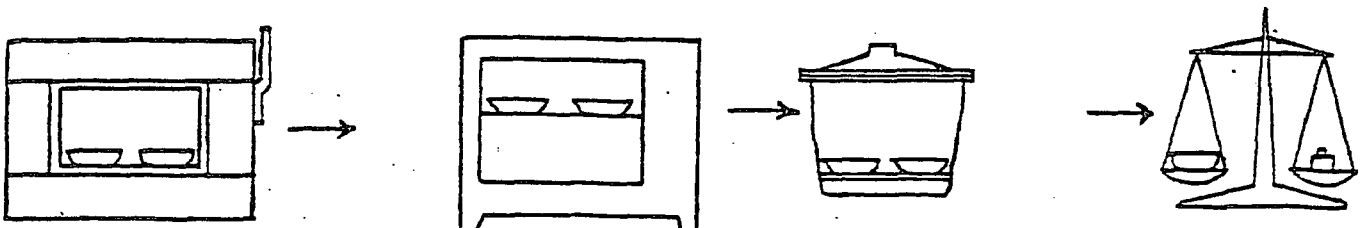


Add Sample 2.22 → Weigh 2.23 →



Evaporate 2.24 → Dry 2.25 → Cool 2.26 → Weigh 2.26 →

Volatile Solids Analysis



Ignite 2.27 → Cool 2.28 → Weigh 2.29

SLUDGE ANALYSIS

Date		1-1-90					
Sample		Raw					
Dish No.		3					
Dish/Sludge		90.30					
Dish Wt.	(-)	50.23					
Wet Sludge Wt.	(A)	40.07					
Dish & Dry		52.43					
Dish Wt.	(-)	50.23					
Dry Wt.	(B)	2.20					
% Total Solids		5.5					
Dish & Dry		52.43					
Dish & Ash	(-)	51.26					
Volatile Wt.	(C)	1.17					
% Volatile		53.2					
Gal. Sludge		10,580					
pH Sludge		6.9					

$$\% \text{ Total Solids} = \frac{\text{Dry Wt. (B)}}{\text{Wet Wt. (A)}} \times 100\%$$

$$= \frac{2.20}{40.07} \times 100\%$$

$$= 5.5\%$$

$$\% \text{ Volatile} = \frac{\text{Volatile Wt. (C)}}{\text{Dry Wt. (B)}} \times 100\%$$

$$= \frac{1.17}{2.20} \times 100\%$$

$$= 53.2\%$$

SLUDGE ANALYSIS

Date						
Sample						
Dish No.						
Dish/Sludge						
Dish Wt. (-)						
Wet Sludge Wt. (A)						
Dish & Dry						
Dish Wt. (-)						
Dry Wt. (B)						
% Total Solids						
Dish & Dry						
Dish & Ash (-)						
Volatile Wt. (C)						
% Volatile						
Gal. Sludge						
pH Sludge						

Date						
Sample						
Dish No.						
Dish/Sludge						
Dish Wt. (-)						
Wet Sludge Wt. (A)						
Dish & Dry						
Dish Wt. (-)						
Dry Wt. (B)						
% Total Solids						
Dish & Dry						
Dish & Ash (-)						
Volatile Wt. (C)						
% Volatile						
Gal. Sludge						
pH Sludge						

% Dry Solids = $\frac{B}{A} \times 100\%$ % Volatile Solids = $\frac{C}{B} \times 100\%$

MIXED LIQUOR SUSPENDED SOLIDS

1. APPARATUS

   1.1 Vacuum pump

   1.2 Vacuum flask (500 ml)

   1.3 Buchner funnel (90 mm diameter or larger)

   1.4 Whatman No. 1 filter paper or equivalent (sized to fit size of Buchner funnel).

   1.5 Automatic single pan analytical balance.

   1.6 Drying oven-forced draft, capable of maintaining temperature at 103°C ± 1°C.

   1.7 Desiccator cabinet indicating desiccant.

2. PROCEDURE

   2.1 Dry a piece of filter paper in the drying oven at 103°C for 1 hour.

   2.2 Place the filter paper in the desiccator until it has cooled.

   2.3 Weigh the filter paper and record the weight.

   2.4 Place the filter paper in the Buchner funnel and seat it by wetting thoroughly with distilled water and applying vacuum.

   2.5 Stir the sample well and pour out 100 ml into a 100 ml graduated cylinder.

   2.6 With the vacuum on, pour the sample onto the filter paper being sure none of the sample escapes over the edge of the filter.

   2.7 Rinse out the graduated cylinder with distilled water and pour the rinse onto the filter paper.

   2.8 Turn off the vacuum when water no longer passes through the filter.

   2.9 Remove the filter paper from the Buchner funnel and place it in the oven at 103°C for 1 hour.

2.10 After 1 hour remove the sample from the oven and place it in the desiccator until cool.

2.11 Weigh the filter paper (dry weight).

3. CALCULATIONS

3.1 Dry weight - filter weight = grams of suspended solids.

3.2 mg/L suspended solids =

$$\text{grams of suspended solids} \times 1000 \times \frac{1000}{\text{mls sample}}$$

NOTE: If mixed liquor volatile suspended solids are to be tested for, use glass fiber filters or ashless filter paper in the Buchner funnel. The glass fiber filters should be of the same quality as those used for influent or effluent volatile solids. They should be sized to fit the Buchner funnel being used for the mixed liquor suspended solids. The procedure used should be identical to the influent or effluent volatile solids. Be sure to pre-ignite the glass fiber filters at 550°C for 15 minutes and cool before the initial weighing. The filter can be placed in a large evaporating dish for easy handling.

SLUDGE DENSITY INDEX AND SLUDGE VOLUME INDEX

DISCUSSION: The determination of settling characteristics is one of the most important tests done in the activated sludge plant. At least three daily readings should be obtained for settling tests in order that changes in settling characteristics can be noted quickly enough for remedial action to be taken before a bulking of sludge over the final tank weirs occurs. A bulking situation can often be predicted by gradual decreases in the sludge density index. Adjustment in operational procedure can then be performed to reverse the direction of SDI readings and prevent bulking from occurring.

1. SETTLING TEST

1.1 The settling test is designed to measure the percent volume of a 1000 ml graduated cylinder occupied by MLSS after thirty minutes of settling.

1.2 Sampling

1.21 Obtain a grab sample of the mixed liquor at the tail-end of the aeration tank just before the flow goes to the secondary clarifier.

1.22 The sample should be obtained in the graduated cylinder if at all possible.

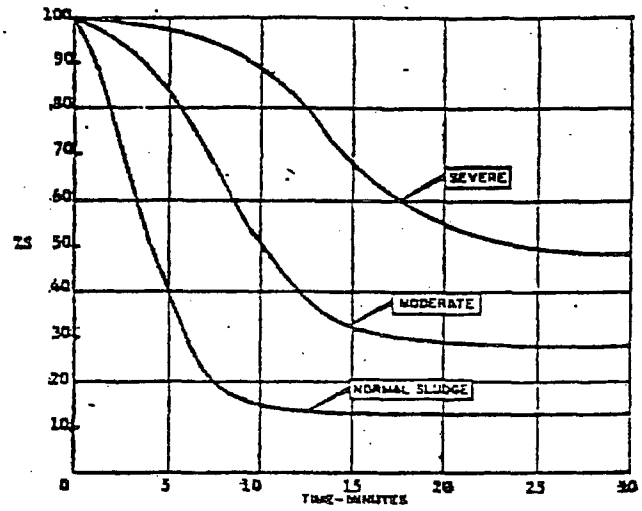
1.23 If the sample cannot be obtained directly in the graduated cylinder, then care should be taken in avoiding disturbing the sample as little as possible prior to pouring in the graduate.

1.3 Laboratory technique. Determine the settled volume of activated sludge by collecting a 1 liter sample at the outlet of the aeration tank.

1.4 Typical range of values: 10% - 30% after thirty minutes settling.

1.5 Graphical representation of the settling test: While the mixed liquor is settling, record the percent settleability at 5 minute intervals and plot on a graph.

SDI-SVI



2. SLUDGE DENSITY INDEX (SDI)

2.1 Sludge Density Index relates the percent concentration of solids in a settled volume of sludge after thirty minutes settling time to the mixed liquor suspended solids.

2.2 Sludge Density Index = $\frac{\text{mg/L Mixed Liquor Suspended Solids} \div 1000}{\text{mls of Solids settled after 30 min.} \div 100}$

2.3 SLUDGE TYPE	SDI
Good Sludges	2 - 1
Moderate Bulking	1 - 0.5
Severe Bulking	0.5

3. SLUDGE VOLUME INDEX (SVI)

3.1 Sludge Volume Index is another sludge density indicator sometimes used.

3.2 Sludge Volume Index = $\frac{\text{mls of Solids settled after 30 min. x 1000}}{\text{mg/L Mixed Liquor Suspended Solids}}$

3.3 SVI = $\frac{100}{\text{SDI}}$

COOK WASTEWATER TREATMENT PLANT
pH TESTING PROCEDURES

The Cook WWTP routinely performs pH on the plant influent, effluent, SBR #1's effluent, SBR #2's effluent, and Equalization Basin. The Cook WWTP follows the DEQ Manual for the pH Test. This procedure is based on USEPA Method 150.1 Some specific procedures for the Cook facility are listed below.

1. Use channel #1 on the Orion Model 920A for pH analysis.

2. Use premade pH 7 and pH 10 buffer for calibration of the meter. The meter is calibrated daily.

3. The slope reading from the pH calibration should be between 92 and 102. Refer to the Orion pH probe's troubleshooting guide for maintenance.

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pH VALUE

DISCUSSION: The pH of a solution gives an indication of the intensity of the acidity or alkalinity of the solution. Pure water exists in a partially ionized state as indicated by the equation:

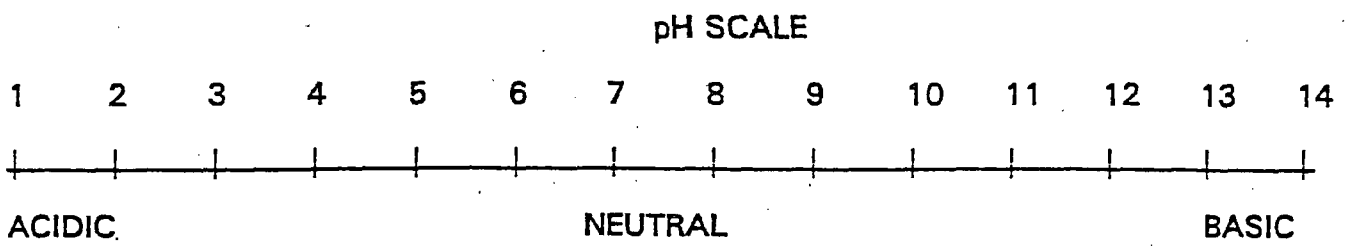
$$H_2O \rightleftharpoons H^+ + (OH)^-$$

Since an acid may be defined as a substance which produces hydrogen ions and a base may be defined as a substance which produces hydroxyl ions, water may be thought of as being both an acid and a base. Since these ions are present in equal quantities pure water is said to be neutral.

It has been found, experimentally, that in pure water the concentration of H^+ is 0.0000001 Molar, which may also be written 1×10^{-7}M. This means that pure water contains 1 molecular weight (1.008 grams) of hydrogen ions for every 10 million liters. Since there is an equivalent amount of hydroxyl ions its concentration is also 1×10^{-7}M.

As a means of making these concentrations easier to work with the term "pH" was developed. pH is defined as the negative logarithm of the hydrogen ion concentration. The log of 1×10^{-7} is -7 and the negative of this number is 7, so that the pH of a 1×10^{-7}M H^+ solution would be 7. As the concentration of H^+ increases, the pH value decreases. For example, if the H^+ concentration of a solution is 1×10^{-3} we can see that the pH value would be 3, since the negative log of 1×10^{-3} equals 3.

The pH of a neutral solution is 7. When a solution has a higher concentration of H^+ than a neutral solution the pH is below 7 and we say that it is acidic. When the H^+ concentration of a solution is less than that of a neutral solution the pH is above 7 and we say that the solution is basic or alkaline. The following diagram helps to illustrate this relationship.



The same type of notation can be used for the $(OH)^-$ concentration. The p(OH) of a neutral solution would also be 7 since the concentrations of H^+ and $(OH)^-$ are equal.

In water we know that the concentration of H^+ times the concentration of $(OH)^-$ gives the constant value 1×10^{-14}. Since adding the logs of numbers is the same as multiplying the numbers we can say that pH + p(OH) = 14. This makes it possible for us to know the p(OH) for a solution by measuring pH and subtracting this value from 14. This also explains why the entire range of possible pH values in water is from 0 to 14.

Acids and bases which ionize almost completely in water are called "strong" acids or bases. Those which do not ionize to this extent are called "weak" acids or bases. Examples of strong acids are HCl, H_2SO_4, and HNO_3, whereas H_2S and H_2CO_3 are weak acids. An example of a strong base is NaOH because it ionizes into Na^+ and $(OH)^-$ almost entirely, but since $Ca(OH)_2$ only partially ionizes into Ca^{+2} and $(OH)^-$ it is considered a weak base.

pH is very important in the wastewater field for several reasons. Most microorganisms are sensitive to changes in pH and wide fluctuations may cause problems in wastewater treatment plants that rely on biological processes. One example of this is the anaerobic digester where pH must be maintained between specific limits for the bacteria to stabilize the sludge. Precipitation reactions such as the removal of phosphorus or heavy metals by addition of lime also depend on close control of pH. Corrosion control is very dependent upon close control of pH levels.

The discharge of acid into a wastewater collection system will usually corrode the piping and may produce toxic gases such as H_2S. Many types of laboratory analyses require samples and reagents to be held at specific pH levels. In many of these analyses failure to adjust pH to the proper level will cause the results to be completely unreliable.

pH levels are measured electrometrically using an electrode which has a pH sensitive glass tip. When the glass electrode is placed in a solution which differs in pH from the solution inside the electrode an electrical potential is generated between the glass electrode and a reference electrode. This potential, which is proportional to the pH difference, is measured and the output is related to the pH of the sample solution in the electronics of the meter.

Temperature effects on the electrometric measurement of pH arise from two sources. The first is caused by the change in electrode output at various temperatures. This interference can be controlled with instruments having temperature compensation or by making sure that the calibrating buffers and the samples are at the same temperature. The second source is the change of pH inherent in the sample at various temperatures. This error is sample dependent and cannot be controlled. On very critical work pH measurements should, therefore, be accompanied by the temperatures at which the measurements were made.

pH VALUE PROCEDURE

1. APPARATUS

   1.1 pH meter consisting of potentiometer, glass electrode, and reference electrode, capable of accuracy to at least 0.1 pH unit.

   1.2 Buffer solutions of pH 4, 7, and 10

   1.3 Beakers, preferably polyethylene or Teflon

   1.4 Magnetic stirrer with Teflon coated stir bar

2. PROCEDURE

   2.1 Remove electrodes from storage solution and rinse with distilled or demineralized water. Blot electrode dry with a soft cloth or tissue.

   2.2 Bring sample solution and buffers to same temperature if possible. Record temperature of measurement.

   2.3 Place the buffer or sample in a clean beaker using a sufficient volume to cover the sensing elements of the electrodes and to give adequate clearance for the magnetic stirring bar.

   2.4 Standardize the instrument using a pH 7.0 buffer solution, adjusting the calibrate control until the proper response is obtained. During calibration and sample measurement the buffer or sample should be stirred at a slow, constant rate.

   2.5 Immerse the electrode in a second buffer solution which is at least 3 pH units different from the first, bracketing the expected sample pH. The adjustment control for the second buffer is labeled either "slope" or "temperature" on most instruments and should be adjusted to obtain the proper response.

pH Value

2.6 After rinsing and blotting the electrode, immerse it in the sample solution, wait for a stable reading, and record the pH value.

2.7 Store electrodes as recommended by the manufacturer.

NOTE: Some pH meters may require a slightly different operating procedure. Consult manufacturer's manual for specific instructions.

BUFFERS

A buffer is a combination of substances which, when dissolved in water, resists a pH change in the water, as might be caused by the addition of an acid or base by accepting or donating hydrogen ions to the solution.

Buffer solutions usually are composed of mixtures of weak acids and their salts or weak bases and their salts. An example of a buffer formed by a weak acid and its salt is the solution of acetic acid and sodium acetate in water. Ionization of these two compounds occurs as in the equations below:

$$HC_2H_3O_2 \rightleftharpoons H^+ + (C_2H_3O_2)^-$$

Acetic Acid $\rightleftharpoons$ Hydrogen Ion + Acetate Ion

$$NaC_2H_3O_2 \rightleftharpoons Na^+ + (C_2H_3O_2)^-$$

Sodium Acetate $\rightleftharpoons$ Sodium Ion + Acetate Ion

Since acetic acid is a weak acid, ionization does not occur to a large extent. The sodium acetate, however, ionizes almost completely. Making a solution of these two chemicals results in a large excess of the acetate ion in the solution.

When an acid (H^+) is added, the H^+ reacts with the excess acetate ion to form acetic acid, leaving the H^+ concentration almost unchanged, thus the pH of the solution remains almost unchanged.

When a base (OH^-) is added, the OH^- reacts with the H^+ to form water, but the acetic acid ionizes more to donate more H^+. Again, the H^+ concentration changes very little and as a result the pH also remains almost unchanged.

It is possible to prepare buffer solutions which have the ability to buffer within various pH ranges by using different acid and salt or base and salt pairs. Listed below are a few chemicals which, when combined in the proper proportions, will tend to maintain the pH to within the indicated range.

COOK WASTE WATER TREATMENT PLANT
AMMONIA NITROGEN TESTING PROCEDURES

The Cook WWTP routinely performs Ammonia Nitrogen testing on the plant influent, effluent, SBR #1's effluent, SBR #2's effluent, and Equalization Basin. The Cook WWTP follows the DEQ Manual for the Ammonia Nitrogen Test (Ion Selective Electrode Method). This procedure is based on USEPA Method 350.2. Some specific procedures for the Cook facility are listed below.

I. Use channel #4 on the Orion Model 920A for Ammonia Analysis.

2. Calibrate with three standards (1 ppm, 10 ppm, and 100 ppm). Use pre-made 100 ppm and 1,000 ppm standards.

3. Use pre-made Ammonia ISA Buffer for adjusting the sample pH.

4. Calibrate meter at least every other day during use. The slope must be between -54 and —60.

5. Refer to Orion Ammonia probe's troubleshooting guide for maintenance including membrane replacement.

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NPDES
APPROVED
METHOD

AMMONIA-NITROGEN
ION SELECTIVE ELECTRODE

The ammonia nitrogen ion selective electrode is a gas sensing electrode. In the procedure, NaOH is added to samples to bring to pH up to at least 11. This causes a release of ammonia gas from the solution. The ammonia gas diffuses through the electrode membrane and causes a change in the pH of the electrode filling solution. This change in pH is detected by the electrode and is related to the concentration of ammonia nitrogen in the sample.

The procedure described below may be used to determine ammonia nitrogen within a sample concentration range of 0.03 mg/l to 1400 mg/l. Distillation of samples before measurement is required by the EPA unless the analyst has data on file to prove that the distillation step is unnecessary. When distilling samples which will be analyzed by this method, 0.04N H_2SO_4 should be used to trap the distillate.

As with all electrode methods, temperature is an important factor in making accurate determinations. Temperature compensation (automatic or manual) must not be used. Instead, assure that standards and samples are at the same temperature before analysis.

Consult the manfacturer's literature for information dealing with calibration and operation of the specific ion meter and electrode.

1. APPARATUS

1.1 Specific ion meter with ammonia selective electrode.

1.2 Beakers - plastic or glass, 150 ml, one for each standard and sample.

1.3 Volumetric flasks, one 1000 ml, and two 100 ml.

1.4 Volumetric pipets, one 1 ml, and one 10 ml.

1.5 Graduated pipet, 5 ml.

1.6 Magnetic stirrer with stir bars.

2. REAGENTS

2.1 Ammonia Stock Solution, 1000 mg/L as N (Orion 951007).

2.11 Dissolve 3.819 g anhydrous NH_4Cl, dried at 100°C, in distilled water, and dilute to 1000 ml. Prepare fresh at least every six months.

2.2 Ammonia Standard Solution, 100 mg/L as N

2.21 Pipet 10.0 ml of the 1000 mg/L stock ammonia solution into a 100 ml volumetric flask and dilute to volume with distilled water. Prepare fresh at least monthly.

2.3 Ammonia pH adjusting solution, 10 N NaOH (Orion 951211).

2.31 Dissolve 400 g NaOH in 800 ml distilled water. Cool and dilute to 1000 ml with distilled water.

3. PROCEDURE

3.1 Prepare two standards that will provide accurate calibration for the expected range of sample concentrations. The concentration of the second standard should be ten times the concentration of the first standard.

3.11 Generally standards of 1.0 mg/L and 10.0 mg/L would be used. This provides accurate calibration for sample concentrations between 0.1 mg/L and 100 mg/L.

3.12 Prepare the 1.0 mg/L standard by pipeting 1.0 ml of the 100 mg/L standard into a 100 ml volumetric flask and diluting to volume with distilled water.

3.13 Prepare the 10 mg/L standard by pipeting 10.0 ml of 100 mg/L standard into a 100 ml volumetric flask and diluting to volume with distilled water.

3.2 Deliver 100 ml of the 1 mg/L standard into a 150 ml beaker, add a stir bar, place on the magnetic stirrer, and insert the electrode.

3.3 Using the graduated pipet, add 1 ml of 10 N sodium hydroxide, NaOH, while slowly mixing with magnetic stirrer (pH should be above 11).

3.31 The NaOH solution must not be added to standards or samples until the electrode is in the solution to be measured.

3.4 When a stable reading is obtained, calibrate the meter to the concentration of the first standard.

3.5 Rinse electrode and immerse in 100 ml of the 10 mg/L standard.

3.6. Add 1 ml of 10 N sodium hydroxide, NaOH, while slowly mixing.

3.7 When a stable reading is obtained, calibrate the meter to the concentration of the second standard.

3.71 If it is difficult to obtain a stable reading during calibration, it is sometimes helpful to immediately go through the calibration procedure a second time.

3.8 Display electrode slope and record this value. Assure that slope is within manufacturer's guidelines.

3.9 Rinse electrode and immerse in 100 ml of sample.

3.10 Add 1 ml of 10 N sodium hydroxide while stirring.

3.11 When a stable reading is obtained, record the concentration of the sample.

3.12 Repeat steps 3.9, 3.10, and 3.11 for each sample.

NH_3-N Electrode

3.13 Consult manufacturer's literature for instructions concerning short term storage of the electrode. For long term storage, the electrode should be disassembled, rinsed with distilled water, dried, and reassembled without the filling solution or membrane.

Ammonia-Nitrogen Recovery Analysis

Determination of percent recovery should be performed on ammonia-nitrogen analyses as part of the laboratory quality control program. This procedure outlines the steps required in making that determination.

A. PROCEDURE

1. Calibrate the meter as directed by the manufacturer.
2. Using a graduated cylinder to determine actual volume, add the volume of a sample normally used to a 150 ml beaker. Place on a magnetic stirrer and immerse the electrode. Add the required volume of 10 N sodium hydroxide, and record the reading when it is stable.
3. Without removing the electrode from the beaker containing the sample, use a volumetric pipet to add a suitable volume of the 100 mg/L standard into the beaker. Use 10-15 mls for influent samples, and 1-5 mls for effluent samples.
4. Do not add more sodium hydroxide after the addition of standard.
5. Record the meter reading when it is stable.
6. Determine the percent recovery using the formula below.

B. CALCULATION

In this analysis, the addition of standard will dilute the sample to some extent. The formula given here will account for this added volume.

$$\frac{(C_{ms} \times V_{ms}) - (C_m \times V_m)}{C_s \times V_s} \times 100\% = \text{Percent Recovery}$$

Where:

C_{ms}	=	mg/L of NH_3-N after spiking
V_{ms}	=	mls sample + mls standard
C_m	=	mg/L NH_3-N before spiking
V_m	=	mls sample before spiking
C_s	=	mg/L of standard used (1.00 mg/L in this case)
V_s	=	mls standard added to sample

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COOK WASTE WATER TREATMENT PLANT
NITRATE TESTING PROCEDURES

The Cook WWTP routinely performs Nitrate Nitrogen testing on the plant effluent, SBR #1's effluent, and SBR #2's effluent. **Note: This is not an approved method. This method can only be used for operational data, not reportable data. An effluent sample will be sent at least once a week to a lab that uses an approved method (USEPA 353.2).** Specific procedures for the Cook facility are listed below.

Discussion: In water and wastewater the forms of nitrogen of greatest interest are nitrate, nitrite ammonia and organic nitrogen. All of these forms of nitrogen, as well as nitrogen gas are biochemically interconvertible and are components of the nitrogen cycle. Nitrate generally occurs in trace quantities in surface water but may attain high levels in some groundwater. In excessive amounts, it contributes to the illness known as methemoglobinemia in infants. A limit of 10 mg nitrate as nitrogen/L has been imposed on drinking water to prevent this disorder.

Nitrate is found only in small amounts in fresh domestic wastewater but in the effluent of nitrifying biological treatment plants nitrate may be found in concentrations of up to 30 mg nitrate as nitrogen/L. It is an essential nutrient for many photosynthetic autotrophs and in some cases has been identified as the growth-limiting nutrient.

Determination of nitrate is difficult because of the relatively complex procedures required, the high probability that interfering constituents will be present and the limited concentration ranges of the various techniques.

SAMPLING: Start nitrate determinations promptly after sampling. If storage is necessary, store for up to 24 hours at 4 degrees Celsius; for longer storage, preserve with 2 ml concentrated H_2SO_4 and store at 4 degrees Celsius. NOTE: When sample is preserved with acid, nitrate (NO_3^-) and nitrite (NO_2^-) cannot be determined as individual species.

INTERFERENCES: Chloride and bicarbonate ions interfere when their weight ratios to NO_3^- N are >10 or >5 respectively. There are a few select ions that are potential interferences but do not normally occur at significant levels in potable waters.

APPARATUS:

1. Orion electro meter 920A with Orion 93 series electrode body with nitrate sensing module
2. Orion double junction reference probe model 90-02
3. 100 ml plastic or glass beakers
4. Ionic Strength Adjuster (ISA)
5. 100 ml graduated cylinders
6. magnetic stir bars
7. 2 ml graduated pipette
8. Magnetic stirring device

Procedure: Orion meter must be calibrated per the manufacturer's recommendations.

1. Use Channel #2 on the Orion Model 920A for Nitrate analysis.
2. Obtain composite samples of the effluent wastewater.
3. Measure 100 ml samples of effluent placing each sample into separate beakers.
4. Visually check the reference probe filling solution level. Be sure to maintain a level of filling solution to the bottom of the outer probe body fill hole.
5. Rinse the nitrate probe with distilled water.
6. Place a magnetic stir bar in each beaker and place one effluent sample on the stirring device. Adjust the stirring speed between 3 and 4.
7. Immerse the probe into an effluent sample and dispense 2.0 ml ISA solution. Push "measure" (#3) after dispensing the ISA to get the reading for the first effluent sample.
8. When the Orion meter reads ready ("rdy"), Hold ("hld"), record the reading on the laboratory data sheet.
9. Rinse the probe once again with distilled water before the next sample reading.
10. Repeat steps 6-9 for the remaining samples.

Calibration procedures for the Nitrate probe are outlined below.

PROCEDURE:

1. Use premade 100 ppm and 1000 ppm standard.
2. Designate the 100 ml volumetric to concentrations of 100, 10.0, and 1.00 ppm.
3. To obtain the three standards:
   - Dilute 10.0 ml of 1000 ppm standard to 100 ml to achieve a 100 ppm standard.
   - Dilute 10.0 ml of 100 ppm standard to 100 ml to achieve a 10.0 ppm standard.
   - Dilute 1.0 ml of 100 ppm standard to 100 ml to achieve a 1.00 ppm standard.
4. Empty the 100, 10.0, and 1.00 ppm concentration solutions into designated beakers.
5. Push "calibrate" (#2) on the Orion 920A Meter.
6. When asked the number of standards, push "3" and "yes" (enter).
7. Begin calibration with lowest concentration standard (1.00 ppm), immerse the probe and dispense 2.0 ml of ISA into the solution.
8. When the meter reads "enter standard value," enter "1.00" and then remove the prove from the sample and immerse it in the next concentration (10.0 ppm).
9. Repeat steps 7-8 for the remaining standards entering "10.0" and "100" when asked for corresponding standard values.
10. The meter will then compute a slope value for the calibration. An optimum slope value is between -54.0 to -60.0 mV.
11. Record the calibration results.
12. Refer to Orion Nitrate probe's troubleshooting guide for maintenance.

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COOK WASTEWATER TREATMENT PLANT
NITRITE NITROGEN TESTING PROCEDURES

The Cook WWTP routinely performs Nitrite Nitrogen on the plant effluent, SBR #1's effluent, and SBR #2's effluent. The Cook WWTP follows the Diazotization Method (#8507) found in the HACH Lab Procedures Manual. This procedure is based on USEPA Method 354.1. Some specific procedures for the Cook facility are listed below.

1. Follow the Powder Pillow procedures.

2. Samples may have to be diluted. Use 2 to 5 ml of sample and dilute to 25 ml using volumetric flask. Remember the Blank will also have to be diluted.

3. Check meter accuracy periodically using premade standards.

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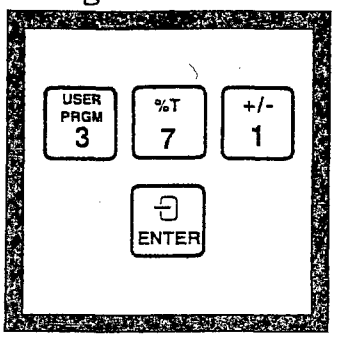
NITRITE, LR (0 to 0.300 mg/L NO_2^--N)

For water, wastewater, and seawater

Diazotization Method (Powder Pillows or AccuVac Ampuls).

USEPA Approved for reporting wastewater analysis*

Using Powder Pillows



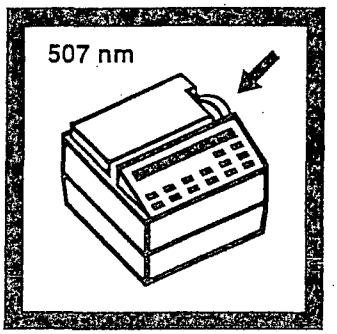
1. Enter the stored program number for low range nitrite nitrogen (NO_2^--N) powder pillows.

Press: **3 7 1 ENTER**

The display will show:

Dial nm to 507

Note: The Pour-Thru Cell can be used with 25 mL reagents only.



2. Rotate the wavelength dial until the small display shows:

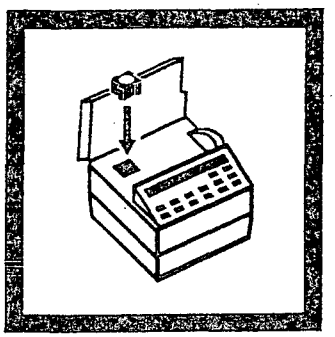
507 nm

When the correct wavelength is dialed in, the display will quickly show:

Zero Sample

then:

mg/L NO_2^--N LR

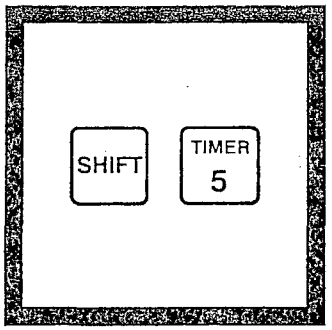


3. Insert the 10-mL Cell Riser into the cell compartment

4. Fill a 10-mL sample cell with 10 mL of sample.

5. Add the contents of one NitriVer 3 Nitrite Reagent Powder Pillow (the prepared sample). Stopper. Shake the cell to dissolve the powder.

Note: A pink color will develop if nitrite nitrogen is present.



6. Press:

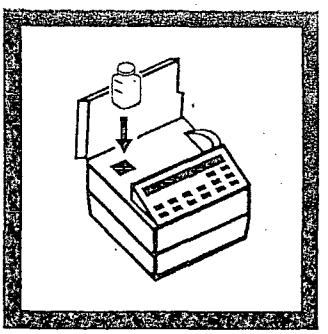
SHIFT TIMER

A 20-minute reaction period will begin.

7. When the timer beeps, the display will show:

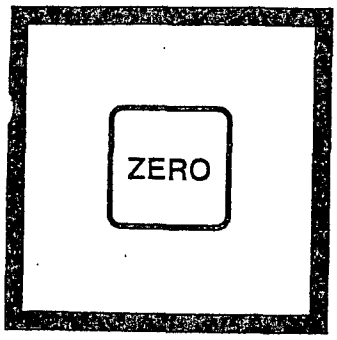
mg/L NO_2^--N LR

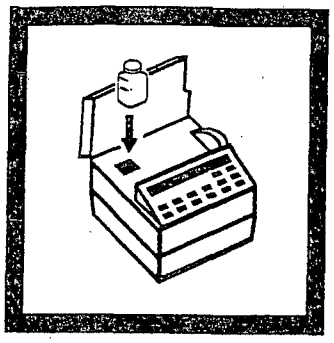
Fill a second 10-mL sample cell with 10 mL of sample (the blank).

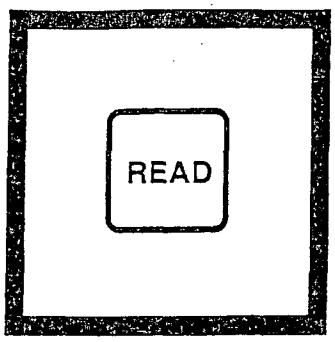


8. Place the blank into the cell holder. Close the light shield.

* *Federal Register*, 44(85) 25505 (May 1, 1979).







9. Press: **ZERO**

The display will show:

Zeroing. . . .

then:

0.000 mg/L NO_2^--N LR

10. Remove the stopper from the prepared sample. Place the cell into the cell holder. Close the light shield.

11. Press: **READ**

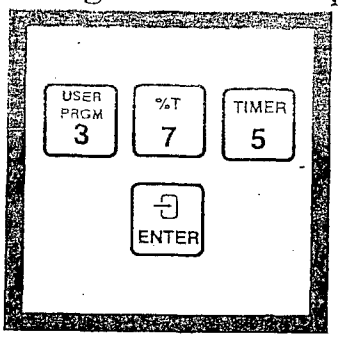
The display will show:

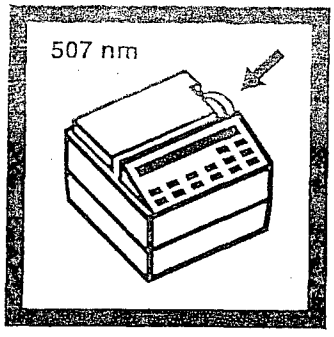
Reading. . . .

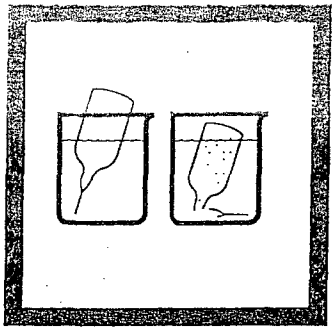
then the result in mg/L nitrite expressed as nitrogen (NO_2^--N) will be displayed.

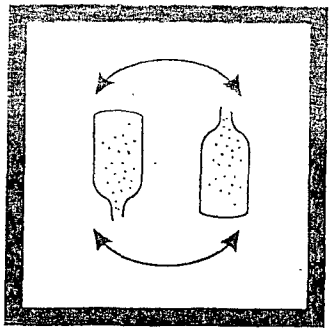
Forms ⇕ $NaNO_2$ / NO_2^--N / NO_2^-

Using AccuVac Ampuls









1. Enter the stored program number for low range nitrite AccuVac ampuls.

Press: **3 7 5 ENTER**

The display will show:

Dial nm to 507

2. Rotate the wavelength dial until the small display shows:

507 nm

When the correct wavelength is dialed in, the display will quickly show:

Zero Sample

then:

mg/L NO_2^--N LR AV

3. Collect at least 40 mL of sample in a 50-mL beaker. Fill a NitriVer 3 Nitrite AccuVac Ampul with sample.

Note: Keep the tip immersed while the ampul fills.

4. Invert the ampul several times to mix. Wipe off any liquid or fingerprints.

Note: A pink color will develop if nitrite nitrogen is present.

COOK WASTEWATER TREATMENT PLANT
BOD TESTING PROCEDURES

The Cook WWTP routinely performs BOD testing on the plant influent and effluent. The Cook WWTP follows the DEQ Manual for the BOD test. This procedure is based on USEPA Method 405.1. Some specific procedures for the Cook facility are listed below.

I. Use the YSI Meter and Probe for BOD testing.

2. Refer to YSI DO probe's troubleshooting guide for maintenance of probe including the changing of membranes.

3. Use influent sample volumes of 4 and 6 mls.

4. Use effluent sample volumes of 200 and 250 mls.

5. The effluent sample may have to be seeded, For this purpose, use seed purchased from a commercial vendor such as NCL.

6. Use Hach BOD buffer pillows for making the dilution water.

7. Do not add nitrification inhibitor to the effluent samples.

8. Use BOD standard purchased from a commercial vendor such as NCL.

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BIOCHEMICAL OXYGEN DEMAND

The B.O.D. test is one of the most commonly used indicators of water pollution. It gives an indication of the amount of oxygen used up, or demanded, by the waste being tested. Microorganisms use up this oxygen as they feed on the carbonaceous material in the waste. This is important because wastes which have a high oxygen demand will deplete the oxygen in the receiving water. This oxygen depletion may have adverse effects on the quality of life in that water. As the oxygen level decreases, the number of higher life forms in the stream decreases. If the oxygen level decreases too far, the only surviving organisms will be those which are normally considered to be nuisances, and the usefulness of the water will be greatly diminished. This is why it is necessary to reduce the B.O.D. of the waste as much as possible before discharge. The amount of B.O.D. which may be discharged by each wastewater treatment plant is limited by the State. This is based on the amount of flow being discharged and the size, type, and uses of the receiving water. Streams with little flow or low velocity cannot support high B.O.D. loading and therefore B.O.D. discharge limitations will be more stringent.

Material which exerts B.O.D. may be either soluble or insoluble. In a wastewater treatment plant, much of the insoluble B.O.D. is removed in the primary tanks by the settling process. Most of the remaining insoluble B.O.D. and the soluble B.O.D. is removed in the secondary process, where the microorganisms which feed on carbonaceous material in the wastes being received are concentrated and provided with air so that B.O.D. will be removed. Soluble B.O.D. will be absorbed directly into the cell by the microorganisms, while insoluble B.O.D. will stick to the outer cell wall until the cell excretes enzymes which solubilize the material and it is absorbed. The maintenance of a healthy biological population and good settling conditions will help assure efficient B.O.D. removal in the wastewater treatment plant.

B.O.D.

The B.O.D. test is an attempt to simulate what happens when a waste enters the receiving waters. The test normally specifies a five day incubation period. During the five days the waste is oxidized by the bacteria normally present in the waste and the dissolved oxygen in the bottle is therefore depleted. In the receiving water the bacteria oxidize wastes in a similar manner, thus using the dissolved oxygen. Five days is an arbitrary time period selected for the test. This time period works out very well since a large percentage of the total oxygen demand is met in five days.

Good technique is very important for all B.O.D. testing but especially at those plants which have stringent B.O.D. limits. When a sample is collected for the B.O.D. test, it should be taken at a place where it will represent the flow being sampled as well as possible. If the sample is not going to be analyzed immediately (such as in composite samples), it should be refrigerated at 4°C until the time of analysis.

Accuracy in the B.O.D. test is dependent on several factors; preparing proper dilutions of the sample, correctly measuring the dissolved oxygen before and after incubation, and proper incubation conditions. It is also necessary that sufficient numbers of microorganisms are present in the B.O.D. bottle to feed on the waste being tested. These microorganisms are normally present in domestic wastes being received by the wastewater treatment plant, but there are some instances where this may not be the case. Many industrial wastes do not contain sufficient numbers of the organisms, therefore no oxygen would be demanded in the B.O.D. test in spite of the presence of organic materials in the waste. This would also be the case in effluents which have been disinfected.

The necessary organisms may be added to the B.O.D. bottle in a procedure called "seeding". The waste would first be treated to remove the disinfecting agent, if present, and a quantity of domestic sewage is added to the B.O.D. bottle containing

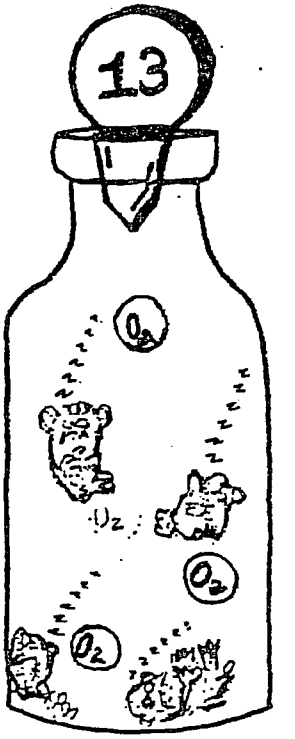
the sample. Typically, 1 ml of primary effluent or settled sewage has been used as seed for industrial samples and dechlorinated wastewater treatment plant effluent samples. Since the seed material will also exert some oxygen demand due to organics in the material used as seed, this oxygen depletion must be subtracted out in the calculation for B.O.D. of the sample. This calculation is addressed in the CALCULATION section of the B.O.D. procedure.

While the B.O.D. test was originally designed to measure the oxygen depletion due to carbonaceous compounds in the waste, ammonia may also exert an oxygen demand if nitrifying bacteria are present in sufficient quantities. These bacteria use oxygen to convert ammonia to nitrates in the process called nitrification. Since many secondary wastewater treatment plants are now designed to encourage the growth of nitrifying bacteria, B.O.D. analysis of effluent samples from these plants may be misleading. A plant which has a lower B.O.D. result and no nitrification may actually have a higher carbonaceous B.O.D. than a plant with a higher B.O.D. reading which is largely or completely nitrogenous B.O.D.

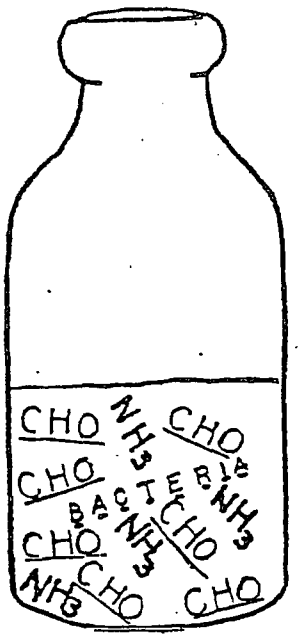
Many discharge permits issued by the State now require the analysis of carbonaceous B.O.D. (CBOD). This may be determined by adding a nitrification inhibitor to the B.O.D. bottle. The chemical which is currently approved for this purpose is 2-chloro-6-(trichloromethyl) pyridine (TCMP), and is available from Hach Chemical Company in a form which is quite easily dissolved. The use of the nitrification inhibitor in the CBOD test is addressed in the B.O.D. procedure.

Sewage contains food & bacteria

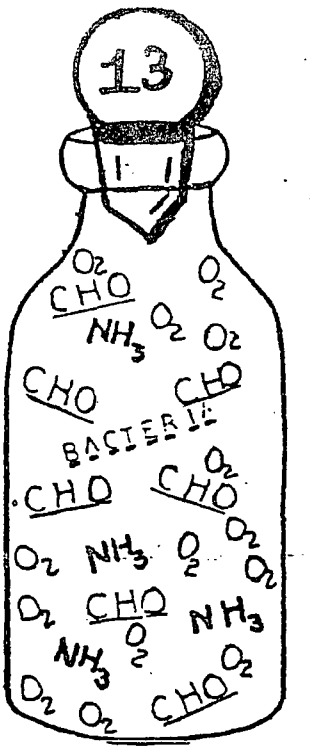
Dilution water provides nutrients and oxygen. Bottle is incubated at 20°C for 5 days in the dark.



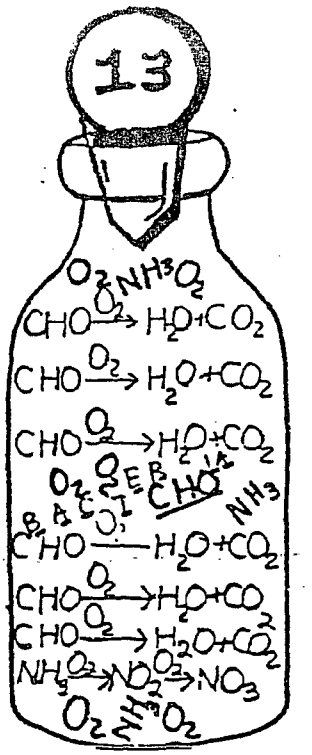
After 5 days, B.O.D. (food) has been oxidized. Unused oxygen remains.



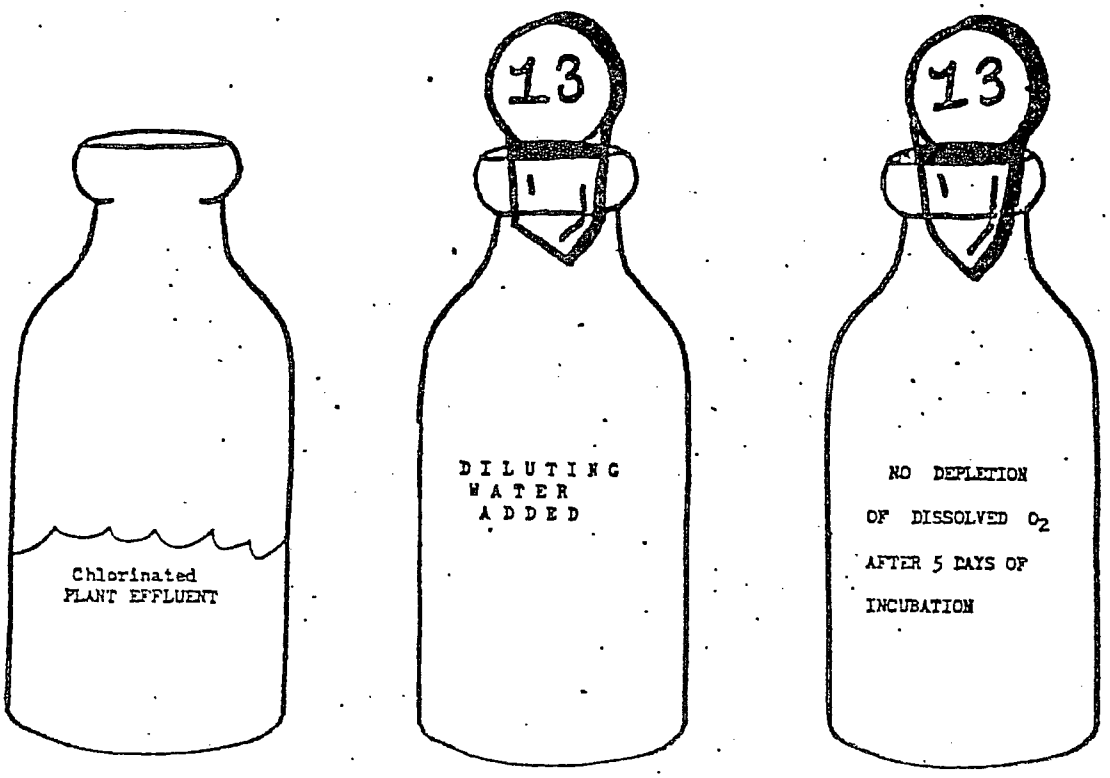
Sewage contains carbonaceous and nitrogenous (from protein) matter and bacteria.

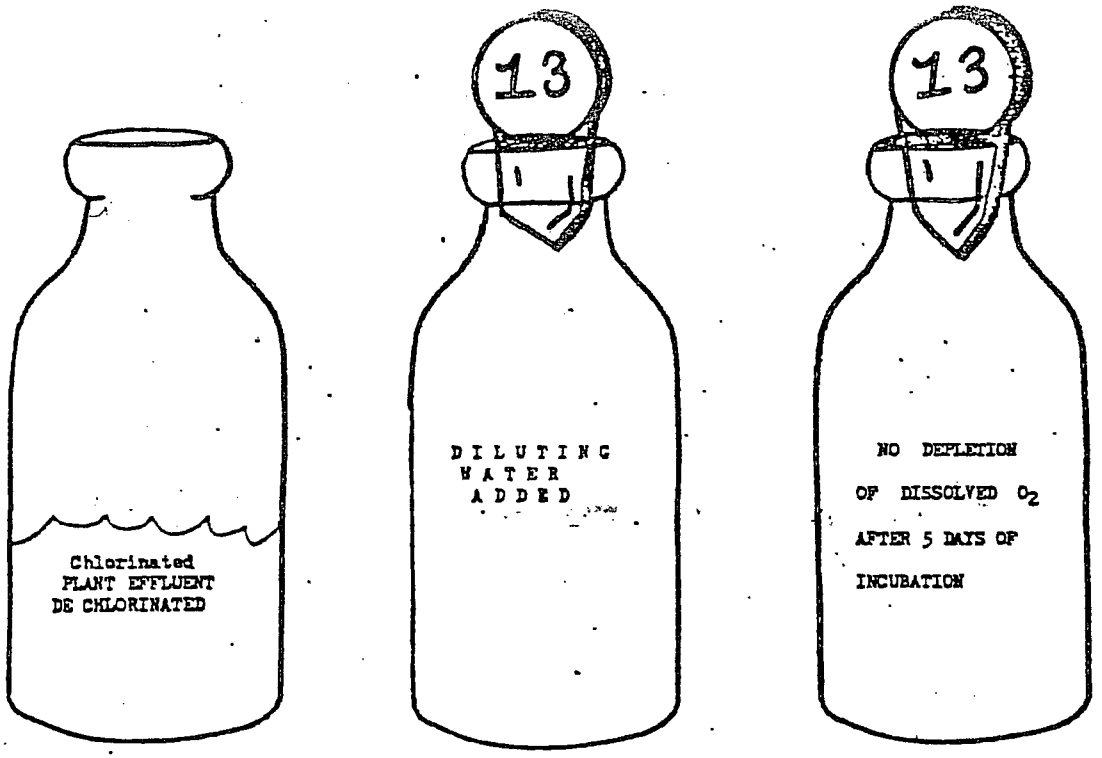


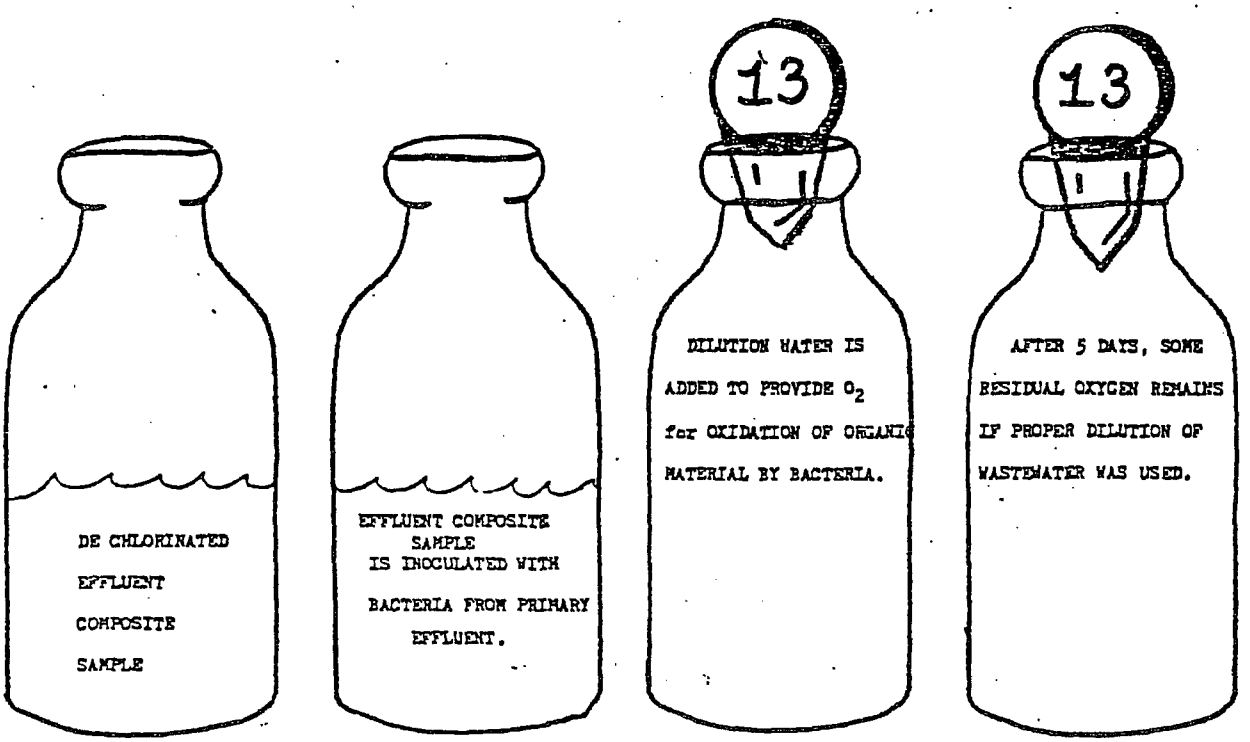
Dilution water contains nutrients and oxygen. Incubate 5 days @ 20°C in the dark.



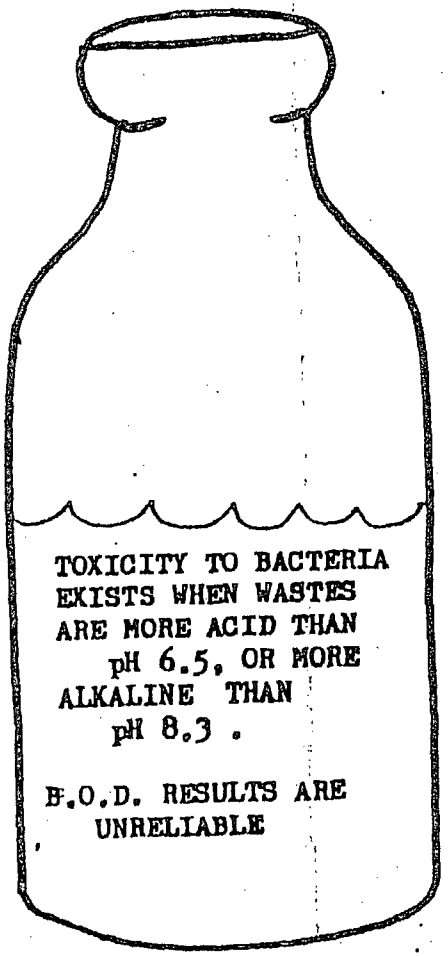
After 5 days, most of the carbonaceous material(69% usually), has been oxidized along with some NH_3(ammonia) unusued oxygen remains.

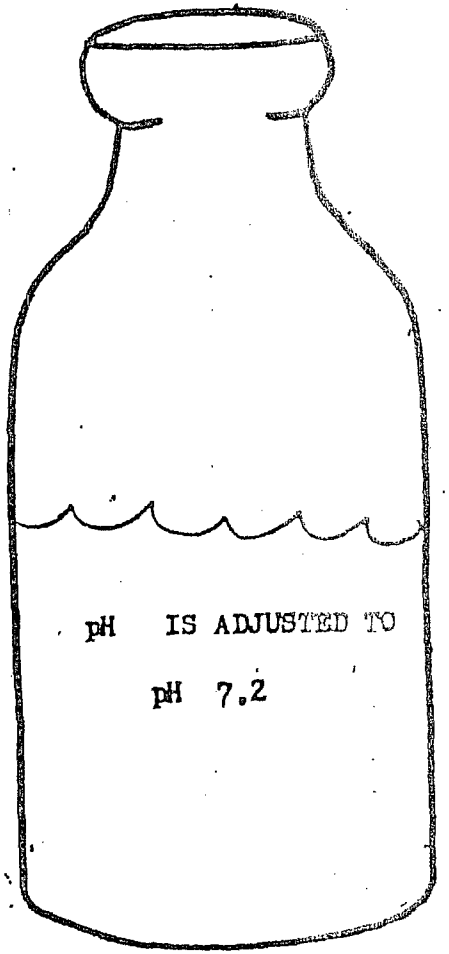

13
13
Chlorinated
PLANT EFFLUENT
DILUTING
WATER
ADDED
NO DEPLETION
OF DISSOLVED O_2
AFTER 5 DAYS OF
INCUBATION

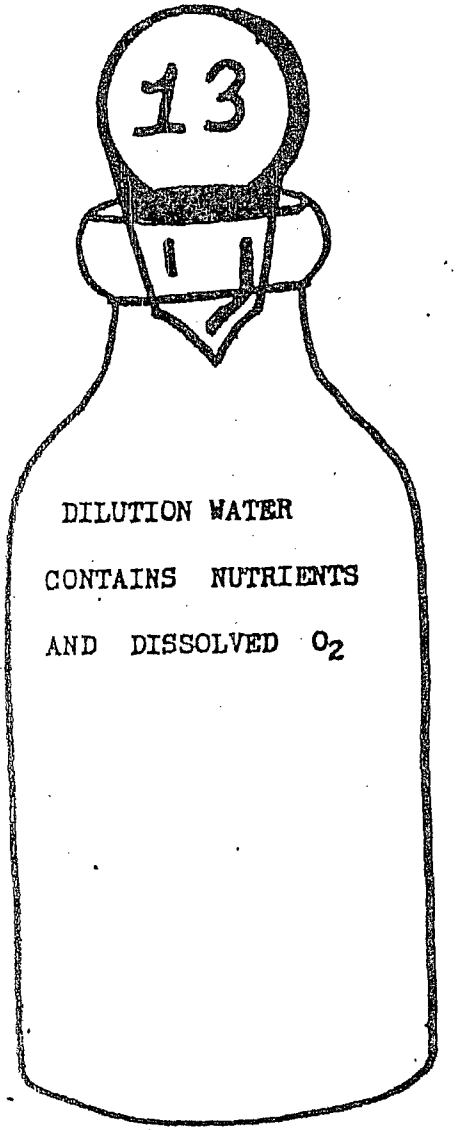

13
13
Chlorinated
PLANT EFFLUENT
DE CHLORINATED
DILUTING
WATER
ADDED
NO DEPLETION
OF DISSOLVED O_2
AFTER 5 DAYS OF
INCUBATION

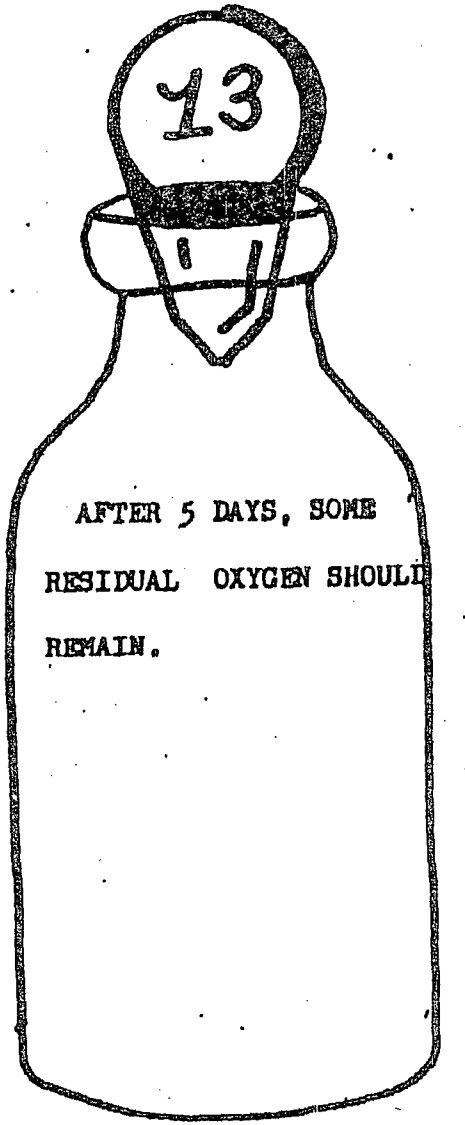

13
13
DE CHLORINATED EFFLUENT COMPOSITE SAMPLE
EFFLUENT COMPOSITE SAMPLE IS INOCULATED WITH BACTERIA FROM PRIMARY EFFLUENT.
DILUTION WATER IS ADDED TO PROVIDE O_2 for OXIDATION OF ORGANIC MATERIAL BY BACTERIA.
AFTER 5 DAYS, SOME RESIDUAL OXYGEN REMAINS IF PROPER DILUTION OF WASTEWATER WAS USED.


13
13
INDUSTRIAL WASTES CONTAINING NO BACTERIA WILL NOT GIVE RELIABLE B.O.D. RESULTS
AN ADAPTED SEED MUST BE ADDED TO THE WASTEWATER AS WITH DE CHLORINATED EFFLUENT
DILUTION WATER ADDED
5 DAY B.O.D.


TOXICITY TO BACTERIA EXISTS WHEN WASTES ARE MORE ACID THAN pH 6.5, OR MORE ALKALINE THAN pH 8.3 .
B.O.D. RESULTS ARE UNRELIABLE


pH IS ADJUSTED TO pH 7.2


13
DILUTION WATER CONTAINS NUTRIENTS AND DISSOLVED O_2


13
AFTER 5 DAYS, SOME RESIDUAL OXYGEN SHOULD REMAIN.

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BIOCHEMICAL OXYGEN DEMAND

1. APPARATUS

1.1 Incubation bottles - 300 ml capacity, with ground glass stoppers and flared mouth for water seal.

1.2 Air incubator - thermostatically controlled at 20 ± 1°C.

1.3 Two-gallon polyethylene aspirator bottle.

1.4 Large mouth graduated pipets - 5 ml, 10 ml, 25 ml.

1.5 Graduated cylinders - 100 ml, 250 ml.

2. REAGENTS

2.2 Distilled water. Water used for solutions and preparation of dilution water must be free of toxic materials such as copper and chlorine, and also must not contain oxygen-demanding substances such as organic compounds. The procedure on page 121-9 may be used to detect low levels of copper in distilled water. It is suggested that demineralized water not be used, since the resins used in such columns seem to contribute contaminants to the water.

2.2 Phosphate buffer solution. Dissolve 4.25 g potassium dihydrogen phosphate, KH_2PO_4, 10.9 g dipotassium hydrogen phosphate, K_2HPO_4, 16.7 g disodium hydrogen phosphate heptahydrate, $Na_2HPO_4 \cdot 7H_2O$, and 0.85 g ammonium chloride, NH_4Cl in about 250 mls distilled water and dilute to 500 ml in a graduated cylinder.

2.21 Discard this reagent (or any of the following reagents) if there is any sign of biological growth in the reagent container.

2.22 Biological growth will be inhibited if the reagents are stored in the dark.

2.3 Magnesium sulfate solution. Dissolve 11.25 g magnesium sulfate, $MgSO_4 \cdot 7H_2O$ in distilled water and dilute to 500 ml in a graduated cylinder.

2.4 Calcium chloride solution. Dissolve 13.75 g anhydrous calcium chloride, $CaCl_2$ in distilled water and dilute to 500 ml in a graduated cylinder.

2.5 Ferric chloride solution. Dissolve 0.135 g ferric chloride, $FeCl_3 \cdot 6H_2O$ in distilled water and dilute to 500 ml in a graduated cylinder.

2.6 If samples are to be dechlorinated, prepare the following solutions:

2.61 Sodium sulfite solution, 0.025N. Dissolve 1.575 g of sodium sulfite, Na_2SO_3, in 1000 ml distilled water. Prepare solution daily.

2.62 Sulfuric acid, concentrated.

2.63 Potassium iodide, crystals.

2.64 Starch indicator. Dissolve 2 g soluble starch in 100 ml hot distilled water.

2.7 If carbonaceous B.O.D. is to be determined, nitrification inhibitor (Hach Chemical or equivalent) will be required.

2.8 Glucose-glutamic acid solution. Dry reagent grade glutamic acid and reagent grade glucose at 103°C for 1 hr. Add 150 mg glucose and 150 mg glutamic acid to distilled water and dilute to 1 liter. Prepare immediately before use. This solution is analyzed on a periodic basis as an accuracy check. Follow the procedure for seeded B.O.D. using a 2% dilution. The B.O.D. value obtained should be 198 ± 30.5 mg/L. (NOTE: Most chemical suppliers list glucose as dextrose).

3. SAMPLE PRETREATMENT

3.1 All samples must be near 20°C before analysis.

3.2 pH adjustment - the pH of samples should be adjusted to between 6.5 and 7.5 with sulfuric acid or a sodium hydroxide solution. This step must not dilute the sample by more than 0.5%.

3.3 Supersaturated dissolved oxygen - If dissolved oxygen in samples is above the saturation point, bring the sample to 20°C and agitate vigorously or aerate to drive out excess oxygen.

3.4 Dechlorination - Samples which contain residual chlorine must be dechlorinated following the procedure below. If the sample has been dechlorinated, or if it has been disinfected but no chlorine residual is present, the procedure for seeded B.O.D. must be followed.

3.41 Add 1 ml of concentrated H_2SO_4 and a few crystals of potassium iodide to a 100 ml portion of the sample.

3.42 Add about 1 ml of starch indicator and titrate with 0.025 N sodium sulfite to obtain a change from blue to clear, counting the drops added.

3.43 Measure out another 100 ml portion of the sample, add the same number of drops of sodium sulfite used in the preceding step, and use this sample for B.O.D. analysis. If more than 100 ml of sample are required, add a proportionate amount of sodium sulfite.

4. PROCEDURE

4.1 Prepare an appropriate quantity of dilution water the day before it is to be used following the procedure below:

4.11 Measure the desired volume of distilled water into the 2 gallon bottle.

4.12 For each liter of dilution water to be prepared, add 1 ml of magnesium sulfate solution, 1 ml of calcium chloride solution, and 1 ml of ferric chloride solution.

4.13 Saturate the solution with oxygen by shaking it in a partially filled bottle or by drawing air through it with a vacuum pump.

4.14 Store the dilution water in the B.O.D. incubator until use.

4.15 On the day it is to be used, add 1 ml of the phosphate buffer solution for each liter of dilution water prepared.

4.2 Prepare at least two dilutions of each sample using the dilution water, such that at least 2 mg/L of dissolved oxygen will be used up during the incubation time and at least 1 mg/L of dissolved oxygen remains. For samples where the approximate B.O.D. is unknown, several dilutions may be necessary.

4.21 If the B.O.D. is expected to be less than 500 mg/L, this dilution may be made directly in the B.O.D. bottle. For samples with B.O.D. concentrations greater than 500 mg/L, the dilution technique outlined on page 122-1 should be used. The table below may be helpful in determining the appropriate sample volumes to use when diluting directly in the B.O.D. bottle.

Expected BOD_5	Sample Volume For 300 ml B.O.D. Bottle
2 - 20 mg/L	300 - 75 mls
20 - 100 mg/L	75 - 15 mls
100 - 500 mg/L	15 - 3 mls

4.22 Thoroughly mix the sample to be analyzed and using a large tip graduated pipet, transfer the ml of sample into a B.O.D. bottle according to the dilution desired. (For sample volumes over 25 mls, an appropriate graduated cylinder may be used).

4.23 If analysis for carbonaceous BOD (CBOD) is required, nitrification inhibitor should be added at this point.

4.231 This is currently available from Hach Chemical Company in dispenser bottles. Two "shots" of inhibitor (0.16 g total) should be added to each bottle where CBOD is to be determined.

4.232 Nitrification inhibitor should only be used in samples where nitrifying organisms may be present and where CBOD is the required parameter.

4.24 If samples are to be seeded, the seed should be added at this time.

4.241 Pipet an appropriate volume of seed into the bottle using a wide-tip graduated pipet.

4.242 One ml of primary effluent is often used as seed but fresh settled sewage may also be used.

4.243 The oxygen depletion due to the seed in the sample should not be a major part of the total oxygen depletion.

4.244 The B.O.D. of the seed material should be determined separately.

4.25 Fill the bottle with dilution water, such that when the stopper is placed in the bottle a water seal is formed around the stopper. Don't add so much that liquid is lost from the bottle.

4.26 Determine the initial dissolved oxygen concentration (D.O.) on each dilution prepared.

4.261 If using the D.O. probe, measure concentration in each bottle directly before incubation.

4.262 If using the Winkler titration to determine D.O. set up a duplicate of each dilution prepared, being very careful not to introduce air during addition of sample or dilution water. Determine initial D.O. on one duplicate using the titration and incubate the other.

4.27 Place the ground glass stoppers in the B.O.D. bottles, making sure that no air bubbles have been trapped.

4.28 If undissolved nitrification inhibitor is present, mix by inverting the B.O.D. bottle until dissolved.

4.29 Add distilled water to form a seal on the top of the stoppers. Prevent this seal from evaporating during incubation by inverting a paper cup over each stopper, or use plastic caps which have been manufactured for this purpose.

4.30 Incubate the bottles in the dark at 20 ± 1°C for 5 days.

4.31 Determine the final D.O. using either the probe or the titration on all incubated bottles.

4.32 Calculate the B.O.D. concentration as outlined in the CALCULATIONS section using the data for the dilution which resulted in a D.O. depletion of at least 2 mg/L and a residual D.O. of at least 1 mg/L. If more than one dilution resulted in a D.O. depletion and residual in the proper range, the B.O.D. for each should be calculated and the average value reported.

4.33 With each set of B.O.D. samples incubated, a dilution water blank must also be incubated as a check on dilution water quality.

4.331 Fill a B.O.D. bottle with dilution water only.

4.332 Determine D.O. in the bottle, either directly using the probe, or on a duplicate using the titration, again being very careful not to introduce air into either bottle.

4.333 If after 5 days of incubation the D.O. has been depleted more than 0.2 mg/L, the quality of the dilution water as well as sources of possible contamination should be investigated. (NOTE: This blank depletion is <u>not</u> subtracted from sample depletions.)

5. CALCULATIONS

5.1 Non-seeded B.O.D.

$$\text{B.O.D., mg/L} = \frac{\text{D.O. Depletion, mg/L}}{\text{mls Sample}} \times 300 \text{ mls}$$

D.O. Depletion, mg/L = Initial D.O., mg/L - Residual D.O., mg/L

EXAMPLE: Calculate B.O.D. for a sample using the data below:

mls sample used	3	6	10
initial D.O., mg/L	8.4	8.4	8.4
residual D.O., mg/L	7.9	4.2	0.6
D.O. depletion, mg/L	0.5	4.2	7.8

Since the dilution using 3 mls of sample did not deplete at least 2 mg/L D.O., it is not valid. The dilution using 10 mls of sample did not have a D.O. residual of at least 1 mg/L, so it also is not valid. The calculation for B.O.D. would be based on the dilution using 6 mls of sample.

$$\text{B.O.D., mg/L} = \frac{\text{D.O. Depletion, mg/L}}{\text{mls Sample}} \times 300 \text{ mls}$$

$$= \frac{4.2 \text{ mg/L}}{6 \text{ mls}} \times 300 \text{ mls} = 210 \text{ mg/L}$$

5.2 Seeded B.O.D.

$$\text{BOD, mg/L} = \frac{D_1 - D_2}{\text{mls Sample}} \times 300 \text{ mls}$$

Where: D_1 = D.O. depletion due to sample and seed
D_2 = D.O. depletion due to seed

EXAMPLE:

A seeded B.O.D. is set up on a dechlorinated effluent sample using 150 mls of sample and 1 ml of primary effluent as seed. A B.O.D. was also set up on the primary effluent using 9 mls of sample. Calculate the B.O.D. of the effluent using the data below:

D.O. depletion for 150 mls sample + 1 ml seed = 4.2 mg/L

9 mls PE D.O. Depletion = 3.2 mg/L

1. Calculate D.O. depletion in the effluent sample bottle due to the 1 ml of seed which was added (D_2)

   In the PE B.O.D. determination, 9 ml of sample depleted 3.2 mg/L of D.O.

   Therefore, 1 ml of PE would deplete

   $$\frac{3.2 \text{ mg/L}}{9 \text{ ml}} = 0.36 \text{ mg/L}$$

2. Calculate the B.O.D. of the effluent sample

   $$\text{B.O.D., mg/L} = \frac{D_1 - D_2}{\text{mls Sample}} \times 300 \text{ mls}$$

   $$\text{B.O.D., mg/L} = \frac{4.2 \text{ mg/L} - 0.36 \text{ mg/L}}{150 \text{ mls}} \times 300 \text{ mls}$$

   $$\text{B.O.D., mg/L} = 7.7 \text{ mg/L}$$

COOK WASTE WATER TREATMENT PLANT
TOTAL PHOSPHORUS TESTING PROCEDURES

The Cook WWTP routinely performs Total Phosphorus on the plant influent, plant effluent, SBR #1's effluent, and SBR #2's effluent. The Cook WWTP follows the Ascorbic Acid Method (#8048) found in the HACH Lab Procedures Manual. This procedure is based on USEPA Method 365.2. Some specific procedures for the Cook facility are listed below.

1. To obtain Total Phosphorus, the samples must be digested. Prior to Method 8048, follow procedures found in Hach Method 8190 (Acid Persulfate Digestion Method).

2. The samples will have to be diluted. Dilute 1 ml of Influent to 25 m1. Dilute 5 ml of Effluent to 25 m1. For diluting, use volumetric pipettes and flasks.

3. Type in program 491 instead of 490 on the Hach DR20I0 Meter.

4. Make sure results are stated as P.

5. Let color develop for 10 minutes.

6. Periodically check accuracy by using premade P standard.

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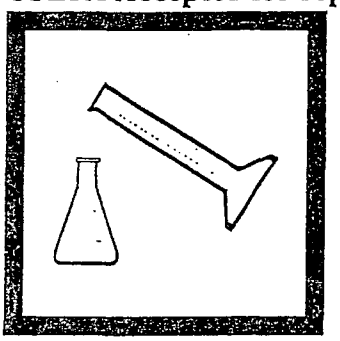
PHOSPHORUS, TOTAL

For water, wastewater, and seawater

(also called Organic and Acid Hydrolyzable)

Acid Persulfate Digestion Method*

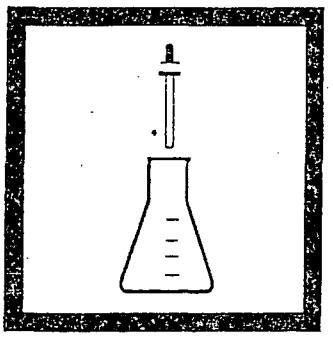
USEPA Accepted for reporting wastewater analysis**



1. Measure 25 mL of sample into a 50-mL (or larger) erlenmeyer flask using a graduated cylinder.

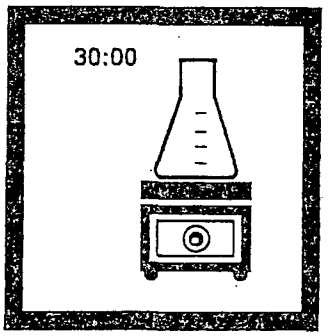
Note: Rinse all glassware with 1:1 Hydrochloric Acid Solution. Rinse again with deionized water.

2. Add the contents of one Potassium Persulfate Powder Pillow. Swirl to mix.



3. Add 2.0 mL of 5.25 N Sulfuric Acid Solution.

Note: Use the 1-mL calibrated dropper provided.

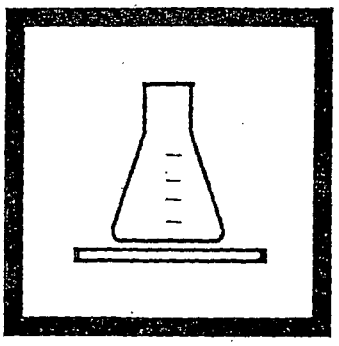


4. Place the flask on a hot plate. Boil gently for 30 minutes.

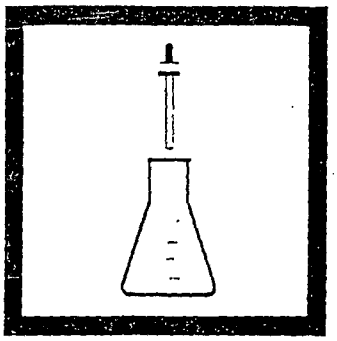
Note: Samples should be concentrated to less than 20 mL for best recovery. After concentration maintain the volume near 20 mL by adding small amounts of deionized water. Do not exceed 20 mL.

* Adapted from *Standard Methods for the Examination of Water and Wastewater.*

** Procedure is equivalent to USEPA Method 365.2 and Standard Method 4500-P B.5 & P E.



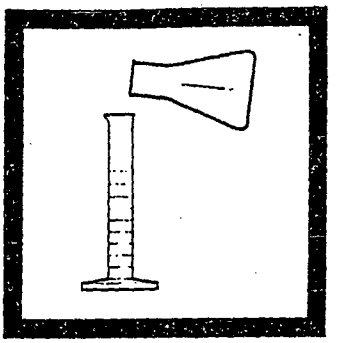
5. Cool the sample to room temperature.



6. Add 2.0 mL of 5.0 N Sodium Hydroxide Solution. Swirl to mix.

Note: Use the 1-mL calibrated dropper provided.

Note: After adding sodium hydroxide, pH should be 8.2.



7. Pour the sample into a 25-mL graduated cylinder. Return the volume to 25 mL.

Note: Use deionized water rinsings from the flask to adjust the volume.

Note: Results of the reactive phosphorus test at this point will include the organic phosphate plus the orthophosphate and the acid-hydrolyzable (condensed) phosphate. The organic phosphate concentration is determined by subtracting results of an acid hydrolyzable phosphorus test from this result. Make sure that both results are in the same units before taking the difference.

Choose reactive phosphorus test.

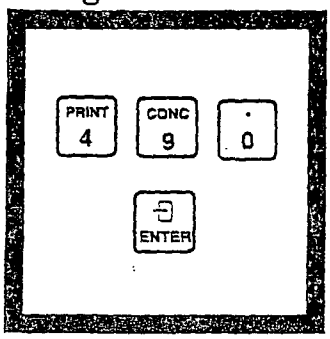
8. Proceed with a reactive phosphorus method that will cover the expected total phosphorus concentration range.

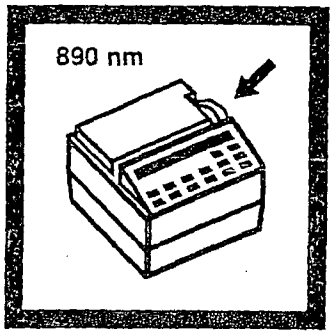
PHOSPHORUS, REACTIVE (0 to 2.50 mg/L PO_4^{3-})

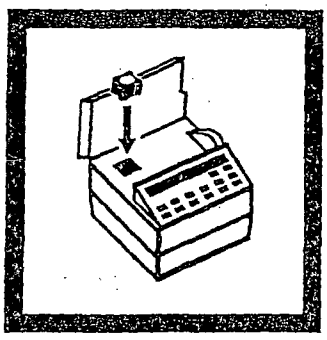
(Also called Orthophosphate) PhosVer 3 (Ascorbic Acid) Method*
(Powder Pillows or AccuVac Ampuls)
USEPA Accepted for wastewater analysis reporting**

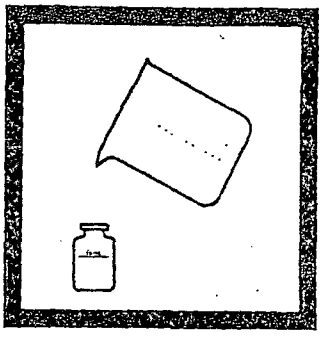
For water, wastewater, seawater

Using Powder Pillows









1. Enter the stored program number for reactive phosphorus, ascorbic acid method, powder pillows.

Press: 4 9 0 ENTER

The display will show:

Dial nm to 890

Note: The Pour-Thru Cell can be used with 25-mL reagents only.

2. Rotate the wavelength dial until the small display shows:

890 nm

When the correct wavelength is dialed in, the display will quickly show: **Zero Sample**

then: **mg/L PO_4^{3-} PV**

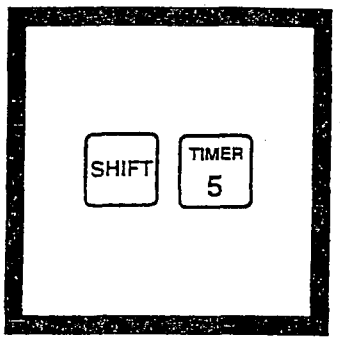
3. Insert a 10-mL Cell Riser into the cell compartment.

4. Fill a 10-mL sample cell with 10 mL of sample.

* Adapted from *Standard Methods for the Examination of Water and Wastewater.*
** Procedure is equivalent to USEPA method 365.2 and Standard Method 4500-P-E for wastewater.

5. Add the contents of one PhosVer 3 Phosphate Powder Pillow for 10-mL sample to the cell (the prepared sample). Swirl immediately to mix.

Note: A blue color will form if phosphate is present.

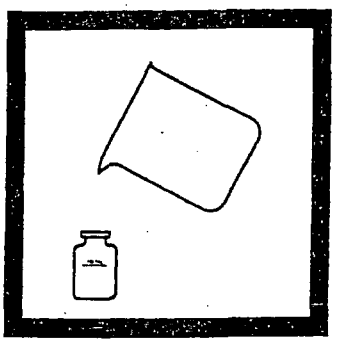


6. Press:

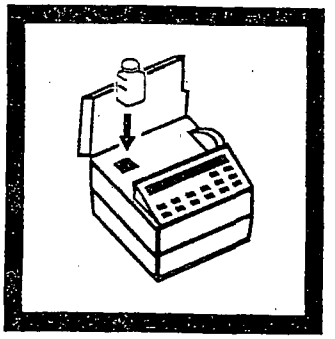
SHIFT TIMER

A two-minute reaction period will begin.

Note: Use a 10 minute reaction period if determining total phosphorus following the acid-persulfate digestion.

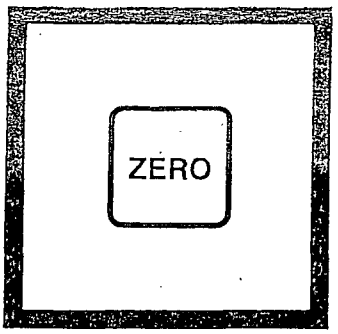


7. Fill a second 10-mL sample cell with 10 mL of sample (this is the blank).



8. When the timer beeps, the display will show: **mg/L PO_4^{3-} PV**

Place the blank into the cell holder. Close the light shield.



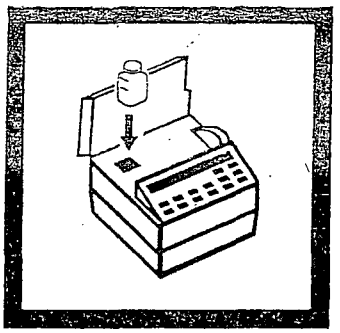
9. Press: **ZERO**

The display will show:

Zeroing. . .

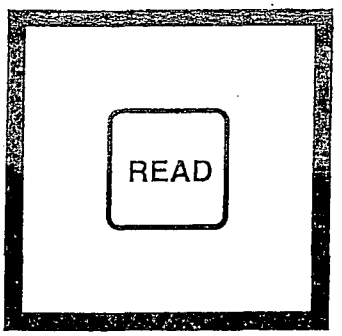
then:

0.00 mg/L PO_4^{3-} PV



10. Place the prepared sample into the cell holder. Close the light shield.

Note: Run a reagent blank for this test. Use deionized water in place of the sample in Steps 4 and 7. Subtract this result from all test results run with this lot of PhosVer 3.



11. Press: **READ**

The display will show:

Reading. ..

then the results in mg/L PO_4^{3-} will be displayed.

Forms ▲▼ P, PO_4^{3-}, P_2O_5

COOK NUCLEAR PLANT
QAQC SCHEDULE

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
WEEK 1		**INFLUENT** SS Duplicate	**INFLUENT** AMMONIA Duplicate & Spike		
	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
WEEK 2		**EFFLUENT** SS Duplicate **EFFLUENT** PHOSPHORUS Dup., Spike, Stnd.	**EFFLUENT** AMMONIA Duplicate & Spike **EFFLUENT** BOD Duplicate		
	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
WEEK 3		**EFFLUENT** NITRITE Duplicate	BOD Standard		
	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
WEEK 4		**INFLUENT** PHOSPHORUS Dup., Spike, Stnd.	**INFLUENT** BOD Duplicate		

Part IV.A.4: "Groundwater Sampling."

Parameters and Frequency as described in the Cook Nuclear Plant's Permit to Discharge #M00988.

Well Number	Parameter	Frequency	USEPA Method
1A, 8, 12, 13, 19	Static Water Elevation	Quarterly	
	pH	Quarterly	150.1
	Chloride	Quarterly	325.1
	Specific Conductance	Quarterly	120.1
	Total Inorganic Nitrogen	Quarterly	
	Ammonia Nitrogen	Quarterly	350.1
	Nitrite Nitrogen	Quarterly	353.2
	Nitrate Nitrogen	Quarterly	353.2
	Total Phosphorus	Quarterly	365.4
	Sulfate	Quarterly	375.4
	Dissolved Sodium	Quarterly	200.7**
	Total Dissolved Solids.	Quarterly	160.1
	Total Alkalinity	Annually	310.1
	Bicarbonate	Annually	4500-202D
	Dissolved Aluminum	Annually	200.7
	Dissolved Barium	Annually	200.7
	Dissolved Boron	Annually	200.7
	Dissolved Cadmium	Annually	200.7**
	Dissolved Calcium	Annually	200.7**
	Dissolved Chromium	Annually	200.7**
	Dissolved Copper	Annually	200.7**
	Dissolved Iron	Annually	200.7
	Dissolved Lead	Annually	200.7**
	Dissolved Manganese	Annually	200.7
	Dissolved Magnesium	Annually	200.7**
	Dissolved Inorganic Mercury	Annually	1631**
	Dissolved Nickel	Annually	200.7**
	Dissolved Potassium	Annually	200.7**
	Dissolved Selenium	Annually	270.3**
	Dissolved Silver	Annually	200.7**
	Dissolved Zinc	Annually	200.7
	Total Organic Carbon (TOC)	Annually	415.1
	Phenols	Annually	420.1
	Hydrazine	Annually	ASTM D1385*
	Ethanolamine	Annually	Betz Method*

*Under Evaluation by Groundwater Program section at this time.

**40 CFR part 136 method approved, 11/22/00 notification to Mr. Tim Unseld.

Part V: "The Details of how inspections will be conducted and a schedule for the inspection of collections system and pump stations, where applicable."

- Wastewater contractors and Cook Plant Wastewater technicians utilize WWT-3 "Cook Wastewater Treatment Plant Weekday Rounds." for a guideline for routine operations. (attached)

- PMP-2280-CSE-001 "Confined Space Entry Requirements." is used whenever a confined space entry is made. (attached)

- Total Water Management Health and Safety Manual, 11.0 "Control of Energy Sources Lockout/Tagout."

- Total Water Management Health and Safety Manual, 12.0 "Electrical Safety"

Procedure No. Vendor Procedure: Earth Tech **Rev.** 0 **Change:** 0

Title: Total Water Management, Heath and Safety Manual Part 11.0 "Control of Energy Sources Lockout/Tagout."

Review Type (Ref. Data Sheet 1): Review per PMP 2110-CPS-002 Step 3.2.6 b Requirements

Return to: Blair Zordell **Phone:** 2006 **Due Date:** 7/27/01

Mail Zone: 5A

Ensure that Contractor procedure meets MIOSHA/MEP Requirements.

Step	Comment (attach additional pages as necessary)	Disposition (explain comments not incorporated)

☐ Additional pages attached? Total Number of comment pages: _____

Review complete and (check one):

☒ Acceptable as written (no comments)

☐ Acceptable as written with comments (No technical inaccuracies or format problems, comments are enhancements)

☐ Not acceptable and returned with comments (Contains technical inaccuracies, format problems, or program interface concerns)

Reviewer's name: Diana D Williams Signature: D D Williams

Dept./Section: _____ Extension: _____ Date: 7/26/01

Resolution of comments accepted (N/A if acceptable on initial review)

Reviewer's name: _____ Signature: _____

Dept./Section: _____ Extension: _____ Date: __/__/__

11.0. CONTROL OF ENERGY SOURCES LOCKOUT/TAGOUT

Lockout/tagout is the process used to prevent injuries by controlling energy sources. Energy sources include electrical, steam, pressurized equipment, pneumatic, gravity, and other sources where stored energy could result in an injury.

OSHA 29 CFR 1910.147 require that any potential energy systems must be isolated prior to work on any equipment. This isolation could be anything from turning off a circuit breaker, to blocking open a power press. Once isolated, steps must be taken to ensure that the isolation technique is not removed until the employee is done his/her work. This is accomplished through the using locks to secure access to the system, and/or placing warning tags at the isolation point.

The requirements of this section do not apply to the following:

A. Normal production operations are not covered.
B. Servicing and maintenance, which take place during normal production operations, are not covered unless guards or other safety devices are bypassed, or any part of the person's body may be placed in the point of operation of the machine, or other associated danger zone.

Lockout/tagout of energy sources must be performed only by the employee doing the work. If more than one employee is involved, either each individual employee must use their own lock (multiple lockout), or a group lockout can be performed by the employees' supervisor. The locks, tags and equipment shall not be tampered with by any employee. Only the person originally locking and tagging the equipment is authorized to remove the locks and tags. If an employee, who placed the lockout/tagout device/sign, subsequently no longer works for Earth Tech, only the supervisor can remove the locks and tags.

11.1. General Lockout/Tagout Procedures for Routine Tasks

A. Electrical Systems.

1. Make sure the equipment to be worked is turned off.
2. Locate the source of the electrical supply, and isolate the equipment. This can be accomplished by:
3. Turning the appropriate circuit breaker off.
4. Unplugging the equipment.
5. Disconnecting the source from the battery (i.e. pulling cables from automotive batteries).
6. Lock the isolation circuit in the closed position, using an appropriate locking device and a unique lock and key system.
7. Tag the locked out circuit. The tag used shall warn against the hazard (i.e. Do Not Start), and include a means of identifying the employee who installed the tag and lock.
8. Go back to the equipment and try to turn on, to ensure that the proper source has been isolated. If the machine turns on, reverse the above steps (2-4), and start again until the proper circuit is isolated.
9. Perform the required work.
10. Upon completion of the work, inspect the area to ensure all tools and parts are removed. If tools or parts are noticed after the energy source is no longer locked out, procedures 1-5 ***MUST*** be performed again prior to retrieval of the tools/parts. Under no circumstances shall the items be retrieved without the equipment being locked out.

11. Remove the tag.
12. Remove the lock.
13. Turn on the closed circuit following the appropriate procedures (or reconnect the battery cables).
14. Turn the equipment on to verify operation.

B. Pressurized Water or Steam Systems.

1. Turn the appropriate valve upstream from the area of work to the off position (closed). Note: if steam or water can enter the pipe from the normal downstream side, either verify that the check valve is operating properly, or ensure that all necessary valves have been closed to stop all fluid or steam flow into the section to be worked.
2. Using the appropriate device, lock the valve(s) in the closed position, using a unique lock and key.
3. Tag the locked out valve(s). The tag shall warn against the hazard (Do Not Open) and include a means of identifying the employee who installed the lock and tag.
4. Allow the system to be worked to cool down (in the case of steam of hot water).
5. Relieve the pressure in the system, and then drain any fluid from the system. If the system is not equipped with a pressure relief or drain system, make sure the pipes are cool to the touch, and slowly open and drain in accordance with standard trade practice.
6. Perform the necessary work.
7. Ensure all sections are secure and closed.
8. Remove the tag and lock.
9. Slowly open the valve, stopping when water of steam flow has started. Observe the work performed to make sure no leaks are evident. If there are no leaks, then the valve can be completely opened. If leaks are observed, then re-close the valve, and follow steps 2-5 above to lockout/tagout the system again.

C. Natural Gas Lines.

1. Turn off the valve upstream from the area to be worked.
2. Using the appropriate device, lock the valve in the closed position using a unique lock and key.
3. Ensure all spark sources in the area have been isolated or removed.
4. Using non-sparking tools, remove the remaining gas in the line using standard trade practice. If in an enclosed area, make sure appropriate ventilation is present. If the flow of gas does not stop, then shut down the next upstream valve, or the gas main valve. Each additional valve closed must be locked out and tagged out.
5. Perform the required work. If hot work is necessary (i.e. soldering, grinding, welding), make sure the line has been purged of gas, and that the hot work requirements of this manual are followed.
6. Make sure that all connections are secure. Also, have a solution of soap and water for leak testing.
7. Remove all tools and parts from the area.
8. Remove the lock(s) and tag(s) from the valve(s).
9. Open the valve(s).
10. Test the work area for leaks using the soap solution. If leaks are detected, the system must be locked out and tagged out following steps 1-4 above before additional repairs can be made.

D. Other work may require the development of lockout/tagout procedures. The following general protocol shall be followed when working on equipment:

1. Determine what energy sources are present, such as electrical, gas, pressurized systems (i.e. steam, water, and hydraulics), heated fluids or gas (i.e. steam, hot water), and gravity (i.e. presses, elevated vehicles).
2. Determine which of these sources require isolation to perform the work. For example, if you were working in a hot water boiler, the gas, electric and water systems would require isolation prior to entry into the system to perform work.
3. Determine the locations where the each energy source for that piece of equipment can be turned off/isolated *AND* be locked out. For example, if a machine has an on/off button, pushing the button to the off position is not sufficient isolation, since the button cannot be locked out. You must then either unplug the equipment, or find, close and lockout the circuit breaker or electrical switch supplying the machine.
4. Make sure anyone in the area knows you are about to turn off and lockout the equipment, and then close the isolation devices. Once closed, lockout the isolation devices so they cannot be inadvertently opened.
5. Place an appropriate tag on each lockout device, with the appropriate warning (i.e. Do Not Open, Do Not Start) and a means of identifying who has performed the lockout.
6. Once everything is locked out, determine if the isolation was successful. The methods for this vary depending on the energy source and the equipment, so follow manufacturers' directions or standard trade practice. Examples of determining is isolation was successful include:
   a) Try to turn the equipment on.
   b) Use pressure relief valves.
   c) Try to ignite the pilot light.
7. Perform the necessary work.
8. Ensure all tools and parts are removed from the work area.
9. Remove the tags and locks used to isolate the various energy sources.
10. Open up each isolation source. For fluid or gas systems, check for leaks at the area the work was performed as necessary.
11. Inform personnel in the area that the lockout/tagout systems have been removed.
12. If additional work is required (i.e. repair of leak, fine tuning of work), the lockout/tagout procedure must be re-established. Under no circumstances shall work be performed on the equipment without prior isolation of the energy sources.

11.2. Specific Lockout/Tagout Procedures.

A. Written procedures shall be developed for the lockout and tagout of each piece of equipment that has potentially hazardous energy sources. These written procedures shall follow the outline provided in Paragraph 1(d) above.

B. Lockout/tagout procedures are not required:

1. If the equipment's' only potential energy source is electrical, and the unexpected start up of the equipment is controlled by the unplugging of the equipment from the electrical source, and, the plug is under the exclusive control of the person performing the work.

2. If hot tap operations are being performed on transmission or distribution systems for substances such as gas, steam, water or petroleum products in pressurized pipelines, if the following can be demonstrated:
3. Continuity of service is essential.
4. Shutdown of the system is impractical.
5. Written procedures for the hot tap are developed and followed, and equipment is used which will provide proven effective protection for employees.
6. Written lockout/tagout procedures are not required if all of the following apply:
7. The machine has no potential for stored or residual energy, or reaccumulation of stored energy after shutdown. Examples of stored energy would be a automotive battery, capacitors, and a punch press with the press up in the air.
8. The machine only has a single energy source that can be readily identified and isolated. If more than one energy source is present (i.e. gas and electric), then written procedures shall be developed.
9. The isolation and locking out of the energy source completely de-energizes and deactivates the equipment.
10. The machine's energy source has been locked out and tagged out in accordance with this section.
11. A single lock out device achieves a locked out condition.
12. The lockout device can only be removed by the employee performing the work.
13. The work does not create hazards for other employees.
14. There have been no accidents related to the unexpected activation of the machine during past servicing or work.

D. Policies for the removal of lockout/tagout devices, or, shift/personnel changes are as follows:

1. Only the person(s) who placed the lockout/tagout devices on the system can remove the devices, unless:
   a) The supervisor has verified that the employee(s) is not at the facility (or no longer is employed by the facility).
   b) All reasonable efforts have been made to contact the employee (active employees only) to verify that the work is complete and the devices are about to be removed.
   c) The supervisor, or another knowledgeable person, inspects the locked out/tagged out device and assures that the equipment is capable of being re-energized.
   d) If all of the above apply, the locks and tags can be removed at the direction of the supervisor.
   e) If additional work is required, the employee who shall be performing the work shall implement the lockout/tagout procedures.
2. If work will be continued using new personnel or different personnel, the employee(s) who originally performed the lockout shall walk through the lockout/isolation steps with the new worker, and, at each isolation point, the original shall remove his/her lockout/tagout device(s), to be immediately replaced by the new worker's device(s). Upon transfer of the lockout/tagout equipment, the new employee shall verify that the equipment is still isolated prior to continuation of work. Under no circumstances shall the original devices remain in place, and just the keys transferred. For supervisor group lockouts, the same procedure shall be used with the oncoming supervisor.

12.0. ELECTRICAL SAFETY

12.1. INSTALLING OR WORKING WITH ELECTRICAL DISTRIBUTION SYSTEMS.

A. Under no circumstances shall electrical lines be routed through doorways, windows or other opening where lines could be crimped, bent or cut.

B. Circuit breakers shall be labeled as to use.

C. All circuit breaker panels shall be kept covered when not in use.

D. A fuse puller shall be used to remove cartridge fuses where one or more energized circuits are present.

E. All live parts of electrical equipment operating at 50 volts or more, shall be properly guarded against accidental contact, which includes:

1. Limit access to the equipment to qualified employees only
2. Label using the proper accident prevention sign, stating DANGER-High Voltage as well as the voltage of the equipment.
3. Provide a conductor of the ampacity of not less than the rating of the circuit breaker or fuses protecting that circuit.
4. Ensure that a bare conductor or earth return is not used for any temporary circuit
5. Ensure that all electrical wiring is protected from physical damage.
6. Extension cords for portable electric tools shall be of a 3-wire type.

F. Temporary extension cords are only allowed for temporary installations not to exceed 90 days (i.e. decorations).

G. Extension cords shall be provided with a plug cap, which is either molded to the cord or equipped with a cord clamp to prevent strain on the terminal screws.

H. Extension cords shall not be fastened with staples, or otherwise hung in a manner that could damage the outer jacket or insulation.

I. Extension cords shall be inspected prior to each use to ensure that there is no damage or defects. Defective cords shall not be used.

J. Extension cords used with grounding-type equipment (i.e. 3 prong plug) shall contain a grounding-type conductor (have 3 plugs to accept the ground plug).

K. Ground fault circuit interrupters shall be used for all non-permanent wiring needed for construction purposes, or when working in wet or moist areas.

L. Extension cords used in highly conductive work locations (i.e. wet areas) shall be of the type approved for such locations.

M. Appropriate insulating gloves shall be worn to pick up or unplug connections that are in highly conductive areas, such as in water.

N. Do not plug in or unplug electric equipment with wet hands.

O. Grounding-type equipment (i.e. 3 prong plugs) shall not be modified to mate to incompatible outlets (i.e. cut off grounding prong to fit 2 prong outlets).

P. A temporary light shall not be suspended by the cord, unless the cord and light is designed for suspension.

Q. Temporary lights shall be equipped with bulb protectors, unless they are installed at least 7 or more feet overhead.

R. Electric lines crossing work areas, personal or vehicular traffic areas, shall either be fastened securely overhead (at a height which provides safe clearance for work operations), or protected by a cover capable of withstanding the imposed loads without creating a trip hazard.

S. Only qualified personnel shall perform electrical wiring or connections.

T. If work on electrical systems is required, ensure the provisions of the lockout/tagout portion of this manual are implemented.

12.2. WORKING ON OR NEAR ENERGIZED PARTS

A. Working on or near energized parts covers either potential direct physical contact with or contact by means of tools or equipment.

B. Only properly trained persons shall work with energized equipment or electric circuits.

C. Work on energized systems requires special precautionary techniques, personal protective equipment, insulating and shielding materials, insulating tools and testing equipment.

D. Personnel working in an elevated position (i.e. trimming trees) shall not come any closer to energized wiring as stated below:

VOLTAGES	NEAREST DISTANCE
Voltages of 50 kV or less	10 feet
Voltages of greater than 50 Kv	10 feet plus 4 inches for every 10kV over 50 kV

E. Persons on the ground using equipment or tools to work overhead, shall not allow the tools/equipment to come any closer than the distances specified in 2.d. above.

F. Personnel working in the vicinity of overhead power lines, either on the ground or elevated, shall not physically be closer than, or allow conductive tools/equipment closer than the distances specified below:

VOLTAGE RANGE	DISTANCE
300 volts and less	AVOID CONTACT
More than 300, but not more than 750 volts	1 foot
More than 750, but not more than 2 Kv	1 foot, 6 inches
More than 2 kV, but not more than 15 kV	2 feet
More than 15 kV, but not more than 37 kV	3 feet
More than 37 kV, but not more than 87.5 kV	3 feet, 6 inches
More than 87.5 kV, but not more than 121	4 feet
More than 121 kV, but not more than 140 kV	4 feet, 6 inches

G. Properly trained persons can work closer to overhead power lines than specified above if:

1. Appropriate personal protective equipment is selected and worn,

2. The energized part is insulated from all other conductive objects at a different potential from the person, or
3. The person is insulated from all conductive objects at a potential different from the energized part.

H. Any vehicle where part of its structure can be elevated near overhead power lines shall be operated such that the elevated structure maintains a clearance distance as specified in section 2.D. above. The only exception is if the equipment is an aerial lift that is insulated for the voltages involved, and a qualified person performs the work, then the distances specified in 2.F. apply.

12.3. PERSONAL PROTECTIVE EQUIPMENT/WORK PRACTICES.

A. Personal protective equipment (PPE) shall be selected in accordance with the Personal Protective Equipment section of this manual.

B. PPE shall be stored in manner to prevent damage when not in use.

C. Nonconductive hard hats shall be worn when there is danger of head injury from electric shock or burns due to exposure to energized parts.

D. Jewelry shall not be worn when working around or with energized parts.

E. Insulated tools shall be used to work with energized parts. Tools that have insulation that might be damaged (i.e. rubber handles) shall be inspected prior to each use to ensure the insulation is not damaged.

F. Eye protection with side shields (refer to PPE section of this manual) shall be worn when working with energized parts.

G. Rubber mats, nonconductive shields or protective barriers shall be used as needed to protect employees from electrical hazards.

12.4. TRAINING.

A. Qualified Personnel.

1. The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment.
2. The skills and techniques necessary to determine the nominal voltage of exposed live parts.
3. The clearance distances specified in 2.d. and 2.f. of this section, and the corresponding voltages to which the person will be exposed.
4. Trained to work safely with energized circuits, and familiar with the use of the following:
5. The above training can be accomplished by either classroom or on-the-job training.

B. All Earth Tech personnel.

1. How to recognize potential electrical hazards.
2. The safe clearance distances specified in 2.d. above.
3. Their responsibilities under the electrical safety program (i.e. use of extension cords).

AMERICAN ELECTRIC POWER	Environmental Affairs Guideline	Number: WWT-3
Effective Date: 12-06-00	Title: Cook Wastewater Treatment Plant Weekday Rounds	Revision: 0

Revision Record

Revision 0: Initial Issue

Originator: Brad Border Date: 12-5-00

Approved by: [illegible] Date: 12/5/00

AMERICAN ELECTRIC POWER
DONALD C. COOK NUCLEAR PLANT

1.0 TITLE

Cook Wastewater Treatment Plant Weekday Rounds

2.0 OBJECTIVE

2.1 To provide guidance during routine wastewater plant operations.

3.0 REFERENCES

3.1 None.

4.0 DETAILS

4.1 Take hour readings on following equipment: backwash pumps, influent pumps, effluent pumps, and blowers. Make sure hour readings are consistent with normal operations. Inconstant readings could indicate a problem with that piece of equipment.

4.2 Take effluent flow reading.

4.3 Take lab equipment temperatures and if necessary, adjust.

4.4 Clean influent basket.

4.5 To verify proper operation, run influent pumps in manual.

4.6 Investigate liftstation condition: grease, condition of floats, proper level.

4.7 Add Dosfolat twice daily. Do not exceed 38ml of concentrated product per day.

4.8 Make sure mag hydroxide is feeding properly. If volume in drum is low, change drum. Do not exceed 20 gallons of concentrated product per day.

4.9 Make sure ferric chloride is feeding properly. If volume is drum is low, change drum. Do not exceed 3 gallons of concentrated product per day.

4.10 Make sure samplers are operating properly. Verify proper sample temperatures.

4.11 Alternate blowers on Monday. Verify proper operation.

4.12 Verify dialer system is operating properly.

4.13 Check lagoons:

- Daily: Observe for erosion, animals burrowing, clarity of water, and any debris.
- Weekly: Measure for freeboard level using depth indicating posts.

4.14 Conduct laboratory tests according to permit requirements and lab procedures.

4.15 Monitor each SBR for proper operation: Decant clarity, sludge blanket levels, and daily lab testing.

4.16 Monitor SBR sludge characteristics for foam, microorganisms, odor, and color. Refer to JET TECH Operator/Process Reference Manual for troubleshooting.

4.17 Check wastewater clarity in effluent tank and backwash tank. Check for solids buildup in each tank.

4.18 Waste from each SBR according to desired MLSS concentrations.

4.19 Perform weekly preventive and corrective maintenance tasks as stated in the computerized maintenance program.

4.20 Maintain plant cleanliness.

REVIEW AND APPROVAL TRACKING FORM

Procedure Information:

Number: PMP-2280-CSE-001 Revision: 0 Change: 0

Title: Confined Space Entry

Category (Select One Only):

- ☐ Correction (Full Procedure)
- ☐ Correction (Page Substitution)
- ☐ Cancellation
- ☐ Change (Full Procedure) with Review of Change Only
- ☐ Change (Page Substitution) with Review of Change Only
- ☒ New Procedure or Change with Full Review
- ☒ Superseded (list superseding procedures): ~~PMP-6010-RPP-005~~ JRBRADSHAW 7/27/01

Associated Configuration Document Impact Assessments:

CDI Tracking No(s).: N/A ☐ N/A

Required Reviews:

Cross-Discipline Reviews:		Programmatic Reviews:	
☐ Chemistry	☐ Training	☐ ALARA	☐ Performance Assurance
☒ Maintenance	☒ Work Control	☒ Bus. Services Proc Grp	☐ Reactivity Mgmt Team
☐ NDM	☐	☐ Component Engineering	☐ SPS (Safety & Health)
☒ Operations	☐	☐ Design Engineering	☐ Surveillance Section
☒ PA/PV RCW 7/31/01	☐	☐ Emerg Oper Proc Grp	☐ System Engineering
☐ Reg Affairs	☐	☒ Environmental	☐
☒ RP	☐ None Required	☐ ISI/IST Coordinator	☐ None Required

☒ Cognizant Org Review: [signature] Date: 7/27/01

☒ Technical Review: [signature] Date: 7/27/01

Concurrence:

☐ Ops Mgr Concurrence: N/A Date: / /

☒ Owner Concurrence: [signature] Date: 7/27/01

Package Check:

Updated Revision Summary attached? ☒ Yes

10 CFR 50.59 Requirements complete? Tracking No.: 2001-0680-00 ☒ Yes ☐ N/A

Implementation Plan developed? (Ref. Step 3.4.18) ☒ Yes ☐ N/A

Package Complete: [signature] Date: 7/27/01

Approvals:

PORC Review Required: ☒ Yes ~~☒ No~~ JRB 7/27/01 Mtg. No.: 3887

Administrative Hold Status: ☐ Released ☐ Reissued ☒ N/A CR No.: N/A

Approval Authority Review/Approval: [signature] Date: 8/2/01

Expiration Date/Ending Activity N/A Effective Date: 8/3/01

Periodic Review:

Periodic Review conducted? (Data Sheet 5 Complete) ☐ Yes ☒ No

NDM USE ONLY

Office Information For Form Tracking Only — Not Part of Form

This form is derived from the information in PMP-2010-PRC-002, Procedure Correction, Change, and Review, Rev. 8, Data Sheet 1, Review and Approval Tracking Form.

REVISION SUMMARY

Number: PMP-2280-CSE-001 Revision: 0 Change: 0

Title: Confined Space Entry ~~Program~~ 813101

Section or Step	Change/Reason For Change
Procedure #	Change: PMP-2280-CSE-001, Confined Space Entry replaces PMP-6010-RPP-005, Confined Space Entry as the instructions for performing confined space entries. Reason: Transfer of ownership from Radiation Protection to Fire Protections and Safety Service
Section 1	Change: Changed from objective to Purpose and Scope Reason: Clarification
Section 2	Change: Title change from References to Definitions and abbreviations. Added definitions Reason: Conversion to new procedure format.
Section 3	Change: Titled changed from Exceptions to Details. Deleted use of term "blanket confined space". Changes to this section provide enhanced guidance on confined space classification, atmospheric testing, training requirements, entry procedures, and contractor interface with the confined space entry program. Reason: Conversion to new procedure format. Deletion of "blanket confined space term was done to be consistent with confined space terminology used in both MIOSHA and OSHA regulations for confined space entry. Additional detail for space classification, atmospheric testing, training requirements, entry procedures, and contractor interface were done to provide clarification, consistency with the corporate confined space program, and consistency with the applicable regulations.
Section 4	Change: Title change from Details to Final Conditions. Reason: Conversion to new procedure format.
Section 5	Change: Title change from Training to References. Reason: Conversion to new procedure format.

REVISION SUMMARY

Number: PMP-2280-CSE-001 Revision: 0 Change: 0

Title: Confined Space Entry ~~Program~~ 8/31/01

Data Sheet 1	Change: Attachment 1 changed to Data Sheet 1. Reason: Conversion to new procedure format.
Data Sheet 2	Change: Attachment 2 changed to Data Sheet 2. Title and content changed from Confined Space Entry Permit to Confined Space Entry Pre-Job Brief. Reason: Conversion to new procedure format. Incorporation of job aid as committed to in corrective actions prescribed by 00-01825.
Data Sheet 3	Change: Attachment 3 changed to Data Sheet 3. Title and content changed from Confined Space Entry Log to Pre-Entry Brief Roster Reason: Conversion to new procedure format.
Data Sheet 4	Change: Attachment 4 changed to Data Sheet 4. Title and content changed from Confined Sample Log to Non-Permit Requied and Alternate Procedure Confined Space Log Reason: Conversion to new procedure format. Regulatory requirement to document data supporting confined space classification..
Data Sheet 5	Change: Attachment 5 changed to Data Sheet 5. Title and content changed from Atmospheric Monitoring Instructions to Permit Required Confined Space Permit. Reason: Conversion to new procedure format. Atmospheric monitoring requirements are stated in procedure step 3.1.1, and included on data sheets 4 and 6. Permit required per regulations.
Data Sheet 6	Change: Attachment 6 changed to Data Sheet 6. Title and content changed from Confined Space Blanket Permit to Additional Atmospheric Monitoring. Reason: Conversion to new procedure format. Blanket permit is not consistent with recognized regulatory terms associated with confined space entry. Blanket permits were deleted from this procedure for this reason.
Data Sheet 7	Change: Added Data Sheet 7. Data sheet 7 replaces attachment 3 Entrant and Attendant Reason: Conversion to new procedure format..

REVISION SUMMARY

Number: PMP-2280-CSE-001 Revision: 0 Change: 0

Title: Confined Space Entry ~~Program~~ ~~PRW~~ 8/3/01

Figure 1	Change: Added as Entry Supervisor Job Aid Reason: Incorporation of job aid as committed to in corrective actions prescribed by 00-01825.
Figure 2	Change: Added as Attendant Job Aid Reason: Incorporation of job aid as committed to in corrective actions prescribed by 00-01825.
Figure 3	Change: Added as Entrant Job Aid Reason: Incorporation of job aid as committed to in corrective actions prescribed by 00-01825.

TABLE OF CONTENTS

1 PURPOSE AND SCOPE

1.1 This procedure is applicable to all personnel (including contractors) required to enter/work in confined spaces.

1.2 This procedure is to establish standards and requirements for entering, exiting, and working in confined spaces.

2 DEFINITIONS AND ABBREVIATIONS

Term	Meaning
Alternate Procedure Confined Space	A confined space that normally does not contain atmospheric hazards where the only hazard posed by the permit space is an actual or potentially hazardous atmosphere which can be rendered safe for entry by the use of continuous forced air ventilation and periodic monitoring.
Attendant	A person trained to the requirements of PMI-2280, Confined Space Entry Program, who remains immediately outside the entrance to the permit space and monitors the authorized entrants inside.
Confined Space	A space that meets ALL of the following criteria: • Large enough that an employee can bodily enter and perform assigned work • Limited or restricted means for entry or exit • NOT designed for continuous employee occupancy
Confined Space Entry Permit	A written permit which authorizes and controls entry, showing what precautions must be observed to enter a permit required confined space.
Confined Space Rescue Team Member	A person trained to the requirements of PMI-2280, Confined Space Entry Program, in permit space rescue including the use of proper personal protective equipment and rescue equipment.
Entrant	A person properly trained and authorized to enter/work in a permit required confined space.
Entry	Breaking the plane of an opening into a confined space with any part of the entrant's body.

Term	Meaning
Entry Supervisor	A person trained to the requirements of PMI-2280, Confined Space Entry Program, and responsible for determining acceptable entry conditions, recognizing the hazards of a permit confined space and how to evaluate those anticipated hazards.
Front Line Supervisor	The supervisor assigned the responsibility of oversight and completion of the work being performed in a confined space. This supervisor may or may not be the Entry Supervisor.
Hazardous Atmosphere	An atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute illness as specified in Step 3.1.1.
Immediately Dangerous to Life or Health (IDLH) Atmosphere	Any condition that poses an immediate or delayed threat to life or which is likely to result in acute or immediately severe health effects and interferes with ability to self rescue.
Isolation	The process by which a permit space is removed from service and completely protected against the release of energy and material into the space in accordance with PMP-2110-CPS-001, Clearance Permit System.
Non-Permit Confined Space	A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm
Owner	The licensee listed on the Nuclear Regulatory Commission license for D. C. Cook Nuclear Power Plant
Permit Required Confined Space	A confined space as defined above that has one or more of the following characteristics: • Contains or has a potential to contain a hazardous atmosphere • Contains a material that has the potential for engulfing an entrant. Water is considered an engulfing hazard. • Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross section • Contains recognized mechanical or electrical hazards • Contains any other recognized serious safety or health hazard

3 DETAILS

3.1 Testing Confined Space Atmosphere

> CAUTION: Unless you are certain you are in fresh uncontaminated air, DO NOT select "YES" on the gas monitor when fresh-air set up is displayed.

3.1.1 Prior to an entry into a confined space, the Entry Supervisor tests (or arranges for testing of) the atmosphere using a direct reading instrument with remote sampling capability for:

a. Adequate oxygen – Air which contains not less than 19.5% oxygen, nor more than 22% oxygen.

b. Explosive atmosphere – An atmosphere containing a explosive gas, vapor or mist in excess of 10% of its lower explosive limit (LEL).

c. Toxic gases (if anticipated) – Substances such as carbon monoxide, hydrogen sulfide, etc., for which a dose or permissible exposure limit (PEL) has been established.

d. Airborne combustible dust at a concentration that obscures vision at a distance of five feet or less (visual not instrument observation).

3.1.2 Prior to an entry into a confined space, the Entry Supervisor arranges for radiological surveys of confined spaces in the restricted area with Radiation Protection.

> CAUTION: DO NOT use out of calibration instruments or instruments that fail a field check.

3.1.3 Check Test Equipment as follows:

a. Verify atmospheric testing instrument calibration is current.

b. Perform a field check of test equipment immediately prior to each use.

3.1.4 **IF** entry into a confined space is required to test the atmosphere or perform radiological surveys, **THEN** go to Step 3.5, Obtaining a Permit, to obtain a confined space entry permit prior to continuing with Step 3.1.5, Performing Atmosphere Test.

> **CAUTION:** To prevent erroneous results and potential fire/explosion hazards, smoking and open flames are prohibited prior to and during testing.

3.1.5 Perform tests vertically at 4 to 6 foot intervals to assure test of total atmosphere, or along the direction of travel in a bottom/horizontal entry.

> **CAUTION:** DO NOT enter the confined space until a safe atmosphere is obtained or appropriate personal protective equipment is used. In some cases, such as explosive atmosphere, the permit space may be purged with an inert gas then force ventilated and re-tested.

3.1.6 **IF** an unacceptable atmosphere is found, **THEN** force ventilate the space and re-test until a safe atmosphere is obtained.

3.1.7 Wear direct-reading monitoring devices (area or personal) with alarms **OR** place monitoring devices near the breathing zone to adequately monitor the atmosphere.

3.1.8 Record atmospheric test results on Data Sheet 6, Atmospheric Monitoring

3.1.9 **IF** monitoring is interrupted or the space vacated, **THEN** re-test the area and record results prior to any re-entry as specified in Section 3.1, Testing Confined Space Atmosphere.

3.1.10 **IF** technical assistance is needed, **THEN** contact Safety and Health.

3.2 Classifying Confined Spaces

3.2.1 Review the confined space lists on the Safety and Health web page. **IF** the space is listed as a permit required confined space **THEN** go to Step 3.5, Obtaining a Permit.

3.2.2 **IF** entry is required to test the atmosphere **THEN** the space shall be classified as a Permit Required Confined Space.

- **IF** Permit Required Confined Space, **THEN** obtain a permit in accordance with Step 3.5, Obtaining a Permit.

3.2.3 IF entry is NOT required to test the atmosphere THEN use Data Sheet 4, "Non-Permit Required and Alternate Procedure Confined Space Log" to determine confined space classification.

- IF Permit Required Confined Space, THEN obtain a permit in accordance with Step 3.5, Obtaining a Permit.
- IF Non-Permit Confined Space, THEN enter in accordance with Step 3.3 Entering A Non-Permit Confined Space.
- IF Alternate Procedure Confined Space, THEN enter in accordance with Step 3.4, Entering an Alternate Procedure Confined Space.

NOTE:	Permit Required Confined Space entries are the only entries that require an attendant.

3.3 Entering A Non-Permit Confined Space:

3.3.1 The Front Line Supervisor or Entry Supervisor obtains a confined space entry log number from the "Confined Space Entry Log" data base available through Safety and Health or the Fire Brigade.

NOTE:	WHEN testing and inspection demonstrate all hazards are eliminated, THEN the space may be classified non-permit as long as hazards remain eliminated.

3.3.2 IF entry into the confined space is required to eliminate hazards, THEN go to Step 3.5, Obtaining a Permit, to obtain a permit prior to entering the confined space.

3.3.3 IF hazard determination indicates a Non-Permit Required Confined Space THEN the Entry Supervisor signs Data Sheet 4, Non-Permit Required and Alternate Procedure Confined Space Log, authorizing entry.

3.3.4 The Entry Supervisor performs the following actions for Non-Permit Confined Space Entry:

CAUTION:	To prevent exposing personnel to an atmospheric hazard, when possible, any testing of the confined space is performed before cover is removed.

a. Verifies conditions making it unsafe to remove cover/access plate have been eliminated prior to cover/access removal.

b. Verifies railing, barricades or signs have been established at the confined space opening.

3.4 Entering An Alternate Procedure Confined Space

3.4.1 The Front Line Supervisor or Entry Supervisor obtains a confined space entry log number from the "Confined Space Entry Log" database.

3.4.2 The Entry Supervisor performs the following:

a. Verifies confined space is being ventilated with forced, continuous, clean air.

b. Records Retest Data to support alternate procedure entry on Data Sheet 4, Non-Permit Required and Alternate Procedure Confined Space Log, and posts the data sheet at the confined space during entry evolutions.

CAUTION: To prevent exposing personnel to an atmospheric hazard, when possible, any testing of the confined space is performed before cover is removed.

c. Verifies conditions making it unsafe to remove cover/access plate have been eliminated prior to cover/access removal.

d. Verifies railing, barricades or signs have been established at the confined space opening.

e. Monitor the atmosphere to ensure that the ventilation is effective in preventing the accumulation of a hazardous atmosphere, and record readings every two hours on Data Sheet 6, Atmospheric Monitoring Log.

3.5 Obtaining a Permit

NOTE: Confined spaces determined to be permit required upon re-evaluation of events during entry under non-permit or alternate procedures and requests for emergent work may be processed immediately to meet the needs of plant operation.

More than one job activity may be included on the permit application provided the activities are to be performed by the same work group, and are like tasks.

3.5.1 Planner, Front Line Supervisor, Entry Supervisor, or designee submits Data Sheet 1, Confined Space Entry Permit Application to Safety and Health.

3.5.2 Upon receipt of a complete permit entry application (Data Sheet 1), a Safety and Health Specialist reviews the application.

3.5.3 The Safety and Health Specialist obtains a permit number from the "Confined Space Entry Log" data base.

3.5.4 The Safety and Health Specialist will complete the following sections of Data Sheet 5, Permit Required Confined Space Entry Permit:

- Permit Information
- Permit Requirements

NOTE:	IF the NPM system is down, THEN the permit flag may be pulled once the system is back up.

3.5.5 A Planner or Safety and Health Specialist inputs a confined space permit flag in the Nuclear Plant Maintenance (NPM) program for work planned with this program.

3.5.6 The Safety and Health Specialist pulls the confined space permit flag in the Nuclear Plant Maintenance (NPM) program for work planned with this program.

3.5.7 The Safety and Health Specialist attaches job aids (Figures 1, 2, and 3) for the entry supervisor, attendant and entrants to the permit.

3.6 Entering a Permit Required Confined Space

3.6.1 Prior to entry, the Entry Supervisor performs the following:

CAUTION:	To prevent exposing personnel to an atmospheric hazard, when possible, any testing of the confined space is performed before cover is removed.

a. Verifies conditions making it unsafe to remove cover/access plate have been eliminated prior to cover/access removal.

b. Verifies railing, barricades or signs have been established at the confined space opening.

c. Test the confined space as specified on Data Sheet 5, Permit Required Confined Space Entry Permit, and records results on Data Sheet 6, Atmospheric Monitoring

NOTE:	Safety and Health Specialists performing inspections or providing technical support, HAZMAT team members responding to a HAZMAT event and Rescue team members performing rescue services are exempt from this requirement. They may review the permit in substitution of a pre-entry brief. The attendant may conduct additional pre-entry briefs.

3.6.2 Conducts a pre-job brief with entrants and attendants as follows:

a. The Entry Supervisor conducts an initial pre-entry brief with attendants and entrants prior to the initial entry into the confined space using Data Sheet 2, Confined Space Entry Permit Pre-Entry Brief.

b. **IF** work in the confined space exceeds one shift, **THEN** hold a pre-entry brief for each shift using Data Sheet 2, Confined Space Entry Permit Pre-Entry Brief.

c. Have each entrant and attendant complete Data Sheet 3, Pre-Entry Brief Roster, following the pre-entry brief.

d. Hold additional pre-entry briefs for new personnel who may need to enter the space throughout work evolutions in the space.

3.6.3 The entry supervisor verifies all "Prior to Entry" requirements of Figure 1, Entry Supervisor Job Aid, are met.

3.6.4 The front line supervisor ensures that a confined space entry brief score card is completed in accordance with PMP-7030-POP.001.

3.6.5 The entry supervisor signs the permit authorizing entry.

3.6.6 The attendant verifies all "Prior to Entry" requirements of Figure 2, Attendant Job Aid, are met.

3.6.7 The entrant verifies all "Prior to Entry" requirements of Figure 3, Entrant Job Aid, are met.

3.6.8 While working in permit required confined space, follow the requirements of the "During Entry Evolutions" section of appropriate job aid:

- For Entry Supervisor: Figure 1, Entry Supervisor Job Aid
- For Attendant: Figure 2, Attendant Job Aid
- For Entrants: Figure 3, Entrant Job Aid

3.6.9 The front line supervisor ensures that a confined space entry score card is completed in accordance with PMP-7030-POP.001.

3.6.10 When exiting the confined space, follow the requirements of the "After Entry Is Complete" section of appropriate job aid:

- For Entry Supervisor: Figure 1, Entry Supervisor Job Aid
- For Attendant: Figure 2, Attendant Job Aid
- For Entrants: Figure 3, Entrant Job Aid

NOTE:	IF a permit space has obstructions or turns that prevent clear and proper use of a line, or where rescue would cause a forceful contact with projections, THEN a retrieval system is not required.

3.7 IDLH Entry Procedures

CAUTION:	Due to the health and safety risks to the individual, this type of permit space should only be entered in an emergency.

3.7.1 Entry into a confined space with an IDLH atmosphere shall be done in accordance with PMI 4090, Conducting Infrequently Performed Tests or Evolutions.

3.7.2 IF a permit space has an atmosphere immediately dangerous to life or health (IDLH), hazardous atmosphere or potential of engulfment, THEN station an attendant immediately outside the permit space within sight or constant communication of entrant.

3.7.3 The entry supervisor takes the following actions:

a. Obtains all clearances prior to issuing permit

b. Calls control room and informs them of the attended permit space entry and the location of the entry.

c. Verifies the control room logs entry for reference in case of emergency.

d. Verifies entrants have body harnesses and lifelines attached and attendant has secured the free end of each lifeline.

e. Verifies non-sparking tools are used in permit spaces which may contain a explosive atmosphere.

f. Notifies the control room upon completion of entry.

3.7.4 Entry Supervisor conducts a pre-job brief with entrants and attendants as prior to entry into the confined space as follows:

a. Documents pre-job brief using Data Sheet 2, Confined Space Entry Permit Pre-Entry Brief.

b. Have each entrant and attendant complete Data Sheet 3, Pre-Entry Brief Roster, following the pre-entry brief.

3.7.5 The entry supervisor verifies all "Prior to Entry" requirements of Figure 1, Entry Supervisor Job Aid, are met.

3.7.6 The entry supervisor signs the permit authorizing entry.

3.7.7 Verify the entrant is wearing an approved positive pressure self-contained breathing apparatus (SCBA).

3.7.8 Verify an extra SCBA is available outside the space for rescue purposes (i.e., low oxygen, etc.).

3.7.9 Verify the entrant is wearing a safety harness with a retrieval line attached to it (not the SCBA harness) with the free end secured by the attendant.

3.7.10 Verify communications between attendant and entrant are established.

3.7.11 The attendant verifies all "Prior to Entry" requirements of Figure 2, Attendant Job Aid, are met.

3.7.12 The entrant verifies all "Prior to Entry" requirements of Figure 3, Entrant Job Aid, are met.

3.7.13 While working in permit required confined space, follow the requirements of the "During Entry Evolutions" section of appropriate job aid:

- For Entry Supervisor: Figure 1, Entry Supervisor Job Aid
- For Attendant: Figure 2, Attendant Job Aid
- For Entrants: Figure 3, Entrant Job Aid

3.7.14 When exiting the confined space, follow the requirements of the "After Entry Is Complete" section of appropriate job aid:

- For Entry Supervisor: Figure 1, Entry Supervisor Job Aid
- For Attendant: Figure 2, Attendant Job Aid
- For Entrants: Figure 3, Entrant Job Aid

4 FINAL CONDITIONS

4.1 None

5 REFERENCES

5.1 Use References:

5.1.1 None

5.2 Writing References:

5.2.1 Source References:

a. MIOSHA Part 7 Welding and Cutting R408.40713, Revision as of September 3, 1996

b. MIOSHA Part 86 Power Generation, Transmission, & Distribution, Revision as of May 14, 1997

c. MIOSHA Part 90 Confined Space Entry, Revision as of October 22, 1999

d. MIOSHA Part 490 Permit Required Confined Spaces, Revision as of October 22, 1999

e. 29 CFR 1910.146 Permit Required Confined Spaces, Revision as of July 1, 1999

f. 29 CFR 1910.269 Electric Power Generation, Transmission, & Distribution, Revision as of July 1, 1999

5.2.2 General References

a. PMI 2280, Confined Space Entry Program

b. AEP corporate confined space program

c. Root cause condition report 00-01825

d. PMI 4090, Conducting Infrequently Performed Tests or Evolutions.

e. PMP-2220-001-001, Foreign Material Exclusion

f. PMI-2110, Clearance Permit System

g. PMP-2110-CPS-001, Clearance Permit System

h. PMP-7030-POP-001, Human Performance Observation Program

i. PMP-6010-RPP-006, Radiation Work Permit Program

j. PMI-2270 Fire Protection

APPLICATION DETAILS

Job Order Activity(s)# _____ Unit _____ Elevation _____ Component # _____

Description of Space _____

General Description of Work _____

Expected Date and Time of Entry _____

Duration of work: _____ hrs. _____ days

Clearance permit # _____ Chemical permit # _____ RWP # _____

WBG permit # _____ Digging permit # _____

Does work involve diving? ☐ Yes ☐ No

POTENTIAL HAZARDS

Explosive Atmosphere ☐ Yes ☐ No
(If yes, PMI-2270 may apply and require a fire protection coordinators review and signature)

Toxic Atmosphere or contact With toxic agent ☐ Yes ☐ No

Oxygen deficient Atmosphere ☐ Yes ☐ No

Stored Thermal, hydraulic, mechanical, or electrical energy ☐ Yes ☐ No
(If yes, PMI-2110 may apply)

Engulfment ☐ Yes ☐ No
(If yes, PMI-2110 may apply)

Contact with biological agents ☐ Yes ☐ No

Temperature Extremes ☐ Yes ☐ No
IF yes, THEN specify the direction of the temperature: ☐ Hot ☐ Cold

Radiological Hazard ☐ Yes ☐ No

IF yes, THEN PMP-6010-RPP-006

Other: _____

SIGNATURES

Applicant's Name: _____ Dept: _____ Phone _____
Print/Sign

Signature: _____ Date: _____
Print/Sign

Fire Protection Coordinator _____ Date: _____
(If required) Print/Sign

Safety and Health Specialist Approval: _____ Date: _____
Print/Sign

NOTE:	A separate Pre-Entry Brief Roster (Data Sheet 3) is used for each Pre-entry brief. This data sheet is not retained as a permanent record.

The Confined Space Entry Supervisor discusses the following during the confined space pre-entry brief with **ALL** entrants and attendants:

- ❑ The objective of the confined space pre-entry brief.
- ❑ Expected participants in the confined space entry.
- ❑ Assignments (Attendants and Entrants) for the proposed activity.
- ❑ Review of Data Sheet 5, Permit Required Confined Space Entry Permit, and all Job Aids (Figures 1, 2, and 3) for the Entry Supervisor, Attendants and Entrants.
- ❑ Overview of applicable work package tasks/items allowed under the confined space permit.
- ❑ Training pre-requisites necessary for the use of any special equipment required per the confined space.
- ❑ Task specific duties of the attendant and entrants.
- ❑ Review of Nuclear Generation Group Toolbox, for any human error traps applicable to the job.

Data Sheet 3	Pre-Entry Brief Roster	Page: 17

Name	ACAD	Date of Pre-Entry Brief	Initials

Date:_____ Permit Number: _____

INFORMATION DATA (To be filled out for all confined space entries)

1. Location and Description of Space
   Unit number: _____ Component ID: _____ Equipment Description: _____

2. Permits
   Clearance Permit Number: _____ RWP Number: _____ WBG Number: _____
   Chemical Permit Number: _____ Digging Permit Number: _____
   Description of work to be performed:
   _____
   _____

INITIAL ATMOPSHERIC MONITORING (To be filled out for all confined space entries)

Instrument Information
Atmospheric Monitor Number: _____ Field Check: _____
Calibration due date: _____ (Select fresh air set up in uncontaminated atmospheres)

ATMOSPHERIC SAMPLING DATA

1. Time: _____
2. Oxygen (Acceptable 19.5% to 22%): _____% ☐ Y ☐ N
3. Explosive (LEL) (Acceptable below 10%): _____%
   Flammable Dust Levels (By visual observation) ☐ N/A ☐ Y ☐ N
4. Toxics: ☐ N/A ☐ Y ☐ N
   The specific toxics will vary and depend upon the space. Toxics might include CO, CO2, SO2, H2S, NH3, CL2, or other materials.
   _____(Acceptable _____ppm) _____ ppm
   _____(Acceptable _____ppm) _____ppm
   _____(Acceptable _____ppm) _____ppm
5. Did all tests pass? ☐ Y ☐ N
   *IF the answer to question 5 is no, THEN set up ventilation and go to the Alternate Procedure section.
6. Are all other hazards or potential hazards eliminated? ☐ Y ☐ N
   *IF the answer to question 6 is no, THEN submit a Confined Space Entry Permit Application (Data Sheet 1) to Personal Safety and Health.
7. There will be no hazards that could be immediately dangerous to life and health brought into the space or created in the space by the work being performed? ☐ Y ☐ N
   *IF hotwork is being performed, THEN set up ventilation and go to the Alternate procedure Entry section. Any other hazards require an entry permit.

IF the answer to all the above questions is yes, THEN this is a Non-Permit Required Space. Atmospheric testing must be performed at the beginning of each entry and documented on Data Sheet 6, Atmospheric Monitoring.

SIGN BELOW AND INFORM ENTRANTS OF STATUS OF SPACE

_____ Date: _____
ENTRY SUPERVISOR SIGNATURE (Print/Sign)

Date: _____ Permit Number: _____

ALTERNATE PROCEDURE CONFINED SPACE ENTRY DATA SECTION

Retest atmosphere after setting up continuous ventilation.

1. Time: _____
2. Oxygen: _____%
3. Explosive: _____%
4. Toxics:

Chemical:	_____	Concentration:	_____ ppm
Chemical:	_____	Concentration:	_____ ppm
Chemical:	_____	Concentration:	_____ ppm
Chemical:	_____	Concentration:	_____ ppm

5. Can continuous air ventilation maintain the space safe for entry? ☐ Yes ☐ No
6. Is the only hazard in the space an actual or potential atmospheric hazard? ☐ Yes ☐ No

* IF the answer to all of the above questions is YES, THEN this is an Alternate Procedure Confined Space Entry.

* IF the answer to any of the above questions is NO, THEN this is a permit required entry.

SUBSEQUENT ATMOSPHERIC MONITORING RESULTS ARE RECORDED ON DATA SHEET 6, ATMOSPHERIC MONITORING

SIGN BELOW AND INFORM ENTRANTS OF STATUS OF SPACE

_____ **Date:** _____

ENTRY SUPERVISOR SIGNATURE

ANY CHANGE IN CONDITIONS REQUIRE EVACUATION AND RE-EVALUATION OF THE SPACE.

Forward completed data sheet to Safety and Health Department.

PERMIT INFORMATION

Date permit issued: _____ Expiration Date: _____ Permit Number: _____

1. Location and Description of Space
   Unit number: _____ Component ID: _____ Equipment Description: _____
   Job Order Activity Number(s) _____
2. Description of Work to be performed: _____
3. Potential/Actual Hazards in Space: _____
4. Additional Permits
   Clearance Permit Number: _____ RWP Number: _____
   Chemical Permit Number: _____ Digging Permit Number: _____

PERMIT REQUIREMENTS

Note: Attendants and Entrants shall be logged on the attached Authorized Attendant and Entrant Log.

ATMOSPHERIC MONITORING REQUIREMENTS

Note: Initial and subsequent atmospheric monitoring results shall be documented on Data Sheet 6 Atmospheric Monitoring. Subsequent monitoring shall be documented every 2 hours.

- ❑ Prior to entry
- ❑ 2 gas air monitor
- ❑ 3 gas air monitor
- ❑ Continuous monitoring by entrant(s)
- ❑ Other: _____
- ❑ Draeger tube (specify) _____
- ❑ After purging and venting
- ❑ Continuous monitoring by attendant

PRECAUTIONS TO BE TAKEN FOR ENTRY

- ❑ Forced Ventilation/Venting
- ❑ Non sparking tools
- ❑ Tank Bonding
- ❑ Rescue Team Available
- ❑ Purging Agent
- ❑ No Hot Work
- ❑ GFCI
- ❑ Pneumatic Tools
- ❑ Low voltage Lighting
- ❑ Other: _____

PERSONAL PROTECTIVE EQUIPMENT:

- ❑ Gloves (Specify) _____
- ❑ Respiratory Protection (Specify) _____
- ❑ Coveralls (Specify) _____
- ❑ Communication available
- ❑ Faceshield
- ❑ Goggles
- ❑ Other _____

Note: IF a permit space has obstructions or turns that prevent clean and proper use of a line, or where rescue would cause a forceful contact with projections, **THEN** a retrieval system is not required.

RESCUE EQUIPMENT/

- ❑ Wristlets/lifeline
- ❑ Body harness/lifeline
- ❑ Body harness/lifeline on Tripod winch
- ❑ Retrieval Mechanism (for vertical spaces > 5ft)

MEASURES TO ISOLATE THE SPACE: _____

COMMUNICATIONS REQUIRED: _____

RESCUE SERVICES

Rescue Services Non-Emergency No., Ext. 1411; Rescue Services Emergency Number, Ext. 1911

ENTRY AUTHORIZATION (To be signed after pre-job brief and prior to posting permit)

Entry Supervisor: (Printed Name)_____

(Signature) _____

Entry Supervisor Department: _____

IF ANY CONDITIONS CHANGE WITHIN A SPACE, EVACUATE THE SPACE AND RE-EVALUATE!

Extensions (Approval required by Safety and Health)

Date: _____ Time: _____ Date: _____ Time: ____

Date: _____ Time: _____

PERMIT CLOSURE

Terminate entry and close permit when work is completed or a condition not allowed under the permit arises.

Entry Supervisor Signature: _____ Date: _____

Reason for closure:

_____

Permit Number: _____

NOTE:	DO NOT select "YES" when fresh air set-up is displayed unless you are certain you are in fresh uncontaminated air. **READINGS FALLING OUTSIDE LIMITS LISTED REQUIRE IMMEDIATE EVACUATION.**

Space: _____

Work To Be Performed: _____

Note: Readings are to be taken and documented every two hours.

DATE / TIME	MONITOR SERIAL NUMBER	OXYGEN % (19.5% - 22%)	FLAMMABILITY LIMIT (BELOW 10% LEL)	TOXIC NAME	TOXIC PPM	SIGNATURE

This form is attached to the original permit.

Forward completed data sheet to Safety and Health Department.

Data Sheet 7	Entrant and Attendant Log	Page: 23

Permit Number: ______________

Signature indicates that the individual was briefed and understands entry requirements.

Attendant(s)

Name	ACAD	Date	Time on Duty	Time Off Duty	Signature

Entrant(s)

Name	ACAD	Date	Time In	Time Out	Signature

Forward completed data sheet to Safety and Health Department.

PRIOR TO ENTRY

1) Knows and understands the hazards faced during entry, the modes, signs, signs and symptoms, and consequences of exposure to said hazards.
2) Performs or arranges to have performed by a qualified person all pre-entry tests specified by the permit.
3) Ensures a sign is near the opening stating "Danger Confined Space Entry by Permit Only".
4) Posts a copy of the confined space entry permit (Data Sheet 5) and Job Aids (Figures 1, 2, and 3) near the entrance in plain view of all that approach the space.
5) Ensures all procedures and equipment specified by the permit are in place prior to entry. This includes but is not limited to all required permits (e.g. clearance, Welding, Burning, Grinding (WBG) Permit, Radiation Work Permit (RWP), digging).
6) Informs rescue services prior to entry each shift, and ensures rescue services are available at ext. 1411.
7) Ensures proper communications are available and operable prior to entry (For Example: radios, phones, PA)
8) Ensures all tools, equipment, and materials taken into the space area accounted for in accordance with PMP-2200-001-001, Foreign Material Exclusion.

DURING ENTRY EVOLUTION

1) Removes unauthorized individuals who enter or attempt to enter the space during entry operations
2) Determines that entry operations remain consistent with the terms of the confined space entry permit and acceptable entry conditions are maintained.
3) Terminates and cancels the confined space as necessary.
4) In the event of an emergency evacuation, the confined space entry supervisor ensures the following:
   a) Entrants evacuated the confined space immediately
   b) All entrants are accounted for using the entry/exit log
   c) The rescue team has been contacted using the emergency number 1911 for rescue if needed.
5) Calls Personal Safety and Health Services if any of the following monitoring results occur or any other hazards are present where technical assistance is needed.
   a) Oxygen levels fall below 19.5%, or exceed 22%
   b) Carbon Monoxide levels exceed 35ppm, or
   c) LEL exceeds 10%.

NOTE: **Low battery alarms do not warrant calling Safety and Health Services**

AFTER EACH ENTRY IS COMPLETE

1) Ensures safe closure of the confined space and prevents unauthorized entry through the use of barricade tape, hatch cover in place or similar method.
2) Ensures all tools, equipment and materials taken into the space have been accounted for in accordance with PMP-2220-001-001, Foreign Material Exclusion.
3) Verifies gas monitor(s) is/are returned to Measuring and Testing Equipment (MTE) issue at the end of each shift.
4) Notifies rescue team at ext. 1411 that confined space entry for the shift is complete.
5) Upon completion of the confined space entry(ies), the confined space entry supervisor returns the confined space entry permit and logs to Safety and Health Services.

PRIOR TO ENTRY

1) Attends confined space pre-entry brief
2) At the direction of the Entry Supervisor, performs confined space pre-entry testing and atmospheric monitoring
3) Ensures communications to rescue personnel are available and operable.
4) Verify gas or oxygen cylinders and manifolds are located outside the confined space and properly secured.
5) Verify calibration date of the sampling equipment is current.
6) Verifies that entrant attended the initial pre-entry brief by reviewing the attendance roster.
7) Logs onto the Data Sheet 7, Entrant and Attendant Log.
8) Ensure all entrants are logged onto the Data Sheet 7, Entrant and Attendant Log

DURING ENTRY EVOLUTIONS

1) Perform no tasks that might interfere with the primary duty to monitor and protect the authorized entrants.
2) Continuously maintain an accurate count of authorized entrants..
3) Remain outside the permit space during entry and/or rescue operations until relieved by another attendant.
4) Sample the atmosphere as specified by the permit and record all findings and the time of those findings on Data Sheet 6, Atmospheric Monitoring.
5) Continuously monitor activities inside and outside the space to determine if it is safe for entrants to remain inside the space or non-entry personnel to remain outside the space nearby.
6) Order evacuation under the following conditions
   1. Upon detection of a prohibited condition, e.g. communication failure, monitor alarm
   2. Upon detection of the behavioral effects to authorized entrants of hazard exposure.
   3. Upon detection of a situation outside the space that could endanger the entrants.
   4. Upon noting that the attendant cannot effectively or safely perform required duties.
7) In the event of an emergency condition, the attendant will
   1. Evacuate the confined space immediately
   2. Account for all entrants
   3. Contact the confined space rescue team using the emergency number 1911, if needed
   4. Perform a non-entry rescue attempt.
   5. Notify Entry Supervisor
   6. Document the event on the permit
8) Take the following actions when unauthorized persons approach or enter the space:
   1. Warn the unauthorized person to stay away
   2. Advise the unauthorized person to exit the space
   3. Advise authorized entrants and the confined space entry supervisor that an unauthorized person has entered the space

AFTER THE ENTRY IS COMPLETE

1) Prevent unauthorized entry through the use of barricade tape, green board, or similar method
2) Return the atmospheric sample and entry/exit logs to the confined space entry supervisor

UPON COMPLETION OF THE CONFINED SPACE EVOLUTION

1) Return the confined space permit and attachments to the confined space entry supervisor
2) Return the gas monitor to its proper location at the end of each shift

ACTIVITIES PRIOR TO ENTRY
1) Attend a pre-entry briefing. Safety and Health Specialists performing inspections or providing technical support, HAZMAT team members responding to a HAZMAT event, and rescue team members performing rescue services are exempt from this requirement. They may review the permit in substitution of a pre-entry brief
2) Log onto the Entrant and Attendant Log (Data Sheet 7).
3) Know and understand the hazards faced during entry, the modes, signs, signs and symptoms and consequences of exposure to said hazards.
ACTIVITIES DURING ENTRY EVOLUTIONS
1) Properly use all of the required equipment (for example: ventilation, communication, lighting, PPE).
2) Maintain communications with the attendant
3) Alert the attendant when:
a) Entrant recognizes any warning sign or symptom of exposure or the presence of a dangerous situation
b) A prohibited condition is detected.
4) Exit the space as quickly as possible when:
a) An order to evacuate is given
b) The entrant recognizes a warning sign or symptom of exposure to a dangerous situation
c) The entrant detects a prohibited condition
d) An evacuation alarm is activated
ACTIVITIES AFTER ENTRY IS COMPLETE
1) Sign the Entrant and Attendant Log (Data Sheet 7)

Part VI: "The periodic maintenance procedures for the collection system and pump stations, where applicable."

- Environmental Guideline WWT-4 "Specialized Standard Operating Procedures for the Wastewater Collection and Treatment System." is used for routine maintenance tasks. This guideline includes the component location, equipment type, References, safety precautions, and operating procedures for the most common components of the Cook Wastewater Treatment Plant.

Part VII: "Procedures for routine maintenance and inspection of lagoons and equipment used for irrigation, where applicable, and the documentation of maintenance and inspection."

- Environmental Guideline WWT-4 "Specialized Standard Operating Procedures for the Wastewater Collection and Treatment System." This guideline also includes maintenance and inspection criteria for the seepage lagoons. (Attached)

AMERICAN ELECTRIC POWER	Environmental Affairs Guideline	Number: WWT-4
Effective Date: 5-22-01	Title: Routine Maintenance Procedures for the Wastewater Collection and Treatment System	Revision: 1

Revision Record

Revision 1: Corrected typographical errors, added additional information to clarify "daily" surveillance to mean "weekdays" (M-F) not including holidays. Added information for cleaning the sand filters with commercial detergents, or Sodium Hypochlorite. Changed title to more accurately reflect the intent of the procedure.

Originator: _____ Date: 5-11-01

Approved by: _____ Date: 5-11-01

AMERICAN ELECTRIC POWER
DONALD C. COOK NUCLEAR PLANT

1.0 TITLE

Specialized Standard Operating Procedure for the Wastewater Collection and Treatment System.

2.0 OBJECTIVE

2.1 To provide written guidelines for wastewater collection system routine maintenance.

3.0 REFERENCES

3.1 AEP SBR Wastewater Treatment Plant O&M Manual.

4.0 DETAILS

4.1 Each of the following attachments are standard operating procedures for a specific component or system in the wastewater treatment and collection system.

4.2 When working on a specific component or system, refer to the attachments as listed below.

- Attachment 1, SOP 1, Influent Liftstation
- Attachment 2, SOP 2, Influent Basket Strainer
- Attachment 3, SOP 3, East Emergency Holding Tank
- Attachment 4, SOP 4, SBR Tanks
- Attachment 5, SOP 5, Effluent Holding Tanks
- Attachment 6, SOP 6, Post Filtration System
- Attachment 7, SOP 7, Effluent Liftstation
- Attachment 8, SOP 8, Effluent Seepage Lagoons
- Attachment 9, SOP 9, South Equalization Basin

Standard Operating Procedures (1)

INFLUENT LIFTSTATION

All Wastewater enters the liftstation through an 8-inch diameter gravity sewer. Under normal operations, the liftstation by way of two submersible grinder pumps pump the wastewater to the South Equalization Tank. The pumps operate automatically by a float system and are alternated by a relay. The control panel is located within the East Plant. To insure proper operation, the pumps' hour readings will be taken on weekdays (M-F). The liftstation will be observed for grease and solids buildup. The pumps will occasionally have to be removed for maintenance.

Equipment No.: QS-800	**Location:** In front of the East Plant
Equipment Type: A 5' diameter fiberglass liftstation that is 20' deep with two 5HP submersible grinder pumps.	
Remote Control Location: In Auto, the Influent Pumps (QS-801 and QS-802) are controlled by 4 float switches.	**Local Controls:** Auto/Off/On switches within the liftstation control panel located in the East Building
Safety Precautions: 1. Follow safety precautions in Health and Safety Manual for Total Water Management and AEP safety procedures. 2. Wear hard hat, safety glasses, and rubber gloves. 1. Be careful of open liftstation. Wear fall protection as directed. 4. Follow confined space permit regulations	References: - AEP SBR Wastewater Treatment Plant O&M Manual Part 1, 1996 edition, Section 3.2

Operating Procedures/Pump Removal

1. To lower the water level below the top of the pumps, run pump(s) in manual.
2. Lock out/Tag out pump(s).
3. Open liftstation hatch. Use caution when working around liftstation opening.
4. The stationary hoist cable will have to be removed from the basket.
5. Install the lifting device on the hoist cable.
6. Lower cable through pump chain until it reaches top of pump.
7. Slowly raise pump.
8. When pump is near top of liftstation, hose off pump.
9. Raise pump further and close hatch. To prevent pinching the power cable, place a block of wood between hatch and opening.

10. **If the pumps have to be shipped away for repairs,** a confined space permit will have to be filed for and electrical maintenance personnel will have to be notified to perform the electrical disconnection. The electrical box is located within the liftstation's check valves chamber.
11. Prior to electrical disconnection and to verify the power is off, electrical maintenance personnel will wear flash gear and perform a voltage test.

Maintenance

1. Schedule pump for pickup and repair. (Keep pump locked and tagged out)
2. **To change seal oil,** after removing pump close liftstation hatch. (Protect power cable by placing a block of wood under hatch)
3. There are two oil plugs on pump (motor oil and seal oil).
4. Remove the plug labeled seal oil and allow oil to drain into container. The pump will have to be tipped to remove all of the oil. (Contact Environmental for pickup of used oil)
5. Lay pump on its side. Clean threads of drain hole and plug. Fill pump with approximately 13 ounces of seal oil. The oil level should be approximately ¼ " from bottom of the fill hole.
6. Add a small amount of sealant to the plug and replace plug.

Pump Installation

1. Raise pump and open hatch.
2. Align pump with guide rails and lower pump to the bottom of the liftstation.
3. Make sure pump is aligned properly with the discharge piping.
4. Remove hoist cable and reinstall basket.
5. Remove lock out/tag out and run pump(s) in manual.
6. Observe water level in liftstation. Make sure pump(s) are primed and seated properly. If the water level declines and leakage around pump mounting flange is minimal, the pumps are seated properly.

Final Conditions

1. Close hatch and clean work area.
2. Put pump in auto.

Standard Operating Procedures (2)

INFLUENT BASKET STRAINER

Wastewater enters the liftstation through an 8-inch diameter gravity sewer. An influent basket may be hung at the end of the influent line to capture any large rags, solids, etc. that could plug or damage an influent pump or other pumps further down the treatment process. The basket is raised and lowered by the fixed ¾ ton hoist (12-QM-119).

Equipment No.: QS-803	**Location:** Within Influent Liftstation (QS-800)
Equipment Type: A 12" x 12" x 20" stainless steel strainer basket	
Remote Control Location: None	**Local Controls:** None
Safety Precautions: 1. Follow safety precautions in Health and Safety Manual for Total Water Management and AEP safety procedures. 2. Wear hard hat, safety glasses, and rubber gloves. 3. Be careful of open liftstation	**References:** - AEP SBR Wastewater Treatment Plant O&M Manual Part 1, 1996 edition, Section 3.2

Operating Procedures

1. Open liftstation hatch. Use caution when working around liftstation opening.
2. Remove basket daily by using the stationary hoist (12-QM-119). Make sure handle lock is engaged.
3. Dump rags into trash basket. The trash basket is emptied regularly by Modsanco.
4. Lower basket with the hoist back into the liftstation making sure basket is properly positioned.
5. Position hoist cable in the slot of the liftstation hatch and close the hatch.
6. Clean work area of rags, debris, etc that may have fallen while emptying basket.

Standard Operating Procedure (3)

EAST EMERGENCY HOLDING TANK

The East Plant can be used in case of unusually high volumes, waste strength that differs from typical domestic sewage, or in the event of a chemical spill.

Equipment No.: QS-200	**Location:** In the East Sewage Treatment Building, Valves are located near the west side of the Building.
Equipment Type: Tank	
Remote Control Location: None	**Local Controls: Manual valves**
Safety Precautions: 1. Follow safety precautions in Health and Safety Manual for Total Water Management and AEP safety procedures. 2. Wear hard hat, safety glasses, and gloves.	**References:** - AEP SBR Wastewater Treatment Plant O&M Manual Part 1, 1996 edition, Section 3.2

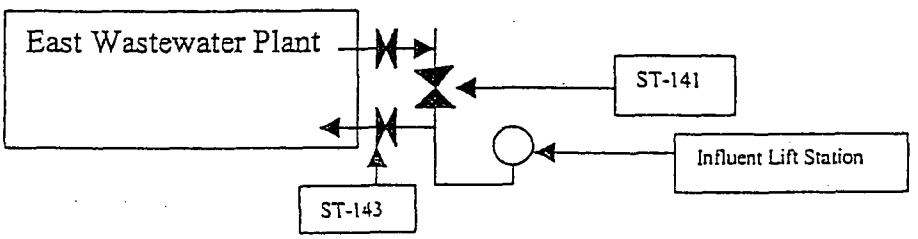
Operating Procedures

Placing Tank in Service

1. Remove valve operator cover and by using the valve wrench located in the East Plant, open valve ST-143.
2. Remove valve operator cover and close valve ST-141.

Removing Tank from Service

1. Open ST-141
2. Close ST-143
3. If the wastewater is to remain in the East EQ Tank for several days, Blower #3 can be set to auto. This will keep the wastewater from going septic.
4. The Wastewater is pumped back into the liftstation by way of submersible pump when conditions are back to normal.



Standard Operating Procedures (4)

SBR TANKS

The SBR Tanks contain activated sludge which biologically treat the wastewater. The SBR system operates automatically from the PLC. The system treats wastewater from operating through several stages: Fill, React, Settle, Decant, and Idle. Mixing and aeration during the React Cycle are accomplished by using two submersible pumps connected to jet aspirators. Occasionally, the SBR tanks will have to be drained for repairs. In addition, maintenance will be needed on the Aspirator Pumps.

Equipment No.: QS-919 and QS-920	**Location:** Third Floor
Equipment Type: Two 9.75' x 23.5' x 18' reinforced concrete tanks. (27,400 gallons) Aspirator Pumps (QS-909 and QS910)	
Remote Control Location: Aspirator Pumps are turned on automatically by the PLC program	**Local Controls:** Auto/Manual/Off switch located on PLC Panel.
Safety Precautions: 1. Follow safety precautions in Health and Safety Manual for Total Water Management and AEP safety procedures. 2. Wear hard hat, safety glasses, and rubber gloves. 3. Wear fall protection 4. If entering Tank, follow Permit Required Confine Space Requirements.	References: - AEP SBR Wastewater Treatment Plant O&M Manual Part 1, 1996 edition, Section 3.4

Operating Procedures

(To Drain SBR for Repair)

1. Schedule draining SBR when one digester is empty.
2. Obtain a Permit for Entering the Confined Space.
3. Put SBR in manual.
4. Decant SBR down to approximately 11'. Monitor clear level. To prevent blowing solids, you may have to allow for more settle time.
5. Manually waste into empty digester.
6. Once the SBR tank and digester equalize, pump the remaining liquid into digester by using trash pump. The SBR tank has a sump located in the center of the SBR tank and positioned

4.5' north of the south SBR tank wall. Put the trash pump suction in this sump.

7. Once the tank is completely drained and before entry, Lock Out/Tag Out the Influent Valve and Aspirator Pump.
8. Remove guardrail and lower ladder.
9. Monitor air according to Confined Space Requirements.
10. The person entering the Tank must wear fall protection at all times.
11. Be careful of tripping hazards on bottom of tank.
12. After job is complete, Remove all tools and reinstall guardrail.
13. Open waste valve until levels equalize.
14. By using trash pump, pump the remaining digester into the SBR tank.
15. Remove all Lock out/Tag outs. Put SBR into auto.
16. Make sure Aspirator Pump is primed.

(To Change Oil in Aspirator Pump)

1. Lock out/Tag out the Pump to be serviced.
2. Remove chain hoist from bag. Check condition of chain.
3. Remove guardrail from Tank opening.
4. Put on fall protection.
5. Remove bungy cords from pump guide rail.
6. Install chain hoist with lifting hook.
7. Remove pump's lifting chain around waste valve.
8. Once the lifting hook is around chain, reinstall chain around waste valve.
9. While holding the pump's lifting chain tight, lower chain hoist until it becomes slack.
10. Let go of the pump's chain and pull up on the hoist's chain. It should grab.
11. Remove air hose from air valve and slowly raise pump.
12. When pump is visible, Hose off pump
13. Swing pump onto deck.
14. Keep hoist connected and lean pump backwards.
15. Remove bottom oil drain plug and allow oil to drain into container.
16. Call Environmental to dispose of oil.
17. Remove oil fill plug and install drain plug.
18. To flush chamber, tilt pump forward and add some oil. Drain again.
19. Reinstall drain plug and fill pump with 19 ounces of oil.
20. Install fill plug.
21. Align pump over guide rails and slowly lower pump until it becomes partially submerged.
22. To allow for priming the pump, Open and close the ball valve located on the pump's volute.
23. Reinstall airline.
24. Lower pump until it rests on platform.
25. Remove hoist chain from pump and reinstall bungy cords.
26. Reinstall guardrail.
27. Remove lock out/tag out and put pump back into service.
28. Make sure pump is primed.
29. Clean up the work area.

Standard Operating Procedures (5)

EFFLUENT HOLDING TANK

The Effluent Tank holds wastewater after each SBR decant phase. Because the SBRs decant at a higher rate than the post filtration system can handle, this tank is important for holding decant water while supplying the filters with a constant flow. In the tank are two 2" submersible filter feed pumps. These pumps are located in a sump and are automatically turned on and off from a pressure transducer. Under normal operations, the filter-feed pumps supply the post filtration system. The filters could also be bypassed. Over time the effluent tank will acuminate solids and will need to be cleaned.

Equipment No.: QS-923	**Location:** SBR Sand Filter Area
Equipment Type: A 19' by 17'4" (8,620 gallons) Concrete Tank with two 2" submersible pumps (QS-901 and QS-902).	
Remote Control Location: The pressure transducer is wired to the PLC. The levels by which the pumps are turned automatically on and off can be changed within the computer.	**Local Controls:** On/Off switch located directly above pumps outside of the tank. Auto/Off/Manual switch located on PLC Panel.
Safety Precautions: 1. Follow safety precautions in Health and Safety Manual for Total Water Management and AEP safety procedures. 2. Wear hard hat, safety glasses, rubber gloves, and rubber boots. 3. Follow confined space blanket permit regulations and Lock out/Tag out procedures. 4. Be careful of low headroom within Tank.	References: - AEP SBR Wastewater Treatment Plant O&M Manual Part 1, 1996 edition, Section 3.5

Operating Procedures

1. Schedule cleaning of Effluent Tank before or after decant times.
2. Lock and Tag out the effluent valves'(YMO-101 & YMO-102) circuit breakers. The 110-volt breakers are located by the main exit and are numbered 4 and 5.
3. Open effluent tanks hatch and monitor the air quality. The space is covered by a confined space blanket permit. Monitor the air continuously.
4. Lower the ladder, garden hose, and squeegee into tank.
5. Spray the floor and walls of tank and squeegee the solids into the sump.
6. To remove the solids within the sump, run the effluent pumps (QS-901 & QS-902) in manual. Make sure the Sand filters are online.
7. When finished remove all equipment and reenergize the effluent valves.
8. Manually backwash filters.

Standard Operating Procedures (6)

POST FILTRATION SYSTEM

The Post Filtration System consists of two gravel/sand/anthracite gravity filters with two backwash pumps and a backwash tank. The Filters are used to further remove any solids that may be remaining in the effluent. The filters also help remove any insoluble phosphorus, BOD, etc. that may still be present. Effluent water from the effluent tank is pumped to the top of the filters and is drawn down through the media by gravity into the backwash tank. The filters can also be bypassed. The backwash tank is used to hold water for the purpose of backwashing the filters. Backwashing the filters can be done manually or automatically. The filter media may be replaced if it looses efficiency. Minor cleaning using a commercially available detergent will regenerate the filter media, the solution and debris will be backwashed. The backwash wastewater is routed back into the Equalization Basin. Sodium hypochlorite can also be used to clean the filter media that is contained in the filter housing. Over time, the backwash tank will accumulate solids and will need to be cleaned.

Equipment No.: QS-924	**Location:** 2nd level floor
Equipment Type: A 1,890 gallon backwash tank with two 6" backwash pumps (QS-905 and QS-906) and two gravity filters	
Remote Control Location: The Backwash pump are turned on automatically by a time clock. If the Filters become clogged, they will automatically backwash by tripping a high level float switch.	**Local Controls:** Manual backwash push switch on control panel located between the backwash filters.
Safety Precautions: 1. Follow safety precautions in Health and Safety Manual for Total Water Management and AEP safety procedures. 2. Wear hard hat, safety glasses, rubber gloves and rubber boots. 3. Follow Lock out/Tag out procedures.	**References:** - AEP SBR Wastewater Treatment Plant O&M Manual Part 1, 1996 edition, Section 3.6

Operating Procedures

1. To clean the backwash tank, initiate a manual backwash.
2. Lock out/Tag out filter feed pumps.
3. After both filters are done backwashing, open the ball valve between Zoeller pump and filters' backwash wastewater line.
4. Plug in Zoeller Pump.
5. As level becomes low enough, enter backwash tank.
6. Use a squegee to push the remaining water to the pump.
7. Use a scrub brush to clean the walls and the tank floor. (A little chlorine added to the water may be helpful in cleaning the tank.)
8. Unplug Zoeller Pump and close it's discharge valve.
9. Remove all cleaning supplies.

Standard Operating Procedures (7)

EFFLUENT LIFTSTATION

After effluent water leaves the backwash tank, it flows into the effluent liftstation via a 6" gravity line. The effluent liftstation has two submersible pumps that pump the effluent water up to the seepage lagoons. The pumps are controlled automatically by a series of four float switches and alternated automatically by a relay. The control panel is located within the East Plant. The pumps can be run manually by the auto/manual/off switches, which are located in the control panel. To make sure pumps are operating correctly; pump hour readings should be taken daily. The hour meters are also located within the control panel. Occasionally, the effluent pumps will have to be removed for repairs.

Equipment No.: QS-600	**Location:** Near East Plant along the south edge of the small parking lot.
Equipment Type: 5' diameter steel canister type liftstation that is 11' deep with two 5 HP submersible pumps.	
Remote Control Location: In Auto, the pumps are controlled by way of four float switches.	**Local Controls:** Auto/Off/On switches within the liftstation control panel located in the East Building
Safety Precautions: 1. Follow safety precautions in Health and Safety Manual for Total Water Management and AEP safety procedures. 2. Wear hard hat, safety glasses, rubber gloves, and fall protection. 3. Be careful of open liftstation 4. Follow confined space permit regulations	**References:** - AEP SBR Wastewater Treatment Plant O&M Manual Part 1, 1996 edition, Section 3.7

Operating Procedures

1. Schedule maintenance of pumps around decant cycles. (The filter feed pumps could be turned off). Removing pumps can be done without entering liftstation.
2. **If the pumps have to be shipped away for repairs,** a confined space permit will have to be filed for and electrical maintenance personnel will have to be notified to perform the electrical disconnection. The electrical box is located within the liftstation but is accessed without entering the liftstation.
3. To pull pumps, lower water level within liftstation by running pump(s) in manual.
4. Lock and tag out the pump(s). Control Panel is located within the East Plant.

5. Open liftstation hatch. Use caution when working around liftstation opening.
6. Set up Tripod.
7. Lower Tripod cable down to the top of the pump. Make sure Tripod cable is equipped with a grab hook.
8. Remove pump slowly.
9. If pump is to be sent away for repairs, set pump off to the side.
10. Electrical maintenance personnel will disconnect wiring from electrical box. (Flash gear will be worn)
11. Close hatch and clean work area.
12. Schedule pump for pickup. (Keep pump locked and tagged out)
13. **To change seal oil,** after removing pump close liftstation hatch. (Protect power cable by placing a block of wood under hatch)
14. There are two oil plugs on pump (motor oil and seal oil).
15. Remove the plug labeled seal oil and allow oil to drain into container. The pump will have to be tipped to remove all of the oil. (Contact Environmental for pickup of used oil)
16. Lay pump on its side. Clean threads of drain hole and plug. Fill pump will approximately 13 ounces of seal oil. The oil level should be approximately ¼ " from bottom of the fill hole.
17. Add a small amount of sealant to the plug and replace plug.
18. Raise pump and open hatch.
19. Align pump with guide rails and lower pump to the bottom of the liftstation.
20. Make sure pump is aligned properly with the discharge piping.
21. Remove hoist cable.
22. Remove lock out/tag out and run pump(s) in manual.
23. Observe water level in liftstation. Make sure pump(s) are primed and seated properly. If the water level declines and leakage around pump mounting flange is minimal; the pumps are seated properly.
24. Remove tripod and close the hatch.
25. Clean work area.
26. Put effluent lift pumps and filter feed pumps into auto.

Standard Operating Procedures (8)

EFFLUENT SEEPAGE LAGOONS

Discharge from the Effluent Liftstation is directed to either one of the two seepage lagoons by gate valves. The gate valves are located within a manhole between the two lagoons. The lagoons filter solids and allow the effluent to enter the groundwater. Each Lagoon has a measuring device to assist in determining the amount of freeboard available. Routinely alternating and cleaning the lagoons will maintain low water levels within the lagoons. A two-foot freeboard should be maintained at all times. The lagoons should be checked daily (M-F) and examined for erosion, animal burrowing, and freeboard. Preventive maintenance is done on the pond that is not in service, which includes weed control (herbicide application by licensed applicator), leaf removal, and lagoon bed repair. A fence has been installed to reduce leaf accumulation in the ponds.

Equipment No.: Lagoon A and B	**Location:** On Hill, approximately 750 ft southeast of the East Plant. Lagoon A is the northern most lagoon while Lagoon B is the southern most Lagoon.
Equipment Type: Lagoon	
Remote Control Location: None	**Local Controls:** Two 4 inch gate valves
Safety Precautions: 1. Follow safety precautions in Health and Safety Manual for Total Water Management and AEP safety procedures. 2. Wear hard hat, safety glasses, and rubber gloves. 3. Follow confined space blanket permit regulations.	**References:** - AEP SBR Wastewater Treatment Plant O&M Manual Part 1, 1996 edition, Section 3.8

Operating Procedures

1. The lagoons should be alternated quarterly or more often depending on freeboard levels. Maintain at least a two-foot freeboard at all times.
2. Prior to discharging to a lagoon, make sure lagoon is free of weeds, leaves, etc.
3. Open the manhole between the two lagoons and monitor the atmosphere within the manhole before entering and continuously during entry.
4. Open the closed valve with a pipe wrench and close the other valve.
5. Reinstall manhole cover.
6. On next rounds, verify discharge is flowing properly and the closed valve is not leaking.

Standard Operating Procedures (9)

SOUTH EQUALIZATION BASIN

Wastewater from the Influent liftstation enters the EQ Basin by a 3" force main. A 4" digester decant line and a 6" backwash water line also feed into the EQ Basin. The main function of the EQ Basin is to help equalize normal diurnal flow variations. This is accomplished by gradual filling of the basin during high flow times and gradual emptying of the basin during low flow times. The wastewater is mixed by utilizing two Roots-Dresser blowers (QS-301 and QS-302). Wastewater is pumped from the basin to the SBR tanks by two 3 HP submersible pumps (QS-305 and QS-306). These pumps are controlled automatically by the PLC and a pressure transducer.

On a daily basis, Mag Hydroxide is fed into the EQ along with the addition of Dosfolat. The Blowers will need preventive maintenance performed regularly.

Equipment No.: QS-300	**Location:** South Room of former South Plant
Equipment Type: A 31' x 12' x 9' Steel Tank (19,500 gallons with an overflow tank of 3,024 gallons)	
Remote Control Location: For Blowers: In Auto, the blowers are controlled by a clock.	**Local Controls:** For Blowers: Manual/Off/Auto switch located within control panel between the two blowers.
Safety Precautions: 1. Follow safety precautions in Health and Safety Manual for Total Water Management and AEP safety procedures. 2. Wear hard hat and safety glasses. 3. Follow Lock out/Tag out procedures	**References:** - AEP SBR Wastewater Treatment Plant O&M Manual Part 1, 1996 edition, Section 3.3

Operating Procedures (Blower Maintenance)

1. Lock out/Tag out blower(s).
2. Grease blower bearings every two weeks. These are purge type bearings. Purge about ¼ cup of old grease.
3. Clean blower filters every 4 months. Soak filters in hot water and lab soap. Hose of filters, let dry, and reinstall.
4. Check the blower belts for wear and proper tension. Adjust or replace as needed.

5. Check the blower oil level monthly and change every 3 months.
6. Remove lock out/tag out.
7. Put one blower in auto and the other in the off position.
8. Switch blowers weekly.
9. Contact Environmental for disposal of oil.

Part VII.B: "Recordkeeping"

- Wastewater operators use bench sheets (attached) for daily data collection, and process efficiency monitoring results. These bench sheets are collected and filed by date. They are kept for a minimum of three years at the wastewater facility.

- Other operations activities and notations are kept in the "Sequencing Batch Reactor Logbook," which is maintained at the wastewater plant until the book is full. The book is then filed with the Nuclear Documents Management section (NDM) and kept for a minimum of 3 years.

- A report detailing the effluent data, and the treatment efficiency of the Sequencing Batch Reactor is submitted on a monthly basis. The monthly report is submitted for review by EarthTech Operations Services. This report is then filed with the Environmental Records. No retention requirement is associated with this record, but there are currently reports saved back to 1995.

- Monthly groundwater reports are required by the Michigan Department of Environmental Quality Waste Management Division (MDEQ-WMD). These reports are due to the District and Lansing Office no later than the 15th following the completion of the quarter. A copy of this report is filed with NDM and kept for the life of the plant.

COOK NUCLEAR PLANT
GRAB BENCH SHEET

ıple Date:_____ Operator: _____

	Influent	Effluent	EQ Basin	Decant #1	Decant #2
pH					
Operator:					
Date:					
Time:					

	Decant #1	Decant #2	EQ Basin
Ammonia			
Nitrate			
Nitrite			
TIN			

Total Phosphorus

Sample	#1	#2
mls of Sample		
Reading		
Dilution Factor		
T Phos mg/L		

	MLSS SBR #1	MLSS SBR #2
Settleability		
30 minutes		
60 minutes		
SVI		
Temperature		
Clear		
Before decant		
After decant		
unt Wasted		

	MLSS SBR #1	MLSS SBR #2
Susp. Solids		
Volume		
Filter + Dry		
Filter + Ash		
Filter		
Dry Wt		
Vol Wt		
SS mg/L		
VSS mg/L		

COOK NUCLEAR PLANT
COMPOSITE BENCH SHEET

Sample Date: _____ Operator: _____
Collect Date: _____ Collection Time: INF _____ EFF _____

BIOCHEMICAL OXYGEN DEMAND

Set-up: Oper: _____ Date: _____ Time: _____
5 day incubation: Oper: _____ Date: _____ Time: _____

Sample	Blank	Seed	Inf	Inf	Dup	Eff	Eff	Dup	Stand
Bottle No.									
mls of Sample			4	6	6	200	250	250	6
mls of Seed	*****	25	*****	*****	*****	5	5	5	5
Initial DO									
Final DO									
Sample Deplt		x0.2							
Seed Correction			*****	*****	*****				
BOD mg/L									
Average									

SUSPENDED SOLIDS

Oper: _____ Date: _____ Time: _____

	Influent	Duplicate	Effluent	Duplicate
Volume				
Filter + Dry				
Filter + Ash				
Filter				
Dry Wt				
Vol Wt				
SS mg/L				
Average				

TOTAL PHOSPHORUS

Oper: _____ Date: _____ Time: _____

Sample	Stand	Influent	Duplicate	Effluent	Duplicate	Spike
mls of Sample		1ml/25				
Reading						
Dilution Factor		25				
T Phos mg/L						
Average						

AMMONIA, NITRATE, NITRITE

Date:		Date:		Date:		Date:		
Time:		Time:		Time:		Time:		
Operator:		Operator:		Operator:		Operator:		
	NH3-N		NH3-N		N03-N		N02-N	T.I.N.
Influent		Effluent		Effluent		Effluent		
Duplicate		Duplicate		Duplicate		Duplicate		
Average		Average		Average		Average		
Spike		Spike		Spike		Spike		

Part VIII: "A listing of environmental regulations, other than this part, that apply to operation of the wastewater treatment facility.

- 40 CFR 112, EPA Regulations on Oil Pollution Prevention, July 1, 1994.
- 40 CFR 110, EPA Regulations on Discharge of Oil, August 25, 1993.
- 40 CFR 239-282, Resource Conservation and Recovery Act (RCRA)
- 40 CFR 350-372, Emergency Planning and Community Right to Know Act (SARA Title III)
- 40 CFR 401-471, Clean Water Act
- 40 CFR 500-503, Clean Water Act
- 40 CFR 100-140, Clean Water Act
- 40 CFR 702-799, Toxic Substances Control Act (TSCA)
- Michigan Department of Environmental Quality Surface Water Quality Division NPDES Permit M0005827 (Stormwater Regulations)

Part VIII.A: Vegetation Control.

- The D.C. Cook Nuclear Plant herbicide application is regulated by 10 CFR 20.
- FIFRA Section 12, Pesticide label adherence.
- 40 CFR 171, Pesticide applicator certification.

The following procedures, guidelines, and lab guides were also included in the Operation and Maintenance Manual:

12-OHP-4021-062-001, Demineralized Makeup Water System Regeneration (North and South Trains), Rev. 12

12-OHP-4021-062-002, Third Makeup Plant Train Regeneration, Rev. 11

12-OHP-4021-062-009, Regeneration Waste Neutralization, Rev. 8

SPP-2281-HAZ-001, Hazardous Material Response Organization and Training, Rev. 2

12-EA-6090-ADM-001, Preparation and Submittal of Environmental Reports, Rev. 2

PMP-6090-PCP-100, Spill Response – Oil, Polluting, and Hazardous Materials, Rev. 4

12-THP-6020-ADM-010, Analytical Results, Rev. 6

CLG-127, Chemistry Lab Guide for ICP/MS, Rev. 3

THI-6020-ADM-003, On-Line Instrument Quality Control, Rev. 1

12-THP-6020-ANA-006, Oil and Grease, Rev. 0 CS 1

12-THP-6020-ANA-005, Total Dissolved Solids, Rev. 2a

12-THP-6020-CHM-311, Turbine Room Sump, Rev. 14

CLG-104, Chemistry Lab Guide for pH, Rev. 1

12-THP-6020-ANA-011, Suspended Solids, Rev. 1 CS1

CLG-103, Chemistry Lab Guide for Hach Spectrophotometer, Rev. 1

12-THP-6020-INS-210, TRS pH Monitor, Rev. 2

THI-6020-ADM-001, Quality Control, Rev. 3

12-OHP-4022-001-010, Severe Weather, Rev. 4

12-OHP-4022-001-009, Seiche, Rev. 2

PMP-6090-ADM-001, Environmental Reviews and Surveillance, Rev. 3

PMP-5055-001-001, Winterization/Summerization, Rev. 2

12-OHP-5030-001-001, Operations Plant Tours, Rev. 6

SUR-1, Environmental Surveillance Guideline, Rev. 17

PMP-2280-CSE-001, Confined Space Entry, Rev. 1

PMP-5020-FLM-001, Fluid Leak Management Program, Rev. 0

PMI-7030, Corrective Action Program, Rev. 35

NPDES-6, Discharge Monitoring Report, Rev. 3

INDIANA MICHIGAN POWER

Indiana Michigan
Power Company
Cook Nuclear Plant
One Cook Place
Bridgman, MI 49106

Ms. Jeanette Bailey
Michigan Department of Environmental Quality
Groundwater Permits Unit
P.O. Box 30273
Lansing Michigan 48909-7773

January 20, 2006

Dear Ms. Bailey:

Subject: Donald C. Cook Nuclear Plant
Groundwater Permit M00988

Thank you for arranging a teleconference with your staff on January 11, 2006 regarding the draft groundwater permit for Cook Nuclear Plant. Attached is a revised draft permit based on our meeting. The following comments provide written documentation.

Page One, Permittee Address request:
Indiana Michigan Power
One Summit Square
PO Box 60
Ft Wayne IN 46801.

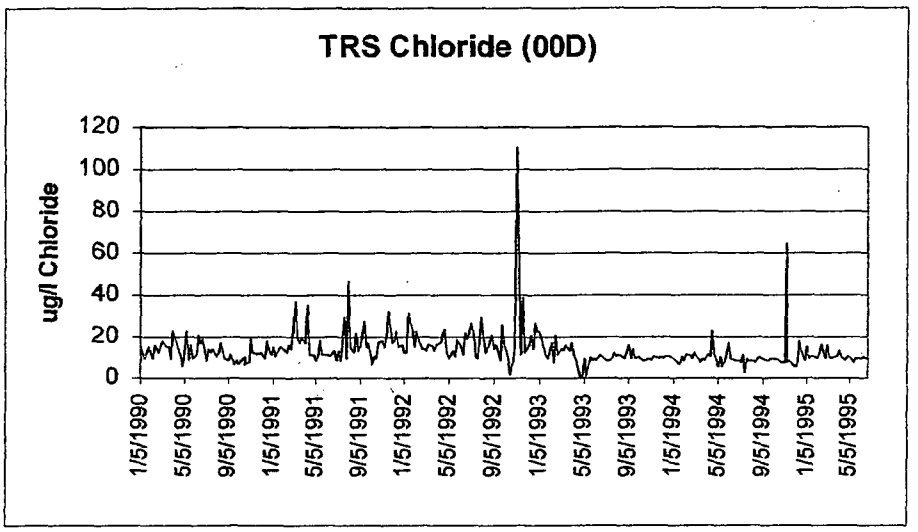
Page One, Authorization to discharge a maximum. Delete the words "chemistry Lab wastewater." The sewage chemistry lab contributes a small fraction to the flow of Outfall 00E. The chemistry lab is not specifically described in Outfall 00D, therefore for consistency please delete the wording.

Page Three Section A, Effluent Limitations and Monitoring Requirements.

Change quarterly to monthly in the second sentence.

EF-1, and EF-2 currently requires direct measurement. It is our understanding that the calculation specified is the summation of "total flow".

Chloride analysis. Historic weekly data from January 1990 to June 1995 show average chloride concentration to be 13.7 mg/l. A single data point 1/5/1992 shows a Maximum chloride concentration of 110.2 mg/l, the next highest is 64.2 mg/l. The following data was submitted under NPDES permit requirements from 1990 through 1995 for Outfall 00D. If CNP is required to monitor for chlorides, we would be required to discharge mercury or silver compounds which are present in approved chloride analysis methods which would have to be disposed of in the Outfall. This is contrary to our pollution prevention plan in which Cook Plant has taken steps to reduce mercury discharges. Since introduction of this test would increase pollutants without any environmental benefit, CNP recommends that this requirement be deleted.



EQ-1 All test measurement frequencies are listed as "daily" with the exception of pH. We agree that this could be done daily Monday through Friday to avoid weekend overtime.

pH limits. The pH analysis in the past permit was listed as continuous. We have an on-line pH analyzer that will isolate flow if the effluent pH values exceed limits.

TIN, Ammonia, Nitrate, and Nitrite analysis frequency will be reduced to monthly as we discussed in the meeting.

Sodium and Sulfate sample will be changed from daily to 1/month during discharge of regeneration wastewater, and 1/month when no regeneration wastewater discharge occurs.

Page Four EQ-2 Sanitary Sewage/Chemistry Lab Wastewater (Outfall 00E)

BOD: Reduce requirement from daily to weekly.

Chloride: The lab at the sewage plant used less than one gallon of 10% HCL during the past year for glassware cleaning. Sewage plant uses ferric chloride as phosphorus control. If CNP is required to monitor for chlorides, we would be required to discharge mercury and silver compounds which are present in approved chloride analysis methods which would have to be disposed of in the Outfall. This is contrary to our pollution prevention plan in which Cook Plant has taken steps to reduce mercury discharges. Since introduction of this test would increase pollutants without any environmental benefit, CNP recommends that this requirement be deleted. The influent to the wastewater plant is 100% domestic sewage with no industrial waste stream influence.

Dissolved oxygen: Reduce requirement from daily to weekly.

Sodium: The influent to the wastewater plant is 100% domestic sewage with no industrial waste stream influence. We do not discharge any sodium containing products other than normal domestic sanitary sewage.

Part B Groundwater Limitations and Monitoring Requirements.
Page Five

pH Limits added (6.5 - 9.0) MDEQ agreed to consider changing the lower limit to 6.0.

Sulfate: Should be changed from Quarterly to Annually.

Dissolved Iron: The units should be changed from mg/l to ug/l. (Cook Plant groundwater wells have naturally occurring iron in pockets around the site. Wells 12, 13, and 19 have exceeded the 300 ug/l limit.) Grab samples of both effluent streams in November and December 2005 for dissolved iron are below the limit of 300 ug/l. Data is listed below.

Date	Outfall 00D dissolved iron ug/l	Outfall 00E Dissolved Iron ug/l
November 2005	MAX:<10, AVG:<10, MIN:<10	MAX: 30, AVG:30, MIN:20
December 2005	MAX:<10, AVG:<10, MIN:<10	MAX:40, AVG:20, MIN:10

Iron fixing bacteria from nearby abandoned septic tanks are the likely source of the elevated iron levels found in wells 12, 13 and 19.

Page Six Part C Observation Requirements:

Seepage ponds Oil Sheen daily visual observation requirement. Due to manpower issues, we agreed to a change of monitoring frequency to weekdays [daily, Monday through Friday].

Freeboard This level does not change, an overflow pipe drains the water to the overflow pond to the East. The ponds are surrounded by a natural dune impoundment up to 60' in height. Freeboard measurement should be performed on Outfall 00E, where the seepage lagoons are situated on top of the dunes. A failure of the dike would be more likely to happen if the freeboard approached the two foot minimum distance. We request that the freeboard measurement be removed from Outfall 00D and added to Outfall 00E.

Part D Compliance Requirements: Reference to Section A.1 and B.1 will be corrected to Section A and B.

Part D.b Due to the use of offsite laboratories, we feel that additional wording should be added to this section. We request that the phrase "within 14 days of becoming aware of the exceedence." Be inserted into this section.

Part E. Schedule of activities:

Part 1 The Operation and Maintenance manual has been submitted to the Kalamazoo district office on December 26, 2000. Additional copies will be provided, if required.

Part 2 Upstream well #8 is located within 300 ft of an abandoned septic tank and tile field used by fish sampling crews in the 1970's. Cook Nuclear Plant believes that this is the source of Mercury in this well and will provide a report documenting this to your office.

Part H. Approved Documents. This should include the Restrictive Covenant dated October 26, 2000. (Attached)

Should you have any questions regarding this response, please contact me at (269) 465-5901, ext. 1153.

Sincerely,

John P. Carlson
Environmental Manager

Enclosure

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this and all attached documents, and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

John P. Carlson
Environmental Manager

bc: J. P. Carlson
C. E. Hawk
J. N. Jensen
J. S. Miller
W. H. Schalk
R. J. Sieber
B. W. Watson
L. J. Weber
T. K. Woods
B. K. Zordell
MDEQ File
NDM (2006-65)

DRAFT

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER BUREAU

GROUNDWATER DISCHARGE PERMIT

This permit is issued under the provisions of Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), being Sections 324.3101 through 324.3119 of the Compiled Laws of Michigan, and the Administrative Rules promulgated thereunder. This permit does not relieve the permittee from obtaining and complying with any other permits required under local, state, or federal law.

Permit Number: GW **Authorization Rule:** 2218
Facility Name: Donald C. Cook Nuclear Plant
Issue Date: 2005 **Effective Date:**
Expiration Date:
Deadline for Submittal of Renewal Application:

Facility Address: 1 Cook Place, Mail Zone 5A, Bridgman, Michigan 49106
Telephone: 269-465-5901, ext.1153 **Fax:** 269-466-2550

Discharge Location Description:
SW 1/4 of the SE 1/4 of Section 6, T06S, R19W, Lake Township, Berrien County, Michigan, as identified in Attachment 1 (Site Map) and fully described in this permit.

Permittee Name: Indiana Michigan Power
Permittee Address: One Summit Square ~~NEED ADDRESS/PHONE OF PARENT COMPANY~~PO Box 60, Ft. Wayne, Indiana 46801
Telephone: (260) 421-1400 **Fax:**

Authorization to discharge a maximum: 2.4 million gallons per day (876 million gallons per year) of process wastewater and 60,000 gallons per day (21.9 million gallons per year) of sanitary sewage ~~and chemistry lab~~ wastewater in accordance with the limitations, monitoring requirements, and other conditions as set forth in this permit, Part 31, and its administrative rules.

Type of Wastewater #1: Process
Method of Treatment: Neutralization (B-1b)
Method of Disposal: Seepage Ponds (A-1f)
Type of Wastewater #2: Sanitary Sewage/Chemistry Lab
Method of Treatment: Sequencing Batch Reactor (C-3b)
Method of Disposal: Rapid Infiltration Basins (A-1f)

In accordance with Section 324.3122 of the Michigan Act, the permittee shall make payment of an annual permit fee to the Department for each December 15 the permit is in effect regardless of occurrence of discharge. The permittee shall submit the fee in response to the Department's annual notice. The fee shall be postmarked by March 1 for notices mailed by January 15. The fee is due no later than 45 days after receiving the notice for notices mailed after January 15. Fees paid in accordance with the Michigan Act are not refundable.

All construction, maintenance, operations, and monitoring of this facility must comply with the conditions set forth in this permit or in plans approved by the Department in accordance with this permit. Failure to comply with the terms and provisions of this permit may result in civil and/or criminal penalties as provided in Part 31.

This permit is based upon the information submitted in the July 25, 2005 application for Groundwater Discharge received by the Michigan Department of Environmental Quality and any subsequent amendments. This permit supersedes Permit M 00988 issued to the facility on September 29, 2000.

Issued this ____ day of _____ for the Michigan Department of Environmental Quality.

_____

James R. Janiczek, Chief
Groundwater Permits Unit
Water Bureau
Michigan Department of Environmental Quality

A. Effluent Limitations and Monitoring Requirements

The wastewater discharge shall be limited and monitored by the permittee, at a minimum, as specified below. The permittee shall submit reports ~~quarterly~~ monthly as specified in Section F.1 of this permit. In the event of any non-compliance of limitations, including any detected in additional sampling to the minimum required below, the permittee shall fulfill the requirements of Section D.1 of this permit (Rule 2227)

SAMPLE LOCATION ID	PARAMETER	LIMITATION-UNITS	MEASUREMENT FREQUENCY	SAMPLE TYPE
Effluent				
Flows:				
EF-1 Process Wastewater (Outfall 00D)	Flow	2,400,000 GPD	Daily	Direct Measurement
		876, 000, 000 GPY	Annually	Calculation
EF-2 **Sanitary Sewage/ Chemistry Lab Wastewater** (Outfall 00E)	Flow	60,000 GPD	Daily	Direct Measurement
		21,900,000 GPY	Annually	Calculation
Effluent Quality:				
EQ-1 Process Wastewater (Outfall 00D)	~~Chloride~~	~~mg/l~~	~~Daily~~	~~Grab~~
	Ethanolamine	mg/l	~~Daily~~ Daily Weekdays	Grab
	Hydrazine	ug/l	~~Daily~~ Daily Weekdays	Grab
	Total Inorganic Nitrogen	mg/l	~~Daily Weekdays~~ Monthly	Calculation Ammonia (N) + Nitrate (N + Nitrite (N)
	Ammonia Nitrogen	Grab	~~Daily Weekdays~~ Monthly	Grab
	Nitrite Nitrogen	Grab	~~Daily Weekdays~~ Monthly	Grab
	Nitrate Nitrogen	Grab	~~Daily Weekdays~~ Monthly	Grab
	pH	6.5-9.0 S.U..	Daily	~~Grab~~Continuous
	Sodium	mg/l	~~Daily~~1/month * 1/month**	Grab
	Sulfate	mg/l	1/month * 1/month**~~Daily~~	Grab

*During discharge of resin regeneration wastewater if discharge occurs.

**During discharge when no regeneration wastewater discharge occurs.

1-2 **Sanitary Sewage/Chemistry Lab Wastewater** (Outfall 00E)	BOD5	35 mg/l	~~Daily~~Weekly	Grab
	~~Chloride~~	~~mg/l~~	~~Daily~~	~~Grab~~
	Dissolved Oxygen	mg/l	~~Daily~~Weekly	Grab
	Phosphorus	15 mg/l	~~Daily~~Weekly	Grab
	pH	6.5-9.0 S.U.	~~Daily~~Weekly	Grab
	~~Sodium~~	~~mg/l~~	~~Daily~~	~~Grab~~
	Total Inorganic Nitrogen	mg/l daily max	~~Daily~~ Weekly	Calculation: Ammonia (N) + Nitrate (N) + Nitrite (N)
	Ammonia Nitrogen	mg/l	~~Daily~~Weekly	Grab
	Nitrate Nitrogen	mg/l	~~Daily~~Weekly	Grab
	Nitrite Nitrogen	mg/l	~~Daily~~Weekly	Grab

* The daily maximum is defined as the total discharge by weight, volume or concentration if specified, during any calendar day.

** The monthly average is defined as the total discharge by weight, volume or concentration if specified, during the reporting month divided by the number of days in the reporting month that the discharge occurred. When less than daily sampling occurs, the monthly average shall be determined by the summation of the measured daily discharge, by weight or concentration, divided by the number of days in which samples were collected, analyzed, and reported during the reporting month.

B. Groundwater Limitations and Monitoring Requirements

The disposal of treated wastewater shall not cause the groundwater quality to exceed the limitations listed below. Groundwater monitoring wells EW-1A, EW-8, EW-12, EW-13, and EW-19 shall be sampled and the groundwater analyzed for the parameters listed below at least at the minimum frequencies indicated. Monitoring well EW-8 is the upgradient well. Compliance with limits established in this section will be measured at monitor wells EW-1A, EW-12, EW-13, and EW-19. Monitoring wells and groundwater flow direction are identified on Attachment 3 (Groundwater Monitoring Well Map). In the event of any non-compliance with limitations, including any detected in sampling additional to the minimum required below, the permittee shall fulfill the requirements of Section D.1 of this permit (Rule 2227).

PARAMETER	LIMITATION UNIT	MEASUREMENT FREQUENCY	SAMPLE TYPE
Static Water Elevation	USGS - Ft	Quarterly	Direct Measurement
pH	6.~~5~~0-9.0 S.U.	Quarterly	Grab
Chloride	250 mg/l	Quarterly	Grab
Specific Conductance	umhos/cm	Quarterly	Grab
Total Inorganic Nitrogen	5 mg/l	Quarterly	Calculation = Ammonia-N+ Nitrate-N+Nitrite-N
Ammonia Nitrogen	mg/l	Quarterly	Grab
Nitrite Nitrogen	0.5 mg/l	Quarterly	Grab
Nitrate Nitrogen	mg/l	Quarterly	Grab
Total Phosphorus	1 mg/l	Quarterly	Grab
Sulfate	250 mg/l	~~Annually~~Quarterly	Grab
Dissolved Sodium	120 mg/l	Quarterly	Grab
Total Dissolved Solids	mg/l	Quarterly	Grab
Total Alkalinity	mg/l	Annually	Grab
Bicarbonate	mg/l	Annually	Grab
Dissolved Aluminum	150 ug/l	Annually	Grab
Dissolved Barium	440 ug/l	Annually	Grab
Dissolved Boron	1900 ug/l	Annually	Grab
Dissolved Cadmium	2.2 ug/l	Annually	Grab
Dissolved Calcium	mg/l	Annually	Grab
Dissolved Chromium	11 ug/l	Annually	Grab
Dissolved Copper	9 ug/l	Annually	Grab
Dissolved Iron	300 ~~mg~~ug/l	Annually	Grab
Dissolved Lead	10 ug/l	Annually	Grab
Dissolved Manganese	530 ug/l	Annually	Grab
Dissolved Magnesium	200 mg/l	Annually	Grab
Dissolved Inorganic Mercury	0.0013 ug/l	Annually	Grab
Dissolved Nickel	52 ug/l	Annually	Grab
Dissolved Oxygen	mg/l	Annually	Grab
Dissolved Potassium	mg/l	Annually	Grab
Dissolved Selenium	5 ug/l	Annually	Grab
Dissolved Silver	0.2 ug/l	Annually	Grab
Dissolved Zinc	120 ug/l	Annually	Grab
Total Organic Carbon	mg/l	Annually	Grab
Phenols	mg/l	Annually	Grab
Hydrazine	10 ug/l	Annually	Grab
Ethanolamine	2 mg/l	Annually	Grab

C. Observation Monitoring Requirements

The permittee shall inspect the treatment and disposal facilities for the operational conditions required below at the minimum frequency specified. All inspections shall be documented in a logbook to be maintained at the on-site facility and shall be available for review by Department personnel at all times.

LOCATION	CONDITION	MEASUREMENT FREQUENCY	SAMPLE TYPE
Seepage Ponds (Outfall 00D)	Oil Sheen	~~Daily~~Weekdays	Visual Observation
	Dike Inspection	Weekdays	Visual Observation
	~~Freeboard~~	~~2 feet minimum~~	~~Direst Direct Measurement~~
Rapid Infiltration Basins (Outfall 00E)	Vegetation Control	Weekly	Visual Observation
	Freeboard	2 feet minimum	Direct Measurement

D. Compliance Requirements If Permit Limits Are Exceeded

1. If a limit described in Section A.~~1~~ or B.~~1~~ is exceeded, the discharger shall comply with Rule 2227 and undertake the following within the specified timeframes indicated below:

   a. Provide written notification to the Department at the address in Section F.2 of this permit, within seven calendar days, that a limit has been exceeded. Such notification shall include the name of the substance(s), the concentration(s), and the location(s) that exceeded the limit(s).

   b. Resample and analyze for the parameter(s) of concern, within 14 days of becoming aware of the exceedence, at the location where a limit was exceeded.

   c. Submit a report to the Department at the address in Section F.2 of this permit, within 60 days. Such report shall include the results of confirmation sampling, an evaluation of the reasons for the limit being exceeded, and the steps taken or proposed to prevent recurrences.

   d. Complete additional activities as may be required by the Department pursuant to Rule 2227(1)(d).

E. Schedule of Activities – The permittee shall undertake the following activities by the dates specified.

1. Submit for review and receive approval for an Operation and Maintenance Manual by March 1, 2006 [Rule 2218(4)(b)]. O&M Manual submitted to Tim Unseld of the MDEQ. Permittee will supply additional copy if required.

2. The permitee is required to investigate the source of elevated levels of mercury found in monitoring well EW-8. A workplan, including a timeline, shall be submitted by April 3, 2006 for review and approval. Two copies of the final report shall be submitted by

December 1, 2006. Mercury source is abandoned fish collection complex and septic system. Permittee will submit written report to your office.

F. Reporting Requirements – Rule 2225

1. The permittee shall submit self-monitoring data monthly on the Department of Environmental Quality's Compliance Monitoring Report (CMR) forms for each calendar month of the authorized discharge period to the following address:

   NMS-CMR Data Entry-Groundwater
   Water Bureau
   Michigan Department of Environmental Quality
   P.O. Box 30273
   Lansing, Michigan 48909-7773

   The forms shall be postmarked no later than the 15th day of the month following each month of the authorized discharge period(s).

   Electronic Environmental Discharge Monitoring Reporting (e2-DMR) System participants shall submit self-monitoring data for each month of the authorized discharge period(s). The electronic forms shall be submitted to the department no later than the 25th day of the month following each month of the authorized discharge period(s).

   Alternative Daily Discharge Monitoring Report formats may be used if they provide equivalent reporting details and are approved by the Department. For information on the electronic submittal of this information, contact the Department or visit the *e2-Reporting* website @ https://secure1.state.mi.us/e2rs/ - click on "about e-DMR" to download the Facility Participation Package.

2. All other notices, plans, reports, and other submissions required by and pursuant to this permit shall be submitted to the following:

   Kalamazoo District Office
   DEQ–Water Bureau
   7953 Adobe Rd.
   Kalamazoo, MI 49009-5026
   Phone: 269-567-3500

G. Other Conditions

1. Effluent shall be isolated from water supply wells as specified in Rule 2204(2)(d).
2. Effluent shall not be applied within 100 feet from property lines.
3. The permittee shall maintain all treatment or control facilities or systems installed or used by the discharger to achieve compliance with this permit in good working order and operate the facilities or systems as efficiently as possible.
4. Pursuant to Rule 2223(1), the Department may modify the effluent or groundwater monitoring parameters or frequency requirements of this permit, or they may be modified upon the request of the permittee with adequate supporting documentation.

5. Prior to any land application of bulk biosolids, the permittee shall submit to the Field Operation Section, Water Bureau, and receive approval of a Residuals Management Program (RMP) that complies with the requirements of the Part 24 Rules (R 323.2401 through R 323.2418 of the Michigan Administrative Code). The permittee is authorized to land apply bulk biosolids or prepare bulk biosolids for land application in accordance with an approved RMP.

H. **Approved Documents** – The following documents, previously submitted and approved are incorporated into this permit by reference. These documents, and those submitted and approved under Section E of this Permit, may be modified upon written approval of the Department.

1. Sampling and Analysis Plan – dated February 23, 2005.
2. Discharge Management Plan – dated July 18, 2005.
3. Restrictive Covenant – dated March 30, 1999.

I. **Permit Application** – Issuance of this permit is based upon the information submitted on the Application for Groundwater Discharge (Application) and any subsequent amendments received by the Department. Any material or intentional inaccuracies found in this information, or omissions of material information, may be grounds for the revocation or modification of this permit or other enforcement action.

The permittee shall inform the Department's Water Bureau, Kalamazoo District Supervisor, of any known material or intentional inaccuracies in the information of the Application which would affect the permittee's ability to comply with the applicable rules or license conditions. The following documents were submitted to the Department as part of the Application:

Basis of Design, Rule 2218 – dated November, 1994.

1. Hydrogeological Report, Rule 2221 – dated February 23, 2005.
2. Waste Characterization, Rule 2220 – 2004 Effluent Data.
3. Discharge Management Plan, Rule 2233 – dated July 18, 2005.

J. **Transfer of Ownership** – The permittee shall notify the Department, in writing, no less than 30 days before a change in ownership of the facility. This permit may be transferred to the new owner by written approval of the Chief of the Permits Section, Water Bureau.

K. **Change or Modification of Treatment or Discharge – Rule 2218 (3)(d) and (e)** The permittee, if proposing to modify the quantity or effluent characteristics of the discharge, if proposing to modify the monitoring program, or if proposing to modify the treatment process for the discharge, shall notify the Department of the proposed modification before it occurs. The Department shall determine if the proposed modification requires the permit to be modified to ensure that the terms of Rule 2204 are met. Modifications determined by the Department to be significant require that the permittee submit an application for and obtain a reissuance of the permit before such modification occurs. For modifications determined by the Department to be minor based on the quantity or quality of the discharge, the permit may be modified by the Department as requested by the permittee without obtaining a reissuance of the permit before such modification occurs.

L. By-Passing

Any diversion from or bypass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except where unavoidable to prevent loss of life, personal injury, or severe property damage. The permittee shall immediately notify the Department of any such occurrence by telephone at 1-800-292-4706. Such notice shall be supplemented by a written report with the next operation report detailing the cause of such diversion or bypass and the corrective actions taken to minimize adverse impact and eliminate the need for future diversion or bypass.

M. Cessation of Discharge-Related Activities

If all or any portion of the permitted treatment facilities and discharge areas is intended to be eliminated, the permittee shall comply with the requirements of Rule 2226.

NOTE:

IF THE PERMITTEE WISHES TO CONTINUE DISCHARGING BEYOND THE EXPIRATION DATE, THE PERMITTEE SHALL SUBMIT AN ADMINISTRATIVELY COMPLETE APPLICATION FOR REISSUANCE NO LATER THAN 180 DAYS PRIOR TO THE EXPIRATION DATE IN ACCORDANCE WITH RULE 2151 OF THE PART 21 ADMINISTRATIVE RULES. FAILURE TO SUBMIT AN ADMINISTRATIVELY COMPLETE APPLICATION FOR REISSUANCE BY THE REQUIRED DATE WILL RESULT IN TERMINATION OF THE AUTHORIZATION TO DISCHARGE ON THE EXPIRATION DATE.

ATTACHMENT 1
SITE MAP

DRAFT

ATTACHMENT 2
PROCESS FLOW DIAGRAM

DRAFT

ATTACHMENT 3
GROUNDWATER MONITORING WELL MAP

American Electric Power
Cook Nuclear Plant
One Cook Place
Bridgman, MI 49106
616 465 5901

AMERICAN® ELECTRIC POWER

Mr. Kevin Holdwick
Michigan Department of Environmental Quality
621 North 10th Street
P.O. Box 355
Plainwell, MI 49080

~~October 17, 2000~~ 11/17/00

Dear Mr. Holdwick:

Subject: Restrictive Covenant
Groundwater Permit M00988

As required in the Groundwater Permit M00988, D. 2, the Restrictive Covenant has been filed in the Berrien County Courthouse on October 27, 2000. This falls within the required time 30 days after the effective date of the permit. The Restrictive Covenant is located on Liber 2086, page 18 through 22 in the Register of Deeds office in Berrien County Michigan.

Attached is a copy of the Restrictive Covenant for you to review. If you have any questions, contact me at (616) 465-5901 extension 1153.

Sincerely,

J. P. Carlson
Environmental Superintendent

/mas

Attachment

2000-1811

Michigan Department Of Environmental Quality
Waste Management Division

RESTRICTIVE COVENANT RUNNING WITH THE LAND

THIS INDENTURE made the 26th day of OCTOBER, 2000, by Indiana Michigan Power Company, an Indiana corporation, whose address is One Summit Square, Fort Wayne, Indiana ("Grantor").

WITNESSES THAT:

WHEREAS, Grantor has applied for a groundwater discharge permit under Part 31 of the Natural Resources and Environmental Protection Act, Act 451 of the Public Acts of 1994, as amended (Act 451) being Sections 324.3101 through 324.3119 of the compiled Laws of Michigan, and the Administrative Rules promulgated thereunder et seq, for the purpose of obtaining a permit to discharge into the groundwaters of the State, under part of the following described lands situated in Lake Township, County of Berrien, to-wit:

> That part of Fractional Section 6 and 7, Township 6 South, Range 19 West, Michigan Meridian Baseline, Lake Township, Berrien County, Michigan, being more fully described as follows:
>
> Commencing at a stone found, being the southeast corner of Fractional Section 6, thence with the south line of said Fractional Section 6, North 88-46-56 West, 1313.06 feet (1320 feet West rec.) (1312.84 feet West rec.) to the TRUE POINT OF BEGINNING, at a 2-inch iron pipe found.
>
> Thence leaving said south line of Fractional Section 6, and the True Point of Beginning, South 01-34-53 West, 1263.35 feet (1264.13 feet South rec.) to a ½ inch iron pin found, being the southeast corner of the exception for "PARCELS No. II and III (Combined)" as described in Liber 1020, Page 561 of the deed records of Berrien County;
>
> Thence with the south line of said "PARCELS No. II and III (Combined)" North 88-36-01 West, 942.69 feet to a Mag nail set in the centerline of Livingston Road;
>
> Thence continuing westerly along the centerline of Livingston Road, traversing the following bearings and distances:
>
> North 47-54-56 West, 133.85 feet; thence

South 86-58-21 West, 248.36 feet; thence
North 51-12-30 West, 574.31 feet; thence
South 79-57-06 West, 320.21 feet; thence
North 65-42-06 West, 348.55 feet; thence
South 89-44-46 West, 400.56 feet; thence
North 81-09-08 West, 173.98 feet to a Mag nail set in the north property line of said "PARCELS NO. II and III (Combined)";

Thence leaving the centerline of Livingston Road, North 88-36-06 West, 278.24 feet, along the north property line of said "PARCELS NO. II and III (Combined)", crossing a 5/8 inch iron pin set at 75.91 feet, to the edge of the water of Lake Michigan as determined from photogrammetric mapping dated April 21, 1993;

Thence northerly along the said waterline of Lake Michigan and with a meander line, traversing the following bearings and distances:

North 13-18-57 East, 902.83 feet, crossing the section line into Fractional Section 6 at 770.26 feet, a 5/8 inch iron pin set for reference on said section line South 88-46-56 East, 125.00 feet from the point of intersection with said section line; thence
North 18-23-48 East, 1202.56 feet; thence
North 22-14-03 East, 1021.40 feet;

Thence leaving said meander line, South 61-34-57 East, 219.34 feet, to a 5/8 inch iron pin set at the southwest corner of the "Visitor Center Tract" (Liber 895, Page 60);

Thence with the southwesterly line of said Visitor Center Tract, South 61-34-57 East, 353.84 feet, to a 5/8 inch iron pin set at the southeast corner of the Visitor Center Tract;

Thence leaving said Visitor Center Tract, South 61-34-57 East, 339.76 feet, to a Mag nail set in the centerline of the Cook Nuclear Plant Entrance Road;

Thence northeasterly, along the centerline of the said Plant Entrance Road, traversing the following bearings and distances:

North 60-56-10 East, 1187.95 feet; thence
North 61-25-00 East, 435.02 feet to a Mag nail set;

Thence leaving said Plant Entrance Road, South 01-16-33 East, 2632.38 feet, passing Environmental Well #2 (EW #2) at 161.23 feet, to the TRUE POINT OF BEGINNING.

Containing 78.15 acres in Fractional Section 7 and 128.78 acres in Fractional Section 6 for a total of 206.93 acres more or less.

Being part of the lands described in Warranty Deed, Liber 907, Page 668, Parcel B. Also, being all of the lands described in Warranty Deed, Liber 822, Page 190, Parcel D and all of Warranty Deed, Liber 898, Page 621.

All bearings and distances were derived from a GPS survey using NGS (National Geodetic Survey) monument "Nuke" and "BALD TOM 2 Azimuth Point" in the Michigan coordinate system of 1983, south zone. "Nuke" has since been found destroyed by beach erosion.

The western boundary along Lake Michigan should be to the apparent "Ordinary High Water Mark" of the IGLD (International Great Lake Datum) of 1995. Due to excessive beach erosion and the plans to repair the dune, the ordinary high water mark cannot be determined at this time.

Subject to covenants, easements and restrictions of record.

This survey was prepared by American Electric Power Service Corporation, Survey Group, Groveport, Ohio in accordance with a plat of survey dated September 04, 1998 and made a part hereof.

WHEREAS, the Michigan Department of Environmental Quality will issue such permit contemporaneous with execution of this restrictive covenant; and

WHEREAS, that permit requires that an instrument imposing a restrictive covenant upon the land involved be executed by all owners of any land lying above a portion of the aquifer impacted by the groundwater discharge, and Grantor is the only owner of land affected by the groundwater discharge.

NOW THEREFORE, in consideration of the sum of one dollar, and other good and valuable consideration, the receipt of which is hereby acknowledged, Grantors agree:

1. That the Grantor is contemporaneous with entry of this document, receiving authorization to discharge treated wastewater to the groundwaters which flow underneath the land pursuant to a permit issued by the Michigan Department of Environmental Quality.

2. That the above-described groundwater may be impacted by the discharge of treated wastewater and may not be useable for drinking water.

3. That any use of the impacted groundwater for drinking water purposes is prohibited unless approved in writing by the Director of the Michigan Department of Environmental Quality or the Director's authorized representation.

4. That Grantor will not drill or develop any drinking water well on the land without prior written approval of the Director of Michigan Department of Environmental Quality or the Director's authorized representative.

5. That this Restrictive Covenant shall be binding upon the Grantors and all successors, assigns, heirs, and lessees.

6. That this restrictive covenant shall not be modified, suspended, terminated, or revoked without the express written authorization by the Director of the Michigan Department of Environmental Quality or the Director's authorized representative.

7. That the State of Michigan or any other governmental unit may, in addition to any other available remedy, bring an action to enforce this restrictive covenant, or to restrain or prevent any violation of this restrictive covenant.

8. That the prohibition on installation of onsite drinking water wells and the Restrictive Covenant may be removed by the Director of the Michigan Department of Environmental Quality when Grantor has demonstrated that the effluent plume from the Cook Nuclear Plant absorption pond, if any, has vented, dispersed or has been attenuated to levels below the clean-up criteria specified in Part 201 – Environmental Response of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

IN WITNESS WHEREOF, the parties have hereunto set their hands and seals this 26th day of OCTOBER, 2000.

GRANTOR:
INDIANA MICHIGAN POWER COMPANY

By: Roger L Wheeler
Printed Name: Roger L. Wheeler
Title: Director, Land Management
American Electric Power Service Corporation
Authorized Signer

WITNESSES:

Thomas R. Archer

Printed Name: THOMAS R. ARCHER

Ronald D. Sowers

Printed Name: Ronald D. Sowers

STATE OF OHIO

SS:

COUNTY OF FRANKLIN

The foregoing instrument was acknowledged before me this 26th day of OCTOBER, 2000, by Roger L. Wheeler, Director, Land Management, American Electric Power Service Corporation, as Authorized Signer for Indiana Michigan Power Company, an Indiana corporation, on behalf of the corporation.

Kenneth E. McDonough

Notary Public

KENNETH E. McDONOUGH, Attorney At Law
NOTARY PUBLIC, STATE OF OHIO
My commission has no expiration date
Section 147.03 R. C.

My Commission Expires:_____

This Instrument Prepared by Kenneth E. McDonough, Assistant General Counsel – Real Estate, American Electric Power Service Corporation, 1 Riverside Plaza, Columbus, OH 43215, for and on behalf of Indiana Michigan Power Company.

kem\mi\MDEQRestrictiveCov.doc

American Electric Power
Cook Nuclear Plant
One Cook Place
Bridgman, MI 49106
616 465 5901

AMERICAN® ELECTRIC POWER

Mr. Tim Unseld
Waste Management Division
Michigan Department of Environmental Quality
Kalamazoo Field Office
7953 Adobe Road
Kalamazoo MI 49009-5026

December 26, 2000

Dear Mr. Unseld:

Subject: Donald C. Cook Nuclear Plant
Groundwater Permit M 00988

As required in Part I.C.5 of the Donald C. Cook Nuclear Plant's Groundwater Discharge Permit, we are providing you with 2 copies of the Operation and Maintenance Manual for the Wastewater Treatment Facility.

Should you have any questions, please call me at (616) 465-5901 Ext. 1153.

Sincerely,

John Carlson
Environmental Superintendent

enclosure

INDIANA MICHIGAN POWER

Indiana Michigan
Power Company
Cook Nuclear Plant
One Cook Place
Bridgman, MI 49106

Ms. Jeanette Bailey
Michigan Department of Environmental Quality
Groundwater Permits Unit
P.O. Box 30273
Lansing Michigan 48909-7773

February 23, 2006

Dear Ms. Bailey:

Subject: Donald C. Cook Nuclear Plant
Groundwater Permit M00988

Thank you for providing a draft groundwater permit for Cook Nuclear Plant. We have a few additional minor comments.

Page One, Permittee Address request:
Fax Number 260/425-2142

Page One, Authorization to discharge a maximum. Delete the words "chemistry Lab wastewater." The sewage chemistry lab contributes a small fraction to the flow of Outfall 00E. The chemistry lab is not specifically described in Outfall 00D, therefore for consistency please delete the wording.

Page Three Section A, Effluent Limitations and Monitoring Requirements.

Change font in Effluent limitations (EF-1/Flow/annually) GPD is not entirely visable.

Chloride analysis: This test produces mercury containing lab wastes; can we reduce the frequency to "weekly"?

pH: Sample type is "grab", we use a continuous pH monitor for reporting. Does this meet the requirement?

Sodium and Sulfate: The phrase "biweekly" is confusing, can this be changed to reflect as specified in **?

Page Four Section A, Effluent Limitations and Monitoring Requirements.

The single asterisk * notation is not used in the above table.

In the ** notation change "softening" to "treatment" to more accurately reflect our water system.

Part B. Groundwater Limitations and Monitoring Requirements. Rewrite as follows to reflect the installation of a future upgradient monitoring well:

> "The disposal of treated wastewater shall not cause the groundwater quality to exceed the limitations listed below. Groundwater monitoring wells EW-1A, EW-8, EW-12, EW-13, and EW-19 shall be sampled and the groundwater analyzed for the parameters listed below at least at the minimum frequencies

indicated. Monitoring well EW-8 is the upgradient well until a new upgradient monitoring well is installed. Then both wells will be used. Compliance with limits established in this section will be measured at monitor wells EW-1A, EW-12, EW-13, and EW-19. Monitoring wells and groundwater flow direction are identified on Attachment 3 (Groundwater Monitoring Well Map). In the event of any non-compliance with limitations, including any detected in sampling additional to the minimum required below, the permittee shall fulfill the requirements of Section D.1 of this permit (Rule 2227).

Page Six Part C Observation Requirements:

Rapid Infiltration Basins (Outfall OOE): "Dike inspection" for this Outfall on a weekday basis is not applicable. The ponds are rapid infiltration, therefore very little water level is present in the ponds. The sides of the basin are 12 ft tall, we request that this inspection be eliminated, or reduced to "weekly" frequency.

Part D.b Due to the use of offsite laboratories, we request that additional wording should be added to this section. We request that the phrase "within 14 days of becoming aware of the exceedence" be inserted into this section.

Part E. Schedule of activities:

Part 1 If chloride analysis frequency must be "weekdays", then additional procedures will be required for chloride analysis, so we request that chloride be added to this item. If chloride analysis frequency can be reduced to "weekly" then we can utilize an offsite lab, and we can implement this requirement upon receiving the final permit.

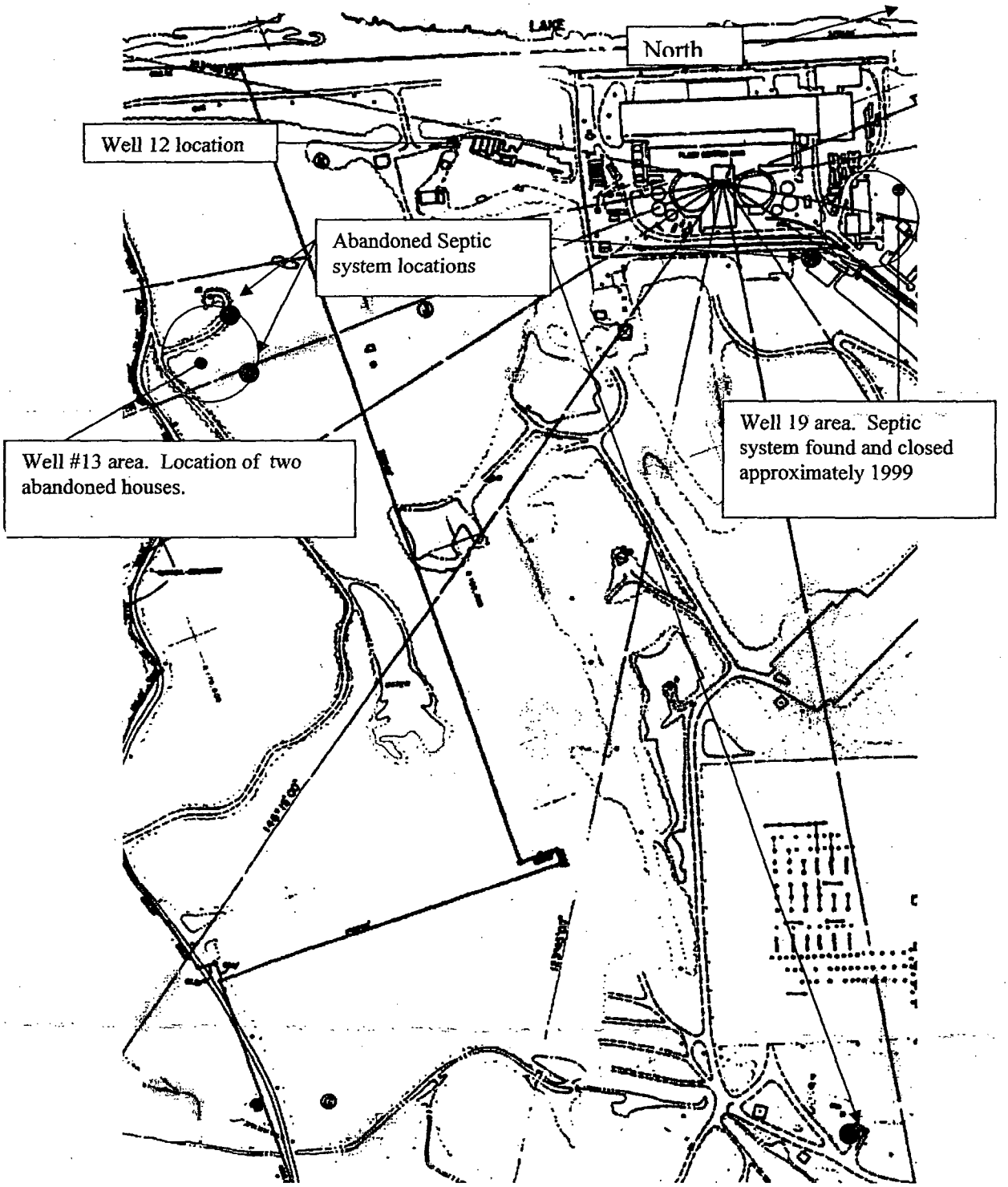
We also request relief from iron limits for Wells 12, 13 and 19. Wells 13 and 19 are in the vicinity of old septic systems that were from previous homes prior to construction of the plant. Old foundations are still visible at Well 13. Recently, a septic system was found and closed out in the vicinity of Well 19. (Cook Plant groundwater wells have naturally occurring iron in pockets around the site. Wells 12, 13, and 19 have exceeded the 300 ug/l limit.)

Iron uG/l

Method:EPA 200.7/SW846 6010 Detect Limit: 20 uG/l

Well #	1A	8	12	13	19
Date:					
08/01/00	<20	86.9	287	4370	
01/16/01	<10	230	260	4530	1470
02/15/01	<10	70	290	4950	1400
03/13/01	<10	60	330	5060	1350
04/11/01			490		
04/24/01	<10	110	470	6570	1470
05/17/01	<10	90	370	6720	1380
06/05/01	<10	150	290	6830	1370
07/12/01	<10	90	220	6890	1330
07/24/02	<10	110	280	5790	1530
07/29/03	<10	90	260	5480	1730
7/19/2004	<10	90	260	4900	1710
7/18/2005	<10	140	350	5580	2270

ıe previous table shows monitoring well data from 2000 to the present. Iron fixing bacteria from nearby abandoned septic tanks are the likely source of the elevated iron levels found in Wells 12, 13 and 19. The map below shows the approximate locations of monitoring Wells 12, 13, and 19 and known abandoned septic systems.



:ab samples of both effluent streams in November and December 2005 for dissolved iron are well below concentration seen at monitoring wells 12, 13, and 19. This indicates that there are naturally occurring pockets of iron in the groundwater on the Cook Plant Site. Data is listed below.

Date	**Outfall 00D dissolved iron ug/l**	**Outfall 00E Dissolved Iron ug/l**
November 2005	MAX:<10, AVG:<10, MIN:<10	MAX: 30, AVG:30, MIN:20
December 2005	MAX:<10, AVG:<10, MIN:<10	MAX:40, AVG:20, MIN:10

Should you have any questions regarding this response, please contact me at 269) 465-5901, ext. 1153.

Sincerely,

John P. Carlson
Environmental Manager

Enclosure

certify under penalty of law that I have personally examined and am familiar with the information submitted on this and all attached documents, and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

John P. Carlson
Environmental Manager

c: J. P. Carlson
C. E. Hawk
J. N. Jensen
J. L. Miller
M. K. Scarpello
W. H. Schalk
R. J. Sieber
B. W. Watson
L. J. Weber
B. K. Zordell
MDEQ File
NDM (2006-230)

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

NIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

March 16, 2006

Mr. John Carlson
Donald Cook Nuclear Plant
1 Cook Place
Mail Zone 5A
Bridgman, Michigan 49106

Dear Mr. Carlson:

SUBJECT: Proposed Discharge Authorization for
Donald Cook Nuclear Plant, Lake Township, Berrien County

Enclosed is the draft groundwater discharge authorization prepared under the provisions of Section 3113 of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), for the disposal of process wastewater, sanitary sewage and chemistry lab wastewater from the facility located near Bridgman, Michigan, as described in your application dated February 23, 2005. The draft authorization will be on public notice in the Herald-Palladium, St. Joseph, Michigan on March 21, 2006.

It is the Michigan Department of Environmental Quality's (DEQ's) policy that we send you and other interested parties a copy of the proposed authorization so that you have an opportunity to review it before it is issued in its final form. You are welcome to make suggestions regarding the conditions of the draft authorization. Comments must be received by April 6, 2006.

You will be notified when the authorization is issued and will be mailed a copy for your records.

Sincerely,

Jeanette Bailey/st

Jeanette Bailey
Groundwater Permits Unit
Permits Section
Water Bureau
517-373-7263

Enclosures

cc: Mr. Blair Sordell, Cook Nuclear
Lake Township Supervisor
Mr. Gary Witkowski, Berrien County Health Department
Mr. Greg Danneffel, DEQ - Kalamazoo (e-mail)

2006-360

Michigan Department of Environmental Quality
Water Bureau, Permits Section

PUBLIC NOTICE

Date: March 21, 2006

The Michigan Department of Environmental Quality proposes to issue an authorization for a discharge to the ground or groundwater pursuant to Rule 2218 of the Part 22 Rules of Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451) being Sections 324.3101 through 324.3119 of the Complied Laws of Michigan, and the administrative rules promulgated thereunder, to:

Donald C. Cook Nuclear Plant
1 Cook Place
Bridgman, Michigan
Lake Township, Berrien County

The applicant proposes to discharge a maximum of 2.4 million gallons per day (876 million gallons per year) of process wastewater to seepage ponds and 60,000 gallons per day (21.9 million gallons per year) of sanitary sewage and chemistry lab wastewater to rapid infiltration basins. Sanitary sewage/chemistry lab wastewater is treated by a sequencing batch reactor treatment system prior to discharge to the basins. The discharge areas are located in the SW 1/4 of the SE 1/4 of Section 6, T06S, R19W, Lake Township, Berrien County.

Comments or objections to the proposed authorization received by April 19, 2006, will be considered in the final decision to grant the authorization. Persons desiring information regarding the proposed permit or procedures for commenting or requesting a hearing should contact: Permits Section, Water Bureau, Department of Environmental Quality, P.O. Box 30273, Lansing, Michigan 48909, Telephone: 517-373-8148.

Copies of the public notice and proposed authorization may be obtained at the Kalamazoo District Office, DEQ–Water Bureau, 7953 Adobe Road, Kalamazoo, Michigan 49009-5026. Telephone: 269-567-3500

DRAFT

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER BUREAU

GROUNDWATER DISCHARGE PERMIT

This permit is issued under the provisions of Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), being Sections 324.3101 through 324.3119 of the Compiled Laws of Michigan, and the Administrative Rules promulgated thereunder. This permit does not relieve the permittee from obtaining and complying with any other permits required under local, state, or federal law.

Permit Number: GW	**Authorization Rule:** 2218
Facility Name: Donald C. Cook Nuclear Plant	
Issue Date:	**Effective Date:**
Expiration Date:	
Deadline for Submittal of Renewal Application:	
Facility Address: 1 Cook Place, Mail Zone 5A, Bridgman, Michigan 49106	
Telephone: 269-465-5901, ext.1153	**Fax:** 269-466-2550
Discharge Location Description: SW 1/4 of the SE 1/4 of Section 6, T06S, R19W, Lake Township, Berrien County, Michigan, as identified in Attachment 1 (Site Map) and fully described in this permit.	
Permittee Name: Indiana Michigan Power	
Permittee Address: One Summit Square, P.O. Box 60, Fort Wayne, IN 46801	
Telephone: 260-421-1400	**Fax:** 260-425-2142
Authorization to discharge a maximum: 2.4 million gallons per day (876 million gallons per year) of process wastewater and 60,000 gallons per day (21.9 million gallons per year) of sanitary sewage in accordance with the limitations, monitoring requirements, and other conditions as set forth in this permit, Part 31, and its administrative rules.	
Type of Wastewater #1: Process	**Type of Wastewater #2:** Sanitary Sewage
Method of Treatment: Neutralization	**Method of Treatment:** Sequencing Batch Reactor
Method of Disposal: Seepage Ponds	**Method of Disposal:** Rapid Infiltration Basins

In accordance with Section 324.3122 of the Michigan Act, the permittee shall make payment of an annual permit fee to the Department for each December 15 the permit is in effect regardless of occurrence of discharge. The permittee shall submit the fee in response to the Department's annual notice. The fee shall be postmarked by March 1 for notices mailed by January 15. The fee is due no later than 45 days after receiving the notice for notices mailed after January 15. Fees paid in accordance with the Michigan Act are not refundable.

All construction, maintenance, operations, and monitoring of this facility must comply with the conditions set forth in this permit or in plans approved by the Department in accordance with this permit. Failure to comply with the terms and provisions of this permit may result in civil and/or criminal penalties as provided in Part 31.

This permit is based upon the information submitted in the July 25, 2005, application for Groundwater Discharge received by the Michigan Department of Environmental Quality and any subsequent amendments. This permit supersedes Permit M 00988 issued to the facility on September 29, 2000.

Issued this ____ day of _____ for the Michigan Department of Environmental Quality.

_____

James R. Janiczek, Chief
Groundwater Permits Unit
Water Bureau
Michigan Department of Environmental Quality

A. Effluent Limitations and Monitoring Requirements

The wastewater discharge shall be limited and monitored by the permittee, at a minimum, as specified below. The permittee shall submit reports monthly as specified in Section F.1 of this permit. In the event of any non-compliance of limitations, including any detected in additional sampling to the minimum required below, the permittee shall fulfill the requirements of Section D.1 of this permit (Rule 2227)

SAMPLE LOCATION ID	PARAMETER	LIMITATION-UNITS	MEASUREMENT FREQUENCY	SAMPLE TYPE
Effluent Flows:				
EF-1 Process Wastewater (Turbine Room Sump) (Outfall 00D)	Flow	2,400,000 GPD	Daily*	Direct Measurement
		876, 000, 000 GPY	Annually	Calculation
EF-2 Sanitary Sewage Wastewater (Outfall 00E)	Flow	60,000 GPD	Daily	Direct Measurement
		21,900,000 GPY	Annually	Calculation
Effluent Quality:				
EQ-1 Process Wastewater (Outfall 00D)	Chloride***	mg/l	Weekly	Grab
	Ethanolamine	mg/l	Weekdays	Grab
	Hydrazine	ug/l	Weekdays	Grab
	pH***	6.5-9.0 S.U..	Weekdays	Grab
	Total Inorganic Nitrogen	mg/l	Monthly	Calculation: Ammonia (N) + Nitrate (N) + Nitrite (N)
	Ammonia Nitrogen	Grab	Monthly	Grab
	Nitrite Nitrogen	Grab	Monthly	Grab
	Nitrate Nitrogen	Grab	Monthly	Grab
	Sodium***	mg/l	Twice/month**	Grab
	Sulfate***	mg/l	Twice/month**	Grab

SAMPLE LOCATION ID	PARAMETER	LIMITATION-UNITS	MEASUREMENT FREQUENCY	SAMPLE TYPE
EQ-2 Sanitary Sewage Wastewater (Outfall 00E)	BOD5	35 mg/l	Weekly	Grab
	Chloride***	mg/l	Weekly	Grab
	Dissolved Oxygen***	mg/l	Weekly	Grab
	Phosphorus	15 mg/l	Weekly	Grab
	pH***	6.0-9.0 S.U.	Weekly	Grab
	Sodium***	mg/l	Weekly	Grab
	Total Inorganic Nitrogen	mg/l daily max	Weekly	Calculation: Ammonia (N) + Nitrate (N) + Nitrite (N)
	Ammonia Nitrogen	mg/l	Weekly	Grab
	Nitrate Nitrogen	mg/l	Weekly	Grab
	Nitrite Nitrogen	mg/l	Weekly	Grab

* The daily maximum is defined as the total discharge by weight, volume or concentration if specified, during any calendar day.

** Sodium and sulfate shall be sampled once/month while the water treatment system regenerates and once/month when no regeneration occurs.

*** Refer to Section E., Item 1.

B. Groundwater Limitations and Monitoring Requirements

The disposal of treated wastewater shall not cause the groundwater quality to exceed the limitations listed below. Groundwater monitoring wells EW-1A, EW-8, EW-12, EW-13, and EW-19 shall be sampled and the groundwater analyzed for the parameters listed below at least at the minimum frequencies indicated. Monitoring well EW-8 is the upgradient well until a new upgradient monitoring well is installed. Then both wells will be used. Compliance with limits established in this section will be measured at monitor wells EW-1A, EW-12, EW-13, and EW-19. Monitoring wells and groundwater flow direction are identified on Attachment 3 (Groundwater Monitoring Well Map). In the event of any non-compliance with limitations, including any detected in sampling additional to the minimum required below, the permittee shall fulfill the requirements of Section D.1 of this permit (Rule 2227).

PARAMETER	LIMITATION UNIT	MEASUREMENT FREQUENCY	SAMPLE TYPE
Static Water Elevation	USGS - Ft	Quarterly	Direct Measurement
pH	6.0-9.0 S.U.	Quarterly	Grab
Chloride	250 mg/l	Quarterly	Grab
Specific Conductance	umhos/cm	Quarterly	Grab
Total Inorganic Nitrogen	5 mg/l	Quarterly	Calculation: Ammonia-N + Nitrate-N + Nitrite-N
Ammonia Nitrogen	mg/l	Quarterly	Grab
Nitrite Nitrogen	0.5 mg/l	Quarterly	Grab
Nitrate Nitrogen	mg/l	Quarterly	Grab
Total Phosphorus	1 mg/l	Quarterly	Grab
Sulfate	250 mg/l	Quarterly	Grab
Dissolved Sodium	120 mg/l	Quarterly	Grab
Total Dissolved Solids	mg/l	Quarterly	Grab
Total Alkalinity	mg/l	Annually	Grab
Bicarbonate	mg/l	Annually	Grab
Dissolved Calcium	mg/l	Annually	Grab
Dissolved Iron	mg/l	Annually	Grab
Dissolved Magnesium	200 mg/l	Annually	Grab
Dissolved Oxygen	mg/l	Annually	Grab
Dissolved Potassium	mg/l	Annually	Grab
Total Organic Carbon	mg/l	Annually	Grab
Phenols	mg/l	Annually	Grab
Ethanolamine	2 mg/l	Annually	Grab
Dissolved Aluminum	150 ug/l	Annually	Grab
Dissolved Barium	440 ug/l	Annually	Grab
Dissolved Boron	1900 ug/l	Annually	Grab
Dissolved Cadmium	2.2 ug/l	Annually	Grab
Dissolved Chromium	11 ug/l	Annually	Grab
Dissolved Copper	9 ug/l	Annually	Grab
Dissolved Lead	10 ug/l	Annually	Grab
Dissolved Manganese	530 ug/l	Annually	Grab
Dissolved Inorganic Mercury	0.0013 ug/l	Annually	Grab
Dissolved Nickel	52 ug/l	Annually	Grab
Dissolved Selenium	5 ug/l	Annually	Grab
Dissolved Silver	0.2 ug/l	Annually	Grab
Dissolved Zinc	120 ug/l	Annually	Grab
Hydrazine	10 ug/l	Annually	Grab

C. Observation Monitoring Requirements

The permittee shall inspect the treatment and disposal facilities for the operational conditions required below at the minimum frequency specified. All inspections shall be documented in a logbook to be maintained at the on-site facility and shall be available for review by Department personnel at all times.

LOCATION	CONDITION	MEASUREMENT FREQUENCY	SAMPLE TYPE
Seepage Ponds (Outfall 00D)	Oil Sheen	Weekdays	Visual Observation
	Dike Inspection	Weekdays	Visual Observation
Rapid Infiltration Basins (Outfall 00E)	Vegetation Control	Weekdays	Visual Observation
	Dike Inspection	Weekly	Visual Observation
	Freeboard	2 feet minimum	Direct Measurement

D. Compliance Requirements If Permit Limits Are Exceeded

1. If a limit described in Section A or B is exceeded, the discharger shall comply with Rule 2227 and undertake the following within the specified timeframes indicated below:

   a. Provide written notification to the Department at the address in Section F.2 of this permit, within seven calendar days, that a limit has been exceeded. Such notification shall include the name of the substance(s), the concentration(s), and the location(s) that exceeded the limit(s).

   b. Resample and analyze for the parameter(s) of concern, within 14 days, at the location where a limit was exceeded.

   c. Submit a report to the Department at the address in Section F.2 of this permit, within 60 days. Such report shall include the results of confirmation sampling, an evaluation of the reasons for the limit being exceeded, and the steps taken or proposed to prevent recurrences.

   d. Complete additional activities as may be required by the Department pursuant to Rule 2227(1)(d).

E. Schedule of Activities – The permittee shall undertake the following activities by the dates specified.

1. Within 90 days of permit issuance, the discharger shall be in compliance with permit effluent limits and monitoring requirements for chloride, dissolved oxygen, pH, sodium and sulfate.

2. Submit for review and receive approval for an updated Operation and Maintenance Manual by May 1, 2006 [Rule 2218(4)(b)].

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3. Submit for review and receive approval of a work plan for the installation of monitoring wells by *(60 days after issuance).* Dates for 3-7 will be added when the date of issuance is known.
4. Install monitoring wells as described in the approved work plan by *(90 days after issuance).*
5. Submit for review and receive approval of a report of monitoring well installation by *(120 days after issuance).*
6. Submit monitoring well sampling results for background water quality by *(180 days after issuance).*
7. Submit for review and receive approval of Modifications to the Sampling and Analysis Plan by *(180 days after issuance).* (Rule 2223)

F. Submittal Requirements for Self Monitoring Data

1. The permittee shall submit self-monitoring data monthly on the Department's Compliance Monitoring Report (CMR) for each calendar month of the authorized discharge period to:

NMS-CMR-Data Entry-Groundwater Water Bureau Michigan Department of Environmental Quality P.O. Box 30273 Lansing, Michigan, 48909-7773	and	Kalamazoo District Water Bureau-MDEQ 7953 Adobe Road Kalamazoo, Michigan 49009-5026

The forms shall be postmarked no later than the 15th day of the month following each month of the authorized discharge period(s).

Alternative Daily Discharge Monitoring Report formats may be used if they provide equivalent reporting details and are approved by the Department.

2. All other notices, plans, reports, and other submissions required by and pursuant to this permit shall be submitted to the following:

Kalamazoo District Office
DEQ–Water Bureau
7953 Adobe Rd.
Kalamazoo, MI 49009-5026
Telephone: 269-567-3500

G. Other Conditions

1. Effluent shall be isolated from water supply wells as specified in Rule 2204(2)(d).
2. Effluent shall not be applied within 100 feet from property lines.
3. The permittee shall maintain all treatment or control facilities or systems installed or used by the discharger to achieve compliance with this permit in good working order and operate the facilities or systems as efficiently as possible.
4. Pursuant to Rule 2223(1), the Department may modify the effluent or groundwater monitoring parameters or frequency requirements of this permit, or they may be modified upon the request of the permittee with adequate supporting documentation.
5. Prior to any land application of bulk biosolids, the permittee shall submit to the Field Operation Section, Water Bureau, and receive approval of a Residuals Management Program (RMP) that complies with the requirements of the Part 24 Rules (R 323.2401 through R 323.2418 of the Michigan Administrative Code). The permittee is authorized to land apply bulk biosolids or prepare bulk biosolids for land application in accordance with an approved RMP.

H. Approved Documents – The following documents, previously submitted and approved are incorporated into this permit by reference. These documents, and those submitted and approved under Section E of this Permit, may be modified upon written approval of the Department.

1. Sampling and Analysis Plan – dated February 23, 2005.
2. Discharge Management Plan – dated July 18, 2005

I. Permit Application – Issuance of this permit is based upon the information submitted on the Application for Groundwater Discharge (Application) and any subsequent amendments received by the Department. Any material or intentional inaccuracies found in this information, or omissions of material information, may be grounds for the revocation or modification of this permit or other enforcement action.

The permittee shall inform the Department's Water Bureau, Kalamazoo District Supervisor, of any known material or intentional inaccuracies in the information of the Application which would affect the permittee's ability to comply with the applicable rules or license conditions. The following documents were submitted to the Department as part of the Application:

1. Basis of Design, Rule 2218 – dated November, 1994.
2. Hydrogeological Report, Rule 2221 – dated February 23, 2005.
3. Waste Characterization, Rule 2220 – 2004 Effluent Data.
4. Discharge Management Plan, Rule 2233 – dated July 18, 2005.
5. Restrictive Covenant – dated October 26, 2000

J. Transfer of Ownership – The permittee shall notify the Department, in writing, no less than 30 days before a change in ownership of the facility. This permit may be transferred to the new owner by written approval of the Chief of the Permits Section, Water Bureau.

K. Change or Modification of Treatment or Discharge – Rule 2218 (3)(d) and (e)
The permittee, if proposing to modify the quantity or effluent characteristics of the discharge, if proposing to modify the monitoring program, or if proposing to modify the treatment process for the discharge, shall notify the Department of the proposed modification before it occurs. The Department shall determine if the proposed modification requires the permit to be modified to ensure that the terms of Rule 2204 are met. Modifications determined by the Department to be significant require that the permittee submit an application for and obtain a reissuance of the permit before such modification occurs. For modifications determined by the Department to be minor based on the quantity or quality of the discharge, the permit may be modified by the Department as requested by the permittee without obtaining a reissuance of the permit before such modification occurs.

L. By-Passing
Any diversion from or bypass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except where unavoidable to prevent loss of life, personal injury, or severe property damage. The permittee shall immediately notify the Department of any such occurrence by telephone at 1-800-292-4706. Such notice shall be supplemented by a written report with the next operation report detailing the cause of such diversion or bypass and the corrective actions taken to minimize adverse impact and eliminate the need for future diversion or bypass.

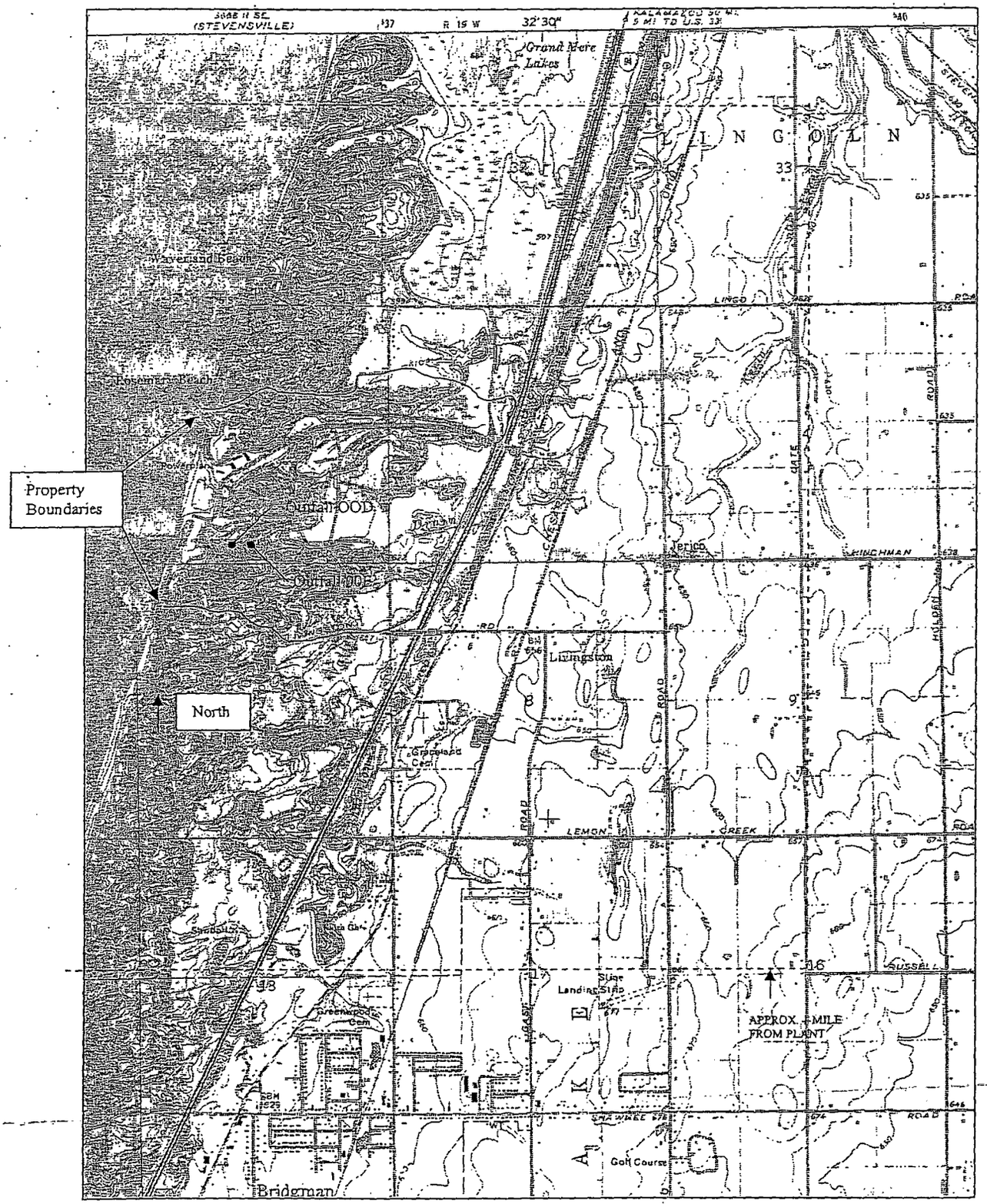
M. Cessation of Discharge-Related Activities
If all or any portion of the permitted treatment facilities and discharge areas is intended to be eliminated, the permittee shall comply with the requirements of Rule 2226.

NOTE:

IF THE PERMITTEE WISHES TO CONTINUE DISCHARGING BEYOND THE EXPIRATION DATE, THE PERMITTEE SHALL SUBMIT AN ADMINISTRATIVELY COMPLETE APPLICATION FOR REISSUANCE NO LATER THAN 180 DAYS PRIOR TO THE EXPIRATION DATE IN ACCORDANCE WITH RULE 2151 OF THE PART 21 ADMINISTRATIVE RULES. FAILURE TO SUBMIT AN ADMINISTRATIVELY COMPLETE APPLICATION FOR REISSUANCE BY THE REQUIRED DATE WILL RESULT IN TERMINATION OF THE AUTHORIZATION TO DISCHARGE ON THE EXPIRATION DATE.

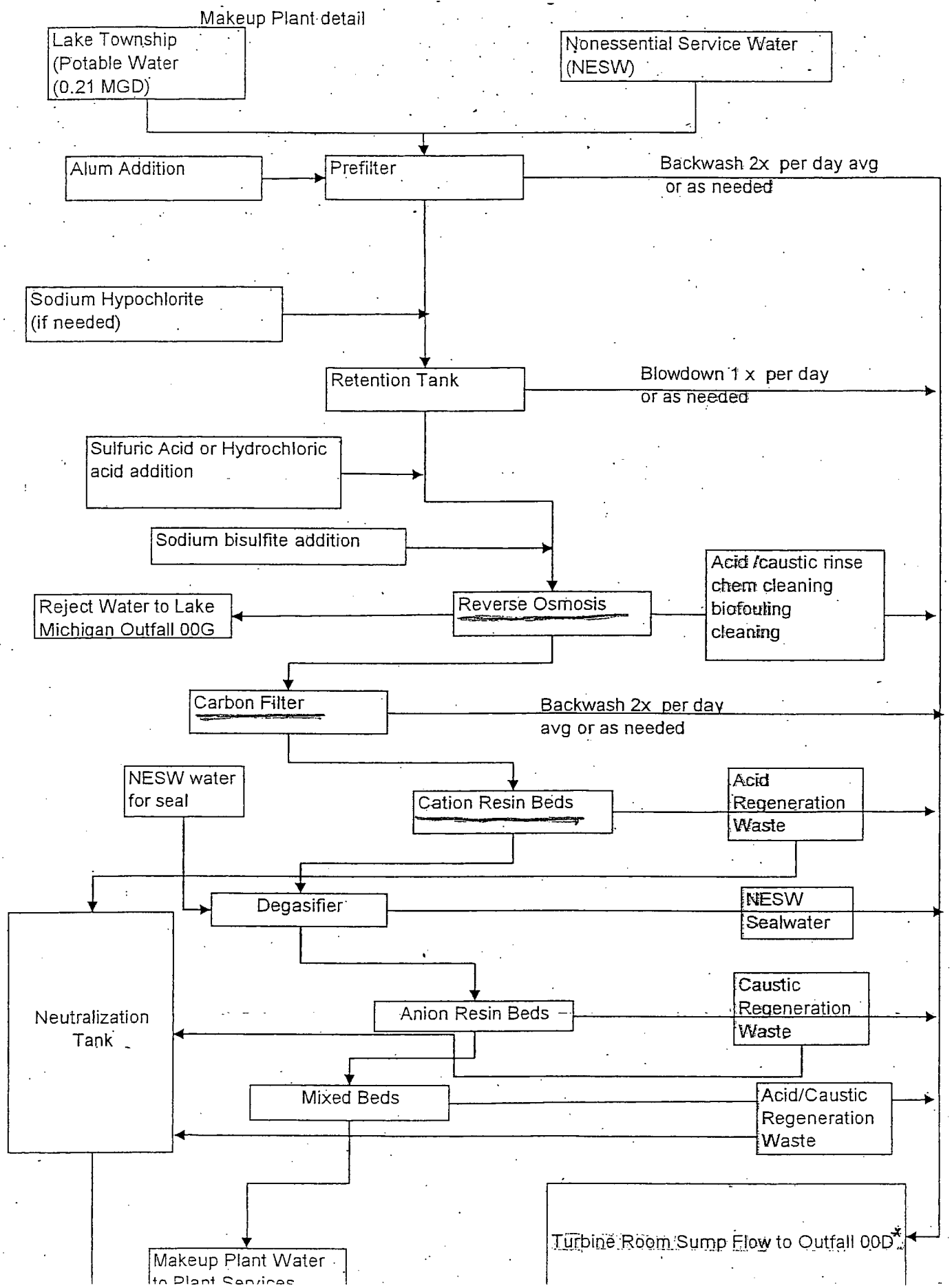
Donald C. Cook Nuclear Plant

ATTACHMENT 1
SITE MAP



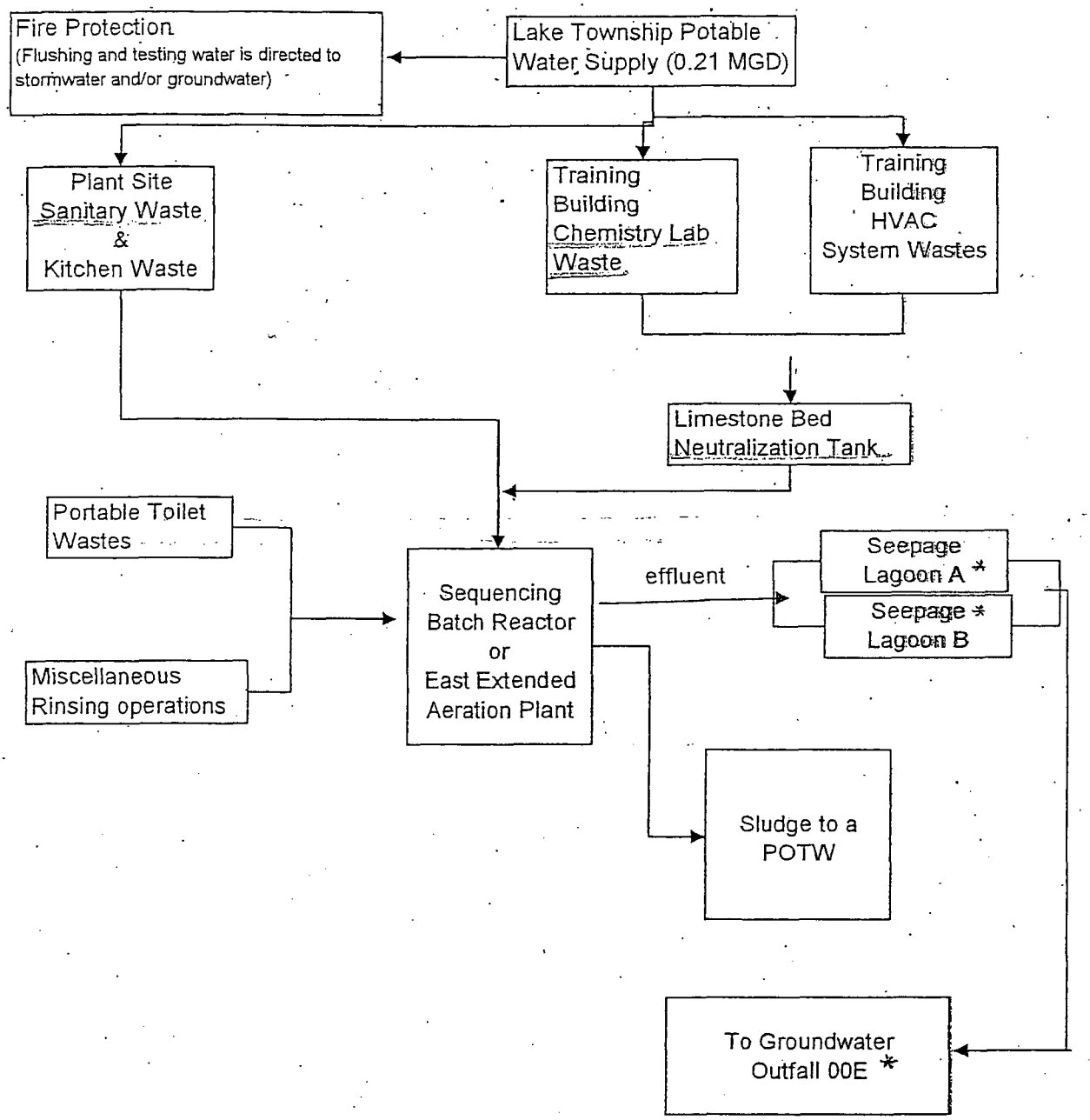
Donald C. Cook Nuclear Plant.
Bridgman Michigan
Lake Township
Berrien County
1" = 0.5 mile

ATTACHMENT 2
PROCESS FLOW DIAGRAM



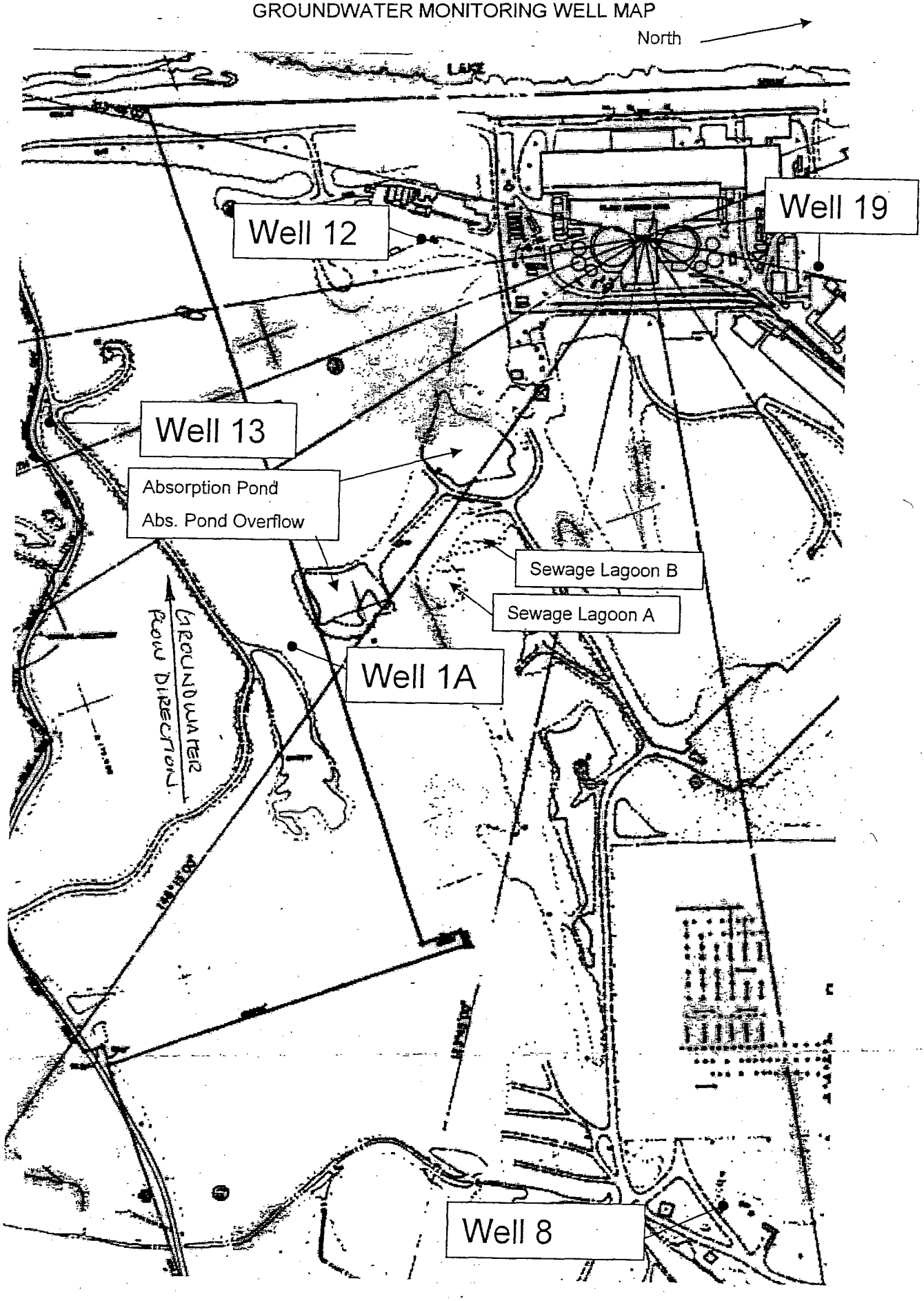
ATTACHMENT 2
PROCESS FLOW DIAGRAM

Sewage treatment plant detail



* Rapid Infiltration Basins

ATTACHMENT 3
GROUNDWATER MONITORING WELL MAP



STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

JENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

May 30, 2006

Mr. John Carlson
Donald Cook Nuclear Plant
1 Cook Place
Mail Zone 5A
Bridgman, MI 49106

Dear Mr. Carlson:

SUBJECT: Groundwater Discharge Authorization for
Donald Cook Nuclear Plant, Lake Township, Berrien County

Enclosed is the Authorization to Discharge, GW1810102, issued by the Department of Environmental Quality (DEQ) on May 30, 2006, effective June 1, 2006. The Authorization provides for the discharge of 2.4 million gallons per day (876 million gallons per year) of process wastewater to seepage ponds and 60,000 gallons per day (21.9 million gallons per year) of sanitary sewage and chemistry lab wastewater to rapid infiltration basins.

Please review carefully the conditions of the Authorization. In particular, please notice that any change in the discharge will require a new Authorization by the DEQ.

Also enclosed are Compliance Monitoring Report (CMR) forms for your facility. Please forward this information to the person responsible for your compliance monitoring.

Questions concerning this Authorization can be directed to the Permits Section, Water Bureau (WB), telephone 517-373-8148, or the WB, Kalamazoo District Office, telephone: 269-567-3500.

Sincerely,

James R. Janiczek, Chief
Groundwater Permits Unit
Water Bureau

Enclosure

cc: Mr. Blair Sordell, Cook Nuclear
Lake Township Supervisor
Mr. Gary Witkowski, Berrien County Health Department
Mr. Greg Danneffel, DEQ - Kalamazoo
Ms. Jeanette Bailey, DEQ
Mr. Jeffrey Jones, DEQ

2006-723

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER BUREAU

GROUNDWATER DISCHARGE PERMIT

This permit is issued under the provisions of Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), being Sections 324.3101 through 324.3119 of the Compiled Laws of Michigan, and the Administrative Rules promulgated thereunder. This permit does not relieve the permittee from obtaining and complying with any other permits required under local, state, or federal law.

Permit Number: GW1810102 **Authorization Rule:** 2218
Facility Name: Donald C. Cook Nuclear Plant
Issue Date: May 30, 2006 **Effective Date:** June 1, 2006
Expiration Date: June 1, 2009
Deadline for Submittal of Renewal Application: December 3, 2008

Facility Address: 1 Cook Place, Mail Zone 5A, Bridgman, Michigan 49106
Telephone: 269-465-5901, ext.1153 **Fax:** 269-466-2550

Discharge Location Description:
SW 1/4 of the SE 1/4 of Section 6, T06S, R19W, Lake Township, Berrien County, Michigan, as identified in Attachment 1 (Site Map) and fully described in this permit.

Permittee Name: Indiana Michigan Power
Permittee Address: One Summit Square, P.O. Box 60, Fort Wayne, IN 46801
Telephone: 260-421-1400 **Fax:** 260-425-2142

Authorization to discharge a maximum: 2.4 million gallons per day (876 million gallons per year) of process wastewater and 60,000 gallons per day (21.9 million gallons per year) of sanitary sewage in accordance with the limitations, monitoring requirements, and other conditions as set forth in this permit, Part 31, and its administrative rules.

Type of Wastewater #1: Process (Outfall 00D)	**Type of Wastewater #2:** Sanitary Sewage (Outfall 00E)
Method of Treatment: Neutralization	**Method of Treatment:** Sequencing Batch Reactor
Method of Disposal: Seepage Basins	**Method of Disposal:** Rapid Infiltration Basins

In accordance with Section 324.3122 of the Michigan Act, the permittee shall make payment of an annual permit fee to the Department for each December 15 the permit is in effect regardless of occurrence of discharge. The permittee shall submit the fee in response to the Department's annual notice. The fee shall be postmarked by March 1 for notices mailed by January 15. The fee is due no later than 45 days after receiving the notice for notices mailed after January 15. Fees paid in accordance with the Michigan Act are not refundable.

All construction, maintenance, operations, and monitoring of this facility must comply with the conditions set forth in this permit or in plans approved by the Department in accordance with this permit. Failure to comply with the terms and provisions of this permit may result in civil and/or criminal penalties as provided in Part 31.

This permit is based upon the information submitted in the July 25, 2005, application for Groundwater Discharge received by the Michigan Department of Environmental Quality and any subsequent amendments. This permit supersedes Permit M 00988 issued to the facility on September 29, 2000.

Issued this 30th day of May 2006 ,for the Michigan Department of Environmental Quality.

James R. Janiczek, Chief
Groundwater Permits Unit
Water Bureau
Michigan Department of Environmental Quality

A. **Effluent Limitations and Monitoring Requirements**
The wastewater discharge shall be limited and monitored by the permittee, at a minimum, as specified below. The permittee shall submit reports monthly as specified in Section F.1 of this permit. In the event of any non-compliance of limitations, including any detected in additional sampling to the minimum required below, the permittee shall fulfill the requirements of Section D.1 of this permit (Rule 2227)

SAMPLE LOCATION ID	PARAMETER	LIMITATION-UNITS	MEASUREMENT FREQUENCY	SAMPLE TYPE
Effluent Flows:				
EQ-1 Process Wastewater (Turbine Room Sump) (Outfall 00D)	Flow	2,400,000 GPD	Daily*	Direct Measurement
		876, 000, 000 GPY	Annually	Calculation
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Effluent Quality:				
EQ-1 Process Wastewater (Turbine Room Sump) (Outfall 00D)	Chloride***	mg/l	Weekly	Grab
	Ethanolamine	mg/l	Weekdays	Grab
	Hydrazine	ug/l	Weekdays	Grab
	pH***	6.5-9.0 S.U.	Weekdays	Grab
	Total Inorganic Nitrogen	mg/l	Monthly	Calculation: Ammonia (N) + Nitrate (N) + Nitrite (N)
	Ammonia Nitrogen	mg/l	Monthly	Grab
	Nitrite Nitrogen	mg/l	Monthly	Grab
	Nitrate Nitrogen	mg/l	Monthly	Grab
	Sodium***	mg/l	Twice/month**	Grab
	Sulfate***	mg/l	Twice/month**	Grab

SAMPLE LOCATION ID	PARAMETER	LIMITATION-UNITS	MEASUREMENT FREQUENCY	SAMPLE TYPE
EQ-2 Sanitary Sewage Wastewater (Outfall 00E)	BOD5	35 mg/l	Weekly	Grab
	Chloride***	mg/l	Weekly	Grab
	Dissolved Oxygen***	mg/l	Weekly	Grab
	Phosphorus	15 mg/l	Weekly	Grab
	pH***	6.0-9.0 S.U.	Weekly	Grab
	Sodium***	mg/l	Weekly	Grab
	Total Inorganic Nitrogen	mg/l daily max	Weekly	Calculation: Ammonia (N) + Nitrate (N) + Nitrite (N)
	Ammonia Nitrogen	mg/l	Weekly	Grab
	Nitrate Nitrogen	mg/l	Weekly	Grab
Land Application: Year Round				
LA-1 Seepage Basins (Outfall 00D)	Application Rate	26.0 gals/ft^2	Daily	Direct Measurement
LA-2 Rapid Infiltration (Basin A) (Outfall 00E)	Application Rate	7.5 gals/ft^2	Daily	Direct Measurement
LA-3 Rapid Infiltration (Basin B) (Outfall 00E)	Application Rate	17.8 gals/ft^2	Daily	Direct Measurement

* The daily maximum is defined as the total discharge by weight, volume or concentration if specified, during any calendar day.

** Sodium and sulfate shall be sampled once/month while the water treatment system regenerates and once/month when no regeneration occurs.

*** Refer to Section E., Item 1.

B. Groundwater Limitations and Monitoring Requirements

The disposal of treated wastewater shall not cause the groundwater quality to exceed the limitations listed below. Groundwater monitoring wells EW-1A, EW-8, EW-12, EW-13, and EW-19 shall be sampled and the groundwater analyzed for the parameters listed below at least at the minimum frequencies indicated. Monitoring well EW-8 is the upgradient well until a new upgradient monitoring well is installed. Then both wells will be used. Compliance with limits established in this section will be measured at monitor wells EW-1A, EW-12, EW-13, and EW-19. Monitoring wells and groundwater flow direction are identified on Attachment 3 (Groundwater Monitoring Well Map). In the event of any non-compliance with limitations, including any detected in sampling additional to the minimum required below, the permittee shall fulfill the requirements of Section D.1 of this permit (Rule 2227).

PARAMETER	LIMITATION UNIT	MEASUREMENT FREQUENCY	SAMPLE TYPE
Static Water Elevation	USGS - Ft	Quarterly	Direct Measurement
pH	6.0-9.0 S.U.	Quarterly	Grab
Chloride	250 mg/l	Quarterly	Grab
Specific Conductance	umhos/cm	Quarterly	Grab
Total Inorganic Nitrogen	5 mg/l	Quarterly	Calculation: Ammonia-N + Nitrate-N + Nitrite-N
Ammonia Nitrogen	mg/l	Quarterly	Grab
Nitrite Nitrogen	0.5 mg/l	Quarterly	Grab
Nitrate Nitrogen	mg/l	Quarterly	Grab
Total Phosphorus	1 mg/l	Quarterly	Grab
Sulfate	250 mg/l	Quarterly	Grab
Dissolved Sodium	120 mg/l	Quarterly	Grab
Total Dissolved Solids	mg/l	Quarterly	Grab
Total Alkalinity	mg/l	Annually	Grab
Bicarbonate	mg/l	Annually	Grab
Dissolved Calcium	mg/l	Annually	Grab
Dissolved Iron	mg/l	Annually	Grab
Dissolved Magnesium	200 mg/l	Annually	Grab
Dissolved Oxygen	mg/l	Annually	Grab
Dissolved Potassium	mg/l	Annually	Grab
Total Organic Carbon	mg/l	Annually	Grab
Phenols	mg/l	Annually	Grab
Ethanolamine	2 mg/l	Annually	Grab
Dissolved Aluminum	150 ug/l	Annually	Grab
Dissolved Barium	440 ug/l	Annually	Grab
Dissolved Boron	1900 ug/l	Annually	Grab
Dissolved Cadmium	2.2 ug/l	Annually	Grab
Dissolved Chromium	11 ug/l	Annually	Grab
Dissolved Copper	9 ug/l	Annually	Grab
Dissolved Lead	10 ug/l	Annually	Grab
Dissolved Manganese	530 ug/l	Annually	Grab
Dissolved Inorganic Mercury	0.0013 ug/l	Annually	Grab
Dissolved Nickel	52 ug/l	Annually	Grab
Dissolved Selenium	5 ug/l	Annually	Grab
Dissolved Silver	0.2 ug/l	Annually	Grab
Dissolved Zinc	120 ug/l	Annually	Grab
Hydrazine	10 ug/l	Annually	Grab

C. Observation Monitoring Requirements

The permittee shall inspect the treatment and disposal facilities for the operational conditions required below at the minimum frequency specified. All inspections shall be documented in a logbook to be maintained at the on-site facility and shall be available for review by Department personnel at all times.

LOCATION	CONDITION	MEASUREMENT FREQUENCY	SAMPLE TYPE
Seepage Basins (Outfall 00D)	Oil Sheen	Weekdays	Visual Observation
	Dike Inspection	Weekdays	Visual Observation
Rapid Infiltration Basins (Outfall 00E)	Vegetation Control	Weekdays	Visual Observation
	Dike Inspection	Weekdays	Visual Observation
	Freeboard	2 feet minimum	Direct Measurement

D. Compliance Requirements If Permit Limits Are Exceeded

1. If a limit described in Section A or B is exceeded, the discharger shall comply with Rule 2227 and undertake the following within the specified timeframes indicated below:

   a. Provide written notification to the Department at the address in Section F.2 of this permit, within seven calendar days, that a limit has been exceeded. Such notification shall include the name of the substance(s), the concentration(s), and the location(s) that exceeded the limit(s).

   b. Resample and analyze for the parameter(s) of concern, within 14 days, at the location where a limit was exceeded.

   c. Submit a report to the Department at the address in Section F.2 of this permit, within 60 days. Such report shall include the results of confirmation sampling, an evaluation of the reasons for the limit being exceeded, and the steps taken or proposed to prevent recurrences.

   d. Complete additional activities as may be required by the Department pursuant to Rule 2227(1)(d).

E. Schedule of Activities – The permittee shall undertake the following activities by the dates specified.

1. Within 90 days of permit issuance, the discharger shall be in compliance with permit effluent limits and monitoring requirements for chloride, dissolved oxygen, pH, sodium and sulfate.

2. Submit for review and receive approval for an updated Operation and Maintenance Manual by August 1, 2006 [Rule 2218(4)(b)].

3. Submit for review and receive approval of a work plan for the installation of monitoring wells by July 1, 2006.
4. Install monitoring wells as described in the approved work plan by August 1, 2006.
5. Submit for review and receive approval of a report of monitoring well installation by September 1, 2006.
6. Submit monitoring well sampling results for background water quality by November 1, 2006.
7. Submit for review and receive approval of Modifications to the Sampling and Analysis Plan by September 1, 2006 (Rule 2223).

F. Submittal Requirements for Self Monitoring Data

1. The permittee shall submit self-monitoring data monthly on the Department's Compliance Monitoring Report (CMR) for each calendar month of the authorized discharge period to:

NMS-CMR-Data Entry-Groundwater Water Bureau Michigan Department of Environmental Quality P.O. Box 30273 Lansing, Michigan, 48909-7773	and	Kalamazoo District Water Bureau-MDEQ 7953 Adobe Road Kalamazoo, Michigan 49009-5026

The forms shall be postmarked no later than the 15th day of the month following each month of the authorized discharge period(s).

Alternative Daily Discharge Monitoring Report formats may be used if they provide equivalent reporting details and are approved by the Department.

2. All other notices, plans, reports, and other submissions required by and pursuant to this permit shall be submitted to the following:

Kalamazoo District Office
DEQ–Water Bureau
7953 Adobe Rd.
Kalamazoo, MI 49009-5026
Telephone: 269-567-3500

G. Other Conditions

1. Effluent shall be isolated from water supply wells as specified in Rule 2204(2)(d).
2. Effluent shall not be applied within 100 feet from property lines.
3. The permittee shall maintain all treatment or control facilities or systems installed or used by the discharger to achieve compliance with this permit in good working order and operate the facilities or systems as efficiently as possible.
4. Pursuant to Rule 2223(1), the Department may modify the effluent or groundwater monitoring parameters or frequency requirements of this permit, or they may be modified upon the request of the permittee with adequate supporting documentation.
5. Prior to any land application of bulk biosolids, the permittee shall submit to the Field Operation Section, Water Bureau, and receive approval of a Residuals Management Program (RMP) that complies with the requirements of the Part 24 Rules (R 323.2401 through R 323.2418 of the Michigan Administrative Code). The permittee is authorized to land apply bulk biosolids or prepare bulk biosolids for land application in accordance with an approved RMP.

H. Approved Documents – The following documents, previously submitted and approved are incorporated into this permit by reference. These documents, and those submitted and approved under Section E of this Permit, may be modified upon written approval of the Department.

1. Sampling and Analysis Plan – dated February 23, 2005.
2. Discharge Management Plan – dated July 18, 2005

I. Permit Application – Issuance of this permit is based upon the information submitted on the Application for Groundwater Discharge (Application) and any subsequent amendments received by the Department. Any material or intentional inaccuracies found in this information, or omissions of material information, may be grounds for the revocation or modification of this permit or other enforcement action.

The permittee shall inform the Department's Water Bureau, Kalamazoo District Supervisor, of any known material or intentional inaccuracies in the information of the Application which would affect the permittee's ability to comply with the applicable rules or license conditions. The following documents were submitted to the Department as part of the Application:

1. Basis of Design, Rule 2218 – dated November, 1994.
2. Hydrogeological Report, Rule 2221 – dated February 23, 2005.
3. Waste Characterization, Rule 2220 – 2004 Effluent Data.
4. Discharge Management Plan, Rule 2233 – dated July 18, 2005.
5. Restrictive Covenant – dated October 26, 2000

J. Transfer of Ownership – The permittee shall notify the Department, in writing, no less than 30 days before a change in ownership of the facility. This permit may be transferred to the new owner by written approval of the Chief of the Permits Section, Water Bureau.

K. Change or Modification of Treatment or Discharge – Rule 2218 (3)(d) and (e)
The permittee, if proposing to modify the quantity or effluent characteristics of the discharge, if proposing to modify the monitoring program, or if proposing to modify the treatment process for the discharge, shall notify the Department of the proposed modification before it occurs. The Department shall determine if the proposed modification requires the permit to be modified to ensure that the terms of Rule 2204 are met. Modifications determined by the Department to be significant require that the permittee submit an application for and obtain a reissuance of the permit before such modification occurs. For modifications determined by the Department to be minor based on the quantity or quality of the discharge, the permit may be modified by the Department as requested by the permittee without obtaining a reissuance of the permit before such modification occurs.

L. By-Passing
Any diversion from or bypass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except where unavoidable to prevent loss of life, personal injury, or severe property damage. The permittee shall immediately notify the Department of any such occurrence by telephone at 1-800-292-4706. Such notice shall be supplemented by a written report with the next operation report detailing the cause of such diversion or bypass and the corrective actions taken to minimize adverse impact and eliminate the need for future diversion or bypass.

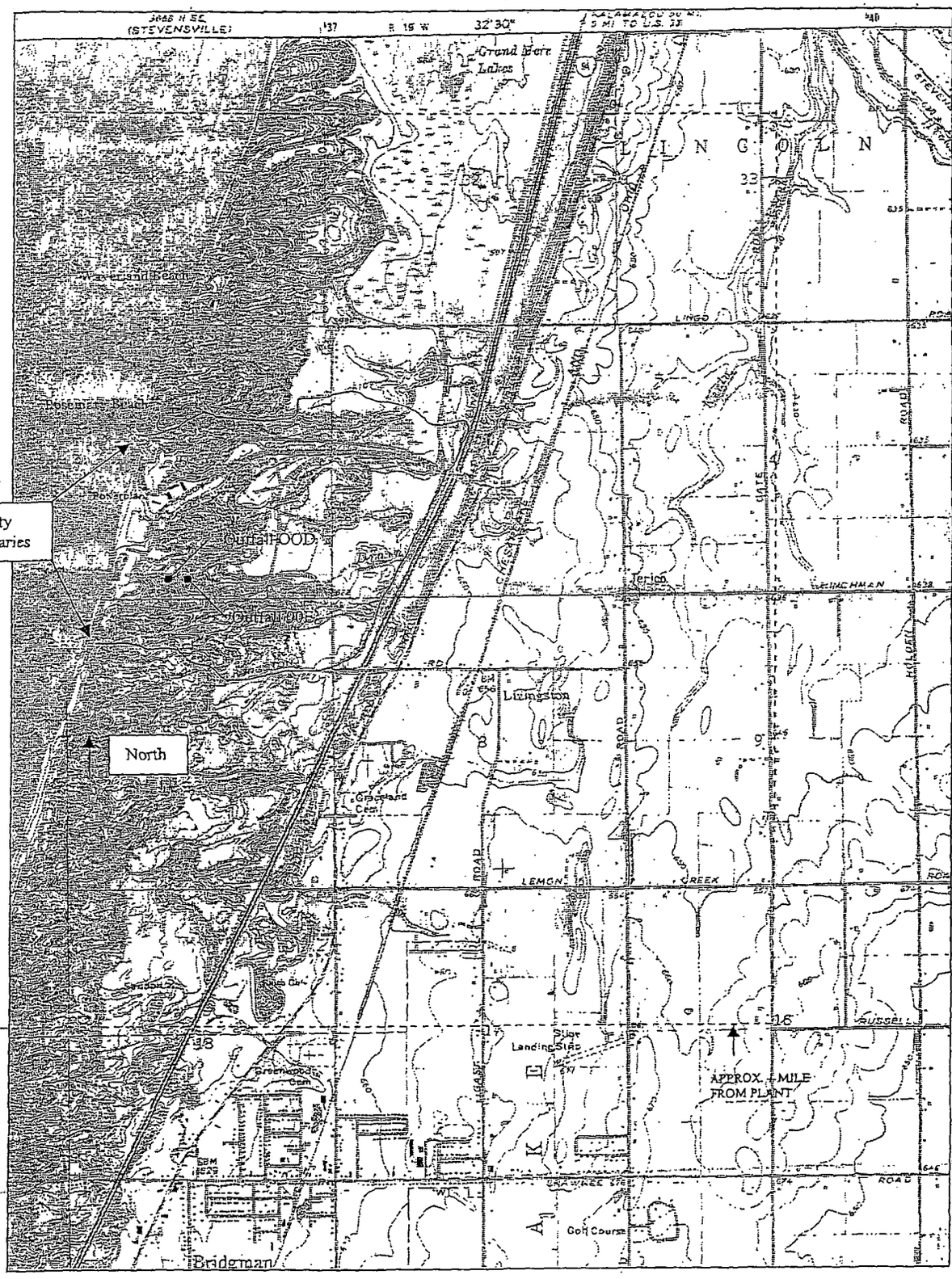
M. Cessation of Discharge-Related Activities
If all or any portion of the permitted treatment facilities and discharge areas is intended to be eliminated, the permittee shall comply with the requirements of Rule 2226.

NOTE:

IF THE PERMITTEE WISHES TO CONTINUE DISCHARGING BEYOND THE EXPIRATION DATE, THE PERMITTEE SHALL SUBMIT AN ADMINISTRATIVELY COMPLETE APPLICATION FOR REISSUANCE NO LATER THAN 180 DAYS PRIOR TO THE EXPIRATION DATE IN ACCORDANCE WITH RULE 2151 OF THE PART 21 ADMINISTRATIVE RULES. FAILURE TO SUBMIT AN ADMINISTRATIVELY COMPLETE APPLICATION FOR REISSUANCE BY THE REQUIRED DATE WILL RESULT IN TERMINATION OF THE AUTHORIZATION TO DISCHARGE ON THE EXPIRATION DATE.

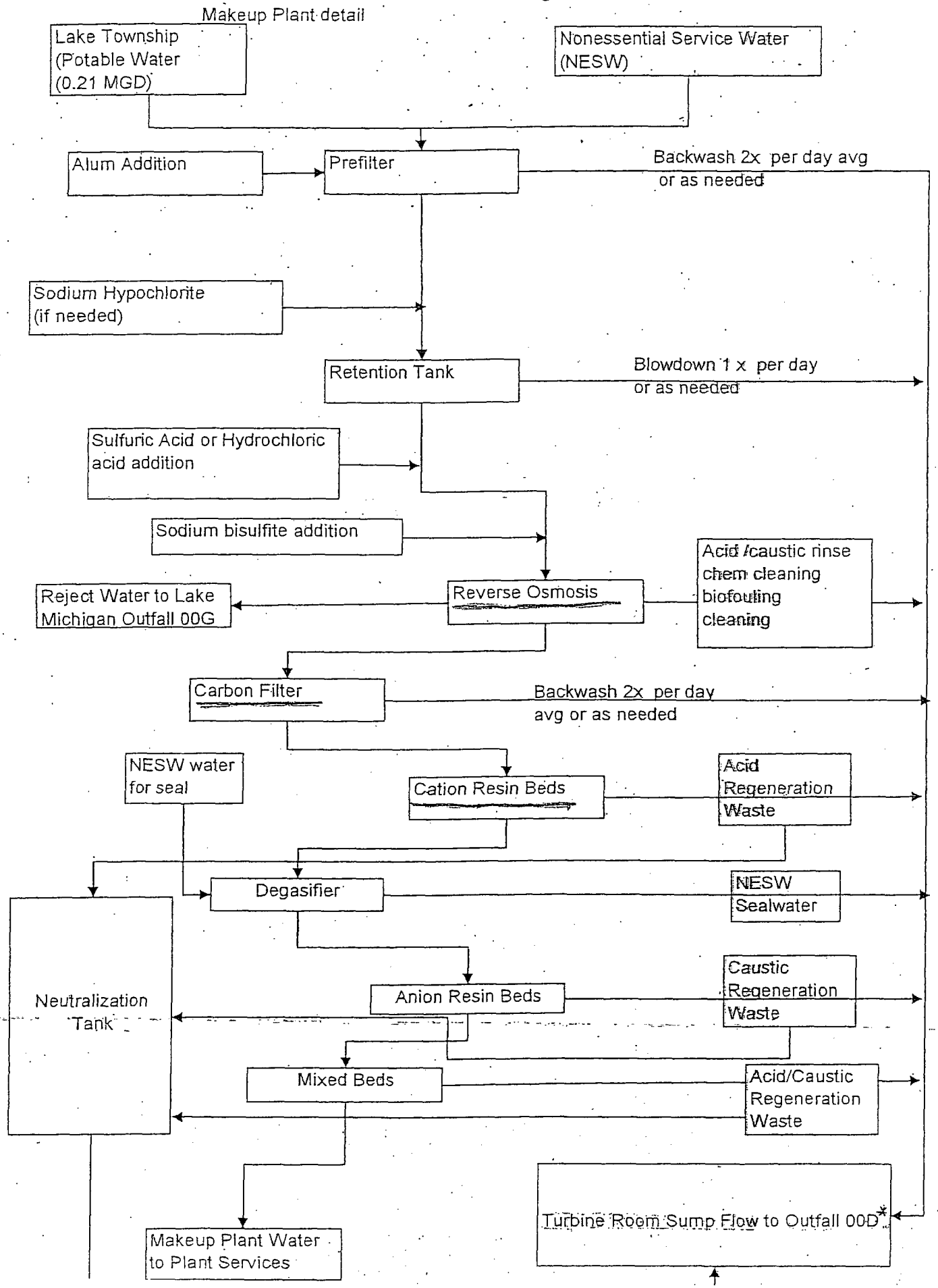
Donald C. Cook Nuclear Plant

ATTACHMENT 1
SITE MAP

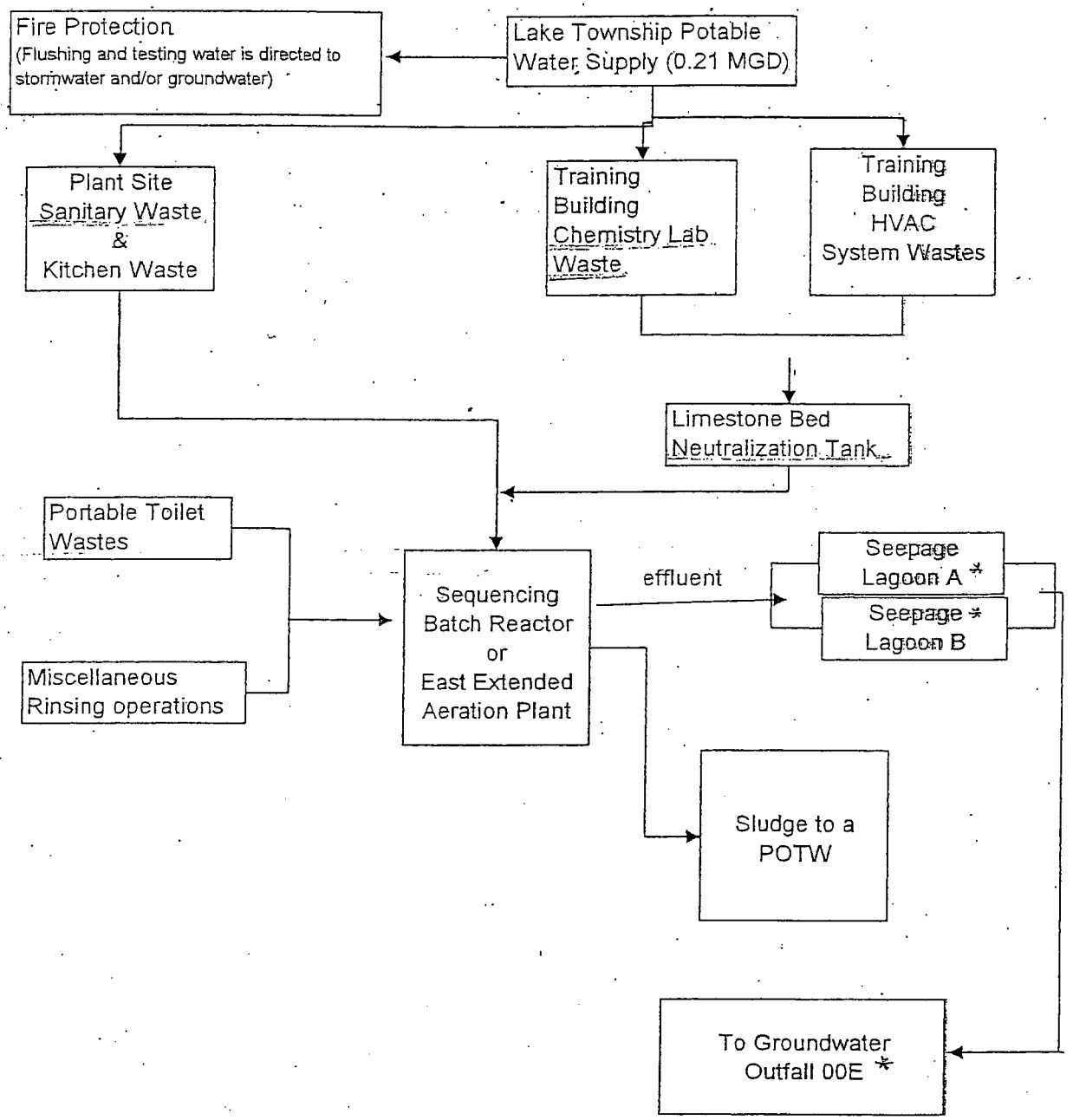


Donald C. Cook Nuclear Plant.
Bridgman Michigan
Lake Township
Berrien County
1" = 0.5 mile

ATTACHMENT 2
PROCESS FLOW DIAGRAM

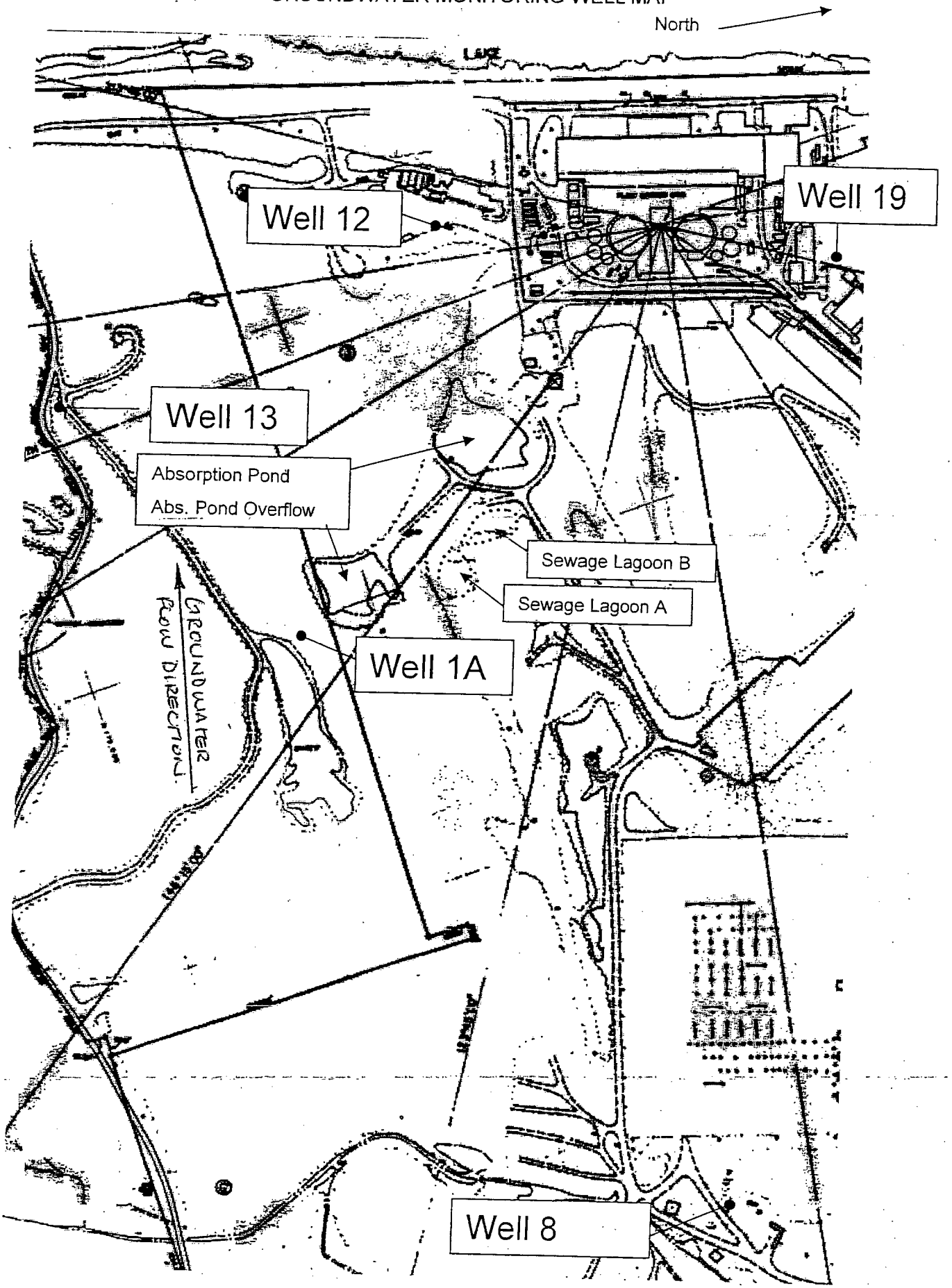


ATTACHMENT 2
PROCESS FLOW DIAGRAM
Sewage treatment plant detail



* Rapid Infiltration Basins

ATTACHMENT 3
GROUNDWATER MONITORING WELL MAP



AEP
INDIANA MICHIGAN POWER

Indiana Michigan
Power Company
Cook Nuclear Plant
One Cook Place
Bridgman, MI 49106

Ms. Jeanette Bailey
Michigan Department of Environmental Quality
Groundwater Permits Unit
P. O. Box 30273
Lansing, Michigan 48909-7773

July 3, 2006

Dear Ms. Bailey:

Subject: Donald C. Cook Nuclear Plant
Groundwater Permit GW 1810102

As required in Part E.3 of the Donald C. Cook Nuclear Plant's Groundwater Discharge Permit, we are providing you with a work plan for the installation of monitoring wells.

Should you have any questions regarding this response, please contact me at (269) 465-5901, ext. 1153.

Sincerely,

Jon H. Hamm For

John P. Carlson
Environmental Manager

Enclosure

c: MDEQ-Kalamazoo district office

2006-742

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this and all attached documents, and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Jon H. Hamm For

John P. Carlson
Environmental Manager

bc: J. P. Carlson
C. E. Hawk
M. A. Peifer
J. S. Miller
M. J. Scarpello
W. H. Schalk
B. W. Watson
L. J. Weber
B. K. Zordell
MDEQ File
NDM (2006-742)

Work plan for the installation of upgradient monitoring wells at the Donald C. Cook Nuclear Plant.

REF:Donald C. Cook Nuclear Plant Groundwater discharge permit GW1810102 Parts E.3,E.4,E.5 and E.6.

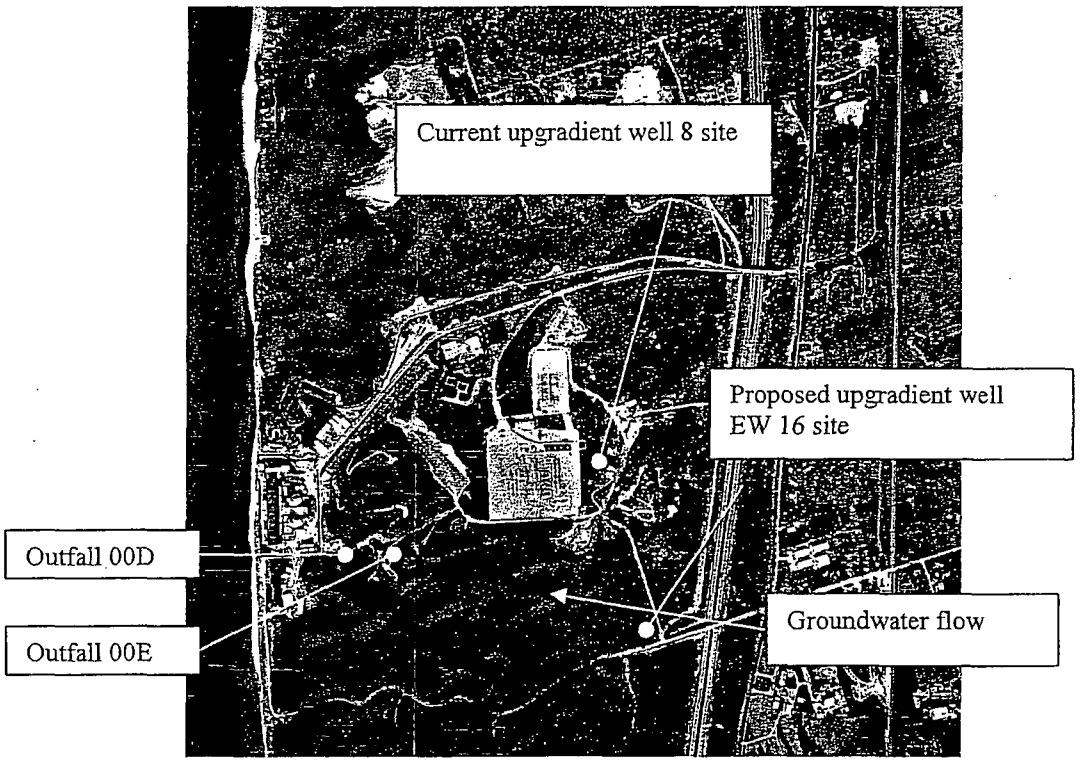
The recently issued groundwater discharge permit requires the establishment of a new upgradient monitoring well at the Donald C. Cook Nuclear Plant. Well 8 at the Cook Nuclear Plant has exhibited minute quantities of mercury since the start of testing in August of 2000. Mercury values have ranged from 0.0009 ug/l to 0.07 ug/l during this time. Method detection limit is 0.0002 ug/l, and the minimum level is 0.0005 ug/l for USEPA method 1669, "Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels." All other parameters are reflective of a typical upgradient groundwater well. Mercury is not detected in any of the remaining 4 monitoring wells at the site.

Cook Plant's historical effluent mercury discharge consists of a small amount of laboratory waste up until 1994, when the analysis for chloride was no longer required and the discharge was discontinued. No other industrial operations have occurred near this monitoring well based on historic reviews of the site. Literature review from the USEPA shows that mercury sources include septic systems. We have identified an abandoned septic tank and tile field 200 ft NE of the well location. This septic system was closed out and abandoned in the early 1990's. This septic system served a fish processing complex set up for fish studies, and a trailer to house employees in the 1970's. The septic system accepted domestic sewage, and fish processing waste. Fish processing waste is another suspected source of mercury. Cook Nuclear Plant believes that this is the source of mercury.

A site walkdown was completed in May of 2006 to identify potential upgradient well sites. The sites were chosen to ensure easy access, and reflect upgradient groundwater. Monitoring Well EW 16 was considered to replace monitoring well EW 8. Well EW 16 was sampled for all parameters listed in the current groundwater permit. This data set was compared to the historical data for this

well, and we have concluded that EW 16 can be used as the new upgradient well for the groundwater compliance monitoring program at the D.C. Cook Nuclear Plant.

Figure #1 Cook Nuclear Plant overview showing relationship between current upgradient well and proposed upgradient well.



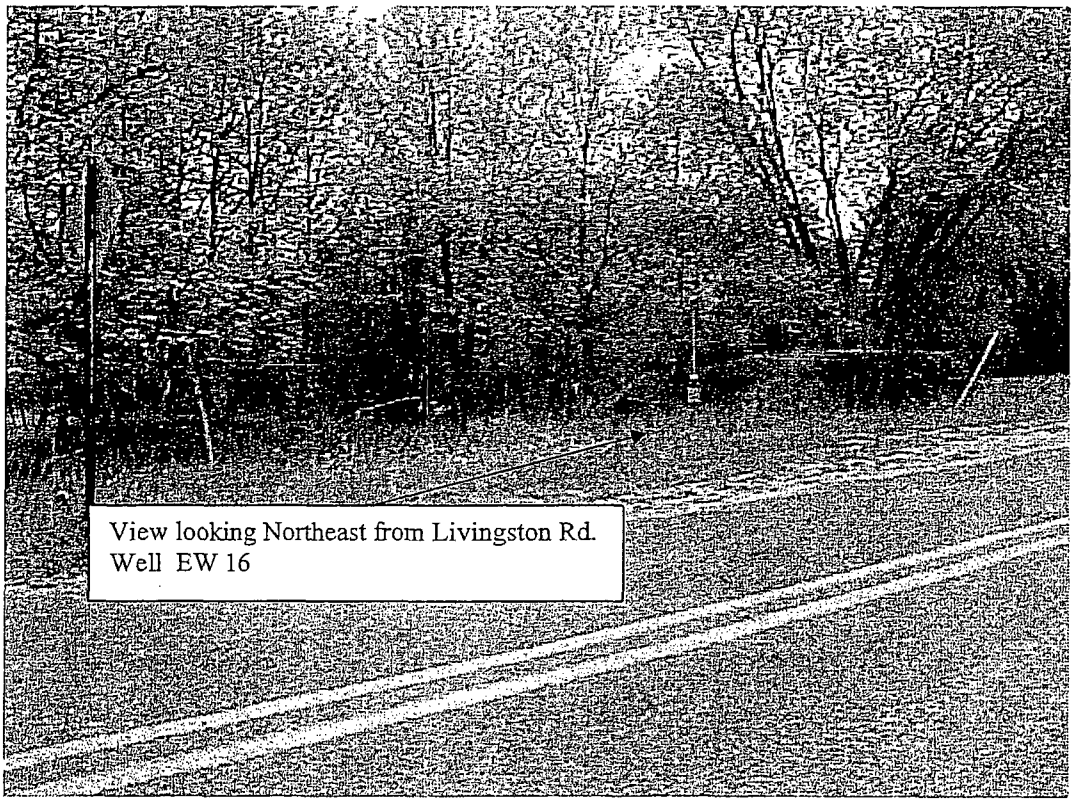
Sample data for both wells is compared in the table below:

Parameter	Well 8A	Well EW 16
pH	7.0	7.2
Sp cond. (uS/cm3)	522	667
Static elevation USGS Ft	608.2	613.60
Temp deg C	14.9	15.9
Ethanolamine (mg/l)	<0.7	<0.7
Hydrazine (ug/l)	<3	<3
Sodium (mg/l)	24.7	19.0
Ammonia (mg/l)	0.2	<0.1
Chloride (mg/l)	44	77
Nitrate (mg/l)	<0.2	0.9
Nitrite (mg/l)	<0.05	0.07
Phosphorus (mg/l)	<0.1	<0.1
TDS (mg/l)	278	345
Sulfate (mg/l)	29	32
Aluminum (mg/l)	<0.05 *	<0.05
Calcium (mg/l)	50.1 *	68.3
Iron (mg/l)	0.140 *	<0.005

Parameter	Well 8A	Well EW 16
Magnesium (mg/l)	14.6 *	20.2
Manganese (mg/l)	0.050 *	<0.0002
Potassium (mg/l)	4.7 *	1.9
Barium (mg/l)	24 *	21.2
Cadmium (mg/l)	<0.5*	<1
Chromium (ug/l)	<2 *	0.5
Copper (ug/l)	<1 *	0.5
Lead (ug/l)	<1 *	<0.1
Nickel (ug/l)	<2 *	0.9
Selenium (ug/l)	<1 *	<1
Silver (ug/l)	<0.2 *	1
Alkalinity (mg/l)	134 *	158
Bicarbonate alkalinity (mg/l)	7 *	157
Boron (mg/l)	0.05 *	0.018
TOC (mg/l)	9 *	1
Zinc (ug/l)	<4 *	1
Mercury (ug/l)	0.00176 *	<0.0005

*Sampled 7/8/2005

The evaluation of monitoring well EW 16 shows similar data to current upgradient well 8, with the exception of mercury, which is below detectable in Well EW 16. This well is upgradient of the predominant groundwater flow patterns on the Cook Plant Property as detailed in attached potentiometric map. Additional reasons for choosing this location: Well 16 is already installed and operational, which will reduce cost and time to establish compliance. This well is easily accessed from the SE corner of the property. Description of the well: Well EW 16 is a 2" PVC well and was installed on August 12, 1991. This well was regularly used for NPDES permit compliance prior to the issuance of Groundwater permit M09888 on September 29, 2000. The new permit reduced the number of wells required for sampling groundwater.

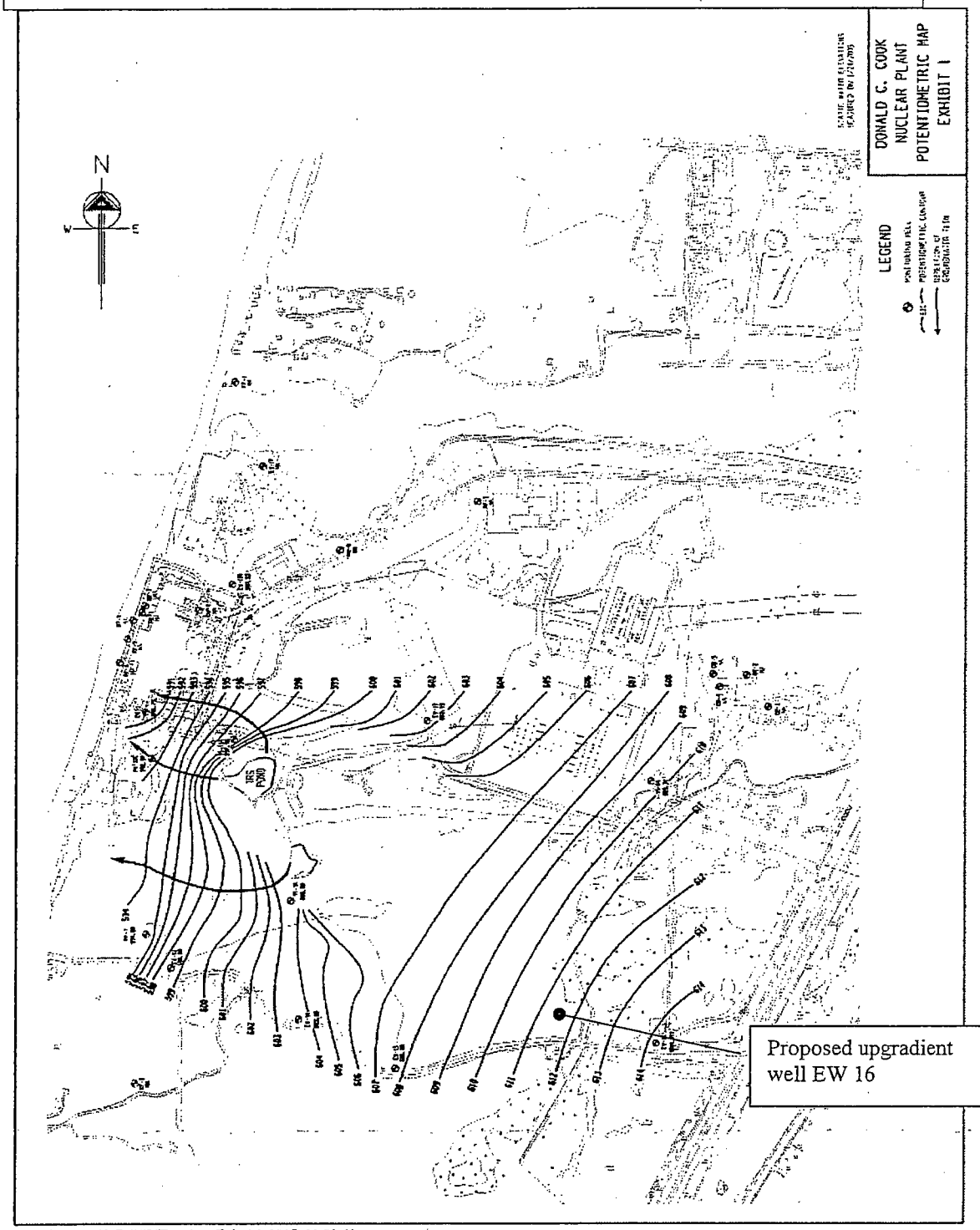


Upon approval of Well EW 16 for use as an upgradient well at the Cook Plant site, the following items listed in the approved groundwater permit will no longer be required to submit to the MDEQ:

1. Item #4 Install Monitoring wells as described in the approved work plan by August 1, 2006.
2. Item #5 Submit for review and receive approval of a report of monitoring well installation by September 1, 2006
3. Item #6 Submit monitoring well sampling results for background water quality by November 1, 2006.

Item #7 – Submit for review and receive approval of Modifications to the Sampling and Analysis Plan by September 1, 2006. This item will be completed as required.

Attachment #1, Donald C. Cook Nuclear Plant Potentiometric Map.



s:\stru\cook\u12\EXHIBIT 1 .dgn Feb. 04, 2005 08:03:48

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

JENNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

July 24, 2006

Mr. John Carlson, Environmental Manager
Indiana Michigan Power Company
Cook Nuclear Plant
One Cook Place
Bridgman, Michigan 49106

Dear Mr. Carlson:

SUBJECT: Schedule of Activities – Monitoring Well Installation
Cook Nuclear Plant – GW1810102
Baroda Township, Berrien County

We have completed our review of the work plan for the installation of a new upgradient monitoring well. This document was required as part of a Schedule of Activities within the recently issued groundwater discharge permit.

Based on that review, monitoring well EW 16 will be the new upgradient monitoring well for the facility. As this well is in existence, the only additional information that will need to be submitted will be a modification of the Sampling and Analysis Plan. This document will need to be submitted for review and approval by September 1, 2006.

If you have any questions or concerns about the work required in this letter, feel free to contact me at the number below.

Sincerely,

Jeffrey B. Warner, Geologist
Groundwater Permits Unit
Permits Section
Water Bureau
517-373-0583

cc: Mr. John Vollmer, DEQ-Kalamazoo
Ms. Jeanette Bailey, DEQ

c-006-830

INDIANA MICHIGAN POWER

Indiana Michigan
Power Company
Cook Nuclear Plant
One Cook Place
Bridgman, MI 49106

Ms. Jeanette Bailey
Michigan Department of Environmental Quality
Groundwater Permits Unit
P. O. Box 30273
Lansing, Michigan 48909-7773

August 30, 2006

Dear Ms. Bailey:

Subject: Donald C. Cook Nuclear Plant
Groundwater Permit GW 1810102

As required in Part E.3 of the Donald C. Cook Nuclear Plant's Groundwater Discharge Permit, we are providing you with a revised Groundwater Sampling and Analysis Plan. A page was added after the Table of Contents to add monitoring well description.

Should you have any questions regarding this response, please contact me at (269) 465-5901, ext. 2006.

Sincerely,

Blair Zordell

Blair K. Zordell
Environmental Specialist

Enclosure

c: Mr. John Vollmer, MDEQ Kalamazoo

2006-961

bc: J. P. Carlson - w/o Enclosure
C. E. Hawk - w/o Enclosure
J. L. Miller - w/o Enclosure
M. A. Peifer - w/o Enclosure
M. J. Scarpello - w/o Enclosure
W. H. Schalk - w/o Enclosure
B. W. Watson - w/o Enclosure
L. J. Weber - w/o Enclosure
B. K. Zordell - w/o Enclosure
MDEQ File
NDM (2006-961)

Sampling and Analysis Plan
Groundwater Discharge Permit
GW1810102

August 14, 2006

Prepared by: Blair Zordell
American Electric Power
Cook Nuclear Plant
One Cook Place
Bridgman, MI

Table of Contents

1.0 Monitoring Well Description. All monitoring wells described below are 2" PVC casings with dedicated Redi-Flo2 sample pumps installed. Each Well is secured by a 4" metal security casing with a locked hinged top to prevent tampering. A portable generator is available in the event that the dedicated power supply at the well fails.

1.1 Upgradient Wells

- Well 95-8A (Well 8) Will be used as a back-up upgradient well due to its proximity to an abandoned septic system, which is contributing low levels of mercury to this well. At the request of the MDEQ, an additional well will be used as an upgradient well at the Cook Site.
- Well ENV 16 (Well 16) This well is located in the SE corner of the Cook plant property and is representative of the upgradient groundwater.

1.2 Monitoring wells

- Well 95-1A (Well 1A)
- Well MW-12C (Well 12)
- Well ENV 13 (Well 13)
- Well ENV 19 (Well 19)

SystemName	ParameterName	Comment	Day of Week	Week Number
ENVIRONMENTAL	Vis. Observation			
ENVIRONMENTAL	evaluation	Perform a summer readiness Evaluation as Per PMP 2291-SCH-002. Owner: John Carlson	MON	10
ENVIRONMENTAL	Perform inspection	Excellence plan item: Inspect the 587' drumming room. Owner: Rick Hedgepeth.	FRI	XX
ENVIRONMENTAL	Perform inspection	Excellence plan item: Inspect the 609' drumming room and Rad waste handling building. Owner: Rick Hedgepeth.	FRI	XX
ENVIRONMENTAL	Perform inspection	Excellence plan item: Inspect the Radioactive Material Building (RMB). Owner: Rick Hedgepeth.	FRI	XX
Env. Tour	Monthly Tour	Perform a scorecard (attachment 2 of HSK-001) observation on the housekeeping condition for the OCA.		
Env. Tour	Monthly Tour	Perform a scorecard (attachment 2 of HSK-001) observation on the housekeeping condition for the 587' and the 609' drumming room.		
Env. Tour	Vis. Observation	TECHNICIANS: Complete 'Environmental Surveillance Guideline' SUR-1	FRI	XX
Groundwater	Grab Samples	TECHNICIANS: Quarterly grab samples for NPDES groundwater compliance. Wells 1A, 8A, 12C, 13, 16,19. Annual montoring will be done in July, Quartely monitoring done in January, April, July, and October CONTACT: Blair Zordell	FRI	43
Groundwater	Grab Samples	TECHNICIANS: Quarterly grab samples for NPDES groundwater compliance. Wells 1A, 8A, 12C, 13, 16, 19. Annual montoring will be done in July, Quartely monitoring done in January, April, July, and October CONTACT: Blair Zordell	FRI	30
Groundwater	Grab Samples	TECHNICIANS: Quarterly grab samples for NPDES groundwater compliance. Wells 1A, 8A, 12C, 13, 16,19. Annual montoring will be done in July, Quartely monitoring done in January, April, July, and October CONTACT: Blair Zordell	FRI	17

6

SystemName	ParameterName	Comment	Day of Week	Week Number
Groundwater	Grab Samples	TECHNICIANS: Semi-annual samples for NPDES remediation compliance. RP Wells RP #4, 5, 6, OW#1 For O&G, BTEX, PAH. Owner: Jon Harner		
Groundwater	Grab Samples	TECHNICIANS: Quarterly grab samples for NPDES groundwater compliance. Wells 1A, 8A, 12C, 13, 16, 19. Annual montoring will be done in July, Quartely monitoring done in January, April, July, and October CONTACT: Blair Zordell	FRI	04
Beach soil	Grab Samples	TECHNICIANS: Semi-annual grab samples of beach soil. (NPDES Remediation compliance) Owner: Jon Harner	FRI	30
Beach soil	Grab Samples	TECHNICIANS: Semi-annual grab samples of beach soil. (NPDES Remediation compliance) Owner: Jon Harner	THU	24
Monthly Operating Report	Submittal of report	ENV SPECIALIST: Submit MOR and NPDES federal forms to SWQD-MI (Lansing) IF Paper due on the 10th, IF electronic due on the 20th. Program: NPDES Owner: Blair Zordell	FRI	49
Monthly Operating Report	Submittal of report	ENV SPECIALIST: Submit MOR and NPDES federal forms to SWQD-MI (Lansing) IF Paper due on the 10th, IF electronic due on the 20th. Program: NPDES Owner: Blair Zordell	FRI	45
Monthly Operating Report	Submittal of report	ENV SPECIALIST: Submit MOR and NPDES federal forms to SWQD-MI (Lansing) IF Paper due on the 10th, IF electronic due on the 20th. Program: NPDES Owner: Blair Zordell	TUE	41

SystemName	ParameterName	Comment	Day of Week	Week Number
Monthly Operating Report	Submittal of report	ENV SPECIALIST: Submit MOR and NPDES federal forms to SWQD-MI (Lansing) IF Paper due on the 10th, IF electronic due on the 20th. Program: NPDES Owner: Blair Zordell	TUE	02
Monthly Operating Report	Submittal of report	ENV SPECIALIST: Submit MOR and NPDES federal forms to SWQD-MI (Lansing) IF Paper due on the 10th, IF electronic due on the 20th. Program: NPDES Owner: Blair Zordell	FRI	06
Monthly Operating Report	Submittal of report	ENV SPECIALIST: Submit MOR and NPDES federal forms to SWQD-MI (Lansing) IF Paper due on the 10th, IF electronic due on the 20th. Program: NPDES Owner: Blair Zordell	FRI	10
Monthly Operating Report	Submittal of report	ENV SPECIALIST: Submit MOR and NPDES federal forms to SWQD-MI (Lansing) IF Paper due on the 10th, IF electronic due on the 20th. Program: NPDES Owner: Blair Zordell	MON	15
Monthly Operating Report	Submittal of report	ENV SPECIALIST: Submit MOR and NPDES federal forms to SWQD-MI (Lansing) IF Paper due on the 10th, IF electronic due on the 20th. Program: NPDES Owner: Blair Zordell	WED	19
Monthly Operating Report	Submittal of report	ENV SPECIALIST: Submit MOR and NPDES federal forms to SWQD-MI (Lansing) IF Paper due on the 10th, IF electronic due on the 20th. Program: NPDES Owner: Blair Zordell	FRI	23
Monthly Operating Report	Submittal of report	ENV SPECIALIST: Submit MOR and NPDES federal forms to SWQD-MI (Lansing) IF Paper due on the 10th, IF electronic due on the 20th. Program: NPDES Owner: Blair Zordell	MON	28

SystemName	ParameterName	Comment	Day of Week	Week Number
Monthly Operating Report	Submittal of report	ENV SPECIALIST: Submit MOR and NPDES federal forms to SWQD-MI (Lansing) IF Paper due on the 10th, IF electronic due on the 20th. Program: NPDES Owner: Blair Zordell	THU	32
Monthly Operating Report	Submittal of report	ENV SPECIALIST: Submit MOR and NPDES federal forms to SWQD-MI (Lansing) IF Paper due on the 10th, IF electronic due on the 20th. Program: NPDES Owner: Blair Zordell	FRI	36
NPDES Wells	Submit Data to State	ENV. SPECIALIST: Submit quarterly well data to MDEQ WMD in Lansing. Program: NPDES Owner: Blair Zordell	FRI	28
NPDES Wells	Submit Data to State	ENV. SPECIALIST: Submit quarterly well data to MDEQ WMD in Lansing. Program: NPDES Owner: Blair Zordell	FRI	02
NPDES Wells	Submit Data to State	ENV. SPECIALIST: Submit quarterly well data to MDEQ WMD in Lansing. Program: NPDES Owner: Blair Zordell	THU	15
NPDES Wells	Submit Data to State	ENV. SPECIALIST: Submit quarterly well data to MDEQ WMD in Lansing. Program: NPDES Owner: Blair Zordell	FRI	41
Abs. Pond	Grab Samples	sample the Absorption Pond for tritium	TUE	XX
Abs. Pond	Grab Samples	TECHNICIANS: sample the Absorption Pond for gamma spec	SAT	XX
Abs. Pond	Grab Samples	TECHNICIANS: sample the Absorption Pond for gamma spec	FRI	XX
Abs. Pond	Grab Samples	TECHNICIANS: sample the Absorption Pond for gamma spec	MON	XX
Abs. Pond	Grab Samples	TECHNICIANS: sample the Absorption Pond for gamma spec	SUN	XX
Abs. Pond	Grab Samples	sample the Absorption Pond for tritium	MON	XX
Abs. Pond	Grab Samples	sample the Absorption Pond for tritium	WED	XX
Abs. Pond	Grab Samples	sample the Absorption Pond for tritium	THU	XX
Abs. Pond	Grab Samples	TECHNICIANS: sample the Absorption Pond for gamma spec	WED	XX

SystemName	ParameterName	Comment	Day of Week	Week Number
Abs. Pond	Grab Samples	TECHNICIANS: sample the Absorption Pond for gamma spec	THU	XX
Abs. Pond	Grab Samples	TECHNICIANS: sample the Absorption Pond for gamma spec	TUE	XX
Abs. Pond	Grab Samples	sample the Absorption Pond for tritium	FRI	XX
Abs. Pond	Grab Samples	sample the Absorption Pond for tritium	SUN	XX
Abs. Pond	Grab Samples	sample the Absorption Pond for tritium	SAT	XX
Abs. Pond	Vis. Observation	Perform visual inspection of Eastern edge of main abs. Pond. Look for erosion, animal burrowing or other challenges to the dike's integrity. Record findings on Sur-1 sheet. Owner: Blair Zordell	MON	XX
Abs. Pond	Vis. Observation	TECHNICIANS: perform visual observation of absorption pond For Oil Sheen at the TRS discharge. Program: NPDES	TUE	XX
Abs. Pond	Vis. Observation	TECHNICIANS: perform visual observation of absorption pond For Oil Sheen at the TRS discharge. Program: NPDES Owner: Blair Zordell	THU	XX
Abs. Pond	Vis. Observation	TECHNICIANS: perform visual observation of absorption pond For Oil Sheen at the TRS discharge. Program: NPDES Owner: Blair Zordell	WED	XX
Abs. Pond	Vis. Observation	TECHNICIANS: perform visual observation of absorption pond For Oil Sheen at the TRS discharge. Program: NPDES Owner: Blair Zordell	FRI	XX
Abs. Pond	Vis. Observation	TECHNICIANS: perform visual observation of absorption pond For Oil Sheen at the TRS discharge. Program: NPDES Owner: Blair Zordell	MON	XX

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SystemName	ParameterName	Comment	Day of Week	Week Number
Abs. Pond	ETA	TECHNICIANS: ENV Grab Sample on Weekly Tour . Program: NPDES Owner: Blair Zordell	MON	XX
Abs. Pond	ETA	TECHNICIANS: Analyze Grab sample. Program: NPDES Owner: Blair Zordell	TUE	XX
Abs. Pond	N2H4	TECHNICIANS: Analyze grab sample. Program: NPDES Owner: Blair Zordell	TUE	XX
Abs. Pond	ETA/ANALYSIS/CAL	ENV TECH PERFORM NEW CALIB LINE FOR NEW LAB LAMBDA-20 ANALYSIS. CONTACT: SCOTT ROSE PERFORM EVERY 3RD MONDAY OF EVERY OTHER MONTH. Program: NPDES Owner: Blair Zordell	MON	03
Abs. Pond	ETA/ANALYSIS/CAL	ENV TECH PERFORM NEW CALIB LINE FOR NEW LAB LAMBDA-20 ANALYSIS. CONTACT: SCOTT ROSE PERFORM EVERY 3RD MONDAY OF EVERY OTHER MONTH. Program: NPDES Owner: Blair Zordell	MON	12
Abs. Pond	ETA/ANALYSIS/CAL	ENV TECH PERFORM NEW CALIB LINE FOR NEW LAB LAMBDA-20 ANALYSIS. CONTACT: SCOTT ROSE PERFORM EVERY 3RD MONDAY OF EVERY OTHER MONTH. Program: NPDES Owner: Blair Zordell	MON	20

SystemName	ParameterName	Comment	Day of Week	Week Number
Abs. Pond	ETA/ANALYSIS/CAL	ENV TECH PERFORM NEW CALIB LINE FOR NEW LAB LAMBDA-20 ANALYSIS. CONTACT: SCOTT ROSE PERFORM EVERY 3RD MONDAY OF EVERY OTHER MONTH. Program: NPDES Owner: Blair Zordell	MON	29
Abs. Pond	ETA/ANALYSIS/CAL	ENV TECH PERFORM NEW CALIB LINE FOR NEW LAB LAMBDA-20 ANALYSIS. CONTACT: SCOTT ROSE PERFORM EVERY 3RD MONDAY OF EVERY OTHER MONTH. Program: NPDES Owner: Blair Zordell	MON	47
Abs. Pond	ETA/ANALYSIS/CAL	ENV TECH PERFORM NEW CALIB LINE FOR NEW LAB LAMBDA-20 ANALYSIS. CONTACT: SCOTT ROSE PERFORM EVERY 3RD MONDAY OF EVERY OTHER MONTH. Program: NPDES Owner: Blair Zordell	MON	38
refrigerator	Temp Check	TECHNICIANS: ENV Techs. ensure refrigerator temp. is in spec. Program: NPDES Owner: Blair Zordell	WED	XX
Turbine Room Sump	chloride	Prepare 250 ml sample (min) to ship to Dolan Labs for analysis, or to wastewater plant for chloride analysis.	THU	XX
Turbine Room Sump	chloride	Collect TRS grab sample for Chloride.	MON	XX
Turbine Room Sump	Grab Samples	TECHNICIANS: Grab sample of the TRS for Hydrazine. Minimum detectable Level is 3 ug/l. Program: NPDES Owner: Blair Zordell	MON	XX
Turbine Room Sump	NH3, NO2, NO3	TECHNICIANS: ENV Monthly Grab Sample. Owner: Blair Zordell	MON	49

SystemName	ParameterName	Comment	Day of Week	Week Number
Turbine Room Sump	NH3, NO2, NO3	TECHNICIANS: ENV Monthly Grab Sample. Owner: Blair Zordell	MON	06
Turbine Room Sump	NH3, NO2, NO3	TECHNICIANS: ENV Monthly Grab Sample. Owner: Blair Zordell	MON	10
Turbine Room Sump	NH3, NO2, NO3	TECHNICIANS: ENV Monthly Grab Sample. Owner: Blair Zordell	MON	14
Turbine Room Sump	NH3, NO2, NO3	TECHNICIANS: ENV Monthly Grab Sample. Owner: Blair Zordell	MON	18
Turbine Room Sump	NH3, NO2, NO3	TECHNICIANS: ENV Monthly Grab Sample. Owner: Blair Zordell	MON	23
Turbine Room Sump	NH3, NO2, NO3	TECHNICIANS: ENV Monthly Grab Sample. Owner: Blair Zordell	MON	27
Turbine Room Sump	NH3, NO2, NO3	TECHNICIANS: ENV Monthly Grab Sample. Owner: Blair Zordell	MON	01
Turbine Room Sump	NH3, NO2, NO3	TECHNICIANS: ENV Monthly Grab Sample. Owner: Blair Zordell	MON	40
Turbine Room Sump	NH3, NO2, NO3	TECHNICIANS: ENV Monthly Grab Sample. Owner: Blair Zordell	TUE	36
Turbine Room Sump	NH3, NO2, NO3	Ship monthly NH3, NO2, and NO3 samples to Dolan Labs for analysis.	THU	01
Turbine Room Sump	NH3, NO2, NO3	Ship monthly NH3, NO2, and NO3 samples to Dolan Labs for analysis.	THU	06
Turbine Room Sump	NH3, NO2, NO3	Ship monthly NH3, NO2, and NO3 samples to Dolan Labs for analysis.	THU	10

SystemName	ParameterName	Comment	Day of Week	Week Number
Turbine Room Sump	NH3, NO2, NO3	TECHNICIANS: ENV Monthly Grab Sample. Owner: Blair Zordell	MON	32
Turbine Room Sump	NH3, NO2, NO3	Ship monthly NH3, NO2, and NO3 samples to Dolan Labs for analysis.	THU	14
Turbine Room Sump	NH3, NO2, NO3	Ship monthly NH3, NO2, and NO3 samples to Dolan Labs for analysis.	THU	49
Turbine Room Sump	NH3, NO2, NO3	Ship monthly NH3, NO2, and NO3 samples to Dolan Labs for analysis.	THU	45
Turbine Room Sump	NH3, NO2, NO3	Ship monthly NH3, NO2, and NO3 samples to Dolan Labs for analysis.	THU	40
Turbine Room Sump	NH3, NO2, NO3	Ship monthly NH3, NO2, and NO3 samples to Dolan Labs for analysis.	THU	36
Turbine Room Sump	NH3, NO2, NO3	Ship monthly NH3, NO2, and NO3 samples to Dolan Labs for analysis.	THU	32
Turbine Room Sump	NH3, NO2, NO3	Ship monthly NH3, NO2, and NO3 samples to Dolan Labs for analysis.	THU	27
Turbine Room Sump	NH3, NO2, NO3	TECHNICIANS: ENV Monthly Grab Sample. Owner: Blair Zordell	MON	45
Turbine Room Sump	NH3, NO2, NO3	Ship monthly NH3, NO2, and NO3 samples to Dolan Labs for analysis.	THU	23
Turbine Room Sump	NH3, NO2, NO3	Ship monthly NH3, NO2, and NO3 samples to Dolan Labs for analysis.	THU	18
Turbine Room Sump	Oil and Grease	Env. grab & prep., Chemistry Analyze, Required for discharge vi outfall OOH only.	THU	XX
Turbine Room Sump	ETA	TECHNICIANS: Grab sample of the TRS for Ethanolamine. Minimum detectable Level is 0.7 mg/l. Program: NPDES Owner: Blair Zordell	MON	XX
Turbine Room Sump	ETA	TECHNICIANS: Analyze Grab sample. Program: NPDES Owner: Blair Zordell	TUE	XX

SystemName	ParameterName	Comment	Day of Week	Week Number
Turbine Room Sump	ETA	TECHNICIANS: Grab sample of the TRS for Ethanolamine. Minimum detectable Level is 0.7 mg/l. Program: NPDES Owner: Blair Zordell	FRI	XX
Turbine Room Sump	ETA	TECHNICIANS: Grab sample of the TRS for Ethanolamine. Minimum detectable Level is 0.7 mg/l. Program: NPDES Owner: Blair Zordell	THU	XX
Turbine Room Sump	ETA	TECHNICIANS: Grab sample of the TRS for Ethanolamine. Minimum detectable Level is 0.7 mg/l. Program: NPDES Owner: Blair Zordell	WED	XX
Turbine Room Sump	ETA	TECHNICIANS: Grab sample of the TRS for Ethanolamine. Minimum detectable Level is 0.7 mg/l. Program: NPDES Owner: Blair Zordell	TUE	XX
Turbine Room Sump	N2H4	TECHNICIANS: Grab sample of the TRS for Hydrazine. Minimum detectable Level is 3 ug/l. Program: NPDES Owner: Blair Zordell	FRI	XX
Turbine Room Sump	N2H4	TECHNICIANS: Analyze Grab samples. Program: NPDES Owner: Blair Zordell	TUE	XX
Turbine Room Sump	N2H4	TECHNICIANS: Grab sample of the TRS for Hydrazine. Minimum detectable Level is 3 ug/l. Program: NPDES Owner: Blair Zordell	MON	XX

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SystemName	ParameterName	Comment	Day of Week	Week Number
Turbine Room Sump	N2H4	TECHNICIANS: Grab sample of the TRS for Hydrazine. Minimum detectable Level is 3 ug/l. Program: NPDES Owner: Blair Zordell	TUE	XX
Turbine Room Sump	N2H4	TECHNICIANS: Grab sample of the TRS for Hydrazine. Minimum detectable Level is 3 ug/l. Program: NPDES Owner: Blair Zordell	WED	XX
Turbine Room Sump	N2H4	TECHNICIANS: Grab sample of the TRS for Hydrazine. Minimum detectable Level is 3 ug/l. Program: NPDES Owner: Blair Zordell	THU	XX
Turbine Room Sump	Dissolved sodium	TECHNICIANS: Ship samples to lab for analysis. (Monthly) Program: NPDES Owner: Blair Zordell	WED	13
Turbine Room Sump	Dissolved sodium	TECHNICIANS: Ship samples to lab for analysis. (Monthly) Program: NPDES Owner: Blair Zordell	WED	05
Turbine Room Sump	Dissolved sodium	TECHNICIANS: prepare TRS 24 hour composite for analysis. Filter w/0.45 u filter, preserve to pH of <2.0 and refrigerate. Program: NPDES Owner: Blair Zordell	FRI	XX
Turbine Room Sump	Dissolved sodium	TECHNICIANS: Ship samples to lab for analysis. (Monthly) Program: NPDES Owner: Blair Zordell	WED	09

SystemName	ParameterName	Comment	Day of Week	Week Number
Turbine Room Sump	Dissolved sodium	TECHNICIANS: Ship samples to lab for analysis. (Monthly) Program: NPDES Owner: Blair Zordell	WED	52
Turbine Room Sump	Dissolved sodium	TECHNICIANS: Ship samples to lab for analysis. (Monthly) Program: NPDES Owner: Blair Zordell	WED	48
Turbine Room Sump	Dissolved sodium	TECHNICIANS: Ship samples to lab for analysis. (Monthly) Program: NPDES Owner: Blair Zordell	WED	44
Turbine Room Sump	Dissolved sodium	TECHNICIANS: Ship samples to lab for analysis. (Monthly) Program: NPDES Owner: Blair Zordell	WED	39
Turbine Room Sump	Dissolved sodium	TECHNICIANS: Ship samples to lab for analysis. (Monthly) Program: NPDES Owner: Blair Zordell	WED	35
Turbine Room Sump	Dissolved sodium	TECHNICIANS: Ship samples to lab for analysis. (Monthly) Program: NPDES Owner: Blair Zordell	WED	31
Turbine Room Sump	Dissolved sodium	TECHNICIANS: Ship samples to lab for analysis. (Monthly) Program: NPDES Owner: Blair Zordell	WED	26
Turbine Room Sump	Dissolved sodium	TECHNICIANS: Ship samples to lab for analysis. (Monthly) Program: NPDES Owner: Blair Zordell	WED	22

SystemName	ParameterName	Comment	Day of Week	Week Number
Turbine Room Sump	Dissolved sodium	TECHNICIANS: Ship samples to lab for analysis. (Monthly) Program: NPDES Owner: Blair Zordell	WED	17
Stormwater	Vis. Observation	Outfall 002S, look for oil sheen & replace booms as required.	MON	XX
Stormwater	Submit Data to State	ENV. SPECIALIST: Within 14 days of November 4, notify MDEQ in writing that annual stormwater inspection has been completed. NPDES permit MI0005827 Part II.C.5. And PartI.A.11.d.1 Owner: Blair Zordell	FRI	46
Stormwater	Complete SWP3	Complete Storm Water Pollution Prevention Plan. Provide written notification to State MDEQ.		
Stormwater		Provide written notification to MDEQ of stormwater inspections and that no non-stormwater discharges exist.		
Stormwater	operating Permit Application	MIS52001 - Stormwater Industrial permit expires on October 1, 2004. Contact Blair Zordell		
Stormwater	Semi-Annual Inspection	TECHNICIANS: Inspect transformer spill containments for leaves and other trash. Remove debris and dispose of properly. (Catchbasins 12 trOB1, 12 TR OB2, 12 TRCAB, 12 TRSCAB) PROGRAM: NPDES (ESAT Commitment) Owner: Blair Zordell	MON	15
Stormwater	Semi-Annual Inspection	TECHNICIANS: Inspect transformer spill containments for leaves and other trash. Remove debris and dispose of properly. (Catchbasins 12 trOB1, 12 TR OB2, 12 TRCAB, 12 TRSCAB) PROGRAM: NPDES (ESAT Commitment) Owner: Blair Zordell	WED	41
Stormwater	Semi-Annual Inspection	ENV. SPECIALIST: Complete appendix E of the Storm Water Pollution Prevention Plan (SWPPP), due 11/04 yearly Program: NPDES Owner: Blair Zordell	FRI	44

SystemName	ParameterName	Comment	Day of Week	Week Number
Stormwater	Semi-Annual Inspection	TECHNICIANS: Inspect transformer spill containments for leaves and other trash. Remove debris and dispose of properly. (Catchbasins 12 trOB1, 12 TR OB2, 12 TRCAB, 12 TRSCAB) PROGRAM: NPDES (ESAT Commitment) Owner: Blair Zordell	MON	19
Stormwater	Semi-Annual Inspection	TECHNICIANS: Inspect transformer spill containments for leaves and other trash. Remove debris and dispose of properly. (Catchbasins 12 trOB1, 12 TR OB2, 12 TRCAB, 12 TRSCAB) PROGRAM: NPDES (ESAT Commitment) Owner: Blair Zordell	WED	45
Stormwater	Semi-Annual Inspection	ENV. SPECIALIST: Complete appendix E of the Storm Water Pollution Prevention Plan (SWPPP), due 11/04 yearly Program: NPDES Owner: Blair Zordell	FRI	18
Stormwater	Semi-Annual Inspection	ENV. SPECIALIST: Complete appendix E of the Storm Water Pollution Prevention Plan (SWPPP), due 11/04 yearly Program: NPDES Owner: Blair Zordell	MON	16
Stormwater	Annual Update	ENV. SPECIALIST: Complete appendix F of the Storm Water Pollution Prevention Plan (SWPPP), due 11/04 yearly Program: NPDES Owner: Blair Zordell	FRI	44

SystemName	ParameterName	Comment	Day of Week	Week Number

SystemName	ParameterName	Comment	Day of Week	Week Number

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SystemName	ParameterName	Comment	Day of Week	Week Number

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Effective Date: 3-1-06	Title: Discharge Monitoring Report	**Rev. # 3**

Revision #: 3

Section or Step	**Change/Reason for Change**
Step 3.1.6	Change: Added new reference on the MDEQ's E2 DMR data entry system. Reason: DMR forms are now preferred to be submitted electronically.
3.2	Change: Split step into two sections: Reason: One for paper submittal, and the second for electronic submittal.
3.2.3	Change: Removed the requirement to submit DMRs to Shaw, Pittman, Potts and Trowbridge. Reason: AEP no longer uses this firm for NPDES related litigation.
3.2.4	Change: Updated DMR distribution list. Reason: To reflect current practices.
4.2	Change: Added due date for electronic reports. Reason: Electronic reports are due later than the paper reports.
5.1.7	Change: Added new reference on the MDEQ's E2 DMR data entry system. Reason: DMR forms are now preferred to be submitted electronically.
Attachment #1	Change: Added attachment #1 Reason: Direction on collecting and entering data

Originator: Blair K. Zordell Blair Zordell Date: 2-15-06

Approved by: Jon H. Harner Jon H. Harner Date: 2-23-06

1 PURPOSE AND SCOPE

1.1 To provide guidance to ensure proper submittal of the Discharge Monitoring Report (DMR) as required by the National Pollutant Discharge Elimination System (NPDES) permit MI0005827, and the Groundwater Report as required by the Michigan Department of Environmental Quality (MDEQ) Waste Management Division Permit M00988.

2 DEFINITIONS AND ABBREVIATIONS

Term	Meaning
DMR	Discharge Monitoring Report
E2 DMR	Electronic Discharge Monitoring Report
NPDES	National Pollutant Discharge Elimination System
MDEQ	Michigan Department of Environmental Quality
PCS	Permit Compliance Section

3 DETAILS

3.1 Refer to the following documents for guidance in the submittal and preparation of the Discharge Monitoring Report (DMR), and the Groundwater Quarterly Report.

3.1.1 Instructions for Completing EPA's Preprinted NPDES DMR Form 3320-1.
3.1.2 Guidelines for Completing DMR
3.1.3 NPDES Permit DMR: Importance of being Accurate
3.1.4 Example of DMR Submittals
3.1.5 Example Groundwater Report Submittal
3.1.6 Electronic Environmental Discharge Monitoring (E2 DMR) System. Facility user's guide.

3.2 Upon completion of the reports, ensure that they are signed by an approved reviewer. (Manager level or equivalent).

NOTE:	The preferred method for DMR submission is the electronic format (E2 DMR System).

3.2.1 Paper submission

a. Make two copies of the federal forms.

b. Submit the original federal and daily forms and 2 copies of the federal forms to the PCS unit in Lansing via certified mail.

c. Submit one copy of the federal and daily forms to the Nuclear Document Management (NDM).

3.2.2 Electronic submission of DMR. The steps below are general information. Use reference 3.1.6 for more detailed information.

a. Log onto EDMR website with valid user ID and Password. User must be registered in order to gain access to the data entry website

b. Select either Daily or Monthly forms

c. Enter data as required in the forms

d. Print out the completed forms

e. Submit for management approval

f. Notify qualified approver when the reports are ready for submittal.

g. Qualified approver will log on to approve and submit the reports

h. Qualified approver will save the submittal file electronically

3.2.3 Retain one copy of the federal and daily forms with Attachment #1 cover sheet for Environmental record.

3.2.4 Distribute (via E-mail) a copy to AEP Corporate, Plant engineering, and Corporate Communications.

3.3 MDEQ Waste Management Division Quarterly Compliance Groundwater Report Submittal.

3.3.1 Monitoring Data required by this permit and other data required by the Waste Management Division, MDEQ. Reporting periods shall be quarterly, January through March, April through June, July Through September and October through December.

3.3.2 Collect monthly data from Outfall OOD and OOE.

3.3.3 Collect Groundwater Monitoring Well Data from the contract laboratory and enter on the Quarterly Compliance Report Form.

3.3.4 Submit original and one copy of the Quarterly Compliance Report to the Groundwater Program Section in Lansing, Michigan via certified mail.

3.3.5 Submit one copy of the Quarterly Compliance Report to the Kalamazoo District Office.

3.3.6 Submit one copy of the Quarterly Compliance Groundwater Report to NDM.

3.3.7 Retain one copy with Attachment #1 cover sheet for Environmental record.

4 FINAL CONDITIONS

4.1 The Discharge Monitoring Report (paper submission) must be postmarked no later than the 10th of the month.

4.2 The electronic submission version of the discharge monitoring report

4.3 The Quarterly Groundwater Compliance Report must be postmarked no later than the 15th of the month following the reporting period.

5 REFERENCES

5.1 Use References:

5.1.1 Instructions for Completing EPA's Preprinted NPDES DMR Form 3320-1.

5.1.2 Guidelines for Completing DMR

5.1.3 NPDES Permit DMR: Importance of being Accurate

5.1.4 Example of DMR Submittals

5.1.5 MDEQ Waste Management Division Groundwater Permit M00988

5.1.6 Example Groundwater Report Submittal

5.1.7 Electronic Environmental Discharge Monitoring (E2 DMR) System. Facility user's guide.

5.2 Writing References:

5.2.1 Source References:

a. NPDES Permit M0005827

b. Groundwater Discharge Permit M00988

5.2.2 General References

a. None

Collecting and Entering the Data

NOTE: All the data must be entered into the "DMR Daily Monitoring" data sheets found at:
- *S:Drive*
- *NPDES* folder
- *OUTFALLS* folder
- *DAILYmmyy.xls* worksheet

AND
The "Discharge Monitoring Report" data sheets found at:
- *S:Drive*
- *NPDES* folder
- *OUTFALLS* folder
- *FEDmonthyear (FEDJun03)* worksheet

1 DMR Daily Monitoring 001/003 & 002/003 (Unit 1 & Unit 2 Circ. Discharge)

1.1 Thermal Discharge

1.1.1 Engineering (ENSB)—Richard Harris—e-mails a spreadsheet with the data to NPDES Program Coordinator

1.1.2 Enter data into worksheet 12-EA-EMR-501 Data Sheet 6, which can be found electronically at:
- *S:Drive*
- *NPDES* folder
- *Circulating Water Temperature Worksheets* folder
- *Service Water System yy* worksheet

1.2 Temperature Water Intake & Effluent

NOTE: Data is reported monthly, but weekly data download is preferred

NOTE: Local groups must be set up on each individual work station prior to performing this session.

1.2.1 Use "RTIME" data viewer to find temperatures

1.2.1.1 Click on "Trends" block.

1.2.1.2 Select "One Trend Window" section, "12 data points" block.

1.2.1.3 Click on gray boxes on the left side of the screen.

1.2.1.4 Pop up menu will appear.

1.2.1.5 Select "Local Group" for point type.

1.2.1.6 Select "GD_Heat" for Unit 1, "2GD_Heat" for Unit 2.

1.2.1.7 Click the "Add" Button.

1.2.1.8 Select appropriate time range to collect temperature data.

1.2.1.9 Select time span between samples.

1.2.1.10 Right click on the data to export to an Excel File.

1.2.2 Enter data into Excel worksheet found electronically at:

- *S:Drive*
- *NPDES* folder
- *Circulating Water Temperature Worksheets* folder
- *Heat* folder
- *Unit 1/Unit 2* folder
- *CIRCyyyy.XLS* worksheet

1.2.3 If recorder or R Time data viewer is out of service, then Chemistry is required to sample and analyze for temperatures

- Environmental collects 12-THP-6020-ADM-010 D.S.#2, *NPDES Results,* from Chemistry

1.3 Flow

NOTE: The Excel spreadsheet automatically performs all calculations

1.3.1 Thermal Discharge (MBTU/hr), Temperature Water Intake & Effluent (Deg. F), and pump activity are all used in finding the flow number

1.3.2 Use 12-EA-6090-EMR-501, D.S.#5, which is performed once a week to record how many NESW & ESW pumps are running

1.3.3 Enter that data into a spreadsheet, which can be found electronically at:

- *S:Drive*
- *NPDES* folder
- *Circulating Water Temperature Worksheets* folder
- *Service Water System yy* worksheet (EMR-501 Data Sheet 6)

1.3.4 Into the same worksheet (EMR-501 Data Sheet 6), copy and paste Temperatures (can be retrieved from *CIRCyyyyXLS* worksheet) and Thermal Discharge

1.4 pH

1.4.1 This is required once per calendar week

1.4.2 Chemistry performs the test and Environmental collects 12-THP-6020-ADM-010 D.S.#2, *NPDES Results*, from Chemistry
- Data can also be retrieved electronically from WinCDMS:
  - Login into WinCDMS
  - Go to Systems dropdown menu
  - Click on CIRC-D
  - Click on 1 or 2 in Unit dropdown menu

1.4.3 Enter data into Excel worksheet found electronically at:
- *S:Drive*
- *NPDES* folder
- *OUTFALLS* folder
- *Dailymmyy (Daily0603)* worksheet
- Outfall Number 001 or 002.

1.5 Outfall Observation

1.5.1 Outfall Observation is performed by Chemistry

1.5.2 Environmental collects 12-THP-6020-ADM-010 D.S.#2, *NPDES Results*, from Chemistry
- Data can also be retrieved electronically from WinCDMS:
  - Go to System dropdown menu
  - Click on CIRC-D
  - Click on 1 or 2 in Unit dropdown menu

1.5.3 The results are entered directly into the "DMR Daily Monitoring" worksheet
- *S:Drive*
- *NPDES* folder
- *OUTFALLS* folder
- *Dailymmyy (Daily0603)* worksheet
- Outfall Number 001 or 002.

1.6 Continuous (TRO), Intermittent (TRO), and Chlorination Duration

1.6.1 All the information for these categories is collected by Chemistry

1.6.2 Environmental collects 12-THP-6020-CHM-313 D.S.#1, *NPDES TRO Data*, from Chemistry

1.6.3 Continuous (TRO): This data is required once per day. If data is collected more than once per day, the highest concentration is reported

1.6.4 Intermittent (TRO): The average of three evenly spaced samples taken during the intermittent chlorination period is reported

1.6.5 Chlorination Duration: Both Continuous and Intermittent are reported daily.

1.6.6 The three sample records should be entered into the Excel worksheet found electronically at:

- *S:Drive*
- *NPDES* folder
- *OPSHEETS* folder
- *yyyy TRS and TRO data* worksheet

1.6.7 Continuous and Intermittent [TRO] can also be found electronically in WinCDMS:

- Go to System dropdown menu
- Click on CIRC-D
- Click on 1 or 2 in Unit dropdown menu

1.7 Total Heat Discharge

1.7.1 This is the heat given off in water discharged through Unit 1 and Unit 2 Circ Water

1. 7.2 Unit 1 and Unit2's Thermal Discharges are added together in the Excel worksheet:

- *S:Drive*
- *NPDES* folder
- *Circulating Water Temperature Worksheets* folder
- *Service Water System yy* worksheet (EMR-501 Data Sheet 6)

1.8 Boron

NOTE: Boron data is required only when there is a shutdown and ice is being made/melted and drained/pumped/transferred to the #3 or #4 monitoring tanks

1.8.1 Calculate Total Boron using Environmental Guideline NPDES-11.

1.8.2 Log boron values on the datasheet.
- *S:Drive*
- *NPDES* folder
- *OUTFALLS* folder
- *Dailymmyy (Daily0603)* worksheet
- Outfall Number 001 or 002.

2 DMR Daily Monitoring OOA and OOB (Unit 1 and Unit 2 Steam Generator Blowdown Discharge)

2.1 Flow

2.1.1 Data comes in an e-mail from the Environmental Specialist in charge of the Radiological Effluent Programs (Doug Foster)

2.1.2 Data should be entered directly into the "DMR Daily Monitoring" worksheet

2.2 Visual Observation

2.2.1 Environmental collects 12-THP-6020-ADM-010 D.S.#2, *NPDES Results* from Chemistry

2.2.2 Data can also be found electronically in WinCDMS:
- Go to Systems dropdown menu
- Click on FT or SG Comp.
- Click on 1 in Unit dropdown menu

2.2.3 Data should be entered directly into the "DMR Daily Monitoring" worksheet.
- *S:Drive*
- *NPDES* folder
- *OUTFALLS* folder
- *Dailymmyy (Daily0603)* worksheet
- Outfall Number 00A or 00B.

3 DMR Daily Monitoring OOC (Heating Boiler Discharge)

3.1 Flow

NOTE: Flow only required if Heating Boiler is operating AND blowdown is used, or if it is drained to the forebay. If it is drained to the TRS, no flow is required.

3.1.1 Use NPDES-2, "Plant Heating Boiler Flow Calculations"

3.1.2 Retrieve information needed from electronic logbook (Powerview), working copy of 12-OHP-4021-061-001; "Operation of the Plant Heating Boiler," or the Plant Heating Boiler Ops Logbook.

3.1.3 Data should be entered directly into the "DMR Daily Monitoring" worksheet.
- *S:Drive*
- *NPDES* folder
- *OUTFALLS* folder
- *Dailymmyy (Daily0603)* worksheet
- Outfall Number 00C.

3.2 Total Suspended Solids

3.2.1 Environmental collects 12-THP-6020-ADM-010 D.S.#2, *NPDES Results* from Chemistry

3.2.2 Data can also be found electronically in WinCDMS:
- Go to the Systems dropdown menu
- Click on HTGBLR (Run)

3.2.3 Data should be entered directly into the "DMR Daily Monitoring" worksheet
- *S:Drive*
- *NPDES* folder
- *OUTFALLS* folder
- *Dailymmyy (Daily0603)* worksheet
- Outfall Number 00C.

4 DMR Daily Monitoring OOG (Makeup Plant RO Reject)

4.1 Flow

4.1.1 Makeup Plant Operations enters the data into the software eSOMS

4.1.2 Environmental, once a week, retrieves the data from eSOMS, which can be found on Doug Foster's, Scott Rose's, or Blair Zordell's computer. It can also be found on the computer in the Makeup Plant Operations office.

4.1.3 To access the data, enter eSOMS then:

- Close the Tour List window
- Click on the Historical Data icon
- Open the *Unit 12 Tours* folder
- Open the Mup Tour window
- NORTH RO: REJECT "TOTAL" FLOW & SOUTH RO: REJECT "TOTAL" FLOW
- History page

4.1.4 Write down all the day and night shift readings and times on a data sheet for both the North and South RO units

4.1.5 Enter data into Excel worksheet found electronically at:

- *S:Drive*
- *NPDES* folder
- *OPSHEETS* folder
- *RO yyyy* worksheet

NOTE: Data must have been taken within 24(±2) hours of the previous day's data for it to be valid.

4.1.6 Find maximum flow for the week and note the date

- If maximum is in the day shift reading, the date for that reading will be the day previous. If the maximum is in the night shift reading, the date will be as is.

NOTE: Data in eSOMS is recorded as thousands of gallons. The "*RO yyyy*" worksheet is in thousands of gallons/day. The data for the report needs to be converted to millions of gallons/day (MGD).

4.1.7 Enter maximum for each week into the "DMR Daily Monitoring" worksheet

- *S:Drive*
- *NPDES* folder
- *OUTFALLS* folder
- *Dailymmyy (Daily0603)* worksheet
- Outfall Number 00G.

4.2 Total Suspended Solids

4.2.1 Environmental collects 12-THP-6020-ADM-010 D.S.#2, *NPDES Results* from Chemistry

4.2.2 Data can also be found electronically in WinCDMS:
- Go to the Systems dropdown menu
- Click on MUP RO

4.2.3 Data should be entered directly into the "DMR Daily Monitoring" worksheet

5 DMR Daily Monitoring OOH (Turbine Room Sump Emergency Overflow Discharge)

NOTE: This outfall is rarely used.

5.1 Flow

5.1.1 Operations gives Environmental the amount of time TRS discharges

5.1.2 Find amount of gallons per minute the TRS discharged using the minutes discharged and the average flow of the TRS two days before through two days after the discharge.

5.1.3 Data should be entered directly into the "DMR Daily Monitoring" worksheet

5.2 Total Suspended Solids

5.2.1 Environmental collects 12-THP-6020-ADM-010 D.S.#2, *NPDES Results* from Chemistry

5.2.2 Data should be entered directly into the "DMR Daily Monitoring" worksheet

5.3 Oil and Grease

5.3.1 Chemistry samples Turbine Room Sump

5.3.2 Chemistry/Environmental may analyze **or** Environmental sends samples out to contract laboratories (e.g. Dolan AEP Environmental Labs. or General Labs.) for analysis:

A. If Chemistry does analysis, then Environmental collects 12-THP-6020-ADM-010 D.S.#2, *NPDES Results*, from Chemistry

B. Contract laboratory mails/ faxes the results to Environmental

5.3.3 Data should be entered directly into the "DMR Daily Monitoring" worksheet

Cook Nuclear Plant
MDEQ Reporting Summary

Month/Year _____
Groundwater _____
Surface Water _____

Exceedences/Missed Samples:

Outfall/Parameter	Permit Limit	Actual Value	Actual Date

Comments:

Prepared By: _____ Date: _____

Licensed Wastewater Operator: _____ Date: _____

General Supervisor Environmental
(or designee) _____ Date: _____

AMERICAN ELECTRIC POWER AEP: America's Energy Partner	Environmental Affairs Guideline	Number: NPDES-8
Effective Date: 8-12-03	Title: Sampling Ambient Water for Trace Metals at EPA Water Quality Levels	Rev. # 2

Revision Record

Revision 2: Added more detail to remove cooling the samples prior to shipping to the laboratory. Per Dolan Labs, cooling is not required. Marginal markings used.

Originator: Blair Zordell Date: 7-30-03

Approved by: Jon H. Hamm Date: 8-6-03

1 PURPOSE AND SCOPE

1.1 This method is for the collection and filtration of ambient water samples for subsequent determination of total and dissolved metals at the levels listed in Data Sheet 1, Analytical Methods, Metals, and Concentration Levels Applicable to Method 1669. It is designed to support the implementation of water quality monitoring and permitting programs administered under the Clean Water Act.

1.2 This procedure is used in addition to 12-EA-6090-ENV-110, Groundwater Sampling when sampling for low-level metals.

1.3 This method is not intended for determination of metals at concentrations normally found in treated and untreated discharges from industrial facilities. Existing regulations (40 CFR Parts 400-500) typically limit concentrations in industrial discharges to the mid to high part-per-billion (ppb) range, whereas ambient metals concentrations are normally in the low part-per-trillion (ppt) to low ppb range. This guidance is therefore directed at the collection of samples to be measured at or near the levels listed in Data Sheet 1, Analytical Methods, Metals, and Concentration Levels Applicable to Method 1669. Actual concentration ranges to which this guidance is applicable will be dependent on the sample matrix, dilution levels, and other laboratory operating conditions.

1.4 Method 1669 is "performance-based"; i.e., an alternate sampling procedure or technique may be used, so long as neither samples nor blanks are contaminated when following the alternate procedures. Because the only way to measure the performance of the alternate procedures is through the collection and analysis of uncontaminated blank samples in accordance with this guidance and the methods referenced in Data Sheet 1, Analytical Methods, Metals, and Concentration Levels Applicable to Method 1669. It is highly recommended that any modifications be thoroughly evaluated and demonstrated to be effective before field samples are collected. Section 4.3.2 provides additional details on the tests and documentation required to support equivalent performance.

1.5 For dissolved metal determinations, samples must be filtered through a 0.45 µm capsule filter at the field site. The filtered samples may be preserved in the field or transported to the laboratory for preservation.

1.6 The procedures in this method are for use only by personnel thoroughly trained in the collection of samples for determination of metals at ambient water quality control levels.

2 PREREQUISITES

2.1 Summary of Method

2.1.1 Before samples are collected, all sampling equipment and sample containers are cleaned in a laboratory or cleaning facility using detergent, mineral acids, and reagent water as described in the methods referenced in Data Sheet 1, Analytical Methods, Metals, and Concentration Levels Applicable to Method 1669. The laboratory or cleaning facility is responsible for generating an acceptable equipment blank to demonstrate that the sampling equipment and containers are free from trace metals contamination before they are shipped to the field sampling team. An acceptable blank is one that is free from contamination below the minimum level (ML) specified in the referenced analytical method.

NOTE:	EPA has found that, in some cases, it may be possible to empty the weak acid solution from the bottle immediately prior to transport to the field site. In this case, the bottle should be refilled with reagent water.

2.1.2 After cleaning, sample containers are filled with weak acid solution, individually double-bagged, and shipped to the sampling site. All sampling equipment is also bagged for storage or shipment.

2.1.3 The laboratory or cleaning facility must prepare a large carboy or other appropriate clean container filled with reagent water for use with collection of field blanks during sampling activities. The reagent-water-filled container should be shipped to the field site and handled as all other sample containers and sampling equipment. At least one field blank should be processed per site, or one per every ten samples, whichever is more frequent.

2.1.4 Upon arrival at the sampling site, one member of the two-person sampling team is designated as "dirty hands"; the second member is designated as "clean hands". All operations involving contact with the sample bottle and transfer of the sample from the sample collection device to the sample bottle are handled by the individual designated as "clean hands." "Dirty hands" is responsible for preparation of the sampler (except the sample container itself), operation of any machinery, and for all other activities that do not involve direct contact with the sample.

2.1.5 All sampling equipment and sample containers used for metals determinations at or near the levels listed in Data Sheet 1, Analytical Methods, Metals, and Concentration Levels Applicable to Method 1669 must be nonmetallic and free from any material that may contain metals, as practical.

2.1.6 Sampling personnel are required to wear clean, non-talc gloves at all times when handling sampling equipment and sample containers.

2.1.7 In addition to processing field blanks at each site, a field duplicate must be collected at each sampling site, or one field duplicate per every 5 samples, whichever is more frequent. Section 4.3 gives a complete description of quality control requirements.

2.1.8 Sampling.

a. Whenever possible, samples are collected facing upstream and upwind to minimize introduction of contamination.

b. Samples may be collected while working from a boat or while on land.

2.1.9 Samples for dissolved metals are filtered through a 0.45 µm capsule filter at the field site. After filtering, the samples are double-bagged. Sample containers are shipped to the analytical laboratory. The sampling equipment is shipped to the laboratory or cleaning facility for recleaning.

2.1.10 Sampling activities must be documented through paper or computerized sample tracking systems. Use appropriate chain of custody forms and NPDES sample logbook.

2.2 Apparatus and Materials

NOTE:	Brand names, suppliers, and part numbers are for illustration only and no endorsement is implied. Equivalent performance may be achieved using apparatus and materials other than those specified here. Meeting the performance requirements of this method is the responsibility of the sampling team and laboratory.

2.2.1 All sampling equipment and sample containers used in this procedure have been cleaned at the laboratory, and are ready for sampling.

2.2.2 Materials such as gloves, storage bags, and plastic wrap, may be used new without additional cleaning unless the results of the equipment blank pinpoint any of these materials as a source of contamination. In this case, either a different supplier must be obtained or the materials must be cleaned.

2.2.3 Sample bottles – fluoropolymer (FEP. PTFE), conventional or linear polyethylene, polycarbonate, or polypropylene; 500 mL or 1 L with lids. If mercury is a target analyte, fluoropolymer or glass bottles should be used.

2.2.4 Gloves – clean, non-talc polyethylene, latex, vinyl, or PVC; various lengths. Shoulder-length gloves are needed if samples are to be collected by direct submersion of the sample bottle into the water.

a. Gloves, shoulder-length polyethylene – Associated Bag Co., Milwaukee, VI, 66-3-301, or equivalent.

b. Gloves, PVC – Fisher Scientific Part No. 11-394-100B, or equivalent.

2.2.5 Storage bags – clean, zip-type, nonvented, colorless polyethylene (various sizes).

2.2.6 Plastic wrap – clean, colorless polyethylene.

2.2.7 Ice or chemical refrigerant packs – to keep samples chilled in the cooler during shipment if required by contract lab.

2.2.8 Wind suit – pamida, or equivalent.

a. An unlined, long-sleeved wind suit consisting of pants and jacket, or a paper lab coat, constructed of nylon or other synthetic fiber is worn when sampling for mercury to prevent mercury adsorbed onto cotton or other clothing materials from contaminating samples.

3 PRECAUTIONS AND LIMITATIONS

3.1 Contamination and Interferences.

3.1.1 Contamination Problems in trace metals analysis.

a. Preventing ambient water samples from becoming contaminated during the sampling and analytical process is the greatest challenge faced in trace metals determinations. In recent years, it has been shown that much of the historical trace metals data collected in ambient water are erroneously high because the concentrations reflect contamination from sampling and analysis rather than ambient levels. Therefore, it is imperative that extreme care be taken to avoid contamination when collecting and analyzing ambient water samples for trace metals.

b. There are numerous routes by which samples may be contaminated. Potential sources of trace metals contamination during sampling include metallic or metal-containing sampling equipment, containers, labware (e.g. talc gloves that contain high levels of zinc), reagents, and deionized water; improperly cleaned and stored equipment, labware, and reagents; and atmospheric inputs such as dirt and dust from automobile exhaust, cigarette smoke, nearby roads, bridges, wires, and poles. Even human contact can be a source of trace metals contamination. For example, it has been demonstrated that dental work (e.g., mercury amalgam fillings) in the mouths of laboratory personnel can contaminate samples that are directly exposed to exhalation.

3.2 Contamination Control.

3.2.1 Philosophy – The philosophy behind contamination control is to ensure that any object or substance that contacts the sample is nonmetallic and free from any material that may contain metals of concern.

3.2.2 Avoiding contamination – The best way to control contamination is to completely avoid exposure of the sample and Apparatus to contamination in the first place. Avoiding exposure means performing operations in an area known to be free from contamination. Two of the most important factors in avoiding/reducing sample contamination are (1) an awareness of potential sources of contamination and (2) strict attention to work being performed. Therefore, it is imperative that the procedures described in this method be carried out by well trained, experienced personnel. Documentation of training should be kept on file and readily available for review.

a. Minimize exposure – The Apparatus that will contact samples or blanks should only be opened or exposed in a clean room, clean bench, glove box, or clean plastic bag, so that exposure to atmospheric inputs is minimized. When not being used, the Apparatus should be covered with clean plastic wrap, stored in the clean bench or in a plastic box or glove box, or bagged in clean, colorless zip-type bags. Minimizing the time between cleaning and use will also reduce contamination.

b. Wear gloves – Sampling personnel must wear clean, non-talc gloves during all operations involving handling of the Apparatus, samples, and blanks. Only clean gloves may touch the Apparatus. If another object or substance is touched, the glove(s) must be changed before again handling the Apparatus. If it is even suspected that gloves have become contaminated, work must be halted, the contaminated gloves removed, and a new pair of clean gloves put on. Wearing multiple layers of clean gloves will allow the old pair to be quickly stripped with minimal disruption to the work activity.

c. Use metal-free Apparatus – All Apparatus used for metals determinations at the levels listed in Data Sheet 1, Analytical Methods, Metals, and Concentration Levels Applicable to Method 1669 must be nonmetallic and free of material that may contain metals. When it is not possible to obtain equipment that is completely free of the metal(s) of interest, the sample should not come into direct contact with the equipment.

1. Construction materials – Only the following materials should come in contact with samples: fluoropolymer (FEP, PTFE), conventional or linear polyethylene, polycarbonate, polysulfone, polypropylene, or ultrapure quartz. PTFE is less desirable that FEP because the sintered material in PTFE may contain contaminants and is susceptible to serious memory effects. Fluoropolymer or glass containers should be used for samples that will be analyzed for mercury because mercury vapors can diffuse in or out of other materials, resulting either in contamination or low-biased results. Metal must not be used under any circumstance.

2. The following materials have been found to contain trace metals and must not be used to hold liquids that come in contact with the sample or must not contact the sample, unless these materials have been shown to be free of the metals of interest at the desired level: Pyrex, Kimax, methacrylate, polyvinylchloride, nylon, and Vycor. In addition, highly colored plastics, paper cap liners, pigments used to mark increments on plastics, and rubber all contain trace levels of metals and must be avoided.

3. The Apparatus should be clean when the sampling team receives it. If there are any indications that the Apparatus is not clean (e.g., a ripped storage bag), an assessment of the likelihood of contamination must be made. Sampling must not proceed if it is possible that the Apparatus is contaminated. If the Apparatus is contaminated, it must be returned to the laboratory or cleaning facility for proper cleaning before any sampling activity resumes.

d. Avoid sources of contamination – Avoid contamination by being aware of potential sources and routes of contamination.

1. Contamination by indirect contact – Apparatus that may not directly contact samples may still be a source of contamination. For example, clean tubing placed in a dirty plastic bag may pick up contamination from the bag and subsequently transfer the contamination to the sample. Shared equipment and sampling tubing must be cleaned prior to use.

2. Contamination by airborne particulate matter – Less obvious substances capable of contaminating samples include airborne particles. Samples may be contaminated by airborne dust, dirt, particulate matter, or vapors from automobile exhaust; cigarette smoke; nearby corroded or rusted bridges, pipes, poles, or wires; nearby roads; and even human breath. Whenever possible, the sampling activity should occur as far as possible from sources of airborne contamination. Areas where nearby soil is bare and subject to wind erosion should be avoided.

4 DETAILS

4.1 Sampling

4.1.1 Sample Collection Procedure – Before collecting ambient water samples, consideration should be given to the type of sample to be collected, the amount of sample needed, and the devices to be used (grab, surface, or subsurface samplers). Sufficient sample volume should be collected to allow for necessary quality control analyses, such as matrix spike/matrix spike duplicate analyses.

a. All operations involving contact with the sample bottle and with transfer of the sample from the sample collection device to the sample bottle (if the sample is not directly collected in the bottle) are handled by the individual designated as "clean hands." "Dirty hands" is responsible for all activities that do not involve direct contact with the sample.

- Although the duties of "clean hands" and "dirty hands" would appear to be a logical separation of responsibilities, in fact, the completion of the entire protocol may require a good deal of coordination and practice. For example, "dirty hands" must open the suitable container containing the sample bottle and unzip the outer bag; clean hands must reach into the outer bag, open the inner bag, remove the bottle, collect the sample, replace the bottle lid, put the bottle back into the inner bag, and zip the inner bag. "Dirty hands" must close the outer bag and place it in a suitable container.

- To minimize unnecessary confusion, it is recommended that a third team member be available to complete the necessary sample documentation (e.g., to document sampling location, time, sample number, etc). Otherwise, "dirty hands" must perform the sample documentation activity.

b. Extreme care must be taken during all sampling operations to minimize exposure of the sample to human, atmospheric, and other sources of contamination. Care must be taken to avoid breathing directly on the sample, and whenever possible, the sample bottle should be opened, filled, and closed while submerged.

c. Manual collection of surface samples directly into the sample bottle.

1. At the site, all sampling personnel must put on clean gloves before commencing sample collection activity. If samples are to be analyzed for mercury, the sampling team must also put on their wind suits, or lab coats at this time.

2. If the sample is to be filtered, "clean hands" installs the filter at the end of the tubing, and "dirty hands" sets up the filter support as required.

3. "Dirty hands" must open the cooler or storage container, remove the double-bagged sample bottle from storage, and unzip the outer bag.

4. "Clean hands" opens the inside bag containing the sample bottle, removes the bottle, and reseals the inside bag. Dirty hands then reseals the outer bag.

5. "Clean hands" unscrews the cap and, while holding the cap upside down discards the dilute acid solution (if necessary) from the bottle into a carboy for wastes or discards the reagent water directly onto the ground.

6. "Clean hands" then starts to fill the sample bottle, and allows the bottle to partially fill with sample. "Clean hands" screws the cap on the bottle, shakes the bottle several times, and empties the rinsate away from the site. After two more rinsings, "clean hands" holds the bottle under water and allows bottle to fill (within 1" of top) with sample. After the bottle has filled, "clean hands" replaces the cap of the bottle. In this way, the sample has never contacted the air.

7. Once the bottle cap has been replaced, "dirty hands" reopens the outer plastic bag, and "clean hands" opens the inside bag, places the bottle inside it, and zips the inner bag.

8. "Dirty hands" zips the outer bag, and places the double bagged sample bottle into a clean container for shipment to the laboratory.

9. Documentation – After each sample is collected, the sample number is documented in the sampling log, and any unusual observations concerning the sample and the sampling are documented.

4.2 Preservation.

4.2.1 Ship (rush) the samples to a qualified laboratory. The laboratory will add the necessary preservative to the samples within 48 hours of sample time.

4.3 Quality Assurance/Quality Control

4.3.1 The sampling team shall employ a strict quality assurance/quality control (QA/QC) program. The minimum requirements of this program include the collection of field blanks, and field replicates.

4.3.2 Field blank.

a. To demonstrate that sample contamination has not occurred during field sampling and sample processing, at least one field blank must be generated for every 10 samples that are collected at a given site. Field blanks are collected before sample collection.

b. Field blanks are generated by filling a large carboy or other appropriate container with reagent water in the laboratory, transporting the filled container to the sampling site, processing the water through each of the sample processing steps and equipment (e.g., tubing, sampling devices, filters, etc.) that will be used in the field, collecting the field blank in one of the sample bottles, and shipping the bottle to the laboratory for analysis in accordance with the method(s) referenced in Data Sheet 1, Analytical Methods, Metals, and Concentration Levels Applicable to Method 1669.

4.3.3 Field duplicate.

a. To assess the precision of the field sampling and analytical processes, at least one field duplicate sample must be collected for every 5 samples that are collected at a given site.

b. The field duplicate is collected by collecting two samples in rapid succession.

5 CORRECTIVE MEASURES

5.1 None

6 FINAL CONDITIONS

6.1 None

7 REFERENCES

7.1 Use References:

7.1.1 None

7.2 Writing References:

7.2.1 Source References:

a. USEPA Method 1669, Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels

7.2.2 General References

a. 12-EA-6090.ENV.110, Groundwater Sampling

ANALYTICAL METHODS, METALS, AND CONCENTRATION LEVELS APPLICABLE TO METHOD 1669

Method	Technique	Metal	MDL (ppb)[1]	ML (ppb)[2]
1631	Oxidation/Purge & Trap/CVAFS	Mercury	0.0002	0.0005
1632	Hydride AA	Arsenic	0.003	0.01
1636	Ion Chromatography	Hexavalent Chromium	0.23	0.5
1637	CC/STGFAA	Cadmium	0.0075	0.02
		Lead	0.036	0.1
1638	ICP/MS	Antimony	0.0097	0.02
		Cadmium	0.013	0.1
		Copper	0.087	0.2
		Lead	0.015	0.05
		Nickel	0.33	1
		Selenium	0.45	1
		Silver	0.029	0.1
		Thallium	0.0079	0.02
		Zinc	0.14	0.5
1639	STGFAA	Antimony	1.9	5
		Cadmium	0.023	0.05
		Trivalent	0.10	0.2
		Chromium		
		Nickel	0.65	2
		Selenium	0.83	2
		Zinc	0.14	0.5
1640	CC/ICP/MS	Cadmium	0.0024	0.01
		Copper	0.024	0.1
		Lead	0.0081	0.02
		Nickel	0.029	0.1

[1]Method Detection Limit as determined by 40 CFR Part 136, Appendix B.
[2]Minimum Level (ML) calculated by multiplying laboratory-determined MDL by 3.18 and rounding result to nearest multiple of 1, 2, 5, 10, 20, 50, etc., in accordance with procedures used by EAD and described in the *EPA Draft National Guidance for the Permitting, Monitoring, and Enforcement of Water Quality-Based Effluent Limitations Set Below Analytical Detection/Quantitation Levels*, March 22, 1994.

AMERICAN ELECTRIC POWER AEP: America's Energy Partner	**Environmental** **Guideline**	Number: NPDES-12 Page 1 of 7
Effective Date: 3/23/06	Title: Portable Dissolved Oxygen Analyzer	**Rev. # 0**

Revision #0: Initial Issue

Originator: Blair Zordell Date: 3-15-06

Approved by: Date: 3-16-06

1 PURPOSE AND SCOPE

1.1 To provide instruction for the calibration, operation, and maintenance of the YSI model 550A dissolved oxygen analyzer.

2 DEFINITIONS AND ABBREVIATIONS

Term	Meaning
MDEQ	Michigan Department of Environmental Quality
NPDES	National Pollutant Discharge Elimination System
DO	Dissolved Oxygen

3 DETAILS

3.1 Preparing the probe

3.1.1 Install the Membrane cap

a. Remove the probe sensor guard to access probe tip

b. Unscrew and remove the old membrane cap and discard.

c. Thoroughly rise the sensor tip with DI water

d. Fill a new membrane cap with O2 probe solution that has been prepared according to the directions on the bottle.

CAUTION: Be very careful not to touch the membrane surface. Lightly tap the side of the membrane cap to release bubble that may be trapped.

e. Thread the membrane cap onto the probe. It is normal for a small amount of electrolyte to overflow.

f. Replace the probe sensor guard.

3.1.2 Membrane Maintenance

NOTE:	Additional membrane changes will be required over time. The average replacement interval is 4 -8 weeks, although they may last longer if kept clean.

a. Use a clean lint-free cloth and isopropanol to remove surface contamination.

b. Refer to YSI 550A manual for electrode maintenance.

3.2 Dissolved Oxygen calibration

CAUTION:	Dissolved oxygen calibration must be done in an environment with known oxygen content. The YSI 550A DO instrument can be calibrated in either mg/l or % saturation.

3.2.1 Ensure that the sponge inside the instrument's calibration chamber is moist.

3.2.2 Insert the probe into the calibration chamber.

3.2.3 Power the instrument on and allow the readings to stabilize. This may take 5 – 15 minutes.

3.2.4 Press and release both the **UP ARROW** and **DOWN ARROW** keys at the same time to enter the calibration menu.

3.2.5 Press the **Mode** key until "%" is displayed on the right side of the screen for oxygen units.

3.2.6 Press **ENTER.**

3.2.7 The LCD will prompt you to enter the local altitude in hundreds of feet. Use arrow keys to increase of decrease the altitude to read "6", for 600 feet.

3.2.8 Press ENTER

3.2.9 **CAL** will now display in the lower left corner of the screen, the calibration value in the lower right corner and the current DO reading (before Calibration) will be the main display.

3.2.10 Allow the DO reading to stabilize.

3.2.11 Press **ENTER**.

3.2.12 The LCD will prompt you to enter the approximate salinity of the water.

3.2.13 Use the arrow keys to increase or decrease the salinity setting to zero parts per thousand (PPT)

3.2.14 Press **ENTER**

3.3 Calibration in MG/L

3.3.1 Power the instrument on and allow readings to stabilize. This may take 5 – 15 minutes.

3.3.2 Place the probe in a solution with a known mg/L reading.

3.3.3 Continuously stir or move the probe through the sample at a rate of at least ½ foot per second during the calibration process.

3.3.4 Press and release both the **UP ARROW** and **DOWN ARROW** keys at the same time to enter the calibration menu.

3.3.5 Press the **Mode** key until "mg/L" is displayed on the right side of the screen for oxygen units.

3.3.6 Press **ENTER**.

3.3.7 **CAL** will now display in the lower left corner of the screen and the current DO reading (before calibration) will be on the main display.

3.3.8 Allow the reading to stabilize.

3.3.9 Once the reading is stable, use the up and down arrow keys to select the mg/L value of the known solution.

3.3.10 Press **ENTER**.

3.3.11 The LCD will prompt you to enter the approximate salinity of the water.

3.3.12 Use the arrow keys to increase or decrease the salinity setting to zero parts per thousand (PPT)

3.3.13 Press **ENTER**

3.4 Probe operation

NOTE:	It is important to recognize that a very small amount of oxygen dissolved in the sample is consumed during probe operation. It is therefore essential that the sample be continuously stirred at the sensor tip. If stagnation occurs, measurements will appear artificially low. Stirring may be accomplished by mechanically moving the sample around the probe tip, or by moving the probe through the sample.

3.5 Measurement procedure

3.5.1 Insert the probe into the sample to be measured.

3.5.2 Continuously stir or move the probe through the sample.

3.5.3 Allow temperature and dissolved oxygen readings to stabilize.

3.5.4 Record readings.

3.5.5 Rinse probe with clean water after each use.

4 FINAL CONDITIONS

4.1 Probe is stored in the calibration/storage chamber with the moistened sponge.

5 REFERENCES

5.1 Use References:

5.1.1 YSI Model 550A owner's manual.

5.2 Writing References:

5.2.1 Source References:

a. YSI Model 550 owner's manual.

5.2.2 General References

a. MDEQ Groundwater Discharge permit M00988.

Troubleshooting Guide

Symptom	Possible Solution
1. Instrument will not turn on, LCD Displays "LO BAT", or Main display flashes "OFF".	A. Low battery voltage, replace batteries. B. Batteries installed incorrectly, check battery polarity. C. Return system for service.
2. Instrument will not calibrate.	A. Replace membrane and electrolyte. B. Clean probe electrodes. C. Return system for service
3. Instrument "locks up".	A. Remove batteries, wait 15 seconds for reset, replace batteries B. Replace batteries C. Return system for service
4. Instrument readings are inaccurate	A. Verify calibration altitude and salinity settings are correct and recalibrate. B. Probe may not have been in 100% water saturated air during calibration procedure. Moisten sponge in calibration chamber and recalibrate. C. Replace membrane and electrolyte. D. Clean probe electrodes. E. Return system for service.
5. Main display reads "Over" or "Undr"	A. Sample O2 concentration is more than 60 mg/L or 500%, or less than -0.02 mg/or -0.3%. B. Verify calibration altitude and salinity settings are correct and recalibrate. C. Replace membrane and electrolyte. Recalibrate. D. Clean probe electrodes. E. Return system for service.
6. Main display reads "Over" or "Undr" during calibrations.	A. Replace membrane and electrolyte. B. Clean probe electrodes. C. Return system for service
7. Secondary display reads "Ovr" or "Undr"	A. Sample temperature is less than -5° C (23° F) or more than +45° C (122° F). Increase or decrease the sample temperature to bring within the allowable range. B. Return system for service.
8. Main display reads "Err" and Secondary display reads "RO", "RA", or "AdC".	A. Return system for service
9. Main display reads "Err" or "burn" and Secondary display reads "EEP"	A. Return system for service.

REVIEW AND APPROVAL TRACKING FORM

Section 1 - Procedure Information:

Number: 12-EA-6090-ENV-110 Rev. 01

Title: Groundwater Sampling

Section 2 – Alteration Category:

☒ Minor Editorial Correction
☐ Major Editorial Correction (Full Review)
☐ Minor Revision
☐ Major Revision (Full Review)
☐ Cancellation
☐ Superseded by (list superseding procedures):
☐ New Procedure (Full Review)

Section 3 – Temporary Procedure / Revision:

☒ N/A ☐ Temporary Procedure ☐ Temporary Revision AR No.:

Expiration Date / Ending Activity: N/A

Section 4 – Associated Configuration Impact Assessments:

Change Driver / CDI Tracking No(s). ☒ N/A

Section 5 - Reviews:

Department (Refer to Figure 6, Determination of Required Reviews)	Validation (Figure 11)	Cross-Discipline (Figure 7)	Special (Figure 8 or Figure 10)	Technical (Figure 9)
Environmental	☐	☐	☐	☒
	☐	☐	☐	☐
	☐	☐	☐	☐
	☐	☐	☐	☐
	☐	☐	☐	☐
	☐	☐	☐	☐

Section 6 – Technical Review:

Updated Revision Summary and Implementation Plan (if applicable) attached? ☒ Yes

Implementation Plan developed? If yes, AR No.: ☐ Yes ☒ N/A

Are there implementation actions to be completed prior to the effective date? ☐ Yes ☒ No

10 CFR 50 59 Requirements complete? Tracking No.: ☐ Yes ☒ N/A

Technical Reviewer: Jon H. Hamer / Jon H. Hamer Date: 9-7-05

Section 7 – Ready for Approval:

Administrative Hold Status: ☐ Released ☐ Reissued ☒ N/A CR No.:

Writer: Blair Grubell / Marcia L. Stirling Date: 9-7-2005

☐ Ops Manager Concurrence: N/A Date:

Section 8 – Approvals:

PORC Review Required: ☐ Yes ☒ No Mtg No.:

Approval Authority Review/Approval: Date: 9-8-05

Effective Date 9-14-05

Section 9 – Follow-up Actions:

Commitment Database update requested in accordance with PMP-2350-CMS-001? ☐ Yes ☒ N/A

NDM notified of new records or changes to records that could affect record retention? ☐ Yes ☒ N/A

NDM Use Only		***Office Information For Form Tracking Only – Not Part of Form***
		This form is derived from the information in PMP-2010-PRC-002, Procedure Alteration, Review, and Approval, Rev. 17, Data Sheet 1, Review and Approval Tracking Form. Page 1 of 3

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REVISION SUMMARY

Number: 12-EA-6090-ENV-110 Revision: 01

Title: Groundwater sampling

Alteration	Justification
Global	Formatted procedure to comply with PMP-2010-PRC-002, and PMP-2010-PRC-001.
Step 2.1.1 (b)	Rewrote step, Correction criteria e.
Step 2.1.1 (c): Added "New" at the start of the step. Separated bottle cleanliness requirements from equipment cleanliness issues. (New step2.1.2, renumbered remaining steps)	clarify that new sample bottles do not need to be cleaned and rinsed. Provide clarification on what is a bottle cleanliness criteria, and what is an equipment cleanliness criteria. Correction criteria q
Step 2.1.1 (d) added more detail to step	To specify what type of water to rinse equipment with. Correction criteria q
Step 2.1.2 (h): Removed acceptable range for filters.	Reference 7.1.3 and 7.1.4 no longer specify a range size for filters. They require 0.45 micron size only. Correction criteria q
Step 2.1.2 (p): Included the use of ice in addition to ice packs.	Commercial ice packs are allowed to be used, in addition to bags of ice. Correction criteria q
Step 2.2.1: Rewrote step.	To comply with PMP-2010-PRC-002. Correction Criteria j.
Step 3.1.2: Rewrote step	To comply with PMP-2010-PRC-002. Correction Criteria j.
Step 3.1 2 (a) Rewrote step	To comply with PMP-2010-PRC-002. Correction Criteria j.
Step 3.1.3 Rewrote step, Removed redundant step to rinse bottles with acid	To comply with PMP-2010-PRC-002. Correction Criteria j, and p.
Step 4 1.1: Split step into single action sentences. Corrected spelling of "using", changed "Find" to "Determine"	Sentence structure. Correction Criteria a. Corrected typographical error. Correction Criteria f.
Step 4.1.2 (c): Rewrote step	Sentence structure. Correction Criteria a.
Step 4 1.3 Added clarifying note prior to step	To ensure the proper cleaning method is used for the level instrument prior to insertion into the well. Correction criteria p.
Step 4.2 15 Removed acceptable range for filters.	Reference 7.1 3 and 7 1.4 no longer specify a range size for filters. They require 0.45 micron size only Correction criteria q.

REVISION SUMMARY

Number. **12-EA-6090-ENV-110** Revision: **01**

Title: **Groundwater sampling**

Alteration	Justification
Step 4 2.16, 4.3.9, 4.2.12: Renamed responsible person referenced as "NPDES engineer, Env Engineer" to "ENV Specialist."	Consistency in the procedure. Correction criteria L.
Step 4.2.22: Added additional reference.	Sur-1 data sheet 5 is equivalent to 12 THP 6020 ADM.010 Attachment #2. Correction Criteria n
Step 4.3.1: Rewrote step	To comply with PMP-2010-PRC-002. Correction Criteria j,
Step 4.3 4: Included the use of ice in addition to ice packs.	Commercial ice packs are allowed to be used, in addition to bags of ice. Correction criteria q
Step 7.1.4: Formatted procedure number.	To agree with current procedure requirement. Correction criteria j.
Step 7.1.5: Added additional reference.	Sur-1 data sheet 5 is equivalent to 12 THP 6020 ADM.010 Attachment #2. Correction Criteria n
Step 7.2 1: Updated reference	To agree with current permit issue. Correction Criteria n.

TABLE OF CONTENTS

1 PURPOSE AND SCOPE

1.1 The purpose of this procedure is to provide direction for sampling groundwater wells used to meet National Pollutant Discharge Elimination System (NPDES) Permit, and groundwater permit monitoring requirements.

1.2 This procedure applies to:

- Current NPDES Permit #MI0005827
- Groundwater Discharge Authorization #M00988
- Appendix B Technical Specifications

1.2.1 Steps in this procedure may be performed in any order (unless noted) or omitted in part or entirely, as long as the objective of the procedure is satisfactorily met.

1.3 Definitions.

1.3.1 NPDES – National Pollutant Discharge Elimination System.

1.3.2 MDEQ – Michigan Department of Environmental Quality.

1.3.3 Metals – MDEQ required parameter for *groundwater* reporting. The procedure for obtaining a metals sample for groundwater compliance is to filter the sample prior to preservation at the well site.

2 PREREQUISITES

2.1 Apparatus/Tools

2.1.1 All equipment that will be inserted into the well shall be:

a. Pre-calibrated (if calibration of equipment is required).

b. Constructed of inert materials.

c. Thoroughly cleaned and rinsed with demin water after each use.

2.1.2 Sample bottles shall be new or thoroughly cleaned and rinsed per step 3.1.3 of this procedure before use.

2.1.3 The following equipment is required to successfully perform the task of sampling:

a. Sample containers with labels (the contracted analytical laboratory normally provides these except for pH and conductivity).

b. Sample logbook (entries are to be made in the NPDES Logbook which is located in the cognizant Environmental Specialist's office).

c. Tape measure, if needed for static water level.

d. Electronic static water level instrument.

e. Time keeping device for recording sample time and for checking purge times.

f. Wrench for removing pipe caps.

g. Sample extension tube for Redi-flow wells.

h. 0.45 micron filters (polycarbonate or cellulose acetate).

i. Electrical tape.

j. Portable pH meter (calibrated with a temperature probe). Verify calibration approximately 1 day before use.

k. Conductivity meter.

l. Phillips screwdriver.

m. 100 feet of extension power cord.

n. 1 Liter or 1 gallon container for flow rate calculation.

o. Absorbent material to wipe sample bottles.

p. Ice packs or ice if shipping samples to contract laboratory.

2.1.4 Appropriate keys for all wells, static level pipes, and gates as specified in Attachment 1, Well Water Access, Purge & Well Elevation Sheet.

2.2 Reagents

2.2.1 **IF** preservatives are not provided by the vendor, **THEN** add preservatives as required in Reference 7.1.2 and 7.1.3.

2.3 Training

2.3.1 Transformer Switchyard training or a qualified escort is required for entry into the Transformer Switchyards.

3 PRECAUTIONS AND LIMITATIONS

3.1 Interferences and Sample Quality

3.1.1 Static water level measurements must be taken a minimum of 24 hours after sampling pumps have been operated, to allow for recharge of the monitoring well.

3.1.2 Purge all groundwater wells to satisfy regulatory requirements as specified in Attachment 1, Well Water Access, Purge & Well Elevation Sheet. This is to ensure that a representative sample is obtained. Additional purge time may be necessary if the groundwater is not visibly clean.

a. **IF** groundwater well is equipped with Redi Flo2 electric pump, **THEN** purge a minimum of ten minutes (to include required three well volume purge time) to maintain pump efficiency.

3.1.3 **IF** vendor supplied sample containers are not used, **THEN** glassware and vessels shall be either new or carefully cleaned and rinsed with deionized water to prevent contamination.

- Clean sample bottles carefully before each use.

NOTE:	Use only new bottles for chromium or manganese analysis.

- Used bottle prep acceptable rinse solutions:
  - Add 1 liter concentrated H_2SO_4 slowly, while stirring, to 35 ml saturated sodium dichromate solution.
  - 2% $KMnO_4$ in 5% KOH solution followed by an oxalic acid solution.

- Commercial alternative such as NoChromix.

- Clean plastic bottles with either detergents or concentrated HCl.

- After the bottles have been cleaned, rinse thoroughly with reagent grade water.

3.1.4 Sample shall be analyzed or shipped to meet the holding times listed in references 7.1.2 and 7.1.3. Conductivity and pH analyses should be performed within 15 minutes of sampling.

3.1.5 Sampling shall occur to ensure sample shipments and analysis can be performed to meet associated hold times.

4 DETAILS

4.1 Static Water Level Measurements

CAUTION: Water level measurements are to be made under static conditions prior to pumping for sample collection.

4.1.1 Remove pipe plug at the top of the static pipe.

a. **IF** cap is locked, **THEN** unlock cap using the key log on Attachment 1, Well Water Access, Purge & Well Elevation Sheet to determine the appropriate key.

4.1.2 **IF** using an electronic measuring device, **THEN** ensure the following steps are performed.

a. Turn unit on.

b. Test unit by depressing the test button.

c. Audible signal will sound if it is operating properly.

NOTE:	Probe must be rinsed with demin water prior to use.

4.1.3 Insert the measuring instrument probe or test chain into the well until indicator sounds indicating contact with water.

4.1.4 For instruments with measurement scales provided, read and record the measurement directly into the sample log book.

4.1.5 **IF** a direct measurement is not provided, **THEN** mark the exact point on the instrument tape that is level with the top of the casing.

4.1.6 Partially remove the instrument tape from the casing as necessary.

4.1.7 Measure the distance to the nearest 0.01 foot mark on the instrument to the casing height marked on the tape.

4.1.8 Record the total depth of the well to the nearest 0.01 ft. in the sample log book.

4.1.9 Withdraw measuring equipment from well and remove.

4.1.10 Ensure cap vent path exists before closing.

4.1.11 Replace pipe plug and lock if not obtaining samples.

4.2 Obtaining Samples From Wells

4.2.1 Attach the sample extension tube to the well outlet.

4.2.2 Check the speed dial knob is turned down to zero.

4.2.3 Plug the power cord of the converter into power source.

4.2.4 Check the frequency display on the front of the converter ensure that it reads "0"

4.2.5 **IF** the frequency display does not read "0" **THEN** refer to the troubleshooting table in the Redi-Flo2 Installation and Operating Instruction Manual.

4.2.6 Connect the converter to the well ensuring that the clasp is firmly seated.

4.2.7 Start the pump by depressing the Start/Stop switch.

CAUTION: Excessive pump rates could overload the pump and trip the circuit breaker.

4.2.8 Start pump motor by increasing speed dial until desired purge rate is achieved.

NOTE: All pumps shall be operated for a minimum of ten minutes to maintain the pumps' efficiency.

4.2.9 Measure the purge rate of the well sample stream.

4.2.10 Calculate the time needed to meet the minimum purge volumes listed in Attachment 1, Well Water Access, Purge & Well Elevation Sheet.

4.2.11 Pump for at least the amount of time calculated in step 4.2.10, to ensure a representative sample is collected, or ten minutes whichever is longer.

4.2.12 **IF** the sample container(s) are not pretreated with preservatives, or indicated otherwise, **THEN** rinse the untreated container(s) three times with the water to be sampled.

NOTE: Care should be taken to control rate of flow into the sample container to prevent aspiration and the introduction of any air.

4.2.13 Reduce flow sufficient enough to prevent aspiration in the sample container and meet EPA sampling methodology requirements.

a. Approximately 100 ml/min when sampling for volatile constituents.

4.2.14 The pH and/or conductivity sample should be obtained first and analyzed within 15 minutes.

CAUTION: DO NOT collect sample into a container with preservatives prior to filtering. This will cause inaccurate reporting results.

4.2.15 Filter sample water for metal analysis through a 0.45 micron filter into sample containers containing appropriate preservatives at time of collection. A dedicated filter shall be used for each well, or a new filter can also be used.

NOTE: Each sample bottle should be used for a particular analysis. It is important to ensure that each bottle be rinsed or not rinsed if needed according to the analysis performed. Certain analyses require zero head space in the sample bottle, while others require 1" of head space. Contact the Environmental Specialist, vendor supplied instructions, or reference 7.1.2 or 7.1.3 for guidance.

4.2.16 Fill the appropriate number and types of containers required for analysis as specified by the permits issued by the State of Michigan.

4.2.17 Stop flow by depressing the Start/Stop switch.

4.2.18 Disconnect the converter from the well.

4.2.19 Replace the protective cap to the converter connection on the well, if needed.

4.2.20 Disconnect power from the converter.

4.2.21 Close and lock the well cap.

4.2.22 Complete the data sheet for each well as applicable. The data sheets used must comply with the current NPDES Permit, or Groundwater permit requirements as applicable. The following data sheets are acceptable to use:

a. 12-THP-6020-ADM-010, Analytical Results, Data Sheet 2, NPDES Results.

b. SUR-1, Environmental Surveillance Guideline, Data Sheet 5, NPDES Results.

4.3 Sample Packaging and Shipping

4.3.1 Ship all samples within the specified hold time. Sample must be shipped immediately as appropriate to ensure analysis start time does not exceed hold time and temperature requirements are met.

4.3.2 Complete the Chain of Custody Record. Grouping identical sample containers from the same well on one line is acceptable.

4.3.3 Label all containers with the following information.

a. Date and time of collection.

b. Location and/or well number.

c. Sample number, if applicable.

d. Cook Nuclear Plant – American Electric Power (if a contracted analytical lab is used).

e. Analysis required.

4.3.4 Place sample containers, ice packs, or ice in an appropriate shipping container.

4.3.5 Place enough packing material around the sample containers to prevent breakage.

4.3.6 Securely tape the shipping container closed to prevent tampering.

4.3.7 Deliver the shipping container and Chain of Custody Record to Shipping and Receiving.

4.3.8 Complete a Shipping Memorandum and designate as "Rush", Next Day under shipping priority.

4.3.9 Make a copy of Shipping Memorandum and Chain of Custody form and forward to the cognizant Environmental Specialist.

5 CORRECTIVE MEASURES

5.1 None.

6 FINAL CONDITIONS

6.1 The Environmental Section Cognizant Environmental Specialist and Supervisor have been informed of any samples that could not be collected.

6.2 Ensure that all samples:

6.2.1 Have been collected.

6.2.2 Are ready for shipment and/or analysis.

6.3 Sample points have been returned to normal status (valves closed, wells and gates locked) and sampling equipment has been returned to proper storage.

6.4 Static water measurement date and sample times have been recorded in the NPDES Logbook.

6.5 Environmental sampling equipment has been decontaminated, cleaned and repaired if necessary.

6.6 The NPDES Logbook has the required information entered into it and has been returned to the Environmental Specialist's office.

6.7 The appropriate data has been submitted to the MDEQ in accordance with the NPDES or Groundwater permit.

6.8 Copies of the Discharge Monitoring Daily Report sheet and the chain of custody sheet has been filed with the Nuclear Records Management section.

7 REFERENCES

7.1 Use References:

7.1.1 Redi Flo2 Installation and Operating Instruction Manual.

7.1.2 Guidelines for establishing test procedures for the analysis of pollutants 40 CFR Part 136.

7.1.3 Test methods for evaluating solid waste physical/chemical methods EPA publication SW-846, Third Edition (1986).

7.1.4 12-THP-6020-ADM-010, Analytical Results.

7.1.5 Environmental Guideline SUR-1, Environmental Surveillance Guideline.

7.2 Writing References:

7.2.1 Source References:

a. NPDES Permit MI0005827, effective January 1, 2005

b. D. C. Cook Nuclear Plant Technical Specifications, Appendix B, Environmental Protection Plan (Non-Radiological)

c. Groundwater permit M00988 effective September 29, 2000

d. Standard Methods for the Examination of Water and Waste Water 18th ed. 1992.

7.2.2 General References

a. Section 304(h) of FWPCA 3 U.S.C.1251, Michigan Act 451.

Key #				Purging Requirements	
Well #	Gate	Well	Static Pipe	Three Well Purge Volumes (gal)	Locations of Wells
95 - 1A	E-3	E-3	E-3	9	Livingston road to service trail; access via Well # 13
95 - 8A	---	E-3	E-3	8	East of 765 kV Yard
95 - 11A[1]	L-50/E-3	E-3	E-3	7	Inside 69 kV Yard
MW - 12C	---	E-3	---	15	Next to south Sewage Treatment Plant parking lot
ENV 13	E-3	E-3	---	11	Livingston road 0.7 miles west of Thorton Rd intersection
ENV 14	---	E-3	---	16	Livingston road 0.5 miles west of Thorton Rd intersection
ENV 15	---	E-3	---	15	Livingston road 0.4 miles west of Thorton Rd intersection
ENV 16	---	E-3	---	11	Intersection of Livingston road and Thorton Rd
ENV 18	---	E-3	---	18	Upper Parking Lot, South West corner
ENV 19	---	E-3	---	19	100 ft North of Northguard entrance

[1]Security Key

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STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING

JNIFER M. GRANHOLM
GOVERNOR

STEVEN E. CHESTER
DIRECTOR

August 11, 2006

Mr. John Carlson
Donald Cook Nuclear Plant
1 Cook Place
Mail Zone 5A
Bridgman, MI 49106

Dear Mr. Carlson:

SUBJECT: MODIFIED Groundwater Discharge Authorization for Donald Cook Nuclear Plant, Lake Township, Berrien County

Enclosed is the modified Authorization to Discharge, GW1810102, issued by the Department of Environmental Quality (DEQ) on May 30, 2006

The following changes have been made to the authorization:

Page 4
EQ-2, Sanitary Sewage Wastewater, the parameter Nitrite Nitrogen has been added

Page 6
Seepage Basins, Dike Inspection has been changed from Weekdays to Weekly

Please review carefully the conditions of the Authorization. In particular, please notice that any change in the discharge will require a new Authorization by the DEQ.

Questions concerning this Authorization can be directed to the Permits Section, Water Bureau (WB), telephone 517-373-8148, or the WB, Kalamazoo District Office, telephone: 269-567-3500.

Sincerely,

James R. Janiczek, Chief
Groundwater Permits Unit
Water Bureau

Enclosure
cc: Mr. Blair Sordell, Cook Nuclear
Lake Township Supervisor
Mr. Gary Witkowski, Berrien County Health Department
Mr. Greg Danneffel, DEQ - Kalamazoo

2006-973

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER BUREAU

GROUNDWATER DISCHARGE PERMIT

This permit is issued under the provisions of Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), being Sections 324.3101 through 324.3119 of the Compiled Laws of Michigan, and the Administrative Rules promulgated thereunder. This permit does not relieve the permittee from obtaining and complying with any other permits required under local, state, or federal law.

Permit Number:	GW1810102	**Authorization Rule:**	2218
Facility Name:	Donald C. Cook Nuclear Plant		
Issue Date:	May 30, 2006	**Effective Date:**	June 1, 2006
Expiration Date:	June 1, 2009		
Modified Date:	August 11, 2006		
Deadline for Submittal of Renewal Application:	December 3, 2008		

Facility Address: 1 Cook Place, Mail Zone 5A, Bridgman, Michigan 49106
Telephone: 269-465-5901, ext.1153 **Fax:** 269-466-2550

Discharge Location Description:
SW 1/4 of the SE 1/4 of Section 6, T06S, R19W, Lake Township, Berrien County, Michigan, as identified in Attachment 1 (Site Map) and fully described in this permit.

Permittee Name: Indiana Michigan Power
Permittee Address: One Summit Square, P.O. Box 60, Fort Wayne, IN 46801
Telephone: 260-421-1400 **Fax:** 260-425-2142

Authorization to discharge a maximum: 2.4 million gallons per day (876 million gallons per year) of process wastewater and 60,000 gallons per day (21.9 million gallons per year) of sanitary sewage in accordance with the limitations, monitoring requirements, and other conditions as set forth in this permit, Part 31, and its administrative rules.

Type of Wastewater #1: Process (Outfall 00D)	**Type of Wastewater #2:** Sanitary Sewage (Outfall 00E)
Method of Treatment: Neutralization	**Method of Treatment:** Sequencing Batch Reactor
Method of Disposal: Seepage Basins	**Method of Disposal:** Rapid Infiltration Basins

In accordance with Section 324.3122 of the Michigan Act, the permittee shall make payment of an annual permit fee to the Department for each December 15 the permit is in effect regardless of occurrence of discharge. The permittee shall submit the fee in response to the Department's annual notice. The fee shall be postmarked by March 1 for notices mailed by January 15. The fee is due no later than 45 days after receiving the notice for notices mailed after January 15. Fees paid in accordance with the Michigan Act are not refundable.

All construction, maintenance, operations, and monitoring of this facility must comply with the conditions set forth in this permit or in plans approved by the Department in accordance with this permit. Failure to comply with the terms and provisions of this permit may result in civil and/or criminal penalties as provided in Part 31.

This permit is based upon the information submitted in the July 25, 2005, application for Groundwater Discharge received by the Michigan Department of Environmental Quality and any subsequent amendments. This permit supersedes Permit M 00988 issued to the facility on September 29, 2000.

Issued this 30th day of May 2006 ,for the Michigan Department of Environmental Quality.

Modified August 11, 2006

James R. Janiczek, Chief
Groundwater Permits Unit
Water Bureau
Michigan Department of Environmental Quality

A. Effluent Limitations and Monitoring Requirements

The wastewater discharge shall be limited and monitored by the permittee, at a minimum, as specified below. The permittee shall submit reports monthly as specified in Section F.1 of this permit. In the event of any non-compliance of limitations, including any detected in additional sampling to the minimum required below, the permittee shall fulfill the requirements of Section D.1 of this permit (Rule 2227)

SAMPLE LOCATION ID	PARAMETER	LIMITATION-UNITS	MEASUREMENT FREQUENCY	SAMPLE TYPE
Effluent Flows:				
EQ-1 Process Wastewater (Turbine Room Sump) (Outfall 00D)	Flow	2,400,000 GPD	Daily*	Direct Measurement
		876, 000, 000 GPY	Annually	Calculation
EQ-2 Sanitary Sewage Wastewater (Outfall 00E)	Flow	60,000 GPD	Daily	Direct Measurement
		21,900,000 GPY	Annually	Calculation
Effluent Quality:				
EQ-1 Process Wastewater (Turbine Room Sump) (Outfall 00D)	Chloride***	mg/l	Weekly	Grab
	Ethanolamine	mg/l	Weekdays	Grab
	Hydrazine	ug/l	Weekdays	Grab
	pH***	6.5-9.0 S.U..	Weekdays	Grab
	Total Inorganic Nitrogen	mg/l	Monthly	Calculation: Ammonia (N) + Nitrate (N) + Nitrite (N)
	Ammonia Nitrogen	mg/l	Monthly	Grab
	Nitrite Nitrogen	mg/l	Monthly	Grab
	Nitrate Nitrogen	mg/l	Monthly	Grab
	Sodium***	mg/l	Twice/month**	Grab
	Sulfate***	mg/l	Twice/month**	Grab

SAMPLE LOCATION ID	PARAMETER	LIMITATION-UNITS	MEASUREMENT FREQUENCY	SAMPLE TYPE
EQ-2 Sanitary Sewage Wastewater (Outfall 00E)	BOD5	35 mg/l	Weekly	Grab
	Chloride***	mg/l	Weekly	Grab
	Dissolved Oxygen***	mg/l	Weekly	Grab
	Phosphorus	15 mg/l	Weekly	Grab
	pH***	6.0-9.0 S.U.	Weekly	Grab
	Sodium***	mg/l	Weekly	Grab
	Total Inorganic Nitrogen	mg/l daily max	Weekly	Calculation: Ammonia (N) + Nitrate (N) + Nitrite (N)
	Ammonia Nitrogen	mg/l	Weekly	Grab
	Nitrite Nitrogen	mg/l	Weekly	Grab
	Nitrate Nitrogen	mg/l	Weekly	Grab
Land Application: Year Round				
LA-1 Seepage Basins (Outfall 00D)	Application Rate	26.0 gals/ft^2	Daily	Direct Measurement
LA-2 Rapid Infiltration (Basin A) (Outfall 00E)	Application Rate	7.5 gals/ft^2	Daily	Direct Measurement
LA-3 Rapid Infiltration (Basin B) (Outfall 00E)	Application Rate	17.8 gals/ft^2	Daily	Direct Measurement

* The daily maximum is defined as the total discharge by weight, volume or concentration if specified, during any calendar day.

** Sodium and sulfate shall be sampled once/month while the water treatment system regenerates and once/month when no regeneration occurs.

*** Refer to Section E., Item 1.

B. Groundwater Limitations and Monitoring Requirements

The disposal of treated wastewater shall not cause the groundwater quality to exceed the limitations listed below. Groundwater monitoring wells EW-1A, EW-8, EW-12, EW-13, and EW-19 shall be sampled and the groundwater analyzed for the parameters listed below at least at the minimum frequencies indicated. Monitoring well EW-8 is the upgradient well until a new upgradient monitoring well is installed. Then both wells will be used. Compliance with limits established in this section will be measured at monitor wells EW-1A, EW-12, EW-13, and EW-19. Monitoring wells and groundwater flow direction are identified on Attachment 3 (Groundwater Monitoring Well Map). In the event of any non-compliance with limitations, including any detected in sampling additional to the minimum required below, the permittee shall fulfill the requirements of Section D.1 of this permit (Rule 2227).

PARAMETER	LIMITATION UNIT	MEASUREMENT FREQUENCY	SAMPLE TYPE
Static Water Elevation	USGS - Ft	Quarterly	Direct Measurement
pH	6.0-9.0 S.U.	Quarterly	Grab
Chloride	250 mg/l	Quarterly	Grab
Specific Conductance	umhos/cm	Quarterly	Grab
Total Inorganic Nitrogen	5 mg/l	Quarterly	Calculation: Ammonia-N + Nitrate-N + Nitrite-N
Ammonia Nitrogen	mg/l	Quarterly	Grab
Nitrite Nitrogen	0.5 mg/l	Quarterly	Grab
Nitrate Nitrogen	mg/l	Quarterly	Grab
Total Phosphorus	1 mg/l	Quarterly	Grab
Sulfate	250 mg/l	Quarterly	Grab
Dissolved Sodium	120 mg/l	Quarterly	Grab
Total Dissolved Solids	mg/l	Quarterly	Grab
Total Alkalinity	mg/l	Annually	Grab
Bicarbonate	mg/l	Annually	Grab
Dissolved Calcium	mg/l	Annually	Grab
Dissolved Iron	mg/l	Annually	Grab
Dissolved Magnesium	200 mg/l	Annually	Grab
Dissolved Oxygen	mg/l	Annually	Grab
Dissolved Potassium	mg/l	Annually	Grab
Total Organic Carbon	mg/l	Annually	Grab
Phenols	mg/l	Annually	Grab
Ethanolamine	2 mg/l	Annually	Grab
Dissolved Aluminum	150 ug/l	Annually	Grab
Dissolved Barium	440 ug/l	Annually	Grab
Dissolved Boron	1900 ug/l	Annually	Grab
Dissolved Cadmium	2.2 ug/l	Annually	Grab
Dissolved Chromium	11 ug/l	Annually	Grab
Dissolved Copper	9 ug/l	Annually	Grab
Dissolved Lead	10 ug/l	Annually	Grab
Dissolved Manganese	530 ug/l	Annually	Grab
Dissolved Inorganic Mercury	0.0013 ug/l	Annually	Grab
Dissolved Nickel	52 ug/l	Annually	Grab
Dissolved Selenium	5 ug/l	Annually	Grab
Dissolved Silver	0.2 ug/l	Annually	Grab
Dissolved Zinc	120 ug/l	Annually	Grab
Hydrazine	10 ug/l	Annually	Grab

C. Observation Monitoring Requirements

The permittee shall inspect the treatment and disposal facilities for the operational conditions required below at the minimum frequency specified. All inspections shall be documented in a logbook to be maintained at the on-site facility and shall be available for review by Department personnel at all times.

LOCATION	CONDITION	MEASUREMENT FREQUENCY	SAMPLE TYPE
Seepage Basins (Outfall 00D)	Oil Sheen	Weekdays	Visual Observation
	Dike Inspection	Weekly	Visual Observation
Rapid Infiltration Basins (Outfall 00E)	Vegetation Control	Weekdays	Visual Observation
	Dike Inspection	Weekly	Visual Observation
	Freeboard	2 feet minimum	Direct Measurement

D. Compliance Requirements If Permit Limits Are Exceeded

1. If a limit described in Section A or B is exceeded, the discharger shall comply with Rule 2227 and undertake the following within the specified timeframes indicated below:

   a. Provide written notification to the Department at the address in Section F.2 of this permit, within seven calendar days, that a limit has been exceeded. Such notification shall include the name of the substance(s), the concentration(s), and the location(s) that exceeded the limit(s).

   b. Resample and analyze for the parameter(s) of concern, within 14 days, at the location where a limit was exceeded.

   c. Submit a report to the Department at the address in Section F.2 of this permit, within 60 days. Such report shall include the results of confirmation sampling, an evaluation of the reasons for the limit being exceeded, and the steps taken or proposed to prevent recurrences.

   d. Complete additional activities as may be required by the Department pursuant to Rule 2227(1)(d).

E. Schedule of Activities – The permittee shall undertake the following activities by the dates specified.

1. Within 90 days of permit issuance, the discharger shall be in compliance with permit effluent limits and monitoring requirements for chloride, dissolved oxygen, pH, sodium and sulfate.

2. Submit for review and receive approval for an updated Operation and Maintenance Manual by August 1, 2006 [Rule 2218(4)(b)].

3. Submit for review and receive approval of a work plan for the installation of monitoring wells by July 1, 2006.
4. Install monitoring wells as described in the approved work plan by August 1, 2006.
5. Submit for review and receive approval of a report of monitoring well installation by September 1, 2006.
6. Submit monitoring well sampling results for background water quality by November 1, 2006.
7. Submit for review and receive approval of Modifications to the Sampling and Analysis Plan by September 1, 2006 (Rule 2223).

F. Submittal Requirements for Self Monitoring Data

1. The permittee shall submit self-monitoring data monthly on the Department's Compliance Monitoring Report (CMR) for each calendar month of the authorized discharge period to:

   NMS-CMR-Data Entry-Groundwater
   Water Bureau
   Michigan Department of Environmental Quality
   P.O. Box 30273
   Lansing, Michigan, 48909-7773

   and

   Kalamazoo District
   Water Bureau-MDEQ
   7953 Adobe Road
   Kalamazoo, Michigan 49009-5026

   The forms shall be postmarked no later than the 15th day of the month following each month of the authorized discharge period(s).

   Alternative Daily Discharge Monitoring Report formats may be used if they provide equivalent reporting details and are approved by the Department.

2. All other notices, plans, reports, and other submissions required by and pursuant to this permit shall be submitted to the following:

   Kalamazoo District Office
   DEQ–Water Bureau
   7953 Adobe Rd.
   Kalamazoo, MI 49009-5026
   Telephone: 269-567-3500

G. Other Conditions

1. Effluent shall be isolated from water supply wells as specified in Rule 2204(2)(d).
2. Effluent shall not be applied within 100 feet from property lines.
3. The permittee shall maintain all treatment or control facilities or systems installed or used by the discharger to achieve compliance with this permit in good working order and operate the facilities or systems as efficiently as possible.
4. Pursuant to Rule 2223(1), the Department may modify the effluent or groundwater monitoring parameters or frequency requirements of this permit, or they may be modified upon the request of the permittee with adequate supporting documentation.
5. Prior to any land application of bulk biosolids, the permittee shall submit to the Field Operation Section, Water Bureau, and receive approval of a Residuals Management Program (RMP) that complies with the requirements of the Part 24 Rules (R 323.2401 through R 323.2418 of the Michigan Administrative Code). The permittee is authorized to land apply bulk biosolids or prepare bulk biosolids for land application in accordance with an approved RMP.

H. Approved Documents – The following documents, previously submitted and approved are incorporated into this permit by reference. These documents, and those submitted and approved under Section E of this Permit, may be modified upon written approval of the Department.

1. Sampling and Analysis Plan – dated February 23, 2005.
2. Discharge Management Plan – dated July 18, 2005

I. Permit Application – Issuance of this permit is based upon the information submitted on the Application for Groundwater Discharge (Application) and any subsequent amendments received by the Department. Any material or intentional inaccuracies found in this information, or omissions of material information, may be grounds for the revocation or modification of this permit or other enforcement action.

The permittee shall inform the Department's Water Bureau, Kalamazoo District Supervisor, of any known material or intentional inaccuracies in the information of the Application which would affect the permittee's ability to comply with the applicable rules or license conditions. The following documents were submitted to the Department as part of the Application:

1. Basis of Design, Rule 2218 – dated November, 1994.
2. Hydrogeological Report, Rule 2221 – dated February 23, 2005.
3. Waste Characterization, Rule 2220 – 2004 Effluent Data.
4. Discharge Management Plan, Rule 2233 – dated July 18, 2005.
5. Restrictive Covenant – dated October 26, 2000

J. Transfer of Ownership – The permittee shall notify the Department, in writing, no less than 30 days before a change in ownership of the facility. This permit may be transferred to the new owner by written approval of the Chief of the Permits Section, Water Bureau.

K. Change or Modification of Treatment or Discharge – Rule 2218 (3)(d) and (e)
The permittee, if proposing to modify the quantity or effluent characteristics of the discharge, if proposing to modify the monitoring program, or if proposing to modify the treatment process for the discharge, shall notify the Department of the proposed modification before it occurs. The Department shall determine if the proposed modification requires the permit to be modified to ensure that the terms of Rule 2204 are met. Modifications determined by the Department to be significant require that the permittee submit an application for and obtain a reissuance of the permit before such modification occurs. For modifications determined by the Department to be minor based on the quantity or quality of the discharge, the permit may be modified by the Department as requested by the permittee without obtaining a reissuance of the permit before such modification occurs.

L. By-Passing
Any diversion from or bypass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except where unavoidable to prevent loss of life, personal injury, or severe property damage. The permittee shall immediately notify the Department of any such occurrence by telephone at 1-800-292-4706. Such notice shall be supplemented by a written report with the next operation report detailing the cause of such diversion or bypass and the corrective actions taken to minimize adverse impact and eliminate the need for future diversion or bypass.

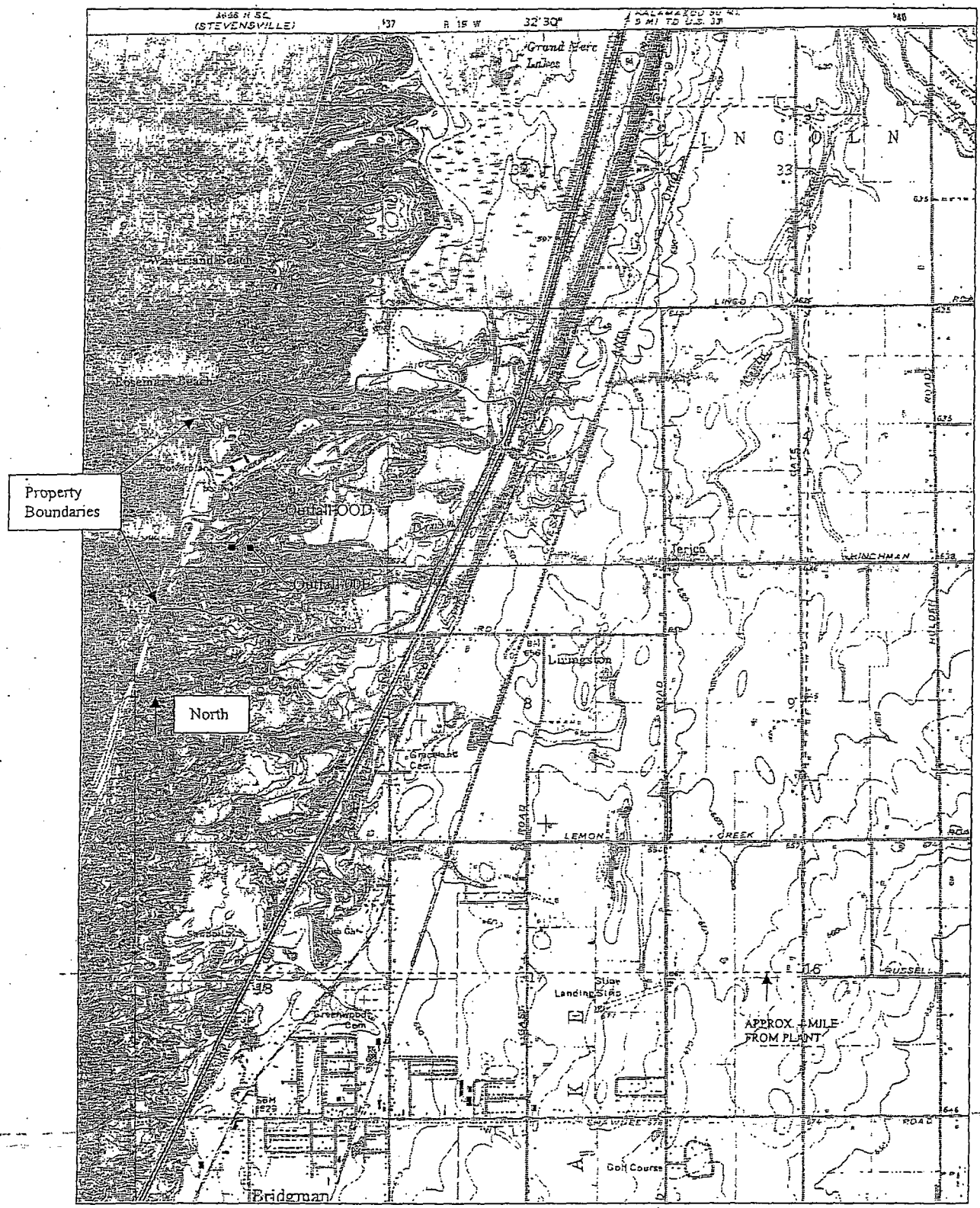
M. Cessation of Discharge-Related Activities
If all or any portion of the permitted treatment facilities and discharge areas is intended to be eliminated, the permittee shall comply with the requirements of Rule 2226.

NOTE:

IF THE PERMITTEE WISHES TO CONTINUE DISCHARGING BEYOND THE EXPIRATION DATE, THE PERMITTEE SHALL SUBMIT AN ADMINISTRATIVELY COMPLETE APPLICATION FOR REISSUANCE NO LATER THAN 180 DAYS PRIOR TO THE EXPIRATION DATE IN ACCORDANCE WITH RULE 2151 OF THE PART 21 ADMINISTRATIVE RULES. FAILURE TO SUBMIT AN ADMINISTRATIVELY COMPLETE APPLICATION FOR REISSUANCE BY THE REQUIRED DATE WILL RESULT IN TERMINATION OF THE AUTHORIZATION TO DISCHARGE ON THE EXPIRATION DATE.

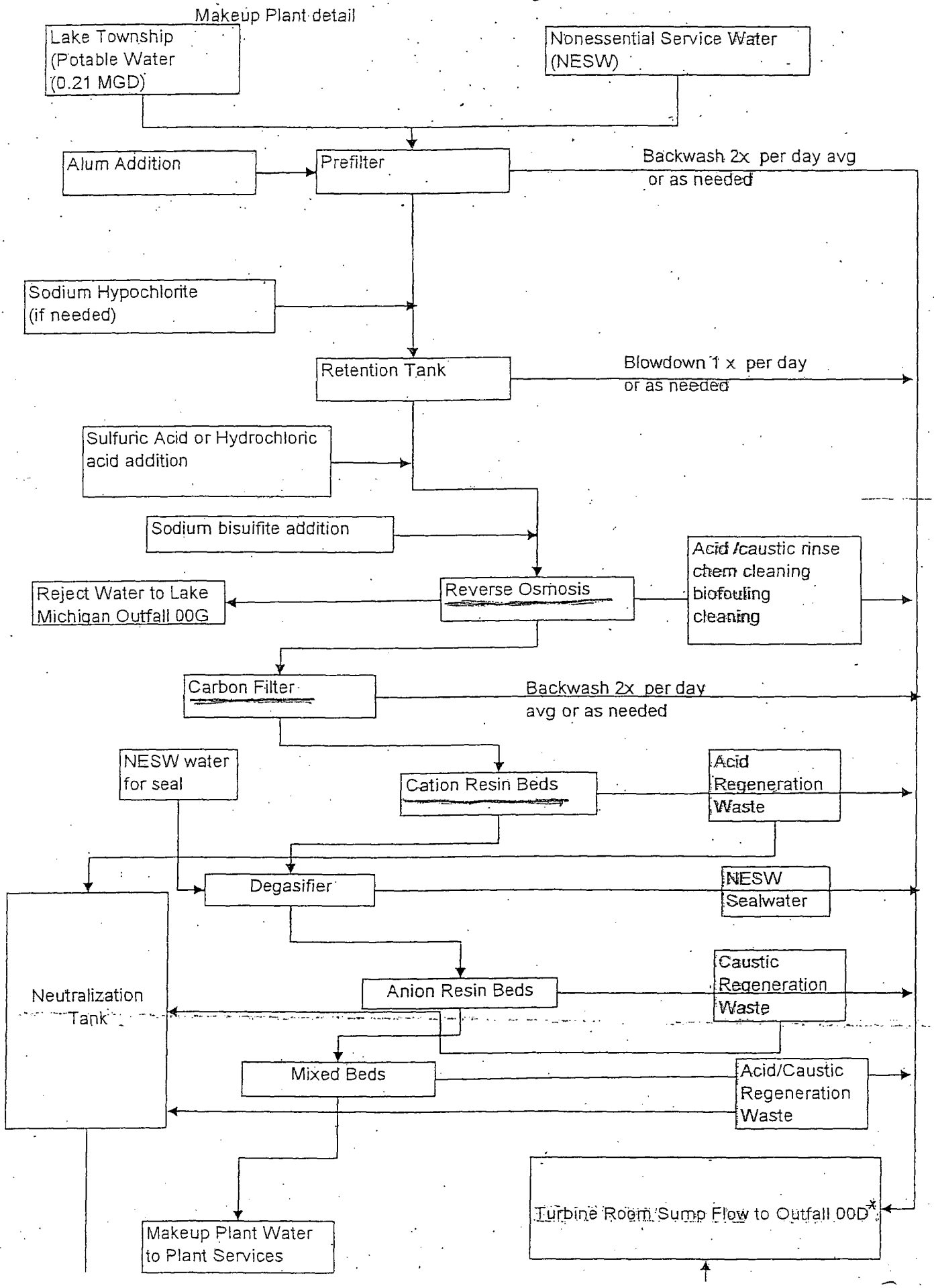
Donald C. Cook Nuclear Plant

ATTACHMENT 1
SITE MAP

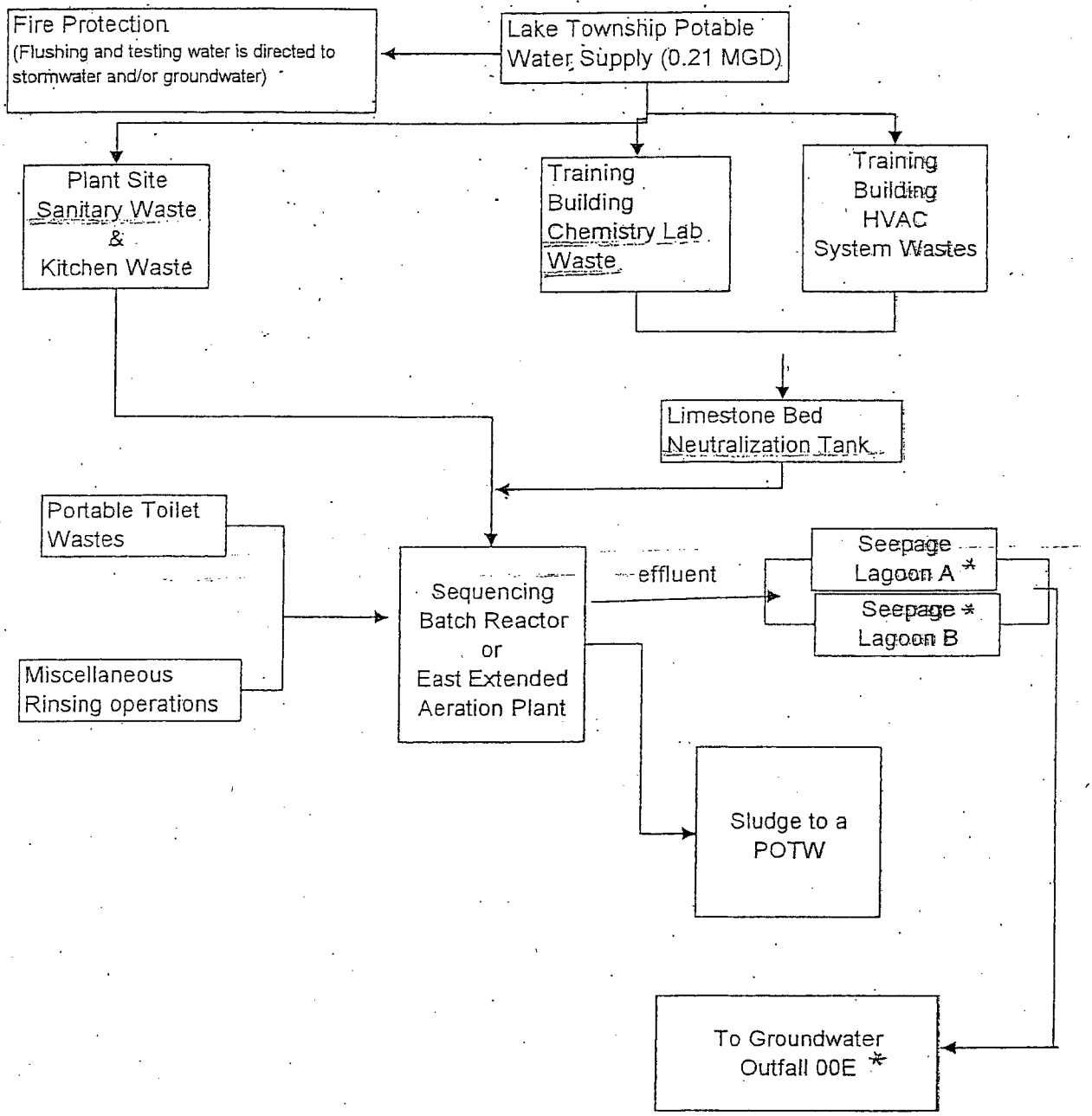


Donald C. Cook Nuclear Plant.
Bridgman Michigan
Lake Township
Berrien County
1" = 0.5 mile

ATTACHMENT 2
PROCESS FLOW DIAGRAM

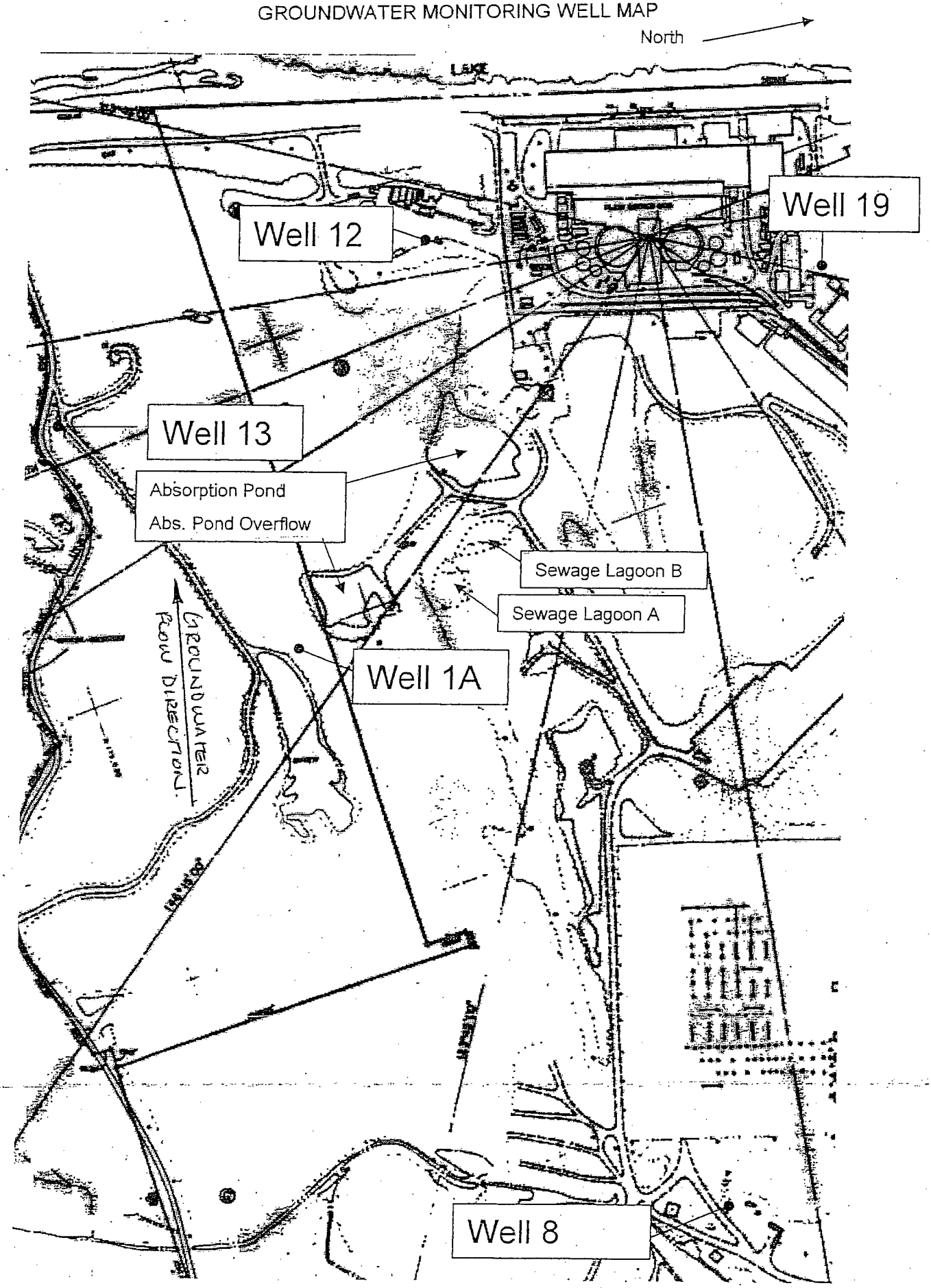


ATTACHMENT 2
PROCESS FLOW DIAGRAM
Sewage treatment plant detail



* Rapid Infiltration Basins

ATTACHMENT 3
GROUNDWATER MONITORING WELL MAP



APPENDIX V

SPECIAL REPORTS

2006

INDIANA MICHIGAN POWER
A unit of American Electric Power

Indiana Michigan Power
Cook Nuclear Plant
One Cook Place
Bridgman, MI 49106
AEP.com

June 29, 2006

Mr. James Entzminger (SC-6J)
Office of Chemical Emergency Preparedness and Prevention
U. S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, IL 60604-3511

Subject: Matter of Indiana Michigan Power Company, d/b/a American Electric Power, Donald C. Cook Nuclear Plant, Bridgman, Michigan
Docket Number CERCLA-05-2004-0010, EPCRA-05-2004-0043, MM-05-2004-0003

Dear Mr. Entzminger:

This interim report is being submitted in accordance with paragraph 22 of the Consent Agreement and Final Order (CAFO) in the referenced matter to address the status of the supplemental environmental project (SEP) and associated costs.

The SEP was completed as described in paragraph 16 of the CAFO. Specifically, new double-walled feed piping for the plant sodium hypochlorite system, improved leak detection devices, and a new sodium hypochlorite pump room with improved secondary containment were purchased and installed at Donald C. Cook Nuclear Plant and became operational on May 11, 2006.

The actual costs incurred for purchasing and installing the described SEP were $730,827.10. Relevant invoices and supporting information are enclosed. These SEP costs exceeded the minimum amount required by paragraph 17 of the CAFO.

Should you have any questions, please contact Mr. John P. Carlson, Environmental Manager, at (269) 465-5901, extension 1153.

Sincerely,

Mark A. Peifer
Site Vice-President

JEN/rdw

Enclosures

CC #2006-720

I certify that I am familiar with the information in this document and that, based on an inquiry of those individuals responsible for obtaining the information, the information is true and complete to the best of my knowledge. I know there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Mark A. Peifer
Site Vice President

c: K. D. Curry, AEP Ft. Wayne
J. T. King, MPSC
K. D. Mack – AEPHQ
MDEQ – WHMD/RPMWS

bc: J. P. Carlson
J. N. Jensen
M. K. Nazar
M. A. Peifer
J. M. Petro
S. D. Simpson
L. J. Weber

Work Order Query

WO Number:	40681304	WO Description:	RPA000719 PERMANENT CHL
FP Number:	RPA000719	FP Description:	Permanent NaOCl System
Company:	Indiana Michigan Power - Nuclear	Major Location:	D C Cook Generating Plant
Business Segment:	Regulated	Department:	19011303 - Cook Plt License Re

Charge Type	06/2006	Total Cost
Original Cost Retirements		
Original Cost Retired	$0.00	$316,890.91
	$0.00	$316,890.91
Regular Transactions		
AFUDC Debt	$0.00	$0.00
AFUDC Equity	$0.00	$0.00
All Other	$0.00	$516.17
Labor	$0.00	$61,023.00
Materials (A/P)	$0.00	$53,418.73
Materials (MMS)	$0.00	$99,662.44
Outside Services	$0.00	$516,206.76
Overheads	$0.00	$144,261.04
	$0.00	$875,088.14
Tax Only Transactions		
CPI	$0.00	$0.00
	$0.00	$0.00
	$0.00	$1,191,979.05

Funding Project Selection

Funding Project	Company	Budget Ver	Budget	Loc	Dept	WO Group	Funding Proj Type

Select One or More Funding Projects

Funding Project

RPA000719

RPA000719 | Perma

Restrict by Company

Display Filter

Joint WO	Funding Project	Description	Company	Status	Total Charges	Major Loca
	RPA000719	Permanent NaOCl System	Indiana Michigan Power -	open	$875,088.14	D.C. Cook Generatin

Total for Selected Entries: $875,088.14

Funding Project Query

Charge Type		Total Cost
AFUDC Debt	$0.00	$0.00
AFUDC Equity	$0.00	$0.00
All Other	$0.00	$516.17
CPI	$0.00	$0.00
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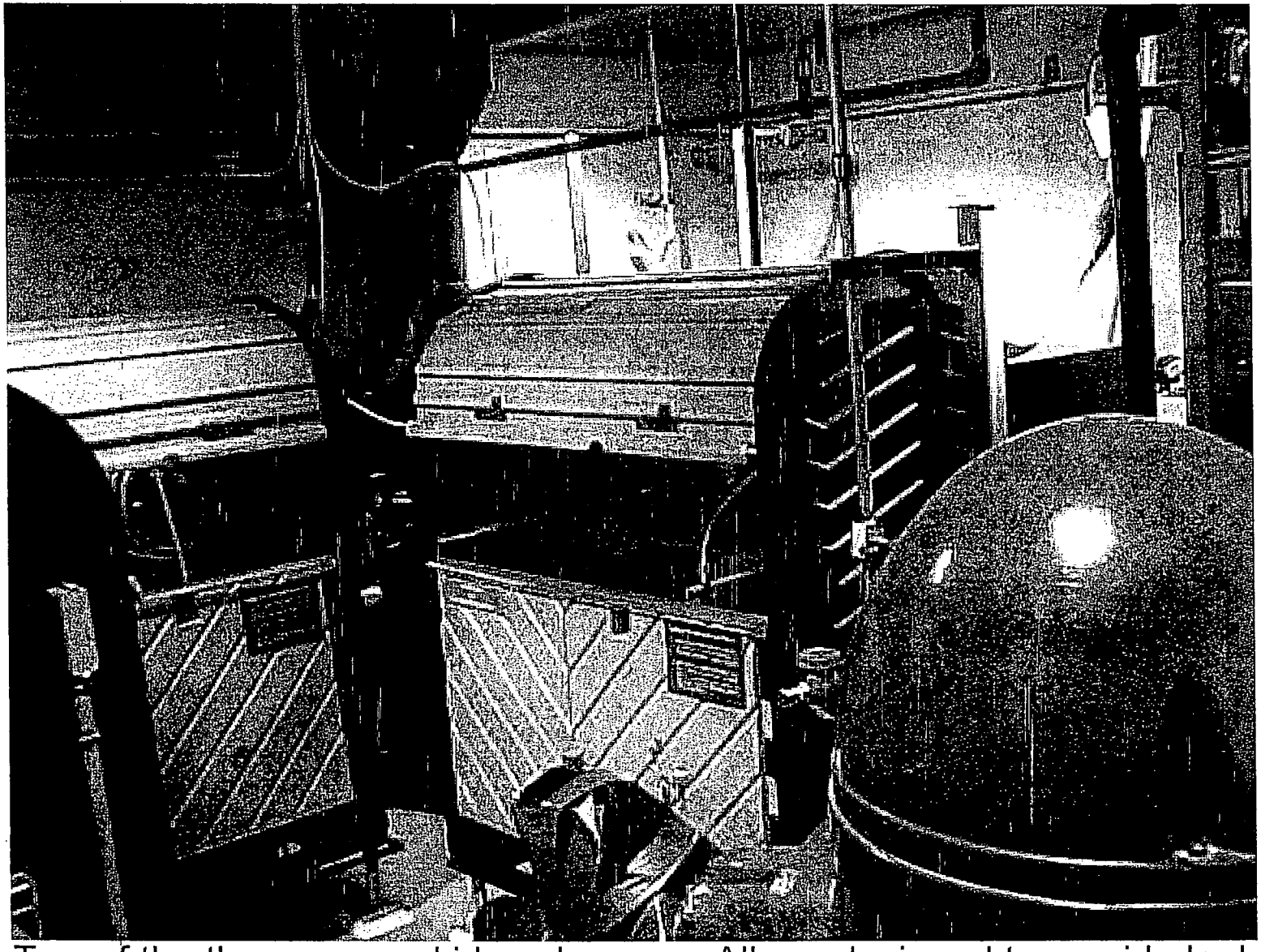
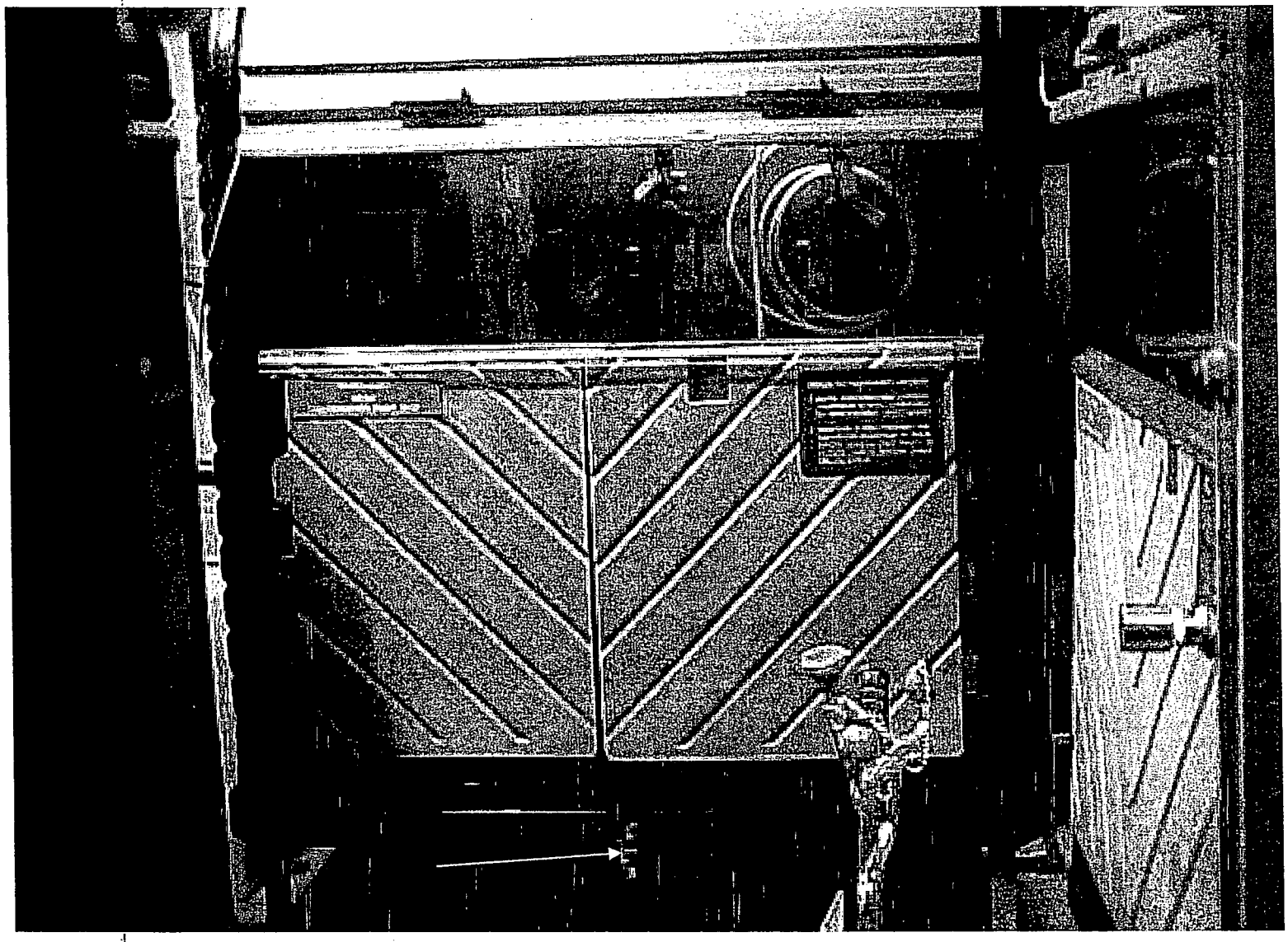
	$0.00	$1,191,979.05

D. C. Cook Nuclear Plant. Bridgman Michigan



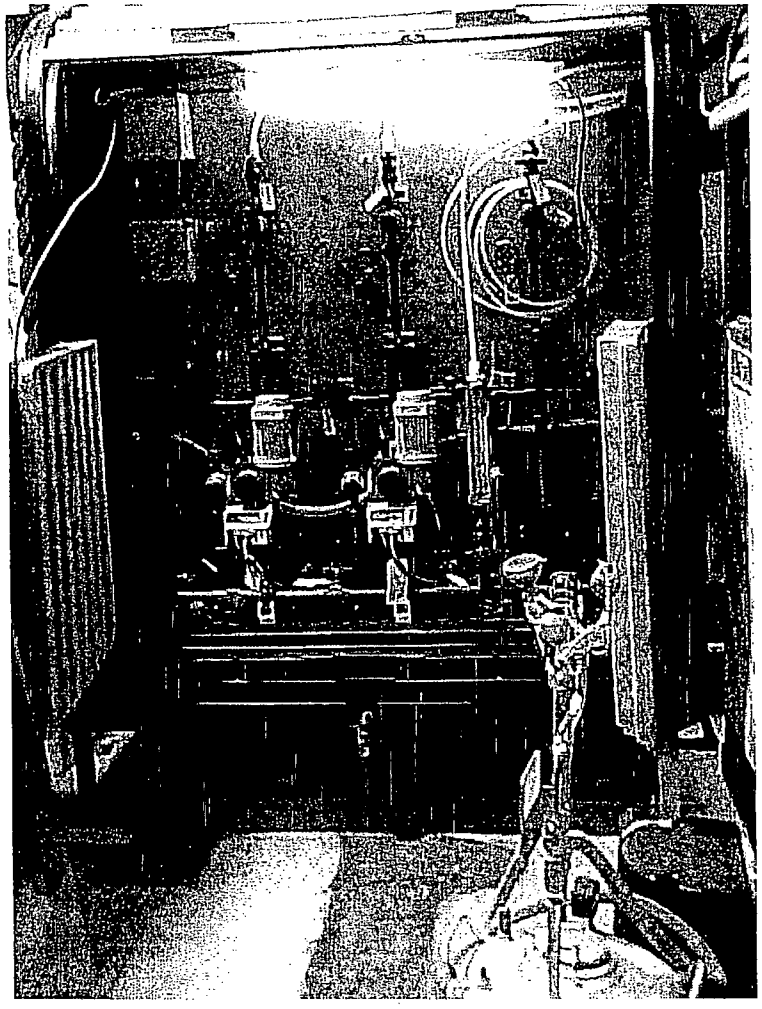
Two of the three pump skid enclosures. All are designed to provide leak and spray protection to the environment.

D. C. Cook Nuclear Plant. Bridgman Michigan



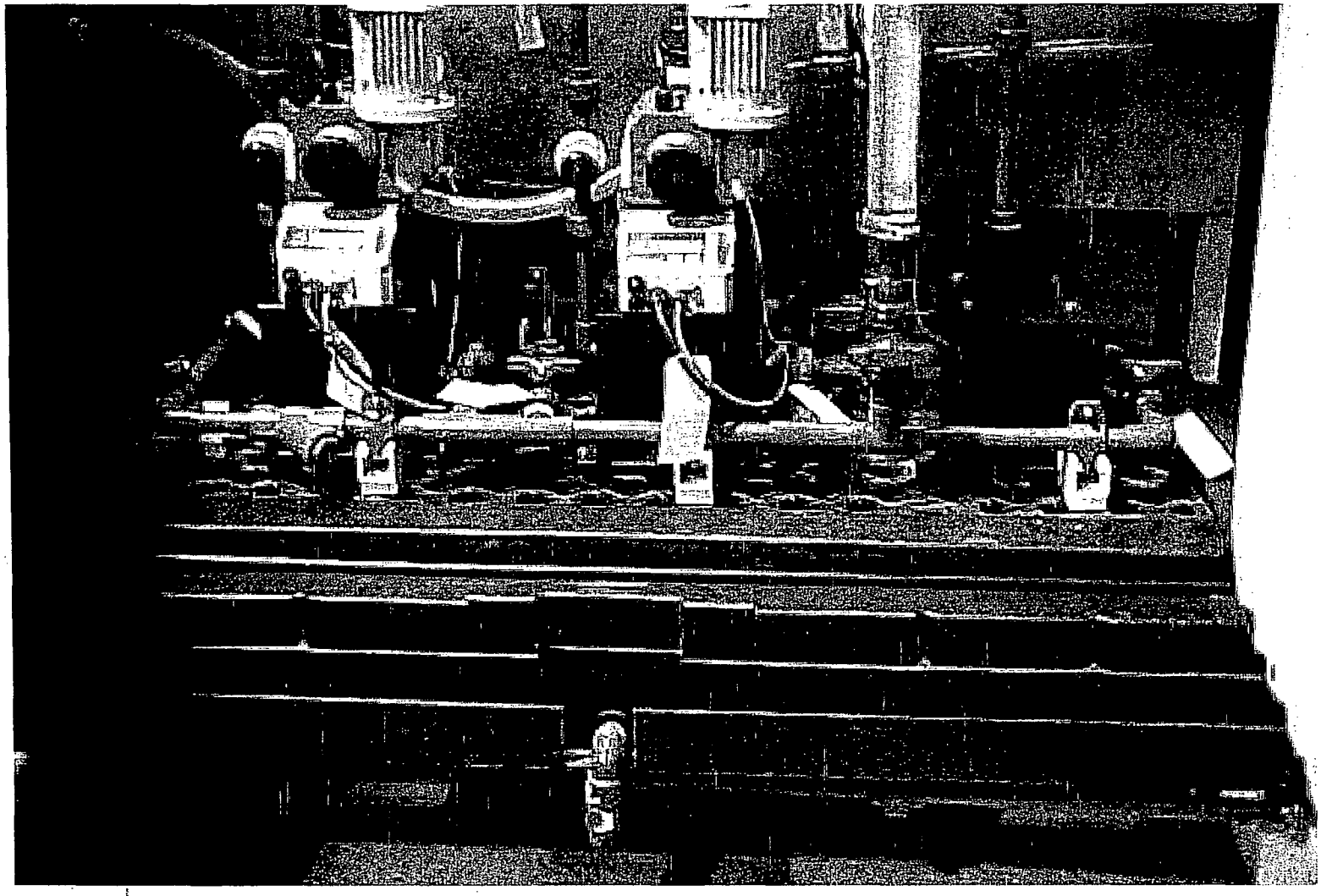
One of three enclosed pump housings. Arrow points to drain from leak containment to main sump with alarms.

D. C. Cook Nuclear Plant. Bridgman Michigan



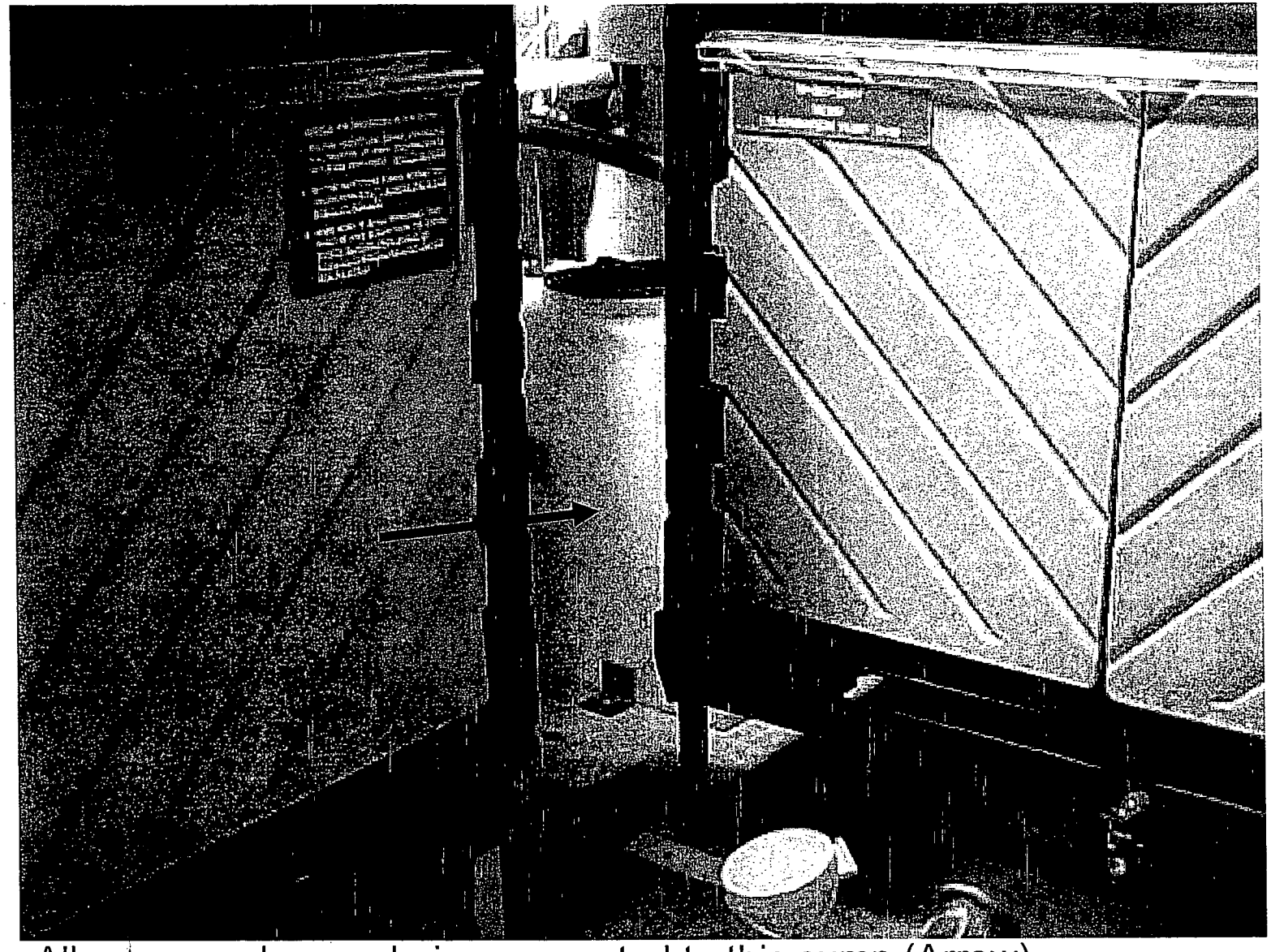
General view of typical pump enclosure.

D. C. Cook Nuclear Plant. Bridgman Michigan



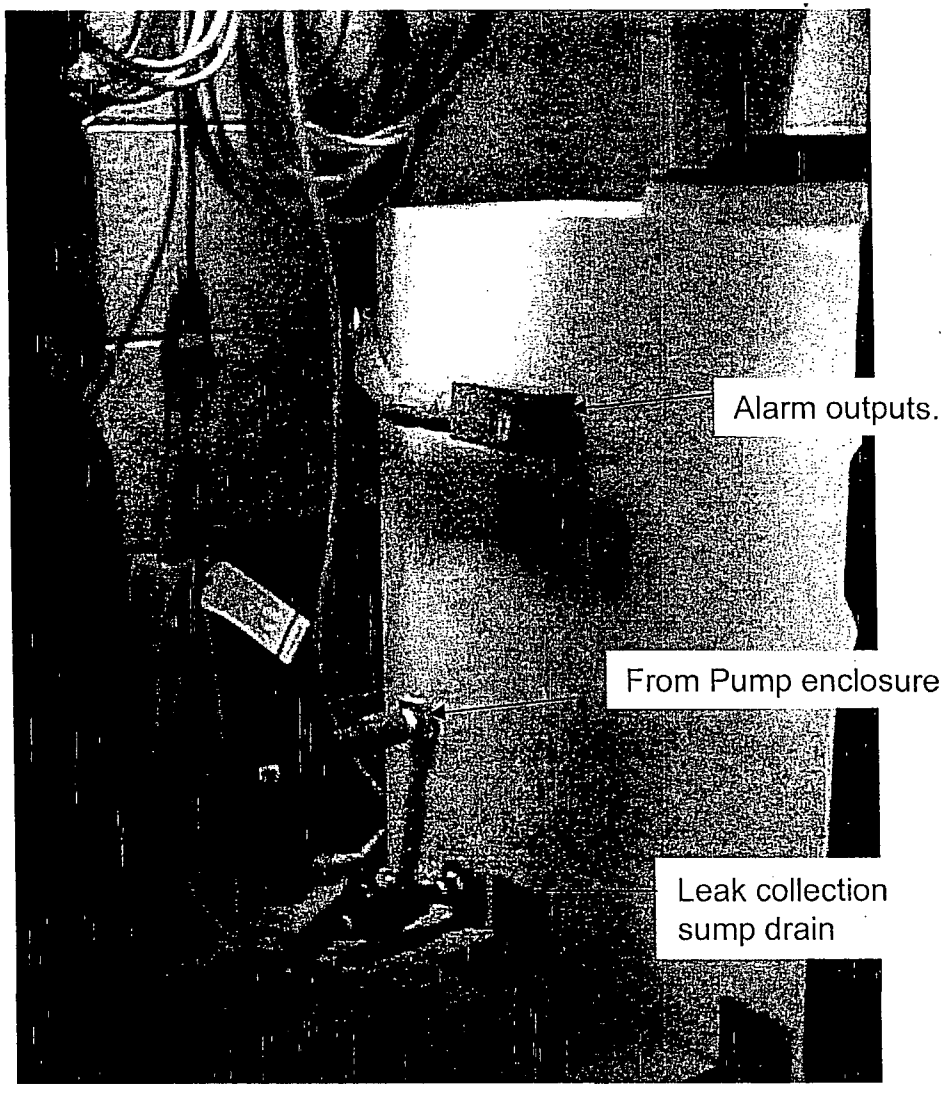
Open Pump cabinet, showing leak collection sump and floor drain that is routed to leak collection sump.

D. C. Cook Nuclear Plant. Bridgman Michigan



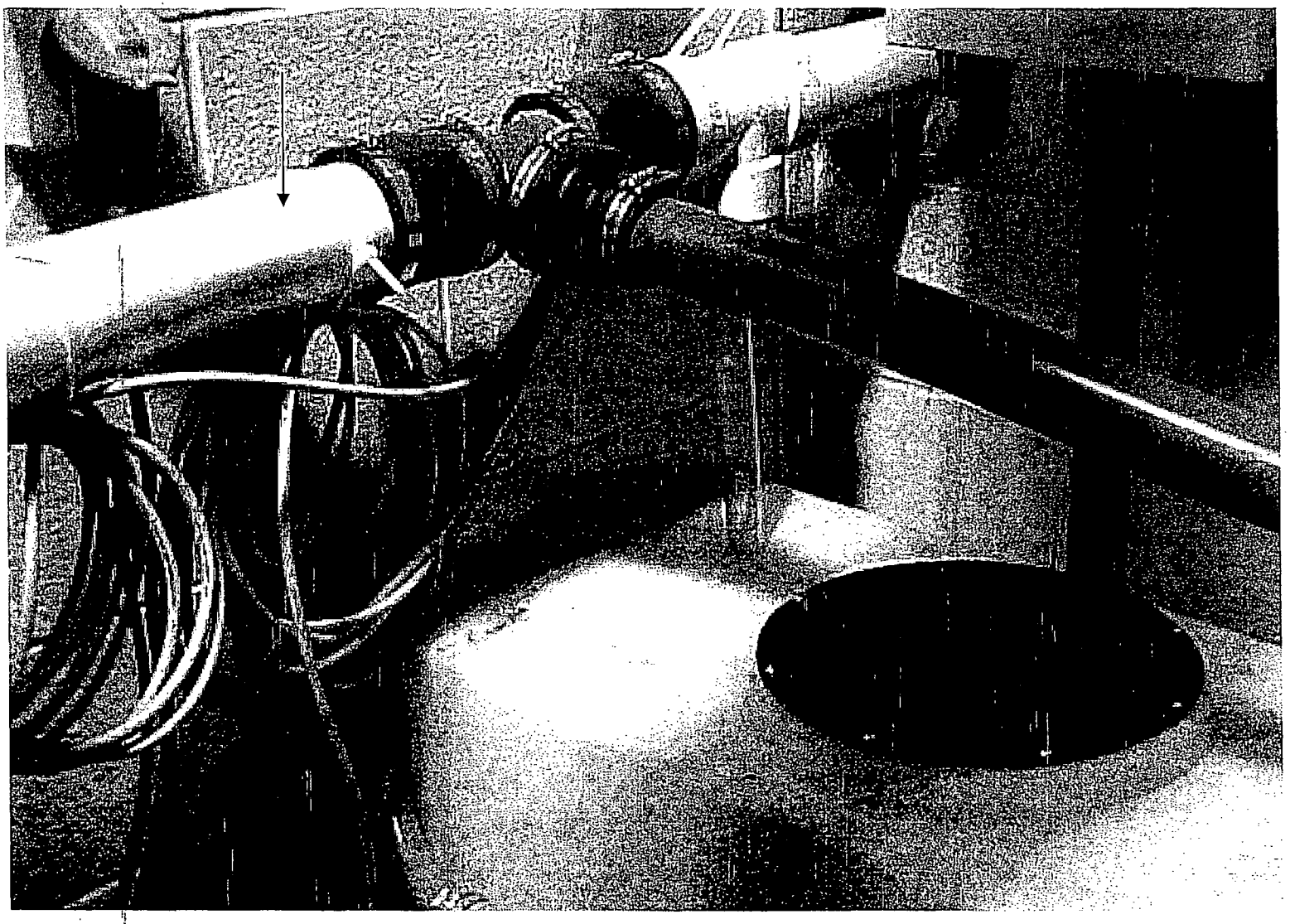
All pump enclosure drains are routed to this sump (Arrow)

D. C. Cook Nuclear Plant. Bridgman Michigan



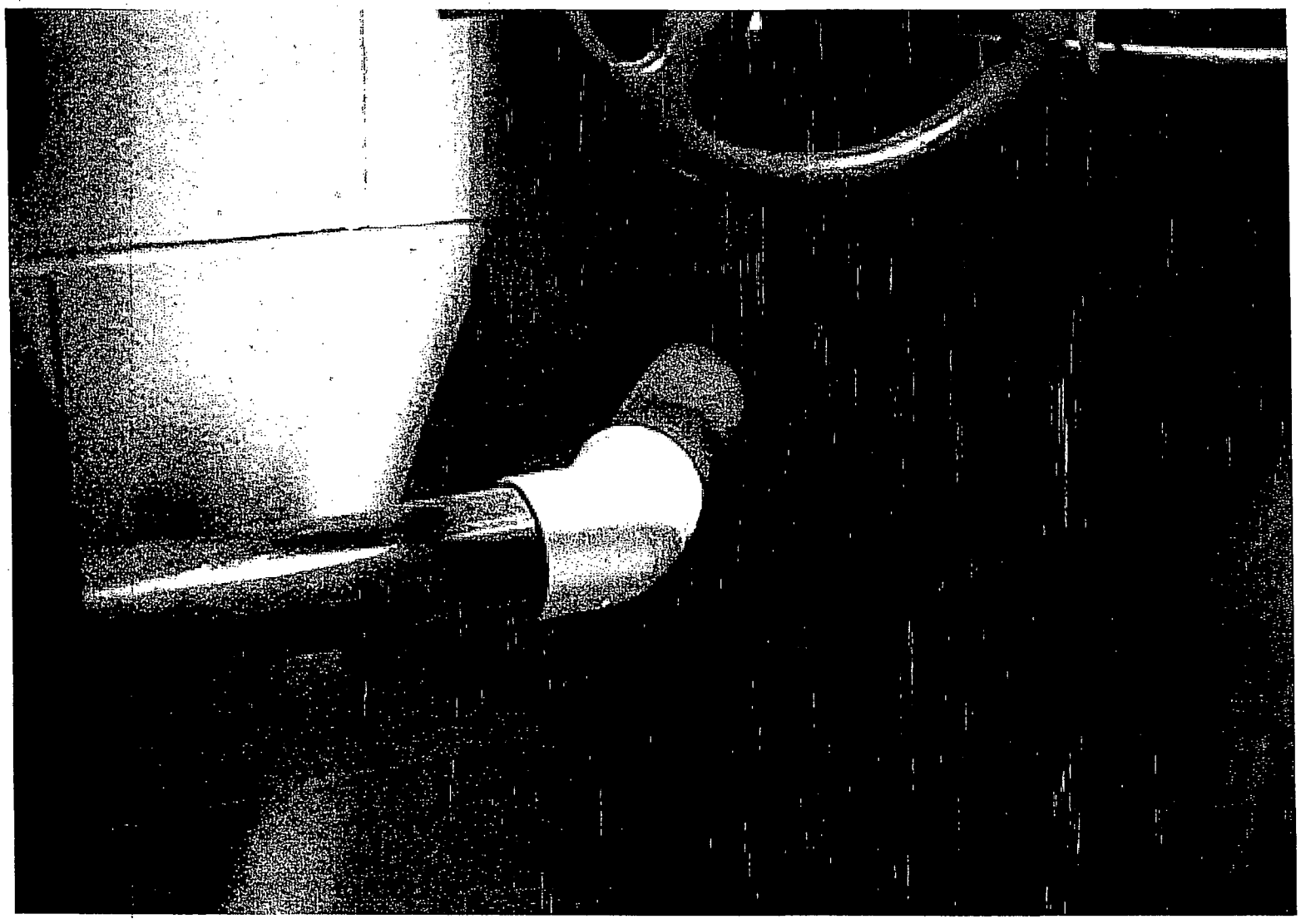
Detail of leak collection sump showing drain lines and alarm fittings.

D. C. Cook Nuclear Plant. Bridgman Michigan



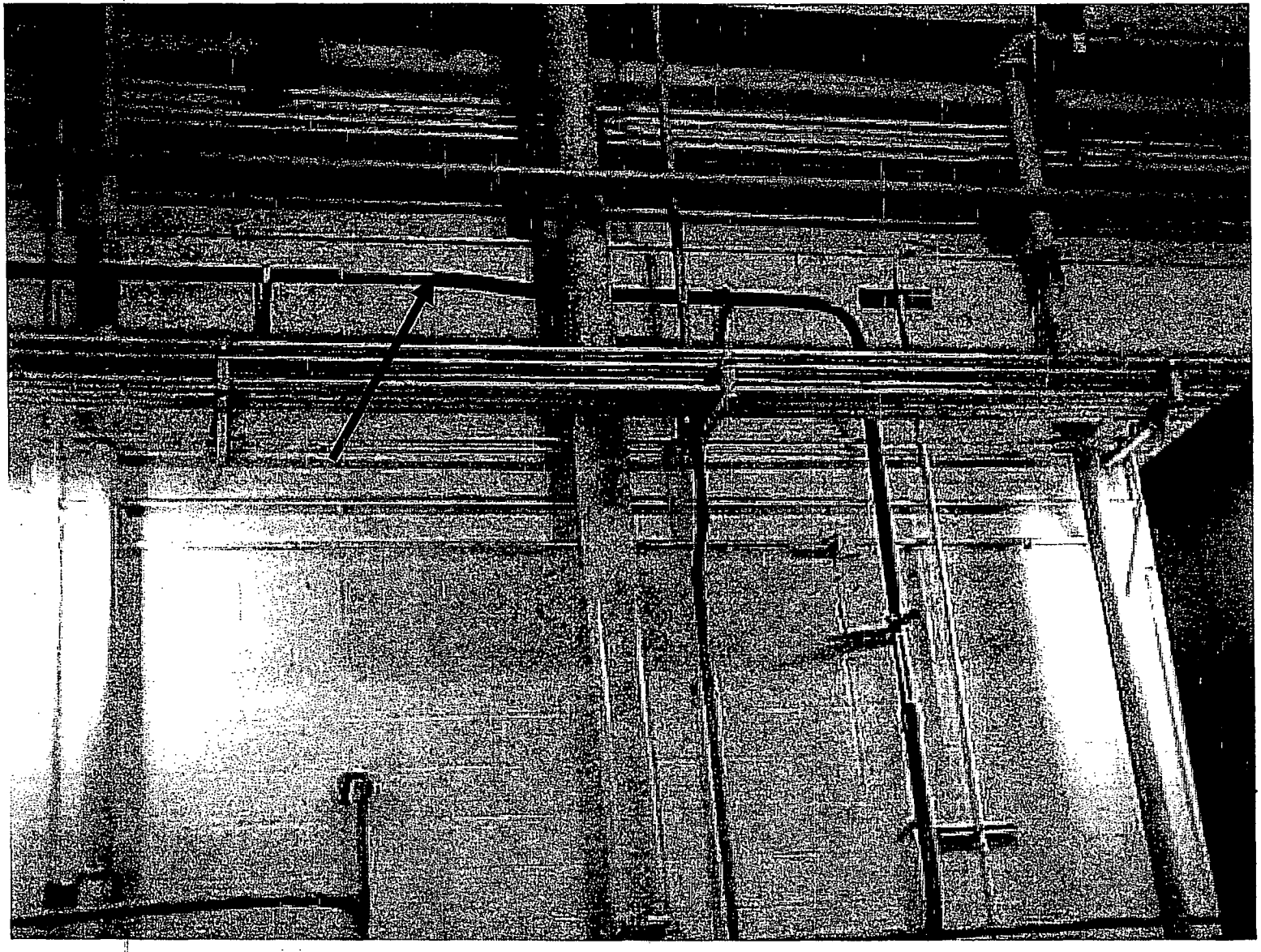
Double-wall configuration from the tank to the pump enclosures. Also outer pipe drains to the leak collection sump.

D. C. Cook Nuclear Plant. Bridgman Michigan



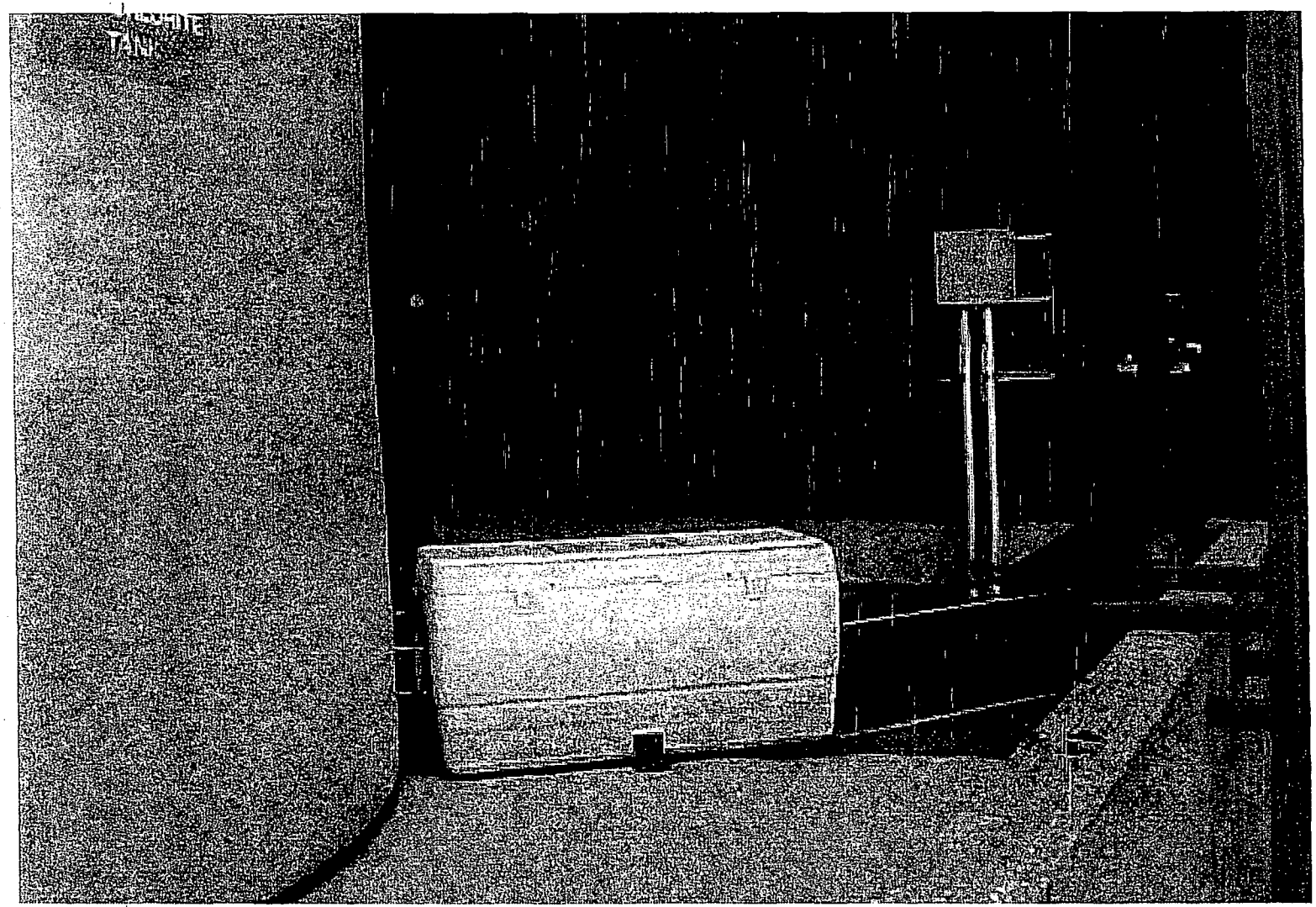
Typical outer pipe of double wall tubing that supplies the pump enclosures.

D. C. Cook Nuclear Plant. Bridgman Michigan



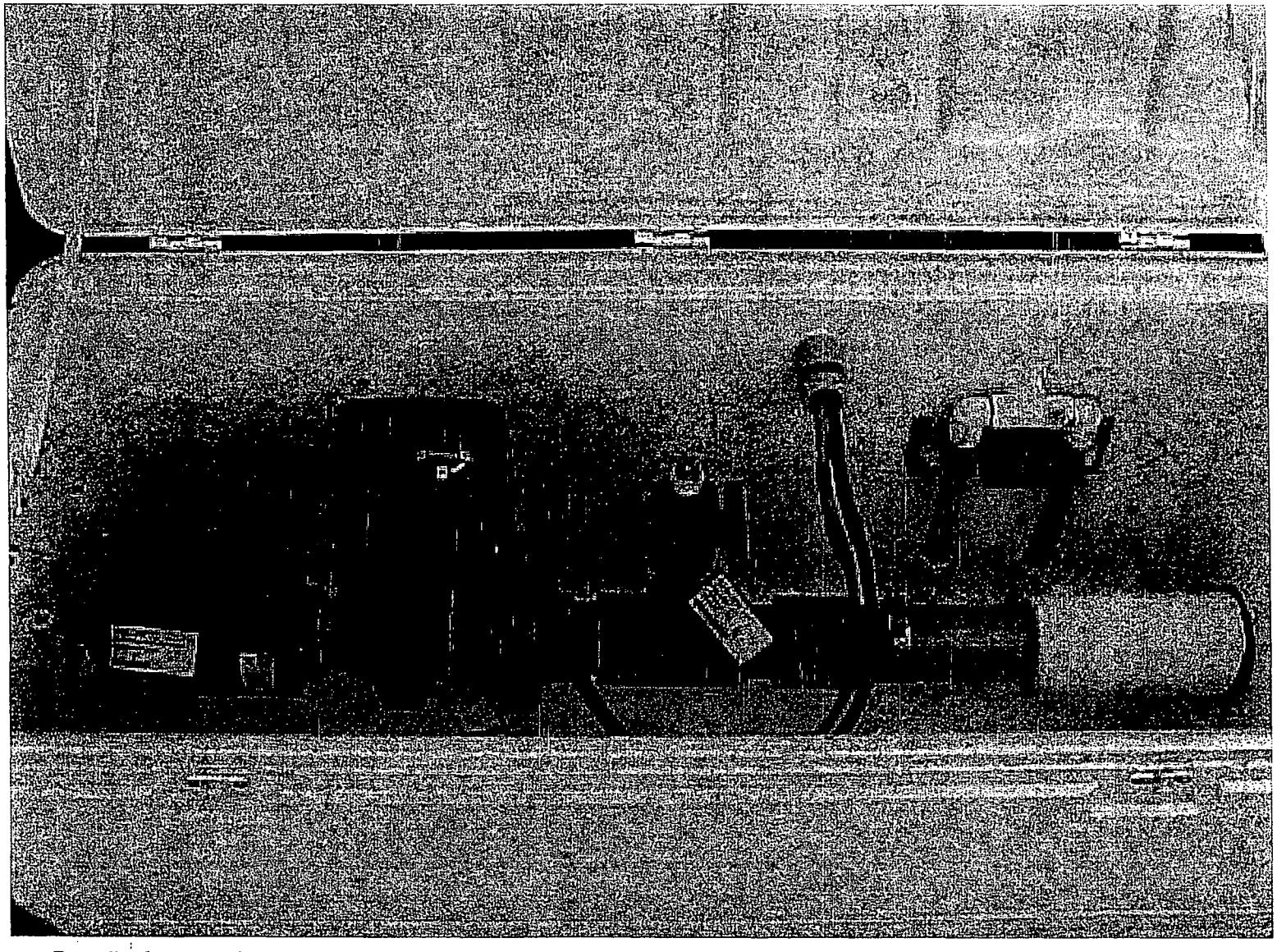
Typical Piping run from the pump enclosures to the system. This is tubing inside pvc pipe.

D. C. Cook Nuclear Plant. Bridgman Michigan



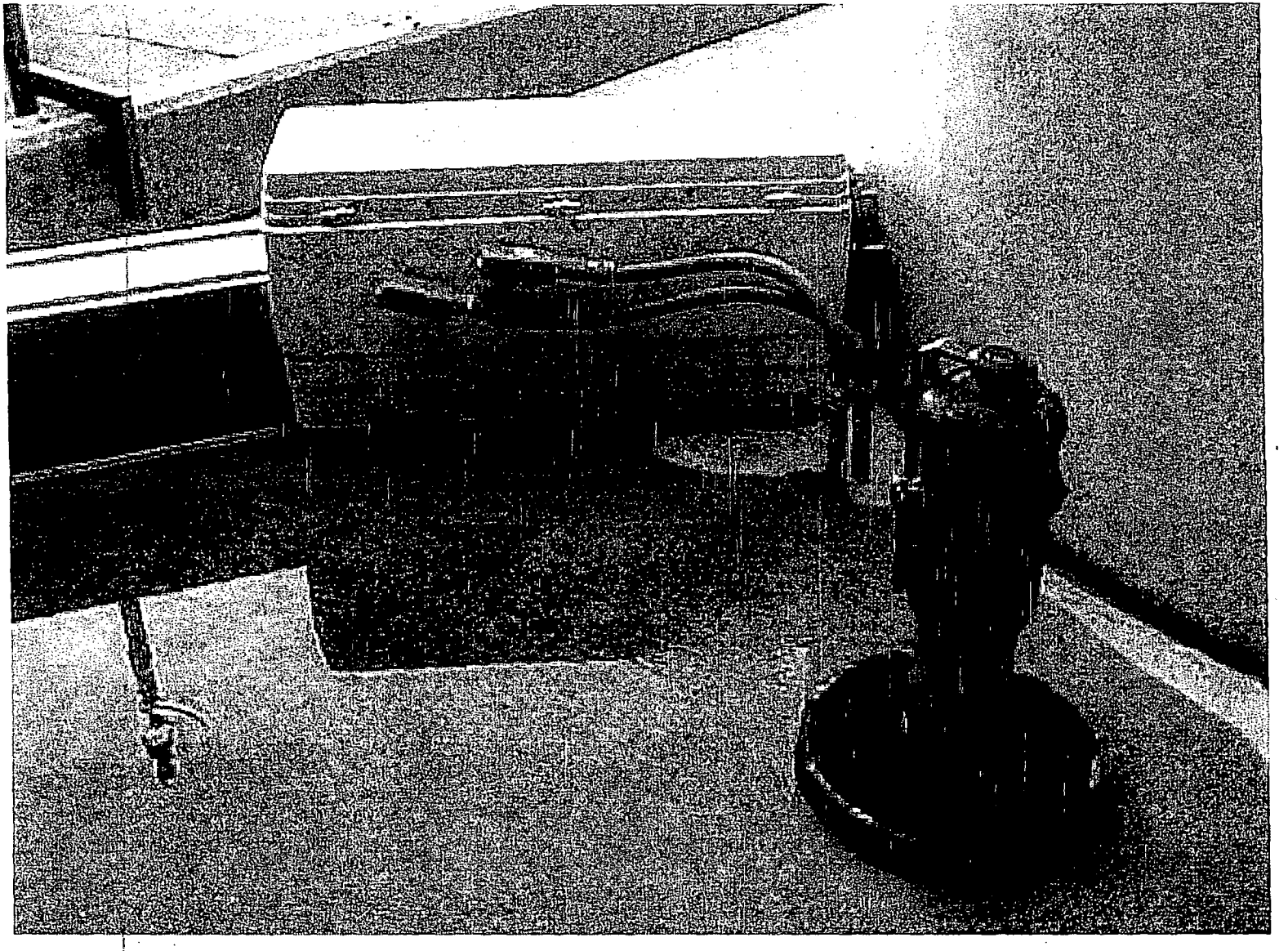
Leak collection sump will close supply tank's valve

D. C. Cook Nuclear Plant. Bridgman Michigan



Detail of manual and automatic shutoff valve configuration . Leak detection sensors are also installed in upper right corner. Note supply tubing installed within pvc pipe.

D. C. Cook Nuclear Plant. Bridgman Michigan



Covered Double wall tank is installed within concrete berm.

D. C. Cook Nuclear Plant. Bridgman Michigan

Calibrated chlorine monitors alarm at pre determined set points to prevent over dosing of chlorine to the circulating water system.