



**INDIANA
MICHIGAN
POWER**

A unit of American Electric Power

Indiana Michigan Power
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AEP.com

March 1, 2005

AEP:NRC:2401-11

Docket Nos: 50-315
50-316

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop O-P1-17
Washington, D.C. 20555-0001

Donald C. Cook Nuclear Plant Units 1 and 2
APPLICATION FOR RENEWAL OF
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY (MDEQ)
GROUNDWATER DISCHARGE PERMIT

In a letter dated March 1, 2005, Indiana Michigan Power Company, the licensee for Donald C. Cook Nuclear Plant (CNP) Units 1 and 2, submitted an application for renewal of MDEQ Groundwater Discharge permit number M00988.

In accordance with Section 3.2 of Part II of Appendix B of the Environmental Technical Specifications for CNP, a copy of the groundwater discharge permit application is being provided to the Nuclear Regulatory Commission as an attachment to this letter.

This letter contains no new commitments.

Should you have any questions or concerns regarding this notification, please contact John P. Carlson, Environmental Manager, at (269) 465-5901, extension 1153.

Sincerely,

John A. Zwolinski
Safety Assurance Director

JEN/jn

attachment

COOL

c: w/o attachment:
J. L. Caldwell – NRC Region III
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MDEQ - DW & RPD
NRC Resident Inspector

ATTACHMENT TO AEP:NRC:2401-11

APPLICATION FOR RENEWAL OF
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
GROUNDWATER DISCHARGE PERMIT



**INDIANA
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CERTIFIED MAIL #7004 2510 0003 5264 6070

Permits Section
Groundwater Discharge Unit
Water Bureau
Michigan Department of Environmental Quality
PO Box 30273
Lansing, MI 48909

March 1, 2005

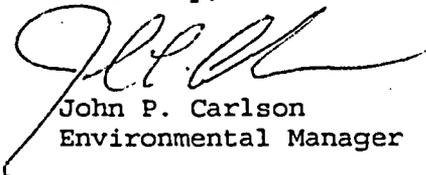
Gentlemen:

Subject: Donald C. Cook Nuclear Plant
Permit No. M00988

Enclosed is the Groundwater Discharge Authorization Application for the disposal of wastewater to the ground or groundwater for renewal of the Donald C. Cook Nuclear Plant Groundwater Discharge Permit M00988. This application is being submitted 180 days prior to the expiration of the present permit.

Should you have any questions regarding this renewal application, please contact me at (616) 465-5901, ext. 1153.

Sincerely,



John P. Carlson
Environmental Manager

Attachment

Indiana Michigan Power
D.C. Cook Nuclear Plant
Groundwater Discharge Authorization Application
For the disposal of wastewater to the ground or groundwater

March 1, 2005

Renewal of Permit M00988
Issued September 29, 2000

TAB 1
GW permit
application

STATE OF MICHIGAN
**GROUNDWATER DISCHARGE AUTHORIZATION
APPLICATION**

for
the disposal of wastewater
to the ground or groundwater



Permits Section
Groundwater Discharge Unit
Water Bureau
Michigan Department of Environmental Quality

Jennifer M. Granholm, Governor

Steven E. Chester, Director

PREFACE

This document contains a set of instructions and the application form necessary to apply for a groundwater discharge authorization. The instructions are organized to allow you to determine what type of authorization is required and how to obtain it.

The instructions first list several types of groundwater discharges that are prohibited, then several types of discharges that are automatically authorized, referred to as exemptions. If the discharge you are proposing is on either of these lists, you will not need to submit an application form. All other discharge authorization requests are required to file an application form. The instructions go on to list several other specific types of discharges that can be authorized short of a full permit. If the discharge is not included among those listed, then you must apply for a permit under Rule 2218.

The application form has two parts. The first is general information, which must be filled out by all applicants. The general information section is found on Pages 14-17 of the application. The second half of the application is divided into sections that are specific to the type of authorization being sought. Authorizations issued under Rules 2211, 2213 and 2216 are for very specific discharges, and are listed in the instructions. All remaining discharges are authorized under Rule 2218. Once you have determined what type of authorization you require and filled out the general information section, you should locate the portion of the application specific to your discharge and fill out the appropriate information. Page 18 of this document contains a detailed index listing the specific pages to be filled out for each specific discharge.

Please note: The Rules require that the applicant must provide all information necessary to make a permit decision. Applications that do not contain all necessary information will be returned as incomplete.

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A. GENERAL INFORMATION

1. WHO MUST APPLY FOR A PERMIT?

Section 3112(1) of Part 31, Water Resources Protection, of the Michigan Natural Resources and Environmental Protection Act of 1994, PA 451 as amended (Act 451) states that any person discharging any waste or waste effluent into the waters of this state must be in possession of a valid authorization to discharge from the Michigan Department of Environmental Quality (department).

A "person" is defined as an individual, partnership, corporation, association, governmental entity, or other legal entity.

2. PURPOSE

The purpose of the Part 22 Rules is to preserve the quality of groundwater for all of its protected uses, both current and potential future uses. Section 3109(1) of Act 451 prohibits the direct or indirect discharge into any waters of the state any substance that is or may become injurious to any protected uses of those waters. The department enforces this prohibition through the "Part 22" Administrative Rules, contained at M.A.C. R323.2201 through 2240. These rules are referenced in this document as Rule 2201 through 2240. The protected uses include public health, safety, and welfare; domestic, commercial, industrial, agricultural, recreational or other uses that may be made of such waters; the value or utility of riparian lands; and the use of the water by livestock, wild animals, birds, fish, aquatic life, or plants or the growth or propagation of those entities.

3. INFORMATION REQUIREMENTS FOR ALL DISCHARGERS

Rules 2206 and 2217 require that you must provide all information for the Department to make a decision regarding an application for a groundwater discharge authorization. If the information is not provided, the application will be returned as incomplete.

4. REQUIREMENTS FOR ALL DISCHARGERS

Rule 2204 establishes certain requirements for all dischargers. These are:

1. The discharge must not become injurious.
2. The discharge must not cause runoff to, ponding of, or flooding of adjacent property.
3. The discharge must not cause erosion.
4. The discharge must not cause nuisance conditions.
5. The discharge must be located not less than 100 feet inside the boundary of the property where the discharge occurs, unless authorized by Rule 2210, 2211, 2213 or a lesser distance is approved by the department.
6. The discharge must be isolated from water supply wells as indicated in Rule 2204(2)(d).
7. The discharge must not create a facility under Part 201 of Act 451.

There are certain operational requirements for each type of discharge that must be met after an authorization is issued. Those requirements are found in Appendix B, Pages 45-46 of the application form.

5. DISCHARGE PROHIBITIONS

Rule 2205 prohibits:

1. A discharge without an authorization under Rule 2204.
2. A discharge from a general-purpose floor drain unless authorized under Rule 2210(v), Rule 2215 or 2218.
3. A discharge of wastewater originating from a structure within 200 feet of an available public sanitary sewer system, except for a discharge of non-contact cooling water or a discharge from a groundwater remediation activity. For sanitary sewage, an available public sanitary sewer system is defined by section 12751(a) of Act 368 of the Public Acts of 1978, as amended, being 333.12751(a) of the Michigan Compiled Laws. For any other discharge, the department must make a determination of availability based on the ability of the public sanitary sewer system to treat the wastewater and the costs associated with providing the treatment.

6. WHAT SETBACK REQUIREMENTS MUST I MEET FOR MY DISCHARGE?

If the discharge is authorized under Rules 2216 or 2218, the point of discharge must be at least 100 feet within the property boundary, unless an alternate distance is required or allowed by the department. Also, there are requirements under Rule 2204(2)(d) for isolation distances from existing water supply wells. The following table lists those isolation requirements.

Well Type	Permit Authorization – 2218, 2216(3)	All Other Authorizations
I, IIa	2000 feet	200 feet
IIb, III	800 feet	75 feet
Domestic	300 feet	50 feet

7. WHAT IF I HAVE AN EXISTING PERMIT, AND THERE IS A CHANGE IN MY DISCHARGE?

If you anticipate there will be a change in either the quantity or quality of your discharge, you must notify the department prior to making the change. Within 30 calendar days of receiving the notice of modification, the department will notify you whether the modification is considered minor or significant. If the department determines the change is minor, you can make the changes you have identified, and the existing permit will be modified to reflect those changes. The department will send you a copy of the amended permit. If the changes are determined to be significant, then you must reapply for a permit by completing the application form and submitting it to the department for review and approval.

8. HOW DO I DEMONSTRATE EQUIVALENCY?

In many instances, the Part 22 rules allow you to provide equivalent information or alternative ways of meeting the conditions of the Rules. To demonstrate equivalency, you should provide both a narrative description and technical data to show that the alternative proposed meets the intent and achieve the same purpose as the Rule in question. For example, there are specific requirements for source water for Fruit & Vegetable washwater, Rule 2211(c), including municipal water, a water source meeting state or federal criteria, or water meeting standards of Rule 2222. An alternative water source not specified is surface water. If you wish to use surface water, you need to describe and demonstrate, possibly through water quality testing, how the surface water meets the intent of the Rule and provides equivalent environmental protection to the sources specified in the Rule.

B. IDENTIFYING THE TYPE OF AUTHORIZATION REQUIRED

This section lists all of the specific discharges identified in the Part 22 Rules. You should review the list and determine if your discharge is listed, and then follow the directions for how that particular discharge receives authorization.

1. EXEMPTIONS

Pursuant to Rule 2210 the activities listed below are automatically authorized and are exempt from obtaining a further authorization from the department, provided the requirements of Rule 2204 are met. You do not need to submit an application form.

- (a) Sanitary sewage in either of the following circumstances if the sanitary sewage is not mixed with other waste:
 - (i) The discharge is less than 1,000 gallons per day and the disposal system is approved by the county, district, or city health department that has jurisdiction in accordance with either the requirements of the local sanitary code or the provisions of the publication entitled "Michigan Criteria for Subsurface Sewage Disposal," April 1994. Copies of the publication may be obtained without charge at the time of adoption of these Rules from the Michigan Department of Environmental Quality, Water Division, P.O. Box 30630, Lansing, Michigan 48909.
 - (ii) The discharge is less than 6,000 gallons per day, the disposal system is designed and constructed in accordance with the provisions of the publication entitled "Michigan Criteria for Subsurface Sewage Disposal," April 1994, and the system is approved by the county, district, or city health department that has jurisdiction. Copies of the publication may be obtained without charge at the time of adoption of these Rules from the Michigan Department of Environmental Quality, Water Division, P.O. Box 30630, Lansing, Michigan 48909.

- (b) **Controlled application of any of the following:**
 - (i) An authorized substance to suppress dust. The following are authorized substances:
 - (A) Water.
 - (B) Calcium chloride.
 - (C) Lignosulfate products.
 - (D) Emulsified asphalt or resin stabilizers.
 - (E) Vegetable by-products.
 - (ii) A deicing substance.
 - (iii) A substance for a natural resource or right-of-way maintenance program.
 - (iv) A substance for a domestic activity.
 - (v) A commercially manufactured pesticide or fertilizer for its intended use.
- (c) **Stormwater, other than from a secondary containment facility, when discharged through surface infiltration.**
- (d) **Stormwater from a secondary containment facility that does not contain leaks or spills if the stormwater is inspected to ensure it meets the standards established in Rule 2222.**
- (e) **Water from a well used temporarily for dewatering at a construction site if the water pumped does not create a site of environmental contamination under part 201.**
- (f) **A discharge from an animal feeding operation that has less than 5,000 animal units if the discharge is determined by the director of the department of agriculture or his or her designated representative, to be in accordance with generally accepted agricultural and management practices, as defined in Act No. 93 of the Public Acts of 1981, as amended, being 286.471 to 286.474 of the Michigan Compiled Laws, and known as the Michigan right to farm act. For purposes of this Rule, 5,000 animal units is equal to 5,000 head of slaughter or feeder cattle, 3,500 mature dairy cattle, 12,500 swine weighing more than 25 kilograms or approximately 55 pounds, 50,000 sheep or lambs, 2,500 horses, 275,000 turkeys, 150,000 laying hens or broilers, or 25,000 ducks. An animal feeding operation is a lot or facility, or series of lots or facilities under one ownership which are adjacent to one another or which use a common area or system for the disposal of wastes, that meets both of the following conditions:**
 - (i) Animals, other than aquatic animals, have been, are, or will be stabled or confined and fed or maintained for a total of 45 calendar days or more in any 12-month period.
 - (ii) Crops, vegetation, forage growth, or postharvest residues are not sustained in the normal growing season over the portion of the lot or facility where animals are confined.
- (g) **Less than 50 gallons of wastewater per day from a commercial animal care facility.**
- (h) **Observation or monitoring well development or evacuation water.**
- (i) **Potable water used for a domestic or domestic equivalent activities other than sanitary sewage disposal.**
- (j) **Step test or pump test water from any of the following:**
 - (i) A potable well or well used to develop a potable water supply.
 - (ii) A well producing water that meets state or federal criteria for use as potable water.
 - (iii) A test well where the quality of the test well discharge water is equal to or better than the background groundwater quality of the aquifer receiving the discharge.
- (k) **Exfiltration from sanitary sewer collection systems.**
- (l) **Wastewater from a heat pump that has a heat exchange capacity of 300,000 Btu per hour or less if there is no chemical additive to the system.**
- (m) **Wastewater from a portable power washer when used in either of the following circumstances:**
 - (i) By the occupant of a household for washing buildings, vehicles, or other surfaces associated with the domestic occupation of the household.
 - (ii) By a commercial operator or in a commercial or industrial setting to remove nonpolluting substances from vehicles or surfaces when no additives are used and the washing process does not add significant pollutants to the water.
- (n) **Swimming pool drainage and backwash water discharged in accordance with sections 12521 to 12534 of Act No. 368 of the Public Acts of 1978, as amended, being 333.12521 to 333.12534 of the Michigan Compiled Laws.**
- (o) **Water treatment filter backwash water if disposal is in accordance with plans and specifications approved by the department under Act No. 399 of the Public Acts of 1976, as amended, being 325.1001 et seq. of the Michigan Compiled Laws, and known as the safe drinking water act.**

- (p) Carpet cleaning wastewater discharged by a noncommercial operator or by a commercial operator at a site receiving wastewater from not more than one location where carpet cleaning has occurred.
- (q) Less than 10,000 gallons per day of noncontact cooling water that does not contain additives if the source of the cooling water is any of the following:
 - (i) A municipal water supply.
 - (ii) A water supply meeting state or federal criteria for use as potable water.
 - (iii) Another source of water meeting the standards of Rule 2222.
 - (iv) Another source approved by the department.
- (r) Land application of process sludge from a wastewater treatment facility treating sanitary sewage when applied in accordance with applicable state and federal law.
- (s) Land application of process sludge from an industrial or commercial wastewater treatment facility when authorized under R 299.4101 to R 299.4922, the administrative Rules implementing Part 115.
- (t) Placement of other solid waste on the ground when authorized under Part 115. This provision does not apply to the disposal of wastewater generated through the operation of a facility licensed under Part 115.
- (u) Wastewater associated with an environmental response activity described in any of the following paragraphs if the discharge is to the plume of groundwater contamination, including an area 100 feet hydraulically upgradient of the edge of the plume, and any additive used in the treatment process that is not part of the contamination plume meets the standards of Rule 2222:
 - (i) A pump test discharge that does not change the physical dimensions of the plume in groundwater or, if the dimensions are changed, the changes are accounted for in the design of the final groundwater remediation plan.
 - (ii) A remedial investigation, feasibility study, or remedial action discharge that is at or below the residential criteria authorized by section 20101a(1)(a) of the act, if applicable, or section 21304(a) of the act, if applicable.
 - (iii) A discharge for a remedial investigation, feasibility study, or remedial action above the residential criteria authorized by section 20101a(1)(a) of the act, if applicable, or section 21304(a) of the act, if applicable, if a remediation investigation, feasibility study, or remediation plan has been approved by the department division that has compliance oversight. The remediation plan must indicate that the treatment system is designed and will be operated so that contaminated groundwater will eventually meet the appropriate land use-based cleanup criteria authorized by section 20120a(1)(a) to (d) of the act, if applicable, or section 21304(a) of the act, if applicable.
- (v) Precipitation and snow melt drainage off vehicles discharged through a general-purpose floor drain in a parking structure in which maintenance activities do not occur.
- (w) A discharge that has been specifically authorized by the department under a permit if the permit was not issued under this part.
- (x) A discharge that occurs as the result of placing waste materials on the ground in compliance with a designation of inertness issued under part 115 or leaving contaminated materials in place in compliance with part 201 or 213.

2. OTHER DISCHARGE SPECIFIC EXEMPTIONS.

Rule 2210 (y) allows discharges other than those listed above to be exempted from permitting on a case by case basis, if the department determines the discharge has an insignificant potential to be injurious based on volume and constituents.

To apply for an exemption according to Rule 2210(y), you should fill out pages 14-17 of the application, which contain general information about the facility. You should also provide the information required on Page 40 of the application. The department will notify you whether your application qualifies for an exemption under Rule 2210(y), or whether you must apply for a different authorization. You are not authorized to discharge until you receive approval from the department.

3. IF I DON'T QUALIFY FOR AN EXEMPTION, WHAT SORT OF AUTHORIZATION DO I NEED?

The following chart lists specific discharges for which you must submit an application prior to authorization. The chart also contains the Rule that describes the authorization and the page numbers in the application that relate to that specific authorization. Please note that there are specific qualifications that must be met for each of the authorizations listed which are contained in the Part 22 rules.

<u>Discharge Type</u>	<u>Volume Limitation</u>	<u>Rule</u>	<u>Authorization</u>	<u>Page #</u>
Commercial Animal Care	>50 gpd but <1,000 gpd	2211(h)	Notification	19, 22
Contact Cooling Water	< 5,000 gpd	2213(4)	Notification w/Certification	23, 25
Egg Washing	< 10,000 gpd	2213(3)	Notification w/Certification	23, 24
Fruit & Vegetable Washing	< 50,000 gpd	2211(d)	Notification	19, 20
Gravel, sand, limestone, dolomite mining		2215(4)	General Permit	27, 30
Hydrostatic Pipe Testing, Flushing	None	2211(g)	Notification	19, 21
Laundromat	< 500 gpd	2211(b)	Notification	19, 20
Laundromat	< 20,000 gpd	2216(4)	Permit, specific discharge	32, 35
Non-contact Cooling Water, w/additives	< 10,000 gpd	2213(2)	Notification w/Certification	23, 24
Non-contact Cooling Water, no additives	> 10,000 gpd	2211(c)	Notification	19, 20
Oil Field Brine		2215(5)	General Permit	27, 30
Portable Power Wash	1,000 gal/mo/acre	2211(e)	Notification	19, 21
Sanitary Sewage	6,000-10,000 gpd	2211(a)	Notification	19, 20
Sanitary Sewage, above ground treatment	<10,000 gpd	2215(1)	General Permit	27, 28
Sanitary Sewage, Construct Wetland	< 20,000 gpd	2216(2)	Permit, specific discharge	32, 33
Sanitary Sewage, Specific Treatment	< 50,000 gpd	2216(3)	Permit, specific discharge	32, 34
Slaughterhouse	< 2,000 gpd	2215(3)	General Permit	27, 29
Groundwater Remediation:				
Pump Test Outside Plume	None	2211(f)	Notification	19, 21
Remediation, Outside Plume	None	2213(5)	Notification w/Certification	23, 26
Vehicle Wash, not open to public	< 2,000 gpd	2215(2)	General Permit	27, 28
Vehicle Wash, open to the public	< 3,000 gpd	2215(6)	General Permit	27, 31

gpd = gallons per day
gal/mo/acre = gallons per month per acre
< = less than
> = greater than

4. WHAT IF MY DISCHARGE TYPE DOES NOT APPEAR ON ANY OF THESE LISTS?

If your discharge does not appear on any of the previous lists, either as an exemption or a specific discharge permit, you must apply for a discharge authorization under Rule 2218. The section of the application that must be filled out specific to Rule 2218 begins on Page 36.

C. Rule 2218

1. IF I HAVE TO APPLY FOR AN AUTHORIZATION UNDER RULE 2218, WHAT TYPE OF INFORMATION MUST I PROVIDE?

Facilities that are authorized under Rule 2218 must provide the following types of information as part of the application:

- An evaluation of the feasibility of alternatives to discharge to the groundwater in accordance with Rule 2219.
- The basis of design as required by Rule 2218(2).
- The hydrogeological report as required by Rule 2221.
- The wastewater characterization as required by Rule 2220.
- If a standard applicable to the discharge is to be determined under Rule 2222(5), the information necessary to determine that standard, including whether a substance is a hazardous substance under part 201.
- The groundwater, or other media, sampling and analysis plan as specified by Rule 2223.
- A description of the discharge methods and information that demonstrate that the land treatment requirements of Rule 2233 will be met.
- If a lagoon is included in the treatment process, information that demonstrates that the requirements of Rule 2237 will be met.

Technical guidance documents have been drafted for items c,d,e,g and h above. They are identified in Part I, Section D.4 as additional reference materials. Sections C.2, C.3 and C.4 of these instructions provide guidance for the other information requirements of Rule 2218.

You are also responsible for meeting the groundwater quality standards contained in Rule 2222. You must meet the standards either in the discharge, or in the groundwater if treatment that takes place after discharging the wastewater to the ground. The standards themselves are complex, and it is strongly recommended that you schedule a pre-application meeting to discuss them with program staff. The process for requesting a meeting is found on Page 12, Section D.1 of these instructions. If you wish to investigate the standards on your own, the Part 22 Rules, including Rule 2222, are available on the Internet at the following location, <http://www.deq.state.mi.us/wmd/GWP/index.html>. You may also contact staff at the address or phone number found on Page 13 of these instructions for printed copies of the rules.

2. RULE 2219 - EVALUATION OF FEASIBILITY OF ALTERNATIVES TO DISCHARGE TO GROUNDWATER

Prior to applying for a Rule 2218 authorization, you must conduct an evaluation of the feasibility of alternatives to discharging to the groundwater and submit that as part of the application. The analysis should contain, at a minimum, the items listed below. Feasibility includes the practical ability to implement the alternative and a comparison of the cost of the alternative to its benefits.

At a minimum, alternatives to the discharge that must be considered are:

- (a) minimizing the volume and toxicity of the wastewater.
- (b) recycling wastewater.
- (c) connecting to a municipal sanitary sewer system.
- (d) discharging to surface water.

Alternatives for minimizing the volume and toxicity of wastewater include pollution prevention opportunities, including the following:

- (a) Equipment or technology modifications.
- (b) Process or procedure modifications.
- (c) Reformulation or redesign of products.
- (d) Substitution of raw materials.
- (e) Improvements in housekeeping, maintenance, training, or inventory control.

The following treatment systems must be considered for substances determined to be in the discharge by the characterization required by Rule 2220:

- (a) For a metal, the following:
 - (i) Flocculation.
 - (ii) Settling.
 - (iii) Oxidation.
 - (iv) Filtration.
 - (v) Ion exchange
 - (vi) Reverse osmosis.
 - (vii) Electrolytic recovery.
- (b) For a volatile substance, the following:
 - (i) Carbon adsorption.
 - (ii) Air stripping.
 - (iii) Aeration.
- (c) For a nonvolatile substance, the following:
 - (i) Sorption.
 - (ii) Settling.
 - (iii) Filtration.

For a substance that degrades biologically, biological treatment in a lagoon, tank, or biological reactor or through controlled land treatment.

3. RULE 2218(2), BASIS OF DESIGN

At the time of application, you must submit a basis of design for the treatment system. The basis of design should include all of the following information:

- (a) The volume of wastewater to be treated per unit of time.
- (b) An analysis of the influent, or a description of the anticipated influent, including the substances to be treated to meet the requirements of Rule 2222 and the concentrations of the substances.
- (c) A description of the existing or proposed treatment, or both; including, where applicable, the following:
 - (i) The treatment methods before discharge.
 - (ii) To the extent applicable, engineering plans depicting all of the following:
 - (A) A schematic flow diagram.
 - (B) Information on unit processes.
 - (C) Flow rates.
 - (D) Design hydraulic capacity.
 - (E) Pollutant loading.
 - (F) Detention times.
 - (G) Sizing of treatment units.
 - (H) Design calculations for major treatment units.
 - (I) A description of sludge management.
 - (iii) A discharge management plan that includes, where applicable, all of the following information:
 - (A) Maximum daily and annual discharge volumes.
 - (B) The total discharge area.
 - (C) Scheduled maintenance.
 - (D) Vegetative cover control and removal.
 - (E) Load and rest cycles.
 - (F) Application rates.
 - (G) Means for even distribution of waste or wastewater.
 - (H) Strategies for periods of adverse weather.
 - (I) Monitoring procedures.
 - (J) Other pertinent information.
- (d) For a discharge of sanitary sewage, unless the Rules provide otherwise, the treatment system must be consistent with the standards in chapter 10 of the publication entitled "Engineering Reports and Facility Plans of the Recommended Standards for Wastewater Facilities" 1997 edition. The standards in chapter 10 are adopted by reference in the Rules. The standards may be purchased from Health Education Services, P.O. Box 7126, Albany, New York 12224, or from the Michigan Department of Environmental Quality, Water Division, P.O. Box 30630, Lansing, Michigan 48909, at a cost at the time of adoption of these Rules of \$12.00, plus shipping and handling.

4. RULE 2223 - DISCHARGE MONITORING.

You are required to monitor your discharge in a manner, at a frequency, and for a substance(s) the department specifies are necessary to assess compliance with these Rules. The components of a monitoring program are:

- (1) Monitoring of an indicator parameter may be used in monitoring if the technique accurately reflects the effect of the discharge. An indicator parameter must be representative of the environmental fate of a substance or substances in the discharge and must be one of the following:
 - (a) A substance in the discharge.
 - (b) A decomposition material of a substance.
 - (c) A sampling parameter that can be directly correlated to the concentration of another substance in the discharge.
- (2) Groundwater monitoring must include the collection of water quality and water level data from a well or group of wells that are specifically designed to adequately assess the impact of the discharge on groundwater. The design of the groundwater monitoring system must be based on all of the following:
 - (a) The hydrogeologic report.
 - (b) Considerations of the local geology.
 - (c) Groundwater conditions specific to each site.
 - (d) The type of discharge.

- (3) At the time of application for a permit under Rule 2218, an applicant must propose, for department approval, a groundwater sampling and analysis plan that establishes criteria for collecting representative samples of groundwater. The plan must contain all of the following information:
- (a) The number and location of wells to be included in the groundwater monitoring system.
 - (b) For each well, the depth and screened interval for each monitor well. The screened interval must be referenced to United States geological survey data.
 - (c) Well construction materials and installation techniques.
 - (d) Sampling frequency.
 - (e) A list of substances to be sampled.
 - (f) Sampling procedure, including all of the following:
 - (i) The method and volume of water removed from each well during sampling.
 - (ii) Steps taken to prevent cross contamination between wells.
 - (iii) Sample handling and preservation methods.
 - (iv) Laboratory analysis method.
 - (v) Laboratory method detection level.
 - (vi) Quality assurance and quality control program.
 - (g) A description of the techniques used to present and evaluate groundwater quality monitoring data.
 - (h) A description of the method used to collect static water levels and present groundwater flow data. Static water level precision must be to 0.01 foot.
- (4) A discharger must design, construct, and abandon a monitoring well as follows:
- (a) A monitoring well must be located at a depth where the screened interval will intercept the path of any discharge from the site in the groundwater.
 - (b) If the thickness of the aquifer receiving the discharge is more than 20 feet, then at least one hydraulically downgradient monitor well location must contain a cluster well. The separation and length of the screens must be such that discrete groundwater potentiometric surface data can be collected to determine vertical gradients within the aquifer.
 - (c) Monitor well construction and sampling equipment materials must not influence the sampling results for the substances sampled.
 - (d) A monitor well must be designed to collect an adequate volume of water to allow analysis for the complete set of substances indicative of the discharge.
 - (e) Annular space between the borehole and the well must be grouted from the ground surface to two feet above the well screen to prevent vertical leakage of the fluids between the casing and the drill hole. When drilling through confining layers, a discharger must install double-cased wells to prevent the hydraulic connection of fluids between formations above and below the confining layer.
 - (f) A well must be protected against the introduction of contaminants by means of a locking device or by another method approved by the department.
 - (g) A well must be vented so that accurate static water levels may be collected, or well caps must be removed a sufficient amount of time before measurement so that representative static water levels can be measured. Care must be taken to prevent the introduction of contaminants through vents.
 - (h) The well casing must be adequately marked and protected against accidental damage.
 - (i) A well must be labeled so that the discharger's name, address and the well number can be determined through the life of the permit.
 - (j) If a monitoring well is to be permanently abandoned, a discharger must follow the plugging procedures in part 127 of Act No. 368 of the Public Acts of 1978, as amended, being 323.12701 to 323.12715 of the Michigan Compiled Laws.
 - (k) A discharger must receive department approval before installing, replacing, redeveloping, or abandoning a monitoring well that is part of the discharge-monitoring program.
- (5) If necessary to measure compliance with a standard established under Rule 2222, the department may specify the monitoring of media in addition to groundwater.
- (6) A monitoring program under this Rule must be evaluated by the department on the basis of the threat the discharge poses to protected uses given all of the following factors:
- (a) The substances in the discharge.
 - (b) The volume of the discharge.
 - (c) The amount of information related to predicting the impacts of a discharge developed through the hydrogeological report prepared under Rule 2221.

D. APPLICATION PROCESS

At this point, you should be aware of the type of authorization that you will need from the department. This section describes the process of filing an application form with the department, formally requesting the authorization.

1. WHEN DO I HAVE TO APPLY?

For new discharges or significant changes to an existing discharge, you must submit the application at least 180 days in advance of the proposed date of discharge or significant change (Rule 2106). Permits are generally issued for five years, at which time an updated application must be submitted. For reissuance of an existing permit, you must submit the completed application form and the necessary attachments 180 days prior to the expiration date of your current permit (Rule 2151(1)).

It is strongly recommended, especially prior to submitting an initial application or an application for a Rule 2218 authorization, that you request a pre-application meeting with staff of the Groundwater Section, Water Division. Technical staff will be available to discuss the proposed discharge, and can answer questions and provide information to you regarding such items as treatment alternatives, hydrogeologic studies, waste characterization, etc. It is recommended that you and/or your consultant be prepared to describe, at least in general terms, the basis of design for the proposed or existing wastewater treatment and disposal facilities.

To arrange a pre-application meeting, please contact:

Groundwater Discharge Unit Chief
Permits Section
Water Bureau
PO Box 30273
Lansing, MI 48909
Telephone: 517-373-8148
Fax: 517-241-1328

2. HOW IS THE FORM ORGANIZED?

The application form is divided into two sections. Section I, pages 14-17, consists of general information that must be filled out by all applicants. (Occasionally, especially for general permits, not every item in Section I will be required, so please only fill out the applicable portions. For example, if you are applying for a General Permit under Rule 2215 for brine spreading, you would not fill out Item 7 which requests a CMR address). Section II contains information that must be filled out for specific discharges. An index appears after the general information section of the application, Page 18, which lists all of the specific discharges, Rules 2213 through 2216, and other discharges, covered under Rule 2218, and directs you to the appropriate pages for each particular discharge. Many of the discharges require supporting documentation of one kind or another. There are guidesheets available, listed on Page 13 as available reference materials, which provide guidance on how to gather and report the information in a manner that is acceptable to the Department. This does not preclude you from using alternative methods. It only means that if the guidance is followed very carefully, the methodology for collecting and reporting the information will be acceptable.

3. WHO MUST SIGN THE FORM?

The Part 21 Rules have very specific requirements for who must sign an application form. For a corporation, the form must be signed by a principal executive officer of at least the level of vice president, or his/her designated representative, if the representative is responsible for the overall operation of the facility from which the discharge described in the permit application (appropriate documentation must be provided to demonstrate the position and responsibility of the designated representative). For a partnership, the form must be signed by a general partner, for a sole proprietorship, by the proprietor. For municipal, state or other public facility, the form must be signed by either a principal executive officer, the mayor, village president, city or village manager or other duly authorized employee. All signatures submitted to the department must be original signatures, or the application will be returned to you. The details of these requirements are found in Rule 2114.

4. WHAT ADDITIONAL REFERENCE MATERIALS ARE AVAILABLE?

The following are a list of the acts, rules, forms and other items that can be obtained from the Groundwater Program Section to assist an applicant in filling out an application form and providing information necessary to obtain a groundwater discharge permit or permit exemption:

1. Part 31 Water Resources Protection of Act 451
2. Part 41 Sewerage Systems of Act 451
3. Part 21 Wastewater Discharge Permits - Rules of Part 31 of Act 451
4. Part 22 Groundwater Quality - Rules of Part 31 of Act 451
5. Communities Participating in the Michigan Wellhead Protection Plan
6. Guidesheet I Guidance document for hydrogeologic studies
7. Guidesheet II Guidance document for irrigation management plans
8. Guidesheet III Guidance document for waste characterization
9. Guidesheet IV Guidance document for wastewater treatment and storage lagoons
10. Guidesheet V Guidance document for development of toxicology information
11. Guidesheet VI Guidance document for the Operation and Maintenance Manual

Requests for any of the above items should be made to:

Permits Section
Groundwater Discharge Unit
Water Bureau
Michigan Department of Environmental Quality
P. O. Box 30273
Lansing, Michigan 48909
Telephone: 517-373-8148
FAX: 517-241-1328

There is a charge of 5 cents per page to cover handling costs.

This information is also available electronically on the Internet at the following address:

http://www.michigan.gov/deq/0,1607,7-135-3313_4117--,00.html

5. WHAT IF I HAVE QUESTIONS?

If you have questions about the form or process, please call or fax your questions to the following numbers:

Telephone: 517-373-8148
FAX: 517-241-1328

6. WHERE SHOULD I SEND THE COMPLETED FORM?

Please provide two copies, including the signed original, of the application form and all pertinent attachments, to the following address:

Permits Section
Groundwater Discharge Unit
Water Bureau
Michigan Department of Environmental Quality
P. O. Box 30273
Lansing, Michigan 48909

7. DO THE RULES SPECIFY OPERATIONAL REQUIREMENTS?

Appendix B, Pages 45-46, provides an outline of the operational requirements that are mandated by the Part 22 Rules for each particular authorization. Please refer to the specific rule for detailed requirements.

8. PENALTIES

It is against the law to knowingly discharge wastewater into the groundwater without a permit or in violation of an existing permit. It is also against the law to intentionally make false statements in a permit application. A person who commits these offenses is guilty of a felony and substantial fines, and perhaps imprisonment, are the consequences. Section 3115(2) of Act 451 contains the details of the penalties associated with violating Part 31.

The Michigan Department of Environmental Quality (MDEQ) will not discriminate against Any individual or group on the basis of race, sex, religion, age, national origin, color, marital status, disability, or political beliefs. Questions or concerns should be directed to the Office of Personnel Services, PO Box 30473, Lansing, MI 48909

Groundwater Discharge Permit Application

REFERENCES IN THIS DOCUMENT TO "RULES" ARE TO ADMINISTRATIVE RULES IMPLEMENTING PART 31 OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994 PA 451, AS AMENDED, BEING R 323.2101 TO 2192 AND R 323.2201 TO 2240.

GENERAL INFORMATION

Please type or print clearly

1. DISCHARGE FACILITY NAME		
2. FACILITY OWNER NAME AND MAILING ADDRESS		
Name		
Street Address or P.O. Box		
City, State and Zip Code		
Telephone No.		
Fax No.		
3. CONTACT PERSON		
Name and Title		
Street Address or P.O. Box		
City, State and Zip Code		
Telephone No.		Fax No.
4. DISCHARGE LOCATION		
Street Address		
City	State	Zip Code
County	Township	
Township	Range	Section Number
First Quarter Section	Second Quarter Section	Additional Quarter Sections
Latitude	Longitude	
5. FACILITY TYPE		
Municipal (Sanitary Only) _____	Municipal (w/ Sanitary and Industrial Wastewater Inputs) _____	
Industrial _____	Commercial _____	
If Municipal, population served _____		
6. CERTIFIED OPERATOR (NOT REQUIRED FOR 2211(c), (d), (e), (g), (h), or 2213 (2), (3), (4))		
A Certified Operator is required by Section 3110 (1) of Part 31 of Act 451.		
Name	Certification Number	
Street Address		
City	State	Zip Code
Telephone No.		

7. FOR RULE 2215, 2216 AND 2218 AUTHORIZATIONS ONLY:

PLEASE INDICATE WHERE THE COMPLIANCE MONITORING REPORT FORMS SHOULD BE SENT

NAME

STREET ADDRESS

CITY

STATE

ZIP CODE

8. AUTHORIZATION REQUESTED:

<input type="checkbox"/> Rule 2210(y), Site Specific Exemption	<input type="checkbox"/> NEW USE	<input type="checkbox"/> REISSUANCE
<input type="checkbox"/> Rule 2211, Notification	<input type="checkbox"/> NEW USE	<input type="checkbox"/> REISSUANCE
<input type="checkbox"/> Rule 2213, Notification with Certification	<input type="checkbox"/> NEW USE	<input type="checkbox"/> REISSUANCE
<input type="checkbox"/> Rule 2215, General Permit, Certificate of Coverage	<input type="checkbox"/> NEW USE	<input type="checkbox"/> REISSUANCE
<input type="checkbox"/> Rule 2216, Specific Discharges	<input type="checkbox"/> NEW USE	<input type="checkbox"/> REISSUANCE
<input type="checkbox"/> Rule 2218, Discharge Permit	<input type="checkbox"/> NEW USE	<input type="checkbox"/> REISSUANCE

IF REQUESTING A REISSUANCE OR AN AUTHORIZATION DIFFERENT THAN THE CURRENT AUTHORIZATION, PLEASE INCLUDE THE PERMIT/EXEMPTION NUMBER OF THE CURRENT AUTHORIZATION:

If the current authorization is a permit, Rules 2216 or 2218, or was issued prior to August 26, 1999, the number is:

M _____

If the current authorization is a General Permit, Rule 2215, the number is:

MG _____

If the current authorization is a site specific exemption, Rule 2210(y), or was issued prior to August 26, 1999, the number is:

GWE- _____

If the current authorization is a notification, Rule 2211, the number is:

GWN- _____

If the current authorization is a notification/certification, Rule 2213, the number is:

GWC- _____

9. FACILITY STANDARD INDUSTRIAL CLASSIFICATION (SIC) CODE. _____

This information is available through the US Department of Labor, Office of Safety and Health Administration, at the following web address: www.osha.gov/oshstats/sicser.html

10. SITE MAPS

Provide two black and white 8 1/2" X 11" maps drawn to scale that show the following:

SITE MAP 1

- Discharge location in relation to property boundaries on a topographic map.
- Township and county name.
- North arrow orientation.

SITE MAP 2 - All sites must include item a, include items b-e as necessary.

- Current and proposed treatment units and discharge areas and distance to property lines.
- Monitoring wells on site and on adjacent properties.
- Potable wells on site and on adjacent properties.
- Surface waters, including wetlands, lakes, rivers, streams, and drains on the property.
- Distance between multiple disposal sites.

ATTACH SITE MAP TO THIS APPLICATION FORM

11. WATER USAGE DIAGRAM

Please attach an 8 1/2 x 11 diagram showing water usage at the facility, from supply to discharge. Include all flows such as sanitary, process water, etc. Please also indicate where in the system additives or other substances are added to the waste stream for which this authorization is being sought. The water balance should show daily average flow rates at influent, intake and discharge points and daily flow rates between treatment units. Please use actual measurements whenever possible.

12. OWNERSHIP OF TREATMENT SYSTEM AND DISPOSAL AREA

Are all parts of the treatment system and discharge areas (e.g. treatment plant, underground piping or irrigation fields) located on property owned by the applicant? Yes _____ No _____

IF NO, ATTACH THE NAME AND ADDRESS OF THE PROPERTY OWNER WHERE THE DISCHARGE WILL OCCUR, AND A COPY OF THE WRITTEN PERMISSION TO DISCHARGE ON PROPERTY NOT OWNED BY THE DISCHARGER.

13. PROXIMITY OF TREATMENT SYSTEM TO A KNOWN SOURCE OF GROUNDWATER CONTAMINATION

Are there any known groundwater contamination sites within 1/4 mile of your disposal site?

Yes _____ No _____ Unknown _____

IF YES, ATTACH TO THE APPLICATION FORM A DESCRIPTION OF THE LOCATION AND CONTAMINANTS BEING REMEDIATED AT THE SITE.

14. ISOLATION DISTANCE

The following are isolation distances required from the discharge to adjacent water supply wells. What is the distance from your discharge to the nearest water supply well?

WELL TYPE	PERMIT AUTHORIZATION: 2218, 2216(3)	ALL OTHER AUTHORIZATIONS
I, IIa	2000	200
IIb, III	800	75
Domestic	300	50

Distance to nearest Type I, IIa water supply well _____

Distance to nearest Type IIb, III water supply well _____

Distance to nearest Domestic water supply well _____

15. ADJACENT PROPERTY OWNERS

List the names and addresses of all property owners adjacent to the facility, treatment systems and discharge locations. Include properties across roadways.

ATTACH ANY ADDITIONAL NAMES AND ADDRESSES TO THE APPLICATION FORM.

NAME

COMPLETE MAILING ADDRESS

16. WELLHEAD PROTECTION

Is your facility located in a designated wellhead protection area? Yes _____ No _____

If yes, please identify the community*

- Approved wellhead protection areas can be reviewed at the following web address:
http://www.michigan.gov/deq/0,1607,7-135-3313_3675_3695-59280--,00.html

17. SIGNATORY REQUIREMENT

Pursuant to Rule 2114 of the Part 21 Rules, this application must have an original signature, and be signed by

the appropriate representative(s) as follows:

- A. For a corporation, the form must be signed by a principal executive officer of at least the level of Vice-president, or his/her designated representative, if the representative is responsible for the overall operation of the facility from which the discharge described in the permit application (appropriate documentation must be provided to demonstrate the position and responsibility of the designated representative).
- B. For a partnership, the form must be signed by a general partner.
- C. For a sole proprietorship, the form must be signed by the proprietor.
- D. For municipal, state or other public facility, the form must be signed by either a principal executive officer, the mayor, village president, city or village manager or other duly authorized employee.

All signatures submitted to the department must be original signatures, or the application will be returned as incomplete. The details of these requirements are found in Rule 2114.

The department reserves the right to request information in addition to that supplied with this application if necessary to verify statements made by the applicant or for the department to make a determination required by Part 31, Water Resources Protection, Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451) and/or the Part 22 Rules associated with Part 31.

I certify, under penalty of law, that I have personally examined and am familiar with the information submitted in this document and all attachments. The information being submitted was collected and analyzed in accordance with the Part 22 Rules of Part 31 of Act 451, as amended. Based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the 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.

Print Name _____ Title _____

Representing _____

Signature _____ Date _____

If the application is for the discharge of treated sanitary wastewater from a privately owned treatment system serving a mobile home park, campground, apartment complex, condominium, nursing home, prison, or other commercial or residential facility, a principal executive officer or ranking elected official from the local unit of government must sign the permit application in the space provided. The signature is only a certification that the local unit of government is aware of its responsibilities as set forth in Section 3109(2) of Act 451. The refusal of the local unit of government to sign the application does not reduce its liability under the statute.

This is to certify that I am aware of and recognize the responsibilities of the municipality as set forth in Section 3109 of Act 451.

Print Name _____ Title _____

Representing _____

Signature _____ Date _____

THE FOLLOWING INDEX SHOWS WHERE EACH OF THE DISCHARGE SPECIFIC PAGES ARE LOCATED. PLEASE FILL OUT THE APPROPRIATE PAGES FOR THE SPECIFIC DISCHARGE PROPOSED AND ATTACH ALL SUPPORTING DOCUMENTATION.

PERMIT INDEX, AUTHORIZATION SPECIFIC INFORMATION

RULE 2211 AUTHORIZATION:		RULE SPECIFIC
<u>WASTEWATER TYPE</u>	<u>DAILY MAXIMUM DISCHARGE, GALLONS</u>	<u>PAGES TO BE FILLED OUT</u>
(a) Sanitary Sewage	6,000 – 10,000	19, 20
(b) Laundromat	< 500	19, 20
(c) Non-contact Cooling Water	>10, 000	19, 20
(d) Fruit & Vegetable Washwater	< 50,000	19, 20
(e) Portable Power Washer		19, 21
(f) Pump test Water		19, 21
(g) Hydrostatic Test Water		19, 21
(h) Commercial Animal Care	50 - 1,000	19, 22

RULE 2213 AUTHORIZATION:

<u>WASTEWATER TYPE</u>		
(2) Non-contact cooling water, with additives	< 10,000	23, 24
(3) Egg washing wastewater	< 10,000	23, 24
(4) Cooling water	< 5,000	23, 25
(5) Groundwater remediation, outside plume		23, 26

RULE 2215 AUTHORIZATION

<u>WASTEWATER TYPE</u>		
00-1 Sanitary Sewage, above ground	< 10,000	27, 28
00-2 Vehicle wash, not open to public	< 2,000	27, 28
01-3 Slaughterhouse	< 2,000	27, 29
00-4 Gravel, sand, limestone, dolomite mining		27, 30
00-5 Oil Field Brine		27, 30
01-6 Vehicle wash, open to the public	<3,000	27, 31

RULE 2216 AUTHORIZATION: **

<u>WASTEWATER TYPE</u>		
(2) Sanitary Sewage, Constructed Wetland	< 20,000	32, 33
(3) Sanitary Sewage, Specific 2216 Design	< 50,000	32, 34
(4) Laundromat wastewater	< 20,000	32, 35

RULE 2218 AUTHORIZATION, WHICH COVERS DISCHARGES NOT OTHERWISE LISTED

New Permits	36, 37
Reissuance Permit, No Modifications	36, 38
Reissuance Permits, With Significant Modifications	36, 39

RULE 2210(y) AUTHORIZATION, SITE SPECIFIC EXEMPTION 40

> = GREATER THAN
 < = LESS THAN

**RULE 2216 LISTS SPECIFIC DESIGN CRITERIA THAT MUST BE MET TO IN ORDER TO QUALIFY FOR THAT AUTHORIZATION. DISCHARGERS THAT MEET THE FLOW AND WASTEWATER CRITERIA, BUT DO NOT MEET THE DESIGN CRITERIA, MUST EITHER DEMONSTRATE EQUIVALENCY WITH THE RULE 2216 CRITERIA, OR APPLY FOR A PERMIT UNDER RULE 2218.

PERMIT BY RULE; NOTIFICATION

RULE 2211

A facility is authorized to discharge at the time a complete application is received by the department. The permittee will receive an acknowledgement letter from the department, indicating that the application was considered complete or is deficient, in which case the discharge would not be authorized.

1. RULE 2211 AUTHORIZATION REQUESTED:

<u>Wastewater Type</u>	<u>Daily Maximum Discharge, Gallons.</u>
<input type="checkbox"/> (a) Sanitary Sewage	6,000 – 10,000
<input type="checkbox"/> (b) Laundromat	< 500
<input type="checkbox"/> (c) Non-contact Cooling Water, w/o additives	>10, 000
<input type="checkbox"/> (d) Fruit & Vegetable Washwater	<50,000
<input type="checkbox"/> (e) Portable Power Washer	
<input type="checkbox"/> (f) Pump Test Water	
<input type="checkbox"/> (g) Hydrostatic Test Water	
<input type="checkbox"/> (h) Commercial Animal Care	50 - 1,000

2. DISCHARGE VOLUME

ALL DISCHARGES:

Maximum daily discharge: _____ gallons per day

Cumulative annual discharge: _____ gallons per year

SEASONAL DISCHARGES SHOULD INCLUDE THE FOLLOWING:

Discharge period _____ through _____

3. DISCHARGE METHOD

Please check the discharge method used:

<u>LAND SURFACE DISPOSAL</u>	<u>DISPOSAL CODE</u>	<u>SUBSURFACE DISPOSAL</u>	<u>DISPOSAL CODE</u>
<input type="checkbox"/> Spray Irrigation	A1f1	<input type="checkbox"/> Tile Field	A1g1
<input type="checkbox"/> Ridge and Furrow	A1f2	<input type="checkbox"/> Injection well	A1g2
<input type="checkbox"/> Flood/Sheet Irrigation	A1f3	<input type="checkbox"/> Trench	A1g3
		<input type="checkbox"/> Drywell	A1g4
Seepage Beds:			
<input type="checkbox"/> Slow/Medium Rate	A1f4		
<input type="checkbox"/> Rapid Rate	A1f5		
<input type="checkbox"/> Other - Please describe:			

a. Sanitary Sewage, Rule 2211(a), 6,000-10,000 gallons per day. Please check all system characteristics that apply to this specific discharge:

- Discharge is between 6,000 and 10,000 gallons per day.
- Sanitary sewage is not mixed with other waste.
- System is, or is to be, designed in accordance with "Michigan Criteria for Subsurface Sewage Disposal."
- The system has been approved by the county, district or city health department having jurisdiction.
- If the facility was constructed or expanded after August 26, 1999, the flow is monitored by a meter.

b. Laundromat Wastewater, Rule 2211(b), less than 500 gallons per day. Please check all system characteristics that apply to this specific discharge:

- Discharge is less than 500 gallons per day.
- The treatment system consists of at least two 1,000 gallon septic tanks, followed by disposal to a tile field.
- There is an operational lint filter on the wastewater discharge line.
- The tile field is designed and constructed in accordance with "Michigan Criteria for Subsurface Sewage Disposal."
- The sanitary sewage is routed to the same septic tank or tanks as the laundry wastewater.

c. Non-contact cooling water, Rule 2211(c), more than 10,000 gallons per day, no additives. Please check all system characteristics that apply to this specific discharge:

- The discharge is greater than 10,000 gallons per day.
- The non-contact cooling water contains no additives.

Please check which one of the following applies:

- The source water is from a municipal supply.
- The water source meets state or federal criteria for use as potable water.
- The water source meets the standards of Rule 2222.
- The water source is an alternative to the above. Department approval is required, and supporting documentation is attached.

d. Fruit & Vegetable washwater, Rule 2211(d), less than 50,000 gallons per day. Please check all system characteristics that apply to this specific discharge:

- The discharge is less than 50,000 gallons per day.
- There are no additives in the discharge.
- There are additives in the discharge which will not cause the groundwater to exceed the standards of Rule 2222.

Please check which one of the following applies:

- The source water is from a municipal supply.
- The water source meets state or federal criteria for use as potable water.
- The water source meets the standards of Rule 323.2222.
- The water source is an alternative to the above. Department approval is required, and supporting documentation is attached.

Please list all additives in the discharge, and the concentration of the additive in the effluent. The concentration can be submitted as an analysis of the wastewater, or as a mass balance calculation. Wastewater characterization, including the use of mass balance calculations, should follow the guidance found in Guidesheet III.

<u>ADDITIVE</u>	<u>ANNUAL USE RATE</u>	<u>CONCENTRATION</u> (Indicate how determined, A for analysis, M for mass balance. Please remember to include units of measurement.)
-----------------	------------------------	--

e. Portable Power Washer, Rule 2211(e). Please check all system characteristics that apply to this specific discharge:

Only household soap or detergent readily available to consumers are used for cleaning.

- Additives other than soap and detergent are used only for their intended purpose and according to manufacturers' directions.
- A log of all locations where discharges occur will be maintained after receiving authorization to discharge, including date, address, additive(s) used, and item(s) washed.
- Washing will be limited to removal of dirt and grime from the exterior of a vehicle, equipment, or a stationary source. It will not include the undercarriage of a vehicle, or the portion of a vehicle used to contain or transport substances as a product.
- Discharge will be limited to less than 1000 gallons of washwater per month per acre where discharge occurs.

Please check which one of the following applies:

- The source water is from a municipal supply.
- The water source meets state or federal criteria for use as potable water.
- The water source meets the standards of Rule 323.2222.
- The water source is an alternative to the above. Department approval is required, and supporting documentation is attached.

f. Pump test water associated with environmental remediation, Rule 2211(f), discharge outside plume.
Please check all system characteristics that apply for this specific discharge:

- Discharge meets the standards of Rule 2222.

TREATMENT CODES

Select and enter the appropriate treatment codes to describe treatment units, i.e., A1b, B2b (See APPENDIX A, Pages 41-44).

Treatment Unit A _____

Treatment Unit B _____

Treatment Unit C _____

Treatment Unit D _____

TREATMENT SYSTEM

Please describe how the current treatment system is/will meet the standards of Rule 2222 and the number of years it has been in operation.

g. Hydrostatic testing or flushing water, Rule 2211(g). Please check all system characteristics that apply to this specific discharge:

- There are no additives in the discharge.
- The testing is for new pipelines or tanks.

Please check which one of the following applies:

- The source water is from a municipal supply.
- The water source meets state or federal criteria for use as potable water.
- The water source meets the standards of Rule 2222.
- The water source is an alternative to the above. Department approval is required, and supporting documentation is attached.

PERMIT BY RULE, NOTIFICATION WITH DEPARTMENT CERTIFICATION

RULE 2213

A facility is authorized to discharge when it receives a certification from the department that verifies the discharge is authorized under this part. Within 60 calendar days of receiving a complete notification form required by this Rule, the department will issue a certification or indicate why the discharger is not authorized to discharge under this Rule.

1. RULE 2213 AUTHORIZATION REQUESTED:

<u>Wastewater Type</u>	<u>Daily Maximum Discharge, Gallons</u>
<input type="checkbox"/> (2) Non-contact cooling water, with additives	< 10,000
<input type="checkbox"/> (3) Egg washing wastewater	< 10,000
<input type="checkbox"/> (4) Cooling water	< 5,000
<input type="checkbox"/> (5) Groundwater remediation, outside plume	

2. DISCHARGE VOLUME

ALL DISCHARGES:

Maximum daily discharge: _____ gallons per day

Cumulative annual discharge: _____ gallons per year

SEASONAL DISCHARGES SHOULD INCLUDE THE FOLLOWING:

Discharge period _____ through _____

IRRIGATION SYSTEMS AND SEEPAGE BEDS UTILIZING SOILS FOR TREATMENT SHOULD INCLUDE THE FOLLOWING:

Effluent application rate:
 Inches per hour _____ Inches per day _____ Inches per week _____ Inches per year _____

3. DISCHARGE METHOD

Please check the discharge method used:

<u>LAND SURFACE DISPOSAL</u>	<u>DISPOSAL CODE</u>	<u>SUBSURFACE DISPOSAL</u>	<u>DISPOSAL CODE</u>
<input type="checkbox"/> Spray Irrigation	A1f1	<input type="checkbox"/> Tile Field	A1g1
<input type="checkbox"/> Ridge and Furrow	A1f2	<input type="checkbox"/> Injection well	A1g2
<input type="checkbox"/> Flood/Sheet Irrigation	A1f3	<input type="checkbox"/> Trench	A1g3
		<input type="checkbox"/> Drywell	A1g4
Seepage Beds:			
<input type="checkbox"/> Slow/Medium Rate	A1f4		
<input type="checkbox"/> Rapid Rate	A1f5		
<input type="checkbox"/> Other - Please describe:			

2. **Non-contact cooling water with additives, Rule 2213(2), < 10,000 gallons per day.** Please check all system characteristics that apply to this specific discharge:

- The discharge is less than 10,000 gallons per day
- The additive(s) will not cause groundwater to exceed the standards of Rule 323.2222.

Please list the name and concentration of all additives in the discharge. The concentration can be submitted as an analysis of the wastewater, or as a mass balance calculation. Wastewater characterization, including the use of mass balance calculations, should follow the guidance found in Guidesheet III.

<u>ADDITIVE</u>	<u>ANNUAL USE RATE</u>	<u>CONCENTRATION</u> (Indicate how determined, A for analysis, M for mass balance. Please remember to include units of measurement)

3. **Egg Washing wastewater, Rule 2213(3), less than 10,000 gallons per day.** Please check all system characteristics that apply to this specific discharge:

- The discharge is less than 10,000 gallons per day.
- The additive(s) will not cause groundwater to exceed the standards of Rule 323.2222. For each additive, please fill out the additive information listed below.

Please check which one of the following applies:

- The source water is from a municipal supply.
- The water source meets state or federal criteria for use as potable water.
- The water source meets the standards of Rule 323.2222.
- The water source is an alternative to the above, approved by the Department.

Please list the name and concentration of all additives in the discharge. The concentration can be submitted as an analysis of the wastewater, or as a mass balance calculation. Wastewater characterization, including the use of mass balance calculations, should follow the guidance found in Guidesheet III.

<u>ADDITIVE</u>	<u>ANNUAL USE RATE</u>	<u>CONCENTRATION</u> (Indicate how determined, A for analysis, M for mass balance. Please remember to include units of measurement)

4. Cooling water, Rule 2213(4), <5,000 gallons per day. Please check all system characteristics that apply to this specific discharge:

- The discharge is less than 5,000 gallons per day.
- The discharge contains no additives.
- The discharge contains an additive, and it will not cause the groundwater to exceed the standards contained in Rule 2222.
- Wastewater has been characterized according to Rule 2220 and is listed below. Wastewater characterization, including the use of mass balance calculations, should follow the guidance found in Guidesheet III.
- If seeking a renewal of a previous authorization, the wastewater has been characterized annually and records are attached.
- If seeking a renewal of a previous authorization, the material cooled does not vary substantially from that used in seeking the original authorization.

Please list all additives in the discharge, and the concentration of the additive in the effluent. The concentration can be submitted as an analysis of the wastewater, or as a mass balance calculation. Wastewater characterization, including the use of mass balance calculations, should follow the guidance found in Guidesheet III.

NOTE: The discharger must characterize the wastewater annually, and submit the records of the annual characterization at the time of reissuance.

<u>ADDITIVE</u>	<u>ANNUAL USE RATE</u>	<u>CONCENTRATION</u> (Indicate how determined, A for analysis, M for mass balance. Please remember to include units of measurement)

5. Groundwater remediation activities, clean up, discharge outside the plume, 2213(5). Please check all system characteristics that apply to this specific discharge:

- The remedial action includes a groundwater extraction system designed and operated to prevent any portion of the plume above approved cleanup criteria from migrating beyond the zone of influence approved by the department division that has compliance oversight. The division having compliance oversight is:
 - Remediation and Redevelopment Division
 - Geological and Land Management Division
 - Waste and Hazardous Materials Division
 - Water Division
 - Other, please identify

A memorandum from the chief, or his/her designated representative, of the department division responsible for compliance oversight of the remediation is included which certifies that the discharge applicable meets the requirements of part 31, 111, 115, 201, 213, or 615, as applicable.

- A performance-monitoring plan was included in the remediation plan submitted to the department division responsible for compliance oversight. The plan included the following:
 - Groundwater monitoring wells have been installed within 150 feet of the discharge to verify that the standards of Rule 2222 are being met in groundwater.
 - Effluent and groundwater sampling to verify compliance with Rule 2213(5)(f).

_____ The frequency of sampling meets the requirements of Rule 2213(5)(e)(ii).

_____ Site map 1, required in Rule 2212(3)(m), should include the location of drinking water wells adequate to identify each water supply formation within 1/2 mile of the discharge. A copy of the well logs for each drinking water well identified on the map should be included.

_____ Site map 2, required in Rule 2212(3)(m) should include all of the following information:

- _____ Groundwater flow direction.
- _____ Extent of contamination plume.
- _____ Calculated capture zone.
- _____ Location of the groundwater extraction and interception system.
- _____ Location of all observation and monitoring wells.

TREATMENT CODES
 Select and enter the appropriate treatment codes to describe treatment units, i.e., A1b, B2b (see APPENDIX A, Pages 41-44)

Treatment Unit A _____

Treatment Unit B _____

Treatment Unit C _____

Treatment Unit D _____

Please provide a description of the treatment system indicating how it will produce an effluent that will meet the standards of Rule 2222.

**GENERAL PERMIT
RULE 2215**

A facility is not authorized to discharge until it receives a Certificate of Coverage from the department that verifies the discharge is authorized under this part.

1. RULE 2215 AUTHORIZATION REQUESTED:

<u>Wastewater Type</u>	<u>Daily Maximum Discharge, Gallons</u>
_____ 00-1 Above ground sewage disposal	< 10,000 (annual average)
_____ 00-2 Vehicle wash, not open to the public	< 2,000
_____ 01-3 Slaughterhouse	< 2,000 (annual average)
_____ 00-4 Gravel, sand, limestone, or dolomite mining	
_____ 00-5 Application of oil field brine	
_____ 01-6 Vehicle wash, open to public	< 3,000

2. DISCHARGE VOLUME

ALL DISCHARGES:

Maximum daily discharge: _____ gallons per day

Cumulative annual discharge: _____ gallons per year

SEASONAL DISCHARGES SHOULD INCLUDE THE FOLLOWING:

Discharge period _____ through _____

IRRIGATION SYSTEMS AND SEEPAGE BEDS UTILIZING SOILS FOR TREATMENT SHOULD INCLUDE THE FOLLOWING:

Effluent application rate:

Inches per hour _____ Inches per day _____ Inches per week _____ Inches per year _____

3. CERTIFICATION OF DISCHARGE MINIMIZATION

Please attach the steps identified and considered to avoid or minimize the use and discharge of pollutants according to Rule 2215(3).

4. DISCHARGE METHOD

Please check the discharge method used:

<u>LAND SURFACE DISPOSAL</u>	<u>DISPOSAL CODE</u>	<u>SUBSURFACE DISPOSAL</u>	<u>DISPOSAL CODE</u>
_____ Spray Irrigation	A1f1	_____ Tile Field	A1g1
_____ Ridge and Furrow	A1f2	_____ Injection well	A1g2
_____ Flood/Sheet Irrigation	A1f3	_____ Trench	A1g3
		_____ Drywell	A1g4
Seepage Beds:			
_____ Slow/Medium Rate	A1f4		
_____ Rapid Rate	A1f5		
_____ Other - Please describe:			

00-1. **Above Ground Sewage Disposal Systems, less than 10,000 gallons per day (annual average), Rule 2215.** Please check all system characteristics that apply to this specific discharge and fill appropriate blanks:

- Discharge is less than 10,000 gallons per day, calculated as an annual average.
- A log will be maintained on site by the discharger of the daily discharge volume of sanitary sewage. The log shall be retained for a minimum of three years, and made available upon request by the Department.

Property Ownership:

- Discharge occurs on property owned by the applicant
- Discharge occurs on property not owned by the applicant. Please attach written authorization to discharge on that property from the property owner.

Lagoon/Irrigation System:

- Anticipated date when plans and specifications for the treatment system will be submitted to the Department.
NOTE: Applicant cannot commence discharge until the Department notifies the discharger that the treatment system will meet the requirements of Rule 2204.
- The lagoon system is fenced and perimeter warning signs placed around the perimeter of the lagoon.
- Irrigation occurs between May 1 and October 15.
- If irrigating crops for human consumption, crops will be processed prior to consumption.
- Dairy animals will not be allowed to graze on fields until 30 days after the land application of wastewater.

Isolation Distance:

- Effluent will not be applied within 100 feet of the property line
- The Department has authorized a discharge less than 100 feet from the property line. The documentation for the lesser distance is included with this application, and is found in Attachment _____.

00-2. **Vehicle Wash Not Open to the Public, less than 2000 gallons per day, Rule 2215.** Please check all system characteristics that apply to this specific discharge:

- Discharge is less than 2000 gallons per day.
- The discharge consists of washwater with additives designed to remove non-polluting, inert substances from the exterior of vehicles, which excludes the washing of undercarriages or any portion of the vehicle that has come in contact with waste or products.
- Soaps, detergents and additives are used according to manufacturers directions, and do not include volatile organic compounds, such as degreasers.
- A log will be maintained on site by the discharger of the daily discharge volume of washwater with additives. The log shall be retained for a minimum of three years, and made available upon request by the Department.

Isolation Distance:

- Effluent will not be applied within 100 feet of the property line.
- The Department has authorized a discharge less than 100 feet from the property line. The documentation for the lesser distance is included with this application, and is found in Attachment _____.

Please check which one of the following applies:

- The source water is from a municipal supply.
- The water source meets state or federal criteria for use as potable water.
- The water source meets the standards of Rule 2222.
- The water source is an alternative to the above. Department approval is required, and supporting documentation is attached.

01-3. Slaughterhouse Washwater with Additives, less than 2,000 gallons per day (annual average), Rule 2215. Please check all system characteristics that apply to this specific discharge:

- The discharge is less than 2,000 gallons per day calculated as an annual average.
- The washwater shall only contain additives resulting from cleaning operations.
- Soaps, detergents and additives are used according to manufacturers directions, and do not include volatile organic compounds, such as degreasers.
- The discharger has taken steps to minimize the discharge of blood, fat, paunch and other solids.
- The wastewater is transported to the discharge location in enclosed containers.
- A log will be maintained on site by the discharger of the daily discharge volume of washwater with additives. The log shall be retained for a minimum of three years, and made available upon request by the Department.

Please check which one of the following applies to the facility water source:

- The source water is from a municipal supply.
- The water source meets state or federal criteria for use as potable water.
- The water source meets the standards of Rule 2222.
- The water source is an alternative to the above. Department approval is required, and supporting documentation is attached.

Location:

- The facility is located in the Upper Peninsula.
- The facility is located in the Lower Peninsula.

Property Ownership:

- Discharge occurs on property owned by the applicant
- Discharge occurs on property not owned by the applicant. Please attach written authorization to discharge on that property from the property owner.

Lagoon/Irrigation System:

- Anticipated date when plans and specifications for the treatment system will be submitted to the Department.

NOTE: Applicant cannot commence discharge until the Department notifies the discharger that the treatment system will meet the requirements of Rule 2204.

- The lagoon system is fenced and perimeter warning signs placed around the perimeter of the lagoon.
- If irrigating crops for human consumption, crops will be processed prior to consumption.

Growing Season:

- Irrigation occurs between May 1 and November 15 in the Lower Peninsula, between May 1 and October 15 in the Upper Peninsula.
- The discharge is less than 4,000 gallons per acre per day.
- The irrigation area is vegetated to prevent erosion and provide adequate nutrient uptake.
- Effluent will not be applied within 100 feet of the property line.
- The Department has authorized a discharge less than 100 feet from the property line. The documentation for the lesser distance is included with this application, and is found in Attachment _____.

Winter Season:

- Irrigation occurs between November 16 and April 30 in the Lower Peninsula, between October 16 and April 30 in the Upper Peninsula.
- The discharge is less than 2,000 gallons per acre per week.
- The maximum total winter seasonal discharge is 10,000 gallons per acre.
- The irrigation area is vegetated to prevent erosion and provide adequate nutrient uptake.
- The irrigation area will be vegetated to prevent erosion and provide adequate nutrient uptake immediately after snow melt.
- The slope of the discharge area does not exceed two per cent.
- Effluent will not be applied within 400 feet of the property line, homes, buildings or surface water.
- The Department has authorized a discharge less than 400 feet from the property line. The documentation for the lesser distance is included with this application, and is found in Attachment _____.

00-4. Gravel, sand, limestone, or dolomite mining, Rule 2215. Please check all system characteristics that apply to this specific discharge:

The discharge consists of washwater without additives, used for the purpose of washing and sorting uncontaminated gravel, sand, limestone or dolomite.

A log will be maintained on site by the discharger of the daily discharge volume of washwater without additives. The log shall be retained for a minimum of three years, and made available upon request by the Department.

Property Ownership:

Discharge occurs on property owned by the applicant

Discharge occurs on property not owned by the applicant. Please attach written authorization to discharge on that property from the property owner.

Isolation Distance:

Effluent will not be applied within 100 feet of the property line

The Department has authorized a discharge less than 100 feet from the property line. The documentation for the lesser distance is included with this application, and is found in Attachment _____.

Please check which one of the following applies:

The source water is from a municipal supply.

The water source meets state or federal criteria for use as potable water.

The water source meets the standards of Rule 323.2222.

The water source is an alternative to the above. Department approval is required, and supporting documentation is attached.

00-5. Application of Oil Field Brine, Rule 2215. Please check all system characteristics that apply to this specific discharge:

The brine meets the requirements of R 324.705(3) of Part 615, Supervisor of Wells, 1994, PA 451, as amended.

The brine is being used for ice or dust control or soil stabilization on land.

Vehicular equipment used for the spreading of approved oil field brine is dedicated for that use or hauling fresh water.

Brine will not be applied at a site of environmental contamination for chlorides as defined under Part 201 of Act 451.

A brine application log will be maintained in the application vehicle for the previous two weeks applications of brine use that includes the information required in Section A.9 of the General Permit, and made available upon request by the Department or a peace officer.

A brine application log will be maintained by the discharger for a minimum of three years of brine use which shall include the information required in Section A.9 of the General Permit, and made available upon request by the Department or a peace officer.

Dust Control/Soil Stabilization:

The number of brine applications per year will be in accordance with Condition A.4.a. and Condition A.4.b. of the General Permit.

Brine will be applied to roads and parking areas with a spreader bar delivering the brine over an eight to ten foot area.

Brine will be applied at a maximum rate of 1500 gallons per lane mile of road or 1250 gallons per acre of land.

Brine will be applied in a manner to prevent runoff.

Ice Control:

Brine will be applied only to paved roads or paved parking lots.

Brine will be applied at a maximum rate of 500 gallons per lane mile or 400 gallons per acre of land.

Brine will be applied only when the air temperature is above 20 degrees Fahrenheit.

Brine will be applied with equipment designed to direct the discharge to the center of the pavement or high sides of curves.

Brine application equipment will be equipped with measuring devices to ensure brine applications meet the requirements of the General Permit.

01-6. Vehicle Wash, open to the public, Rule 2215. Please check all system characteristics that apply to this specific discharge.

- The facility was in operation as of April 1, 2001.
- The discharge is less than 3,000 gallons per day.
- The soaps, detergents, and other cleaning chemicals do not contain volatile organic compounds, such as degreasers.
- There are no repair or maintenance activities taking place in the wash areas.
- Detergents, surfactants and other additives are only used in accordance with manufacturers specifications.
- Groundwater will be sampled twice per year and analyzed for the substances listed in Tables I, II and III of this General Permit.

Isolation Distance:

- Effluent will not be applied within 100 feet of the property line
- The Department has authorized a discharge less than 100 feet from the property line. The documentation for the lesser distance is included with this application, and is found in Attachment _____.

Monitor Wells:

- Monitor wells have been installed in accordance with Attachment II of this General Permit. A map showing the location of the wells in relation to the discharge, well logs, elevations (referenced to USGS datum) for top of casing, ground, and well screen interval, are found in Attachment _____.

Please check which one of the following applies:

- The source water is from a municipal supply.
- The water source meets state or federal criteria for use as potable water.
- The water source meets the standards of Rule 323.2222.
- The water source is an alternative to the above. Department approval is required, and supporting documentation is attached.

RULE 323.2216

PERMITS FOR SPECIFIC DISCHARGES

A DISCHARGE OF THE TYPE AND VOLUME SPECIFIED IN RULE 2216 THAT DOES NOT MEET THE SPECIFIC CRITERIA OF THIS RULE MUST APPLY FOR A PERMIT UNDER RULE 2218.

1. RULE 2216 AUTHORIZATION REQUESTED			
	<u>WASTEWATER TYPE</u>		<u>DAILY MAXIMUM DISCHARGE, GALLONS</u>
<input type="checkbox"/>	(2a) Sanitary Sewage, Constructed Wetland		less than 20,000
<input type="checkbox"/>	(2b) Alternative Treatment System		
<input type="checkbox"/>	(3) Sanitary Sewage, Rule 2216 Design		less than 50,000
<input type="checkbox"/>	(4) Laundromat Wastewater		less than 20,000
2. DISCHARGE VOLUME			
ALL DISCHARGES:			
Maximum daily discharge: _____ gallons per day			
Cumulative annual discharge: _____ gallons per year			
SEASONAL DISCHARGES SHOULD INCLUDE THE FOLLOWING:			
Discharge period _____ through _____			
IRRIGATION SYSTEMS AND SEEPAGE BEDS UTILIZING SOILS FOR TREATMENT SHOULD INCLUDE THE FOLLOWING:			
Effluent application rate:			
Inches per hour _____ Inches per day _____ Inches per week _____ Inches per year _____			
3. PUBLIC NOTICE			
Please attach a copy of the public notice, containing information required by Rule 2217(2)(b).			
4. CERTIFICATION OF DISCHARGE MINIMIZATION			
Please attach the steps identified and considered to avoid or minimize the use and discharge of pollutants according to Rule 2217(2)(c)			
5. DISCHARGE METHOD			
Please check the discharge method used:			
<u>LAND SURFACE DISPOSAL</u>	<u>DISPOSAL CODE</u>	<u>SUBSURFACE DISPOSAL</u>	<u>DISPOSAL CODE</u>
<input type="checkbox"/> Spray Irrigation	A1f1	<input type="checkbox"/> Tile Field	A1g1
<input type="checkbox"/> Ridge and Furrow	A1f2	<input type="checkbox"/> Injection well	A1g2
<input type="checkbox"/> Flood/Sheet Irrigation	A1f3	<input type="checkbox"/> Trench	A1g3
		<input type="checkbox"/> Drywell	A1g4
Seepage Beds:			
<input type="checkbox"/> Slow/Medium Rate	A1f4		
<input type="checkbox"/> Rapid Rate	A1f5		
<input type="checkbox"/> Other - Please describe:			

6a. Sanitary Sewage, Constructed Wetland, Rule 2216(2), less than 20,000 gallons per day. Please check all system characteristics that apply for this specific discharge, either already in place or are part of the proposed design of the treatment system:

- The discharge is less than 20,000 gallons per day.
- A minimum of 2 septic tanks are installed in series preceding the constructed wetland.
- The septic tanks have a combined volume of at least 2 times the daily design flow.
- The outfall to the constructed wetland is equipped with a septic tank effluent filter.
- There is a system to enhance nitrification prior to discharge to the constructed wetland.
- The discharge has been treated to remove oil and grease, if applicable.
- The system has at least 2 wetland cells.
- Each wetland cell has a length to width ratio of between 2:1 and 4:1.
- The constructed wetland treatment cells have a composite bottom liner in compliance with Rule 2237. See Guidesheet IV for lagoon construction guidance
- The bottom of the lagoon cell has been constructed to be level.
- The wetland cell filter media consists of 1/2-inch to 1-inch washed gravel with 100% passing the 1.0-inch sieve and a maximum of 3% passing the 1/2-inch sieve.
- The filter media is between 18 inches and 30 inches in depth.
- The constructed wetland is insulated with at least 6 inches of mulch or other comparable substitute.
- The filter surface area hydraulic loading rate is not more than 1.2 gallons per square foot per day.
- The design retention time is not less than 7 calendar days.
- Indigenous or sterile wetland vegetation has been planted on a 1-foot grid across each wetland cell.
- The system has the capability to recirculate effluent back into the influent end of the system.
- The wetland cell discharges to a tile field designed and constructed in accordance with the provisions of the publication entitled "Michigan Criteria for Subsurface Sewage Disposal," April 1994.
- The tile field has been approved by:
 - The county, district, or city health department that has jurisdiction.
 - The department.

6b. Sanitary Sewage, Rule 2216(2)(b), less than 20,000 gallons per day, alternative treatment system.

- Alternative treatment system. If you are applying for an authorization for a alternative treatment system equivalent to a constructed wetland, please attach documentation that the proposed system produces an effluent of similar quality to that of the constructed wetland.

7. Sanitary sewage, specific design, Rule 2216(3), less than 50,000 gallons per day.

Please check the treatment systems being proposed under this Rule:

- Lagoon w/land treatment
- Sequencing batch reactor
- Activated sludge w/denitrification
- Oxidation ditch
- Other If other, please describe:

Please check all system characteristics that apply for this specific discharge:

- The discharge is less than 50,000 gallons per day.
- The sanitary sewage is not mixed with any other type of wastewater.
- The treatment system has sufficient hydraulic capacity to treat organic or inorganic loading so that the discharge receives physical, chemical, biological treatment or a combination of treatments to meet the standards of Rule 2222.
- The facility is under the supervision of a certified operator.
- Land application is in accordance with Rule 2233, requirements common to all land application.
- Land application is in accordance with the specific requirements of the following Rule:
 - Rule 2234, Slow rate land treatment
 - Rule 2235, Overland flow treatment
 - Rule 2236, Rapid Infiltration

7a. Lagoon with land treatment

- The lagoon liner meets the requirements of Rule 2237. See Guidesheet IV for lagoon construction guidance.
- The lagoon system has at least 2 cells.
- The lagoon storage volume is at a minimum 1/2 of the annual influent flow.
- The lagoon has security fencing and warning signs.
- Wastewater disposal is by means of land application to a suitable crop in accordance with Rule 2233. See Guidesheet II for guidance regarding land application of wastewater.
- The discharge occurs only from a cell(s) which have not received untreated wastewater for at least 30 calendar days prior to the discharge.

Lagoons without aeration

- Cell 1 does not exceed a maximum depth of 6 feet.
- Cell 2 does not exceed a maximum depth of 8 feet.
- All additional cells do not exceed a maximum depth of 10 feet.

Lagoons with aeration

- A minimum of 2 mg/l of dissolved oxygen is maintained in the primary cell.
- The maximum depth of secondary cells does not exceed 10 feet.

7b. Sequencing batch reactor

- The discharge meets the requirements of Rule 2222 in the effluent.
- The facility has a contingency plan to deal with periods of upset, mechanical malfunctions, and routine maintenance while maintaining compliance with this part.
- The sequencing batch reactor system has at least 2 treatment tanks.

7c. All other treatment systems which do not involve land treatment

- The treatment system has a minimum storage volume of 1/2 the annual influent flow.
- The treatment system does not have a minimum storage volume of 1/2 the annual influent flow, the discharge meets the requirements of Rule 2222 in the effluent, and the facility has a contingency plan to deal with periods of upset, mechanical malfunctions, and routine maintenance while maintaining compliance with these rules.

8. Laundromat Wastewater, Rule 2216(4), less than 20,000 gallons per day. Please check all system characteristics that apply for this specific discharge:

- The discharge is less than 20,000 gallons per day.
 - The laundromat does not have any dry cleaning operations.
 - The lagoon liner meets the requirements of Rule 2237. See Guidesheet IV for lagoon construction guidance.
 - The storage volume of the lagoon is at a minimum 1/2 of the annual influent flow.
 - The lagoon system has at least 2 cells.
 - The discharge shall occur only from cells that have not received untreated wastewater for at least 30 days.
 - The lagoons have security fencing and warning signs.
 - Discharge of treated wastewater is by means of low-rate application in accordance with Rule 2233. See Guidesheet II for guidance regarding land application of wastewater.
 - The spray irrigation system is under pressure to enhance volatilization of organic constituents.
- If aeration is not included as part of the lagoon treatment system, the following apply:
- Cell 1 does not exceed a maximum depth of 6 feet.
 - Cell 2 does not exceed a maximum depth of 8 feet.
 - Additional cells do not exceed a maximum depth of 10 feet.
- If aeration is included as part of the lagoon treatment system, the following apply:
- The maximum depth of secondary cells does not exceed 10 feet.
 - A minimum of 2 mg/l of dissolved oxygen will be maintained in the primary cell.

RULE 323.2218

DISCHARGE PERMITS

1. TYPE OF TREATED WASTEWATER FOR WHICH THE AUTHORIZATION IS REQUESTED. PLEASE CHECK ALL THAT APPLY

- Sanitary sewage
- Process wastewater
- Cooling water, greater than 5,000 gallons per day
- Non-contact cooling without additives, greater than 10,000 gallons per day, source water not approved by department.
- Non-contact cooling water with additives, greater than 10,000 gallons per day.
- Other, please describe: _____

2. DISCHARGE VOLUME

ALL DISCHARGES:

Maximum daily discharge: _____ gallons per day

Cumulative annual discharge: _____ gallons per year

SEASONAL DISCHARGES SHOULD INCLUDE THE FOLLOWING:

Discharge period _____ through _____

IRRIGATION SYSTEMS AND SEEPAGE BEDS UTILIZING SOILS FOR TREATMENT SHOULD INCLUDE THE FOLLOWING:

Effluent application rate:

Inches per hour _____ Inches per day _____ Inches per week _____ Inches per year _____

3. DISCHARGE METHOD

Please check the discharge method used:

<u>LAND SURFACE DISPOSAL</u>	<u>DISPOSAL CODE</u>	<u>SUBSURFACE DISPOSAL</u>	<u>DISPOSAL CODE</u>
<input type="checkbox"/> Spray Irrigation	A1f1	<input type="checkbox"/> Tile Field	A1g1
<input type="checkbox"/> Ridge and Furrow	A1f2	<input type="checkbox"/> Injection well	A1g2
<input type="checkbox"/> Flood/Sheet Irrigation	A1f3	<input type="checkbox"/> Trench	A1g3
		<input type="checkbox"/> Drywell	A1g4
Seepage Beds:			
<input type="checkbox"/> Slow/Medium Rate	A1f4		
<input type="checkbox"/> Rapid Rate	A1f5		
<input type="checkbox"/> Other - Please describe:			

4. TREATMENT CODES

Select and enter the appropriate treatment codes to describe treatment units, i.e., A1b, B2b (see APPENDIX A, Pages 41-44)

Treatment Unit A _____

Treatment Unit B _____

Treatment Unit C _____

Treatment Unit D _____

Please provide a description of the treatment system indicating how it will produce an effluent that will meet the standards of Rule 2222.

4a. New Permits – Rule 2218(3)(a)

The following information must be included in the application for a new permit. Refer directly to Rule 2218 for specific information requirements. Please indicate where the necessary information is included in this application. Please indicate NA for those that do not apply to your discharge:

- _____ An evaluation of the feasibility of alternatives to discharge to the groundwater in accordance with Rule 2219. See instructions, Page 9. This item is found _____.
- _____ The basis of design as required by 323:2218(2). See instructions, Page 10. This item is found _____.
- _____ The hydrogeological report as required by Rule 2221. See Guidesheet I. This item is found _____.
- _____ The wastewater characterization as required by Rule 2220. See Guidesheet III. This item is found _____.
- _____ If a standard applicable to the discharge is to be determined under Rule 2222(5), the information necessary to determine that standard, including whether a substance is a hazardous substance under Part 201. See Guidesheet V. This item is found _____.
- _____ The groundwater, or other media, sampling and analysis plan specified by Rule 2223. See instructions, Page 10 This item is found _____.
- _____ Information is attached that demonstrates the land treatment requirements of Rule 2233 will be met. See Guidesheet II. This item is found _____.
- _____ If a lagoon is included in the treatment process, information that demonstrates that the requirements of Rule 2237 will be met. See Guidesheet IV. This item is found _____.

4b. Reissuance of current permit, no modifications, Rule 2218(3)(c). The following information must be included in the application for the reissuance of your current permit. Please check that all items have been included:

- The discharge consists of the same quantity, effluent characterization, and treatment process as previously permitted.
- A narrative description of the history of facility compliance with effluent and groundwater permit limits and sampling frequency is included. This item is found _____.
- An updated site map is included. This item is found _____.
- The most recent static water levels and groundwater elevations from all wells on site. This item is found _____.
- A current groundwater contour map is included, with a narrative evaluation of whether changes to the existing groundwater monitoring system are warranted and the rationale for any proposed change. This item is found _____.
- The most recent groundwater quality results are included from all wells on site. This item is found _____.
- The most recent effluent quality results are included. This item is found _____.

Please check that all of the following that apply are included:

- If permit limits were exceeded, the steps taken to bring the facility into compliance. This item is found _____.
- An evaluation of whether there are general trends in the effluent or groundwater sampling data indicating that the discharge is approaching permit limits. This item is found _____.
- The discharger has provided the department, within 30 calendar days of completion of construction of the treatment facilities, a certification by an engineer licensed under Act No. 299 of the Public Acts of 1980, as amended, that a quality control and quality assurance program was utilized and that the facilities were built consistent with standard construction practices to comply with the permit and this part.

4c. Reissuance of current permit, with significant modifications Rule 2218(3)(b). The following information must be included in the application for the reissuance of your current permit. Please check that all items have been included:

- An evaluation of the feasibility of alternatives to discharge to the groundwater in accordance with Rule 2219 is included. See Page 9. This item is found _____.
- The basis of design required by 323.2218(2) is included. See Page 10. This item is found _____.
- The hydrogeological report required by Rule 2221 is included. See Guidesheet I. This item is found _____.
- The wastewater characterization required by Rule 2220 is included. See Guidesheet III. This item is found _____.
- If a standard applicable to the discharge is to be determined under Rule 2222(5), the information necessary to determine that standard, including whether a substance is a hazardous substance under Part 201. See Guidesheet V. This item is found _____.
- The monitoring plan as specified by Rule 2223 is included. See Page 10. This item is found _____.
- Information that demonstrates the land treatment requirements of Rule 2233 will be met is included. See Guidesheet II. This item is found _____.
- If a lagoon is included in the treatment process, information that demonstrates that the requirements of Rule 2237 will be met is included. See Guidesheet IV. This item is found _____.
- A narrative description of the history of facility compliance with effluent and groundwater permit limits and sampling frequency is included. This item is found _____.
- An updated site map is included. This item is found _____.
- The most recent static water levels and groundwater elevations from all wells on site are included. This item is found _____.
- A current groundwater contour map and a narrative evaluation of whether changes to the existing groundwater monitoring system are warranted and the rationale for any proposed change are included. This item is found _____.
- The most recent groundwater quality results from all wells on site are included. This item is found _____.
- The most recent effluent quality results are included. This item is found _____.

Please check that all of the following that apply are included:

- If permit limits were exceeded, a description of the steps taken to bring the facility into compliance. This item is found _____.
- An evaluation of whether there are general trends in the effluent or groundwater sampling data indicating that the discharge is approaching permit limits. This item is found _____.
- The discharger has provided the department, within 30 calendar days of completion of construction of the treatment facilities, a certification by an engineer licensed under Act No. 299 of the Public Acts of 1980, as amended, that a quality control and quality assurance program was utilized and that the facilities were built consistent with standard construction practices to comply with the permit and this part.

SITE SPECIFIC EXEMPTION

RULE 2210(Y)

A facility is authorized to discharge after it receives approval from the department that states the discharge is authorized under this part.

<p>1. Please attach a narrative description of the discharge, indicating how the volume and/or constituents in the discharge present an insignificant potential to be injurious to the groundwater.</p>																																							
<p>2. DISCHARGE VOLUME</p> <p>ALL DISCHARGES:</p> <p>Maximum daily discharge: _____ gallons per day</p> <p>Cumulative annual discharge: _____ gallons per year</p> <p>SEASONAL DISCHARGES SHOULD INCLUDE THE FOLLOWING:</p> <p>Discharge period _____ through _____</p>																																							
<p>3. DISCHARGE METHOD</p> <p>Please check the discharge method used:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;"><u>LAND SURFACE DISPOSAL</u></th> <th style="text-align: left; border-bottom: 1px solid black;"><u>DISPOSAL CODE</u></th> <th style="text-align: left; border-bottom: 1px solid black;"><u>SUBSURFACE DISPOSAL</u></th> <th style="text-align: left; border-bottom: 1px solid black;"><u>DISPOSAL CODE</u></th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> Spray Irrigation</td> <td>A1f1</td> <td><input type="checkbox"/> Tile Field</td> <td>A1g1</td> </tr> <tr> <td><input type="checkbox"/> Ridge and Furrow</td> <td>A1f2</td> <td><input type="checkbox"/> Injection well</td> <td>A1g2</td> </tr> <tr> <td><input type="checkbox"/> Flood/Sheet Irrigation</td> <td>A1f3</td> <td><input type="checkbox"/> Trench</td> <td>A1g3</td> </tr> <tr> <td></td> <td></td> <td><input type="checkbox"/> Drywell</td> <td>A1g4</td> </tr> <tr> <td colspan="4" style="padding-top: 5px;">Seepage Beds:</td> </tr> <tr> <td><input type="checkbox"/> Slow/Medium Rate</td> <td>A1f4</td> <td></td> <td></td> </tr> <tr> <td><input type="checkbox"/> Rapid Rate</td> <td>A1f5</td> <td></td> <td></td> </tr> <tr> <td><input type="checkbox"/> Other - Please describe:</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				<u>LAND SURFACE DISPOSAL</u>	<u>DISPOSAL CODE</u>	<u>SUBSURFACE DISPOSAL</u>	<u>DISPOSAL CODE</u>	<input type="checkbox"/> Spray Irrigation	A1f1	<input type="checkbox"/> Tile Field	A1g1	<input type="checkbox"/> Ridge and Furrow	A1f2	<input type="checkbox"/> Injection well	A1g2	<input type="checkbox"/> Flood/Sheet Irrigation	A1f3	<input type="checkbox"/> Trench	A1g3			<input type="checkbox"/> Drywell	A1g4	Seepage Beds:				<input type="checkbox"/> Slow/Medium Rate	A1f4			<input type="checkbox"/> Rapid Rate	A1f5			<input type="checkbox"/> Other - Please describe:			
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<input type="checkbox"/> Rapid Rate	A1f5																																						
<input type="checkbox"/> Other - Please describe:																																							

To apply for an exemption according to Rule 2210(y), you should fill out pages 14-17 of this application, which contain general information about the facility. You should also provide the above information. The department will notify you whether your application qualifies for an exemption under Rule 2210(y), or whether you must apply for a different authorization. You are not authorized to discharge until you receive approval from the department.

APPENDIX A

TREATMENT METHOD CLASSIFICATION

The Treatment Method Classification is a three digit alphanumeric code to describe the treatment system and a guide for operator certification. The first entry is a letter designation to indicate **physical (A), chemical (B), or biological (C)** treatment. The second entry describes the appropriate **sub-classification**, and the last entry is a letter correlating to the **specific type of treatment**.

1. PHYSICAL

A-1a Special Classification - Minor discharges with no treatment and limited monitoring requirements. This classification applies only to discharges where no other classification applies. (Note: Proper application for certification is necessary, however no additional examination is required.)

Examples:

Hydrostatic testing of pipes and tanks
Discharge of storm water from secondary containment

A-1b Plain Clarification - Solids removal by gravity separation in a mechanical clarifier with no provision for the addition of chemical coagulant. (Note: Does not include basins intended to provide biological or chemical treatment.)

Examples:

Clarifiers with no provision for addition of coagulant
Settling Tanks with tube or plate settlers with no provision for addition of coagulant

A-1d Impoundment - A tank, basin, or reservoir intended to hold wastewater to allow for a controlled discharge; may or may not provide settling of solids. (Note: Does not include basins intended to provide biological or chemical treatment.)

Examples:

Discharge flow equalization
Mine tailing ponds
Gravel pits used to remove solids from wastewater

A-1f Land Surface Disposal - Disposal of wastewater by means of application to the surface of the land with percolation into the ground i.e.) No Underdrain

Examples:

Spray Irrigation
Ridge and Furrow
Rapid Infiltration Basin
Seepage Pond

A-1g Sub-surface Disposal – Tile field system used for discharge of wastewater with percolation into the ground. Does not include under-drain systems used to collect wastewater for further treatment and/or discharge.

Examples:

Septic tank – tile field system

A-1h Non-contact Cooling Water – Flow measurement, visual observation, sampling, and minor testing of non-contact cooling water discharges regulated by permit. Discharge of cooling water that has mixed with untreated wastewater is excluded. Proper application for certification is required; the written examination consists of a take-home questionnaire.

Examples:

Discharge from Heat Exchangers

Compressor Condensate

Cooling Tower Discharge

A-2b Filtration of Wastewater – Filtration of wastewater for the purpose of removing particulate materials. Specifically for Rapid Sand Filters, but may also include such processes as pressure filters, micro-screens, and bag filters.

A-2c Air Flotation – A wastewater treatment process for separation in which fine air bubbles are utilized to raise suspended materials to the surface where they are collected.

Note: Does not include sludge thickening processes

A-2d Air Stripping (Note Name Change from Gas Stripping) – Air stripping of volatile substances from wastewater or groundwater.

Note: Does not include off-gas treatment for odor control

A-2e Centrifuging – A wastewater treatment process in which a centrifuge is used to apply centripetal force to accelerate the separation of substances.

Examples:

Removal of solids from wastewater by centrifuging

Separation of oil from wastewater by centrifuging

Note: Does not include thickening of sludge by centrifuging

A-2g Deep Well Injection – Pressure injection of wastewater into a sub-surface formation.

B. CHEMICAL

B-1b Neutralization – A chemical treatment process whereby a wastewater is neutralized (pH adjustment) to achieve a pH level required for discharge.

Examples:

Addition of acid or base to meet limit in discharge permit

Does not include pH adjustment intended for such purposes as precipitation, nitrification, or to enhance biological treatment.

B-2a Chemical Clarification - Coagulation and/or Precipitation for solids removal from wastewater.

Chemical coagulation – The removal of suspended solids from wastewater through the addition of polymer, ferric chloride, alum, or other coagulants added to wastewater just prior to clarification.

Chemical precipitation – The removal of dissolved solids from wastewater by precipitation through the addition of a base, ferric chloride, alum or other chemical agent just prior to clarification.

Examples:

Precipitation of metals from wastewater

Precipitation of phosphorus from wastewater

B-2b Ion Exchange – A wastewater treatment process in which undesirable ionic materials in wastewater are exchanged for other ions on a resin material.

Note: Does not include softening of process water or boiler make-up water

B-2c Oil – Water Separation – Separation of oil from water with or without chemical addition.

Examples:

Grease Traps

Gravity Oil Water Separators

Chemical Emulsion Breaking

Oil Skimming

B-2d Ultraviolet Oxidation – A wastewater treatment process in which ultraviolet radiation is used to oxidize organic contaminants (Note: Does not include UV disinfection)

B-3b Carbon Adsorption – Removal of organic compounds from wastewater by adsorption on activated carbon.

Examples:

Includes systems in which wastewater passes through a carbon bed (liquid phase adsorption)

Does not include systems in which organics are removed from the wastewater by air stripping and then from the air by carbon adsorption (vapor phase adsorption).

Does not include carbon canisters used for odor control systems.

B-3c Reduction of Hexavalent Chromium – A wastewater treatment process in which hexavalent chromium is chemically reduced to trivalent chromium.

B-3d Oxidation of Cyanide – The removal of cyanide from wastewater through the process of alkaline chlorination.

C. BIOLOGICAL

C-1b Aerated Lagoons – A man-made pond or lagoon with mechanical or diffused aeration intended to provide aerobic biological treatment.

Note: Includes wastewater treatment systems with a combination of aerated and non-aerated cells

C-1c Stabilization Ponds – A man-made pond or lagoon intended to provide natural biological treatment without the addition of supplemental aeration.

C-2a Disinfection – The chemical or ultraviolet radiation disinfection process to destroy pathogenic organisms in wastewater just prior to discharge.

C-2b Trickling Filters – An attached growth wastewater treatment process in which wastewater is distributed over a media (usually rock or plastic) which supports the biological system and is designed to convert colloidal and dissolved organic compounds into settleable sludge.

C-2c Biological Sand Filters – Sand filtration systems intended to provide biological treatment of wastewater as well as physical filtration.

Examples:

Intermittent Sand Filters
Recirculating Sand Filters

C-2d Rotating Biological Contactors – An attached growth wastewater treatment process utilizing rotating plastic media designed to convert colloidal and dissolved organic compounds into settleable sludge.

C-2e Package Plant – (Note: Exam no longer offered. All new package plants will be classified C-3a or C-3b)

C-2f Constructed Wetlands – A man-made complex that simulates natural wetlands, intended to treat wastewater through microbial utilization and plant uptake of nutrients.

C-3a Activated Sludge – A suspended growth, biological treatment system designed to convert colloidal and dissolved organic compounds in wastewater into settleable sludge.

Examples:

Conventional Activated Sludge
Oxidation Ditch
Package Plants

C-3b Sequencing Batch Reactor – A modification of the activated sludge process in which treatment occurs in batch mode and the reactor also serves as the secondary clarifier. The treatment sequence is largely computer controlled.

APPENDIX B

OPERATIONAL REQUIREMENTS

In addition to information necessary to make a permit decision, the Part 22 Rules contain a series of operational requirements that must be followed after the discharge begins. The following is a brief overview of those requirements. The discharger should refer to the specific rule authorization for detailed requirements.

Rule 2211

(b) Laundromat, less than 500 gallons per day

- (i) Septic tanks must be pumped when the sludge level reaches 25% of the tank volume.
- (ii) Septic tanks must be equipped with an effluent filter.

(e) Portable power washer

- (i) The discharge must not cause runoff of wastewater or deposition of waste materials onto adjacent properties.

Rule 2213

(3) Egg washing, less than 10,000 gallons per day

- (a) The discharger must minimize the discharge of proteinaceous matter, such as egg yolks, to control odor and prevent nuisance conditions.

(4) Department approved groundwater remediation

- (a) The discharger shall maintain all treatment works in good working order at all times.

Rule 2216

(2) Constructed wetland, less than 20,000 gallons per day

- (a) Wetland vegetation shall be cultivated to maximize the rooted depth throughout the gravel filter media.

(3) Sanitary sewage, less than 50,000 gallons per day

- (a) Sludge resulting from the wastewater treatment process must be disposed of in accordance with part 115 or land applied in accordance with applicable state and federal law.
- (b) The discharger shall maintain all treatment or control facilities or systems in good working order and operate the facilities or systems as efficiently as possible.
- (c) A discharger shall have an operation and maintenance manual for the wastewater treatment facility. The manual shall include all of the following information:
 - (i) Function, start-up, shutdown, and periodic maintenance procedures for each unit process and item of mechanical and electrical equipment.
 - (ii) The appropriate response or facility adjustment to minimize the impact of an emergency situation.
 - (iii) A monitoring program to monitor process efficiency.
 - (iv) Details of how inspections will be conducted and a schedule for the inspection of collection system and pump stations, where applicable.
 - (v) Periodic maintenance procedures for the collection system and pump stations, where applicable.
 - (vi) Procedures for the routine maintenance and inspection of lagoons and equipment used for irrigation, where applicable.
- (d) Effluent may be discharged from May 1 through October 15, unless the department approves alternative dates.

(e) The discharger shall inspect the lagoon facilities weekly and maintain an inspection log unless otherwise authorized by the department.

(f) When drawing down a cell for transfer or discharge, the discharger shall meet all of the following requirements unless otherwise authorized by the department:

(i) Water discharged or transferred shall be removed from the surface 2 feet of the cell at a rate of less than 1 foot per day.

(ii) A discharger shall maintain a minimum of 2 feet of freeboard in all cells at all times.

(iii) A discharger shall maintain a minimum of 2 feet of water in all cells at all times.

(g) The discharger shall implement a facility maintenance program that incorporates all of the following management practices, unless otherwise authorized by the department:

(i) Vegetation shall be maintained at a height not more than 6 inches above the ground on lagoon dikes.

(ii) Not more than 10% of the water surface shall be covered by floating vegetation and not more than 10% of the water perimeter may have emergent rooted aquatic plants.

(iii) Dikes shall be inspected for evidence of erosion and animal burrowing. Damage due to erosion or animal burrowing shall be corrected immediately and steps taken to prevent occurrences in the future.

(iv) The occurrence of any of the following shall be minimized and immediate steps shall be taken to eliminate each occurrence:

(A) Scum.

(B) Floating sludge.

(C) Offensive odors.

(D) Insect infestations.

(E) Septic conditions.

(4) Laundromats, less than 20,000 gallons per day

(a) Effluent may be discharged from May 1 through October 15, unless alternative dates are approved by the department.

(b) The discharger shall inspect the lagoon facilities weekly and maintain an inspection log unless otherwise authorized by the department.

(c) When drawing down a cell for transfer or discharge, the discharger shall meet all of the following requirements unless otherwise authorized by the department:

(i) Water discharged or transferred shall be removed from the surface 2 feet of the cell at a rate of less than 1 foot per day.

(ii) A discharger shall maintain a minimum of 2 feet of freeboard in all cells at all times.

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(A) Scum.

(B) Floating sludge.

(C) Offensive odors.

(D) Insect infestations.

(E) Septic conditions.

TAB 2
General Information

Groundwater Discharge Permit Application

REFERENCES IN THIS DOCUMENT TO "RULES" ARE TO ADMINISTRATIVE RULES IMPLEMENTING PART 31 OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994 PA 451, AS AMENDED, BEING R 323.2101 TO 2192 AND R 323.2201 TO 2240.

GENERAL INFORMATION

Please type or print clearly

1. DISCHARGE FACILITY NAME	Donald C. Cook Nuclear Plant		
2. FACILITY OWNER NAME AND MAILING ADDRESS	Name Indiana Michigan Power - A fully owned subsidiary of American Electric Power		
Street Address or P.O. Box	1 Cook Place, Mail Zone 5A		
City, State and Zip Code	Bridgman, MI 49106		
Telephone No.	269-465-5901 ext. 1153		
Fax No.	269-466-2550		
3. CONTACT PERSON	Name and Title John P. Carlson - Environmental Manager		
Street Address or P.O. Box	1 Cook Place, Mail Zone 5A		
City, State and Zip Code	Bridgman, MI 49106		
Telephone No.	269-465-5901 ext. 1153	Fax No.	269-466-2550
4. DISCHARGE LOCATION	Street Address 1 Cook Place		
City	Bridgman	State	MI Zip Code 49106
County	Berrien	Township	Lake
Township	06S	Range	19W Section Number 6
First Quarter Section	SW	Second Quarter Section	SE Additional Quarter Sections
Latitude	41 58'30" Longitude 86 34'30"		
5. FACILITY TYPE	Municipal (Sanitary Only) _____ Municipal (w/ Sanitary and Industrial Wastewater Inputs) _____		
	Industrial <input checked="" type="checkbox"/> Commercial _____		
	If Municipal, population served _____		
6. CERTIFIED OPERATOR (NOT REQUIRED FOR 2211(c), (d), (e), (g), (h), or 2213 (2), (3), (4))	A Certified Operator is required by Section 3110 (1) of Part 31 of Act 451.		
Name	Blair K. Zordell		Certification Number 4537
Street Address	1 Cook Place, Mail Zone 5A		
City	Bridgman	State	MI Zip Code 49106
Telephone No.	269-465-5901 ext. 2006		

7. FOR RULE 2215, 2216 AND 2218 AUTHORIZATIONS ONLY:

PLEASE INDICATE WHERE THE COMPLIANCE MONITORING REPORT FORMS SHOULD BE SENT

NAME Donald C. Cook Plant - Attention John Carlson, Mail Zone 5A

STREET ADDRESS
1 Cook Place

CITY Bridgman STATE MI ZIP CODE 49106

8. AUTHORIZATION REQUESTED:

<input type="checkbox"/> Rule 2210(y), Site Specific Exemption	<input type="checkbox"/> NEW USE	<input type="checkbox"/> REISSUANCE
<input type="checkbox"/> Rule 2211, Notification	<input type="checkbox"/> NEW USE	<input type="checkbox"/> REISSUANCE
<input type="checkbox"/> Rule 2213, Notification with Certification	<input type="checkbox"/> NEW USE	<input type="checkbox"/> REISSUANCE
<input type="checkbox"/> Rule 2215, General Permit, Certificate of Coverage	<input type="checkbox"/> NEW USE	<input type="checkbox"/> REISSUANCE
<input type="checkbox"/> Rule 2216, Specific Discharges	<input type="checkbox"/> NEW USE	<input type="checkbox"/> REISSUANCE
<input type="checkbox"/> Rule 2218, Discharge Permit	<input type="checkbox"/> NEW USE	<input checked="" type="checkbox"/> REISSUANCE

IF REQUESTING A REISSUANCE OR AN AUTHORIZATION DIFFERENT THAN THE CURRENT AUTHORIZATION, PLEASE INCLUDE THE PERMIT/EXEMPTION NUMBER OF THE CURRENT AUTHORIZATION:

If the current authorization is a permit, Rules 2216 or 2218, or was issued prior to August 26, 1999, the number is: M 00988

If the current authorization is a General Permit, Rule 2215, the number is: MG _____

If the current authorization is a site specific exemption, Rule 2210(y), or was issued prior to August 26, 1999, the number is: GWE- _____

If the current authorization is a notification, Rule 2211, the number is: GWN- _____

If the current authorization is a notification/certification, Rule 2213, the number is: GWC- _____

9. FACILITY STANDARD INDUSTRIAL CLASSIFICATION (SIC) CODE. 4911

This information is available through the US Department of Labor, Office of Safety and Health Administration, at the following web address: www.osha.gov/oshstats/sicser.html

10. SITE MAPS

Provide two black and white 8 1/2" X 11" maps drawn to scale that show the following:

SITE MAP 1

- Discharge location in relation to property boundaries on a topographic map.
- Township and county name.
- North arrow orientation.

SITE MAP 2 - All sites must include item a, include items b-e as necessary.

- Current and proposed treatment units and discharge areas and distance to property lines.
- Monitoring wells on site and on adjacent properties.
- Potable wells on site and on adjacent properties.
- Surface waters, including wetlands, lakes, rivers, streams, and drains on the property.
- Distance between multiple disposal sites.

ATTACH SITE MAP TO THIS APPLICATION FORM

11. WATER USAGE DIAGRAM

Please attach an 8 1/2 x 11 diagram showing water usage at the facility, from supply to discharge. Include all flows such as sanitary, process water, etc. Please also indicate where in the system additives or other substances are added to the waste stream for which this authorization is being sought. The water balance should show daily average flow rates at influent, intake and discharge points and daily flow rates between treatment units. Please use actual measurements whenever possible.

12. OWNERSHIP OF TREATMENT SYSTEM AND DISPOSAL AREA

Are all parts of the treatment system and discharge areas (e.g. treatment plant, underground piping or irrigation fields) located on property owned by the applicant? Yes No

IF NO, ATTACH THE NAME AND ADDRESS OF THE PROPERTY OWNER WHERE THE DISCHARGE WILL OCCUR, AND A COPY OF THE WRITTEN PERMISSION TO DISCHARGE ON PROPERTY NOT OWNED BY THE DISCHARGER.

13. PROXIMITY OF TREATMENT SYSTEM TO A KNOWN SOURCE OF GROUNDWATER CONTAMINATION

Are there any known groundwater contamination sites within 1/4 mile of your disposal site?

Yes No Unknown

IF YES, ATTACH TO THE APPLICATION FORM A DESCRIPTION OF THE LOCATION AND CONTAMINANTS BEING REMEDIATED AT THE SITE. On Site Map #2

14. ISOLATION DISTANCE

The following are isolation distances required from the discharge to adjacent water supply wells. What is the distance from your discharge to the nearest water supply well?

WELL TYPE	PERMIT AUTHORIZATION: 2218, 2216(3)	ALL OTHER AUTHORIZATIONS
I, IIa	2000	200
IIb, III	800	75
Domestic	300	50

Distance to nearest Type I, IIa-water supply well 6 miles - Outdoor Kitchen
Distance to nearest Type IIb, III water supply well 3 miles - Grand Mere State Park
Distance to nearest Domestic water supply well 1 mile

15. ADJACENT PROPERTY OWNERS

List the names and addresses of all property owners adjacent to the facility, treatment systems and discharge locations. Include properties across roadways.

ATTACH ANY ADDITIONAL NAMES AND ADDRESSES TO THE APPLICATION FORM.

NAME	COMPLETE MAILING ADDRESS

16. WELLHEAD PROTECTION

Is your facility located in a designated wellhead protection area? Yes No

If yes, please identify the community* _____

- Approved wellhead protection areas can be reviewed at the following web address:
http://www.michigan.gov/deq/0,1607,7-135-3313_3675_3695-59280--,00.html

17. SIGNATORY REQUIREMENT

Pursuant to Rule 2114 of the Part 21 Rules, this application must have an original signature, and be signed by

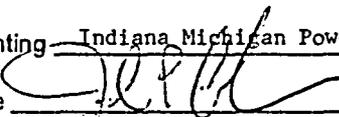
the appropriate representative(s) as follows:

- A. For a corporation, the form must be signed by a principal executive officer of at least the level of Vice-president, or his/her designated representative, if the representative is responsible for the overall operation of the facility from which the discharge described in the permit application (appropriate documentation must be provided to demonstrate the position and responsibility of the designated representative).
- B. For a partnership, the form must be signed by a general partner.
- C. For a sole proprietorship, the form must be signed by the proprietor.
- D. For municipal, state or other public facility, the form must be signed by either a principal executive officer, the mayor, village president, city or village manager or other duly authorized employee.

All signatures submitted to the department must be original signatures, or the application will be returned as incomplete. The details of these requirements are found in Rule 2114.

The department reserves the right to request information in addition to that supplied with this application if necessary to verify statements made by the applicant or for the department to make a determination required by Part 31, Water Resources Protection, Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451) and/or the Part 22 Rules associated with Part 31.

I certify, under penalty of law, that I have personally examined and am familiar with the information submitted in this document and all attachments. The information being submitted was collected and analyzed in accordance with the Part 22 Rules of Part 31 of Act 451, as amended. Based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the 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.

Print Name John P. Carlson Title Environmental Manager
Representing Indiana Michigan Power - A fully owned Subsidiary of American Electric Power
Signature  Date 2-23-05

If the application is for the discharge of treated sanitary wastewater from a privately owned treatment system serving a mobile home park, campground, apartment complex, condominium, nursing home, prison, or other commercial or residential facility, a principal executive officer or ranking elected official from the local unit of government must sign the permit application in the space provided. The signature is only a certification that the local unit of government is aware of its responsibilities as set forth in Section 3109(2) of Act 451. The refusal of the local unit of government to sign the application does not reduce its liability under the statute.

This is to certify that I am aware of and recognize the responsibilities of the municipality as set forth in Section 3109 of Act 451.

Print Name Section not applicable Title _____
Representing _____
Signature _____ Date _____

RULE 323.2218

DISCHARGE PERMITS

1. TYPE OF TREATED WASTEWATER FOR WHICH THE AUTHORIZATION IS REQUESTED. PLEASE CHECK ALL THAT APPLY

- Sanitary sewage
- Process wastewater
- Cooling water, greater than 5,000 gallons per day
- Non-contact cooling without additives, greater than 10,000 gallons per day, source water not approved by department.
- Non-contact cooling water with additives, greater than 10,000 gallons per day.
- Other, please describe:

2. DISCHARGE VOLUME

ALL DISCHARGES:

Maximum daily discharge: _____ gallons per day

Cumulative annual discharge: _____ gallons per year

SEASONAL DISCHARGES SHOULD INCLUDE THE FOLLOWING:

Discharge period _____ through _____

IRRIGATION SYSTEMS AND SEEPAGE BEDS UTILIZING SOILS FOR TREATMENT SHOULD INCLUDE THE FOLLOWING:

Effluent application rate:

Inches per hour _____ Inches per day _____ Inches per week _____ Inches per year _____

3. DISCHARGE METHOD

Please check the discharge method used:

<u>LAND SURFACE DISPOSAL</u>	<u>DISPOSAL CODE</u>	<u>SUBSURFACE DISPOSAL</u>	<u>DISPOSAL CODE</u>
<input type="checkbox"/> Spray Irrigation	A1f1	<input type="checkbox"/> Tile Field	A1g1
<input type="checkbox"/> Ridge and Furrow	A1f2	<input type="checkbox"/> Injection well	A1g2
<input type="checkbox"/> Flood/Sheet Irrigation	A1f3	<input type="checkbox"/> Trench	A1g3
		<input type="checkbox"/> Drywell	A1g4

Seepage Beds:

- Slow/Medium Rate A1f4
- Rapid Rate A1f5
- Other - Please describe: Infiltration pond

4. TREATMENT CODES

Select and enter the appropriate treatment codes to describe treatment units, i.e., A1b, B2b (see APPENDIX A, Pages 41-44)

- Treatment Unit A TRS A-1h B-1b A-1f
- Treatment Unit B SBR A-2b C-3a C3b A-1f
- Treatment Unit C _____
- Treatment Unit D _____

Please provide a description of the treatment system indicating how it will produce an effluent that will meet the standards of Rule 2222.

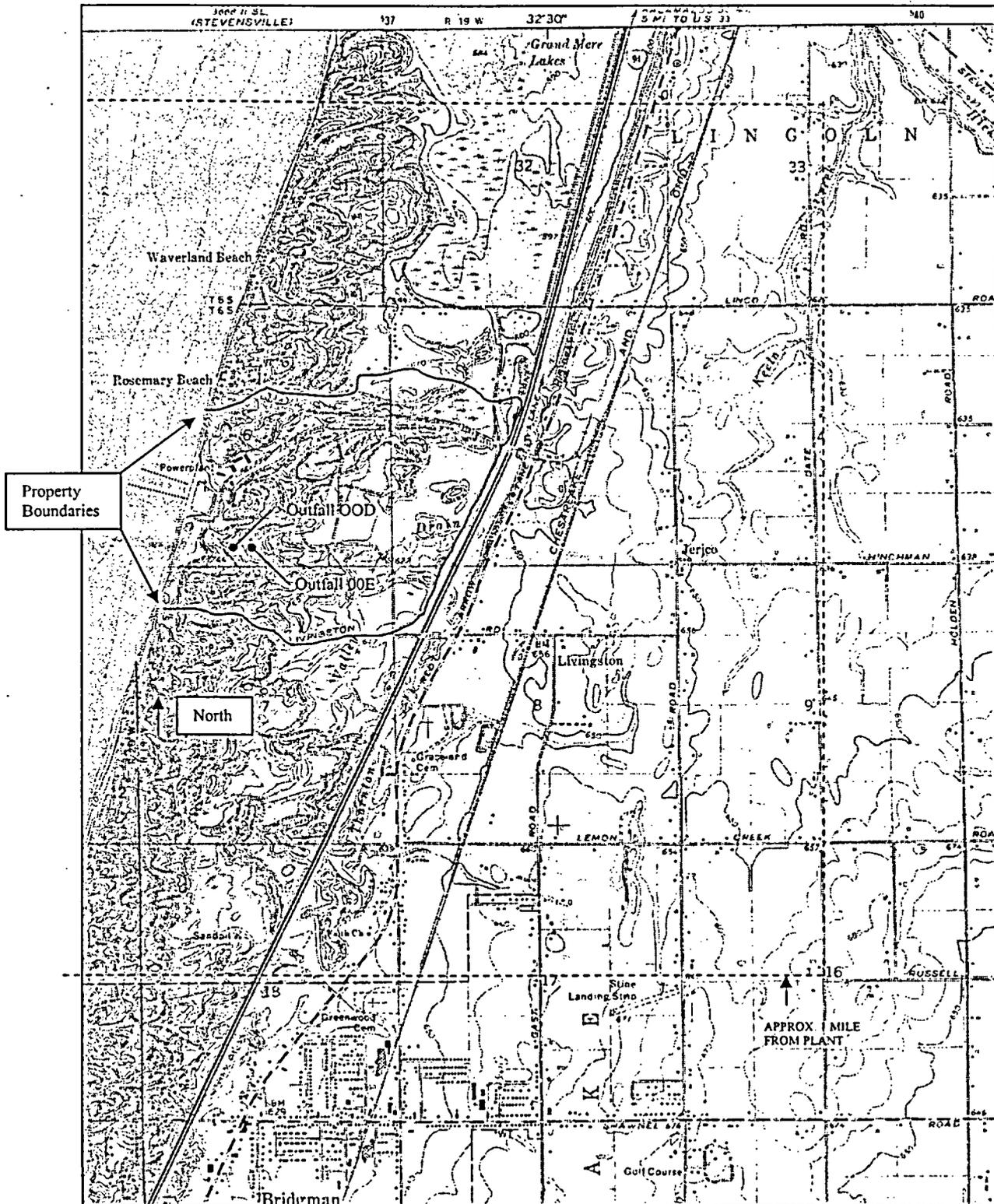
4b. Reissuance of current permit, no modifications, Rule 2218(3)(c). The following information must be included in the application for the reissuance of your current permit. Please check that all items have been included:

- The discharge consists of the same quantity, effluent characterization, and treatment process as previously permitted.
- A narrative description of the history of facility compliance with effluent and groundwater permit limits and sampling frequency is included. This item is found Tab 9.
- An updated site map is included. This item is found Tab 3 & 4.
- The most recent static water levels and groundwater elevations from all wells on site. This item is found Tab 10.
- A current groundwater contour map is included, with a narrative evaluation of whether changes to the existing groundwater monitoring system are warranted and the rationale for any proposed change. This item is found Tab 11.
- The most recent groundwater quality results are included from all wells on site. This item is found Tab 12.
- The most recent effluent quality results are included. This item is found Tab 12.

Please check that all of the following that apply are included:

- If permit limits were exceeded, the steps taken to bring the facility into compliance. This item is found N/A - iron limits - nothing due to naturally occurring
- An evaluation of whether there are general trends in the effluent or groundwater sampling data indicating that the discharge is approaching permit limits. This item is found _____.
- N/A The discharger has provided the department, within 30 calendar days of completion of construction of the treatment facilities, a certification by an engineer licensed under Act No. 299 of the Public Acts of 1980, as amended, that a quality control and quality assurance program was utilized and that the facilities were built consistent with standard construction practices to comply with the permit and this part.

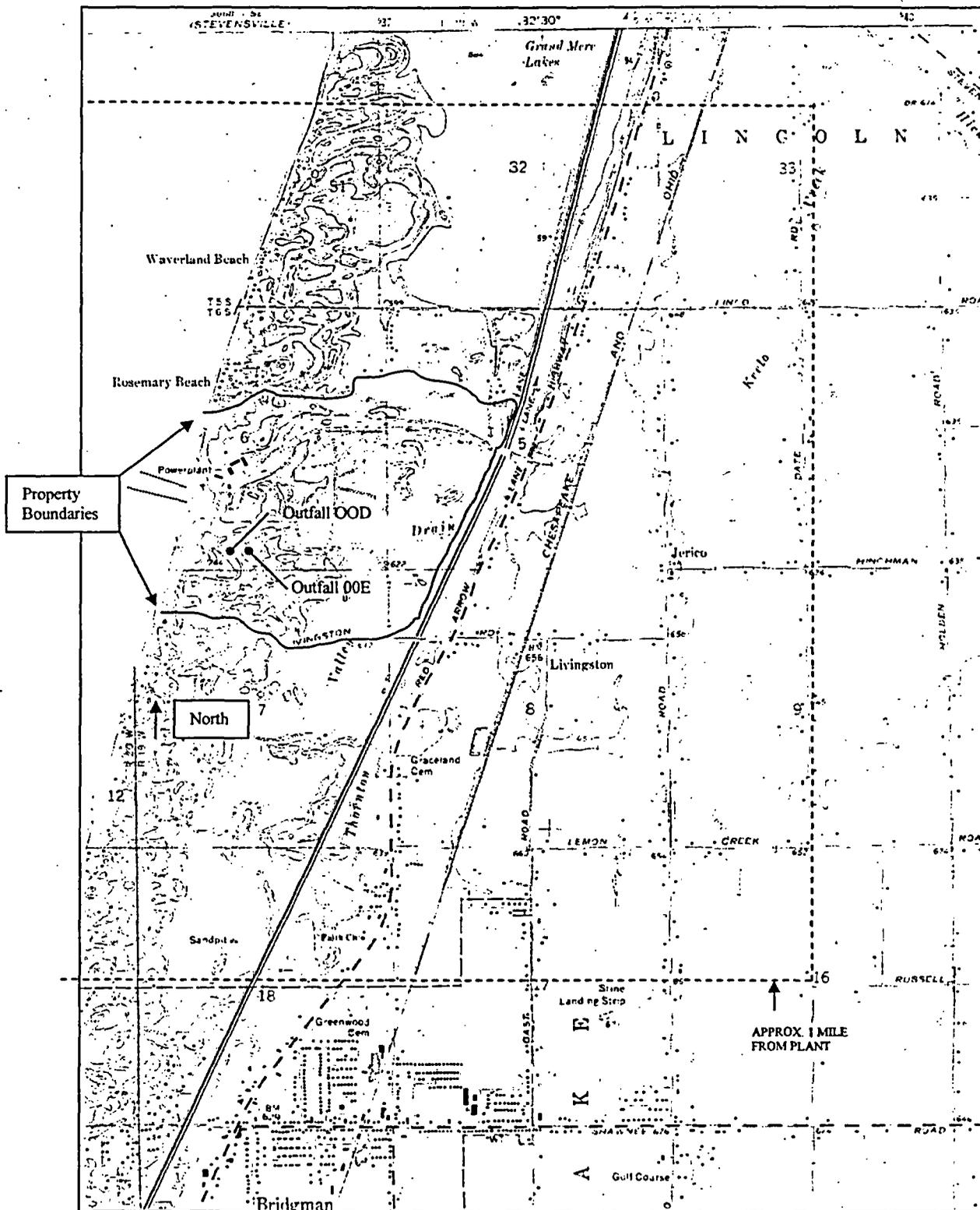
TAB 3
Part 10
Site Map 1



Donald C. Cook Nuclear Plant.
Bridgman Michigan
Lake Township
Berrien County
1" = 0.5 mile

Donald C. Cook Nuclear Plant
Part 10, Site Map 1

M00988



Donald C. Cook Nuclear Plant.
Bridgman Michigan
Lake Township
Berrien County
1" = 0.5 mile

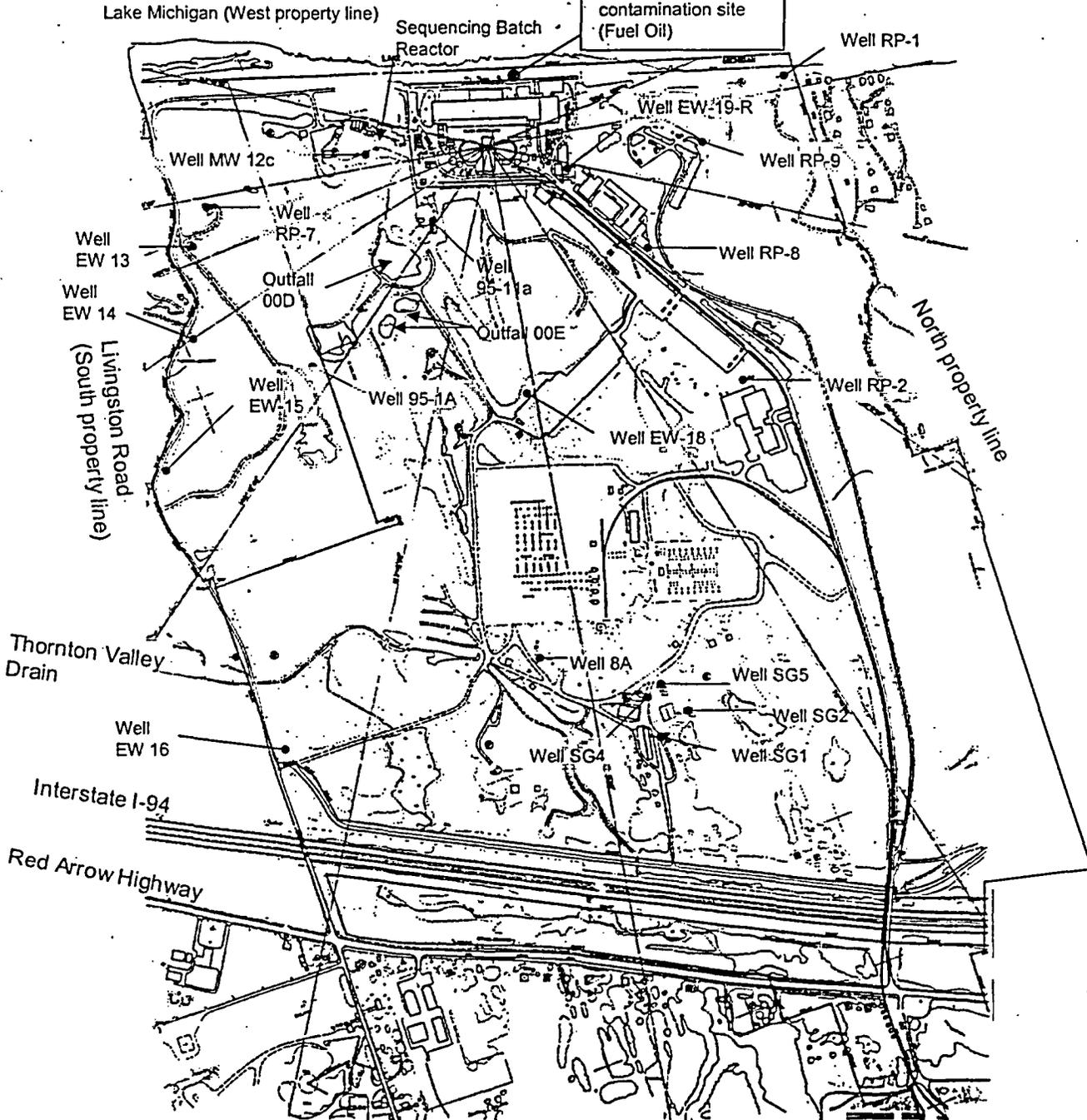
TAB 4
Part 10
Site Map 2

Donald C. Cook Nuclear Plant
Part 10 Site map 2

M00988

Groundwater
contamination site
(Fuel Oil)

North



Distance from discharge 00D
South property line: 1200'
Lake Michigan: 1000'
East property line: 3600'
North property line: 2600'

Distance from discharge 00E
South property line: 1300'
Lake Michigan: 1500'
East property line: 3400'
North property line: 2600'

Cook Nuclear Plant
Berrien County
Lake Township
Scale: 1" = 1000'



Cook Nuclear Plant
Berrien County
Lake Township
Scale: 1" = 1000'

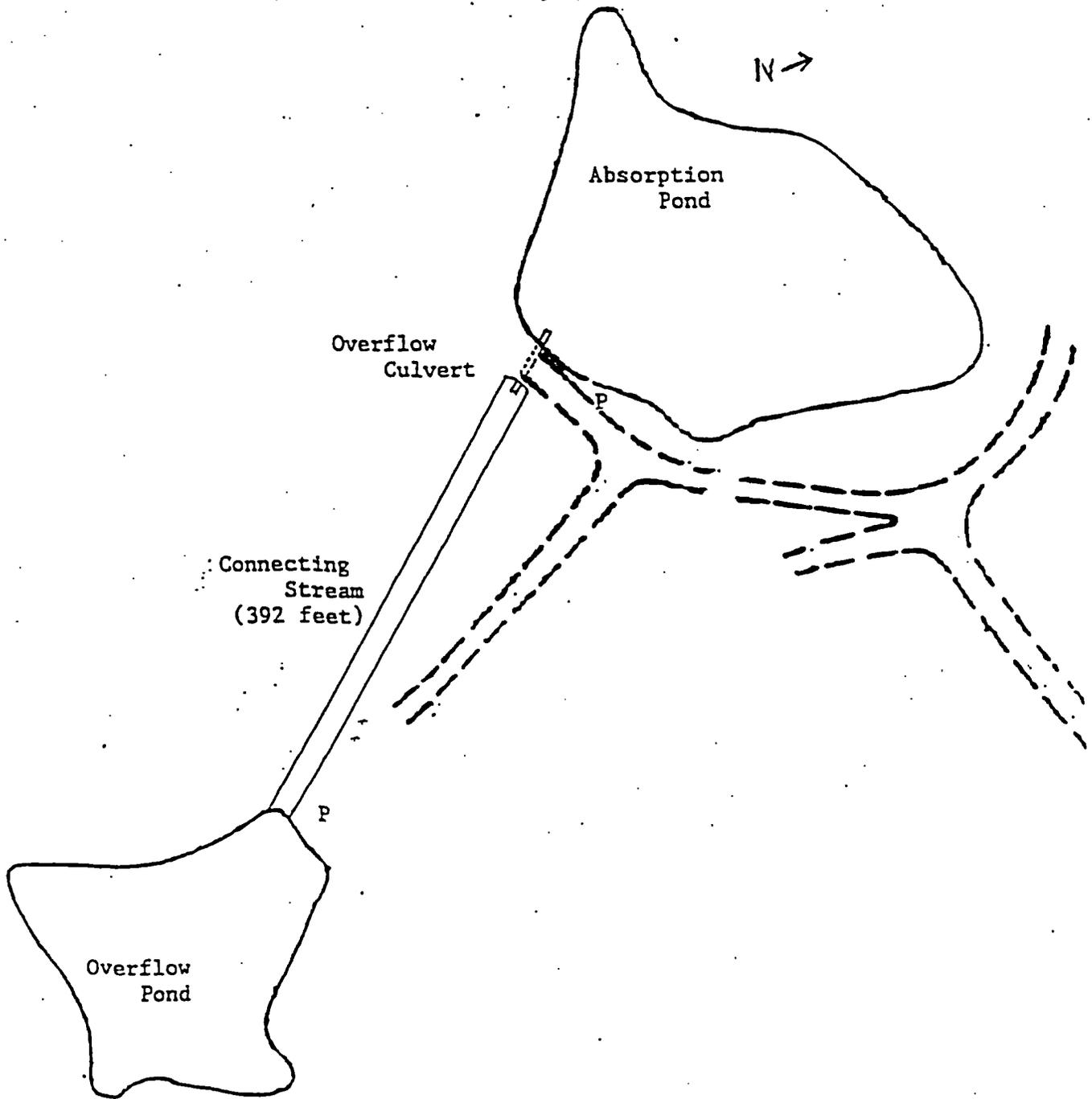


Cook Nuclear Plant
Berrien County
Lake Township
Scale: 1" = 1000'

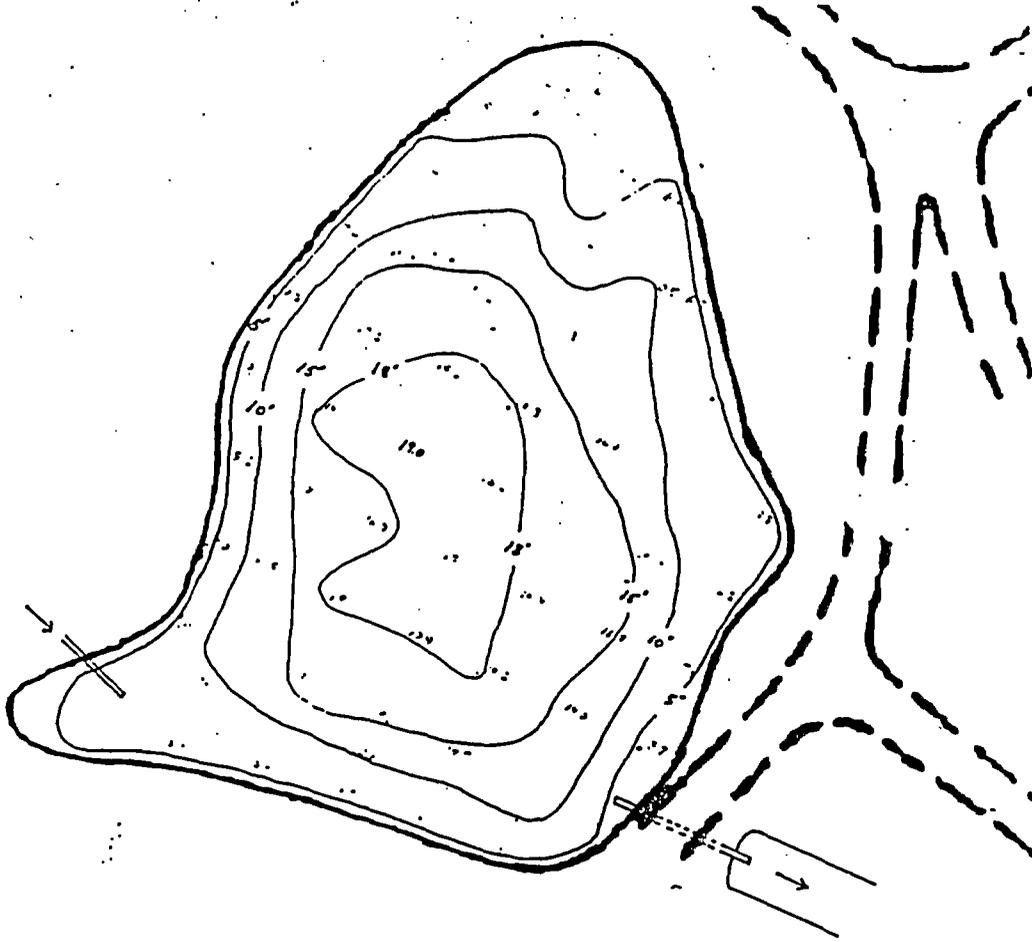
Cook Nuclear Plant, Absorption Pond Complex and Topography



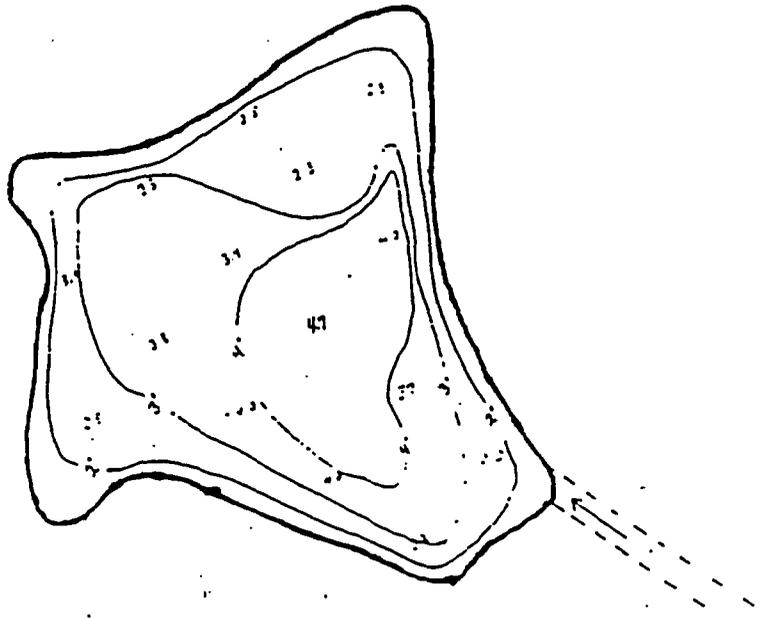
Absorption Pond and Overflow Pond



Absorption Pond Depth Contours



Overflow Pond Depth Contours



TAB 5
Part 15 Adj.
Property
owners

Michigan Department of Environmental Quality-Surface Water Quality Division

Groundwater Discharge Permit Application

General Information

PLEASE TYPE OR PRINT

FACILITY NAME Ronald C. Cook Nuclear Plant		NPDES PERMIT OR COC NUMBER M00988	
15) List adjacent property owners List the names and addresses of all property owners adjacent to the facility, treatment systems, and discharge locations. List this information in the space provided below or include the information as an attachment on 8 1/2" x 11" paper. If additional space is necessary, copy this blank page and attach this information to this application.			
Location	Property Number	Name	Address
NORTH			
Rosemary Beach	11-11-6800 0038-00-5	Tengerstrom, Eric H.	7470 Rosemary Stevensville MI 49127
	11-11-6800-0037-02-5	Tengerstrom Eric H.	7470 Rosemary Stevensville MI 49127
	11-11-6800-0037-01-7	Gielniewski, Michael Z. & Teresa B.	1113 Independence Rd Bartlett IL 60103
	11-11-6800-0037-00-9	Vesely, Alan Kobler, Rich +Matthews, Larry.	527 S Oak Park Ave. Oak Park IL 60304
	11-11-6800-0036-00-2	Lewis, James G. Jr.	4183 Lake Ct. Stevensville, MI 49127
	11-11-6800-0033-00-3	Gilpin, Clark and Nancy	714 Dearborn #8 Chicago IL 60605
	11-11-6800-0032-01-5	Giese Marie E.	4291 Lake Road Stevensville MI 49127
	11-11-6800-0030-02-1	Gottschall, Bruce A. & Susan M.	5760 S. Blackstone Chicago, IL 60637
	11-11-6800-0028-01-8	Balka, Ronald A. & Janet M.	3334 Louise Dr. Lansing, IL 60438
	11-11-0006-0002-03-1	Michigan Department of Natural Resources	PO Box 30735 Lansing, MI 48909
	11-11-0006-0004-00-9	Franklin Real Estate	c/o Indiana Michigan Power Co. PO Box 16428 Columbus OH 43216
	11-11-0006-0004-04-1	Temmel, Edward P.	9617 E. Shore Dr. Oak Lawn IL 60453
	11-11-0006-0004-01-7	Caparo, William E. & Oyler, Kathryn E.	122 S. Ellsworth Pl. South Bend, IN 46635
	11-11-0006-0004-02-5	Rosemary Beach Corp.	C/O Secretary 3415 S. 59 St. Cicero IL 60650
	11-11-0007-0013-00-6	Lake Charter Twp.	Shawnee Rd. Bridgman, MI 49106
	11-11-0007-0013-01-4	Lake Charter Twp.	Shawnee Rd. Bridgman, MI 49106
	11-11-0007-0006-01-8	Indiana Michigan Power Company	PO Box 16428 Columbus OH 43216
	11-11-0007-0001-01-6	Lake Charter Twp.	Shawnee Rd. Bridgman, MI 49106
	11-11-0007-0004-01-5	Lake Charter Twp.	Shawnee Rd. Bridgman, MI 49106
	11-11-0005-0029-00-3	Technisand, Inc.	PO Box 177 Wedron, IL 50557
	11-11-0005-0036-01-8	Ruff, Timothy W.	7500 Thorton Dr. Stevensville, MI 49127

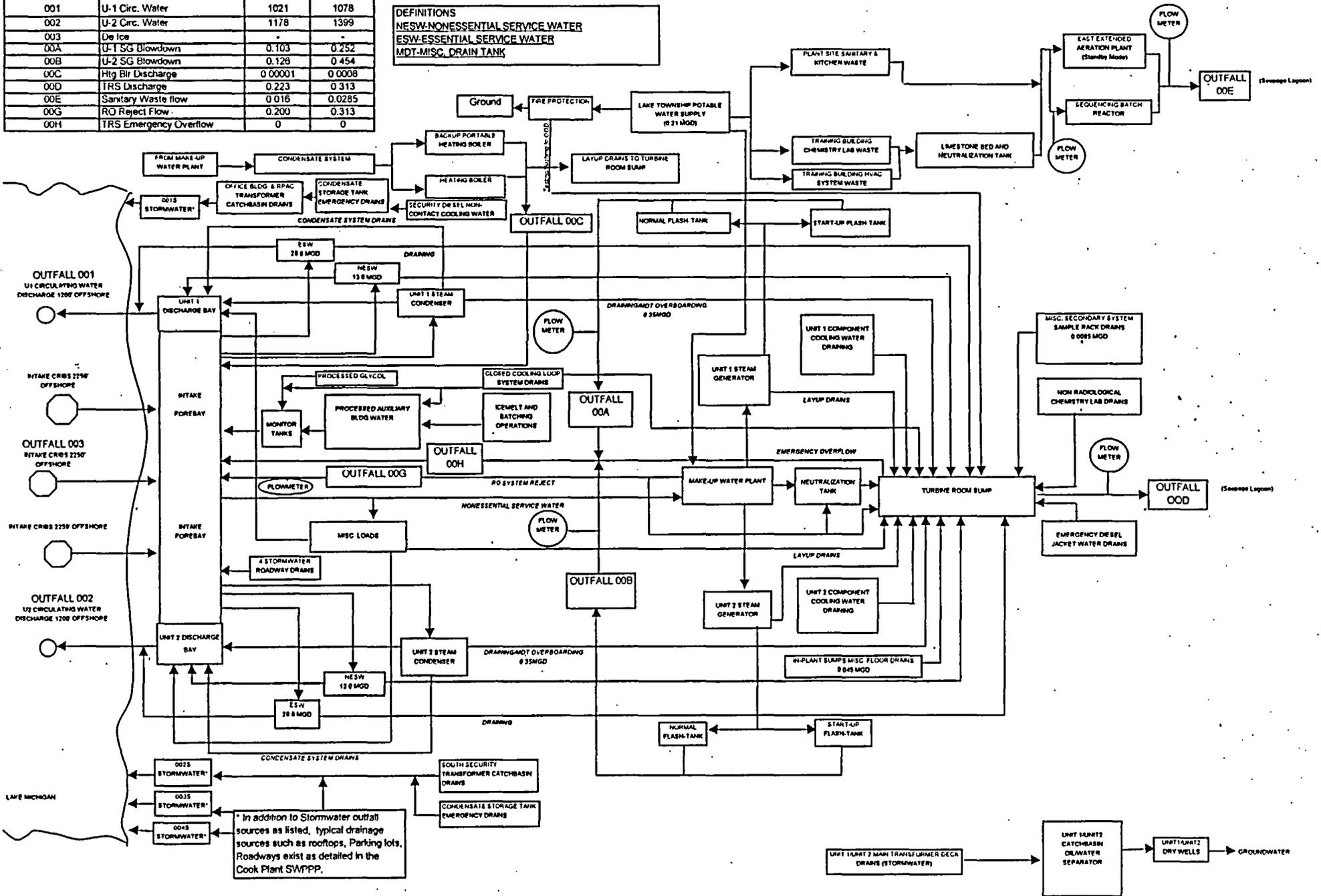
Location	Property Number	Name	Address
	11-11-0005-0027-00-1	Technisand, Inc.	PO Box 177 Wedron, IL 50557
	11-11-0005-0036-06-9	Emery, Martin; Hopkins, Elwood J. & Mable N.;	7499 Thorton Dr. Stevensville, MI 49127
	11-11-0005-0036-02-6	Indiana Michigan Power Company	PO Box 16428 Columbus OH 43216
	11-11-0005-0002-01-6	Blue Jay Assoc.	PO Box 24400 Canton OH 44701
	11-11-0008-0041-00-8	Michigan Dept. of Transportation	Lansing MI 48900
	11-11-0008-0009-00-7	Franklin Real Estate	c/o Indiana Michigan Power Co. PO Box 60 Ft. Wayne, IN 46801.
EAST		Interstate I-94	Michigan Dept of State Highways
SOUTH		Lake Township	Township Supervisor 1410 Shawnee Road Bridgman, MI 49106
WEST		Lake Michigan	State of Michigan and United States of America

TAB 6
Part 11
Water usage
diagram

WASTEWATER FLOW DIAGRAM DONALD C. COOK NUCLEAR PLANT

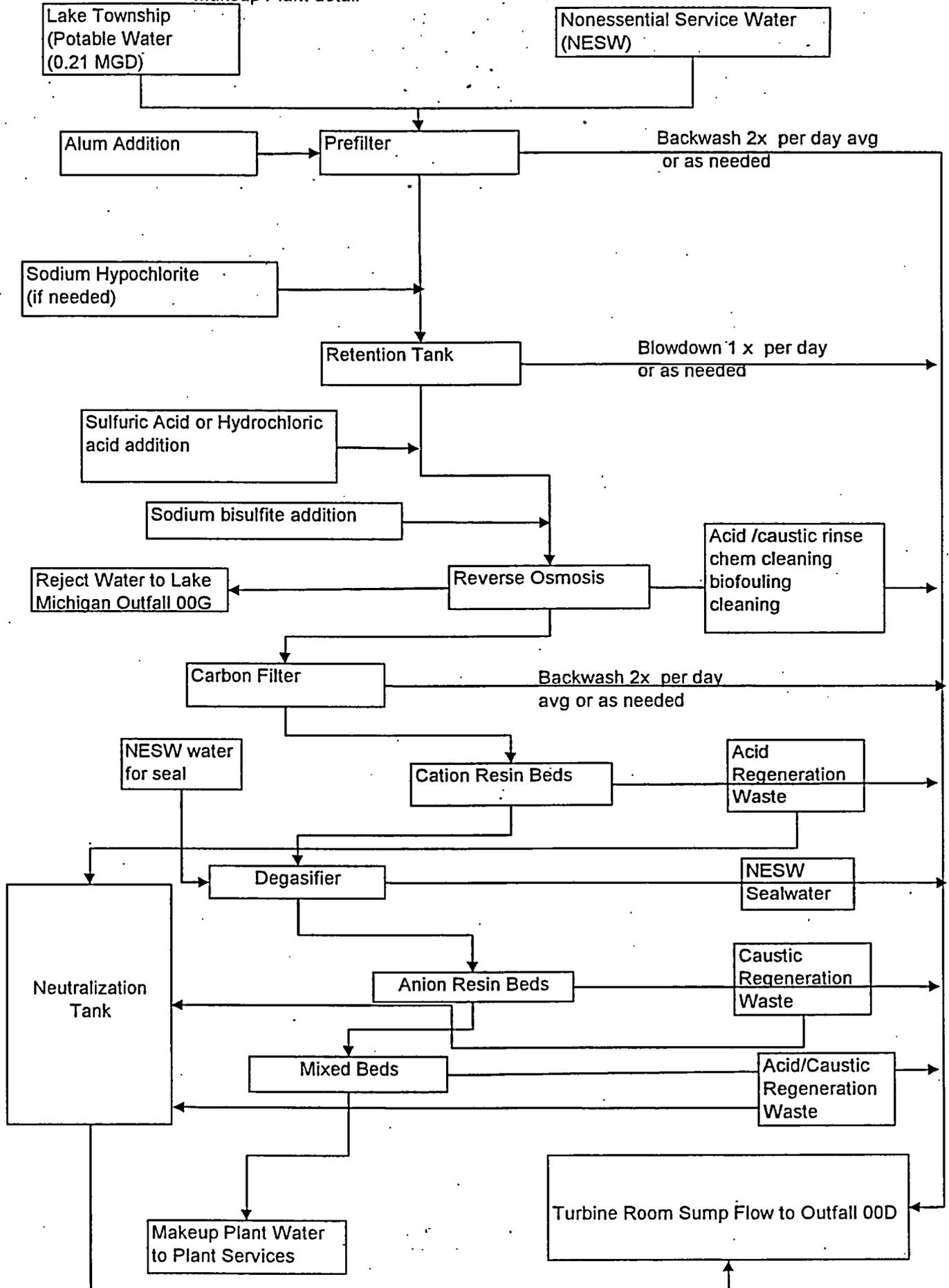
Outfall	Description	AVG Flow in MGD	MAX Flow in MGD
001	U-1 Circ. Water	1021	1078
002	U-2 Circ. Water	1178	1399
003	De Ice	-	-
00A	U-1 SG Blowdown	0.103	0.252
00B	U-2 SG Blowdown	0.128	0.454
00C	Htg Blr Discharge	0.00001	0.0008
00D	TRS Discharge	0.223	0.313
00E	Sanitary Waste flow	0.016	0.0285
00G	RO Reject Flow	0.200	0.313
00H	TRS Emergency Overflow	0	0

DEFINITIONS
 NESW-NONESSENTIAL SERVICE WATER
 ESW-ESSENTIAL SERVICE WATER
 MDT-MISC. DRAIN TANK



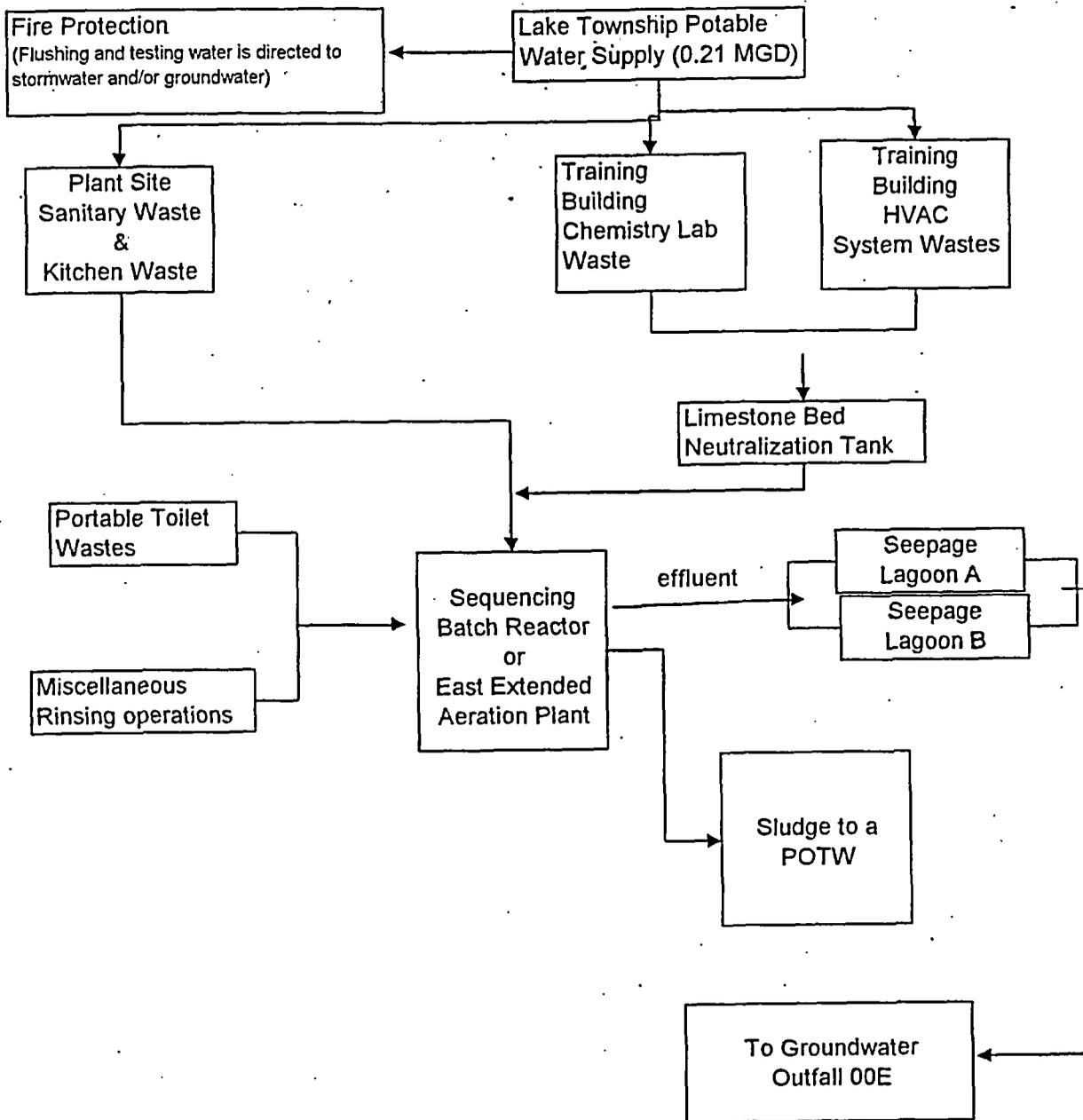
Cook Nuclear Plant Wastewater Flow Diagram
Makeup Plant detail

M00988



Cook Nuclear Plant Wastewater flow diagram
Sewage treatment plant detail

M00988



TAB 7
Water usage
narrative

General Information, ITEM 11 Cont'd
Groundwater and Surface Water Waste Stream Narrative

This narrative describes all outfalls discharging to Lake Michigan under NPDES Permit MI0005827, and for Outfalls 00D and 00E discharges permitted under Permit M00988 "Authorization to Discharge."

Flows are based on a review of previous NPDES applications, Plant system descriptions, or previously submitted Discharge Monitoring Reports (DMR). The chemical additives described below may include a manufacturer's name as an example of the type of product used in a specific system. Indiana Michigan Power may substitute vendors of chemical additives provided that the chemical ingredients are similar. Surface water discharge values are based on maximum release rates and volumes, dilution rates are based on a minimum number of pumps running.

OUTFALL 001 - Unit 1 Circulating Water Discharge

Outfall 001 is a non-contact cooling water discharge. The majority of non-contact cooling water (Circulating Water System, ~690,000 GPM) is used to condense the steam exhausting from steam driven turbines. Non-contact cooling water is drawn from Lake Michigan approximately one-half mile from shore through three 16 ft. diameter tunnels. Water enters the tunnels via intake cribs at an approximate velocity of 1.3 feet per second. The water enters to a forebay where it is screened to remove large debris that may be entrained in the water. It is routed through the Unit 1 condensers and then discharged to Lake Michigan through a 16 foot diameter tunnel. The water exits the tunnels through high velocity discharges at a rate of approximately 13 feet per second approximately 1/4 mile from shore. Outfall 001 also includes internal Outfalls (as designated by the Michigan Department of Environmental Quality) steam generator Blowdown (00A, 00B), Plant Heating Boiler (00C), Reverse Osmosis Unit (00G), and the Turbine Room Sump Emergency Overflow (00H) described in detail later in this document.

Outfall 001 also may contain the effluent flow from both Units' Essential Service Water (ESW) systems, both Units' Non-Essential Service Water (NESW) system, and monitor tank releases. ESW (~40,000 GPM) is Lake Michigan water taken from the forebay that is used to provide cooling to safety-related equipment. NESW (~18,000 GPM) is also Lake Michigan water taken from the forebay used for

non-contact cooling for various plant systems including oil coolers, a source of water for the demineralized makeup system (MUP), and a water supply for non-safety related equipment. Monitor tank releases (~15,000 to 20,000 gallons per event) are regulated by the NRC and consist of wastewater from various system and equipment leakage that may be generated within the auxiliary building area. Minor leakage from systems containing lube oil, hydrazine, carbohydrazide, ethanolamine or closed-loop cooling systems containing a maximum concentration of gluteraldehyde (100 ppm), methyl (bis) thiocyanate (10 ppm), tolyltriazole (60 ppm), Molybdate (1000 ppm), and nitrite (1200 ppm), may be discharged via monitor tank releases.

The non-contact cooling water for the Circulating Water, the ESW and the NESW, and Miscellaneous Sealing and Cooling Water Systems is treated for biological control using sodium hypochlorite. This same water is periodically treated using a non-oxidizing biocide to eradicate zebra mussels from the cooling systems. The biocides (Betz Spectrus CT-1300, Betz CT-4, Calgon H-130M, Calgon EVAC and NALCO Macro-Trol 9380) are all polyquats, and are used as required to protect plant systems while meeting water quality based effluent limits. The treatments can be directed to various critical plant systems from the intake structures through the entire plant cooling system, including the Circulating Water System, ESW and NESW systems and other non-contact cooling water. The biocide may be added to the systems via a chemical injection pipeline through a ring header located inside the intake crib, or directly applied at a specific system. A chemical injection pipeline is installed inside the intake piping and is designed to feed chemicals from inside the plant. The intake chemical injection header may be stored with chemical inside the pipe to prevent zebra mussel infestation. The header may also be leak checked using approved dyes such as fluorescein, or other indicators such as Nalco Trasar 23299. Non-contact cooling systems biocide treatments are dependent upon zebra mussel infestation. Concentrations and chemical feed points are chosen to minimize the amount of biocide required and to maximize the efficacy on zebra mussels. Bentonite clay may be added to detoxify the biocide prior to discharge. The plant non-contact cooling water systems may be treated concurrently or individually to allow more efficient use of chemicals. Plant systems are treated to assure safe operation of the nuclear generating units.

The piping used to apply chemicals is regularly cleaned of calcium carbonate scale buildup. A small amount of weak acid cleaner such as Betz FerroQuest FQ LP 7200 may be used to remove accumulated carbonate scale deposits. The accumulated deposits will be discharged via Outfalls 001/003. Circulating water will dilute the weak acid prior to discharge to Lake Michigan.

Condensate flushes are performed periodically to purge the plant's secondary water system from layup chemistry specifications during shutdown conditions to startup chemistry specifications prior to startup of the unit. Water containing up to 4 ppm hydrazine [Betz Control OS5035, Betz Control OS5010, NALCO 19H], 10 ppm carbohydrazide (NALCO 1250 plus, or equivalent), 100 ppm ethanolamine (Betz Powerline 1440, Betz Powerline 1480, NALCO 92UM001), is overboarded to Outfall 001 as required to remove contaminants to meet desired startup secondary Chemistry specifications. This flowrate averages 70 GPM, but may reach 600 GPM for short periods of time. The flowrate is dependent on chemistry specification parameters and makeup water availability. The maximum output from the MUP is approximately 600 GPM or 864,000 GPD. (See Outfalls 00A, 00B for further description.)

Monitor tanks receive treated water from the auxiliary building radioactive waste removal system and other sources such as ice production and removal processes from the ice condenser systems and other radioactively contaminated wastes generated at the facility. This system handles wastes generated from the reactor coolant pump seal leakoffs, the refueling cavity water, equipment leaks, floor drains, valve stem leakoffs, system sampling, and waste sample solutions. It also handles laboratory wastes from the radiochemistry analysis in the hot chemical laboratory, system equipment drains, non-contact cooling water, ice production/removal and decontamination processes and any contaminated liquid waste generated in the auxiliary building area. The wastes are collected in one of several tanks and are treated when enough water is collected. The treatment utilizes a demineralizer system to minimize radioactive contaminants. A small amount of wastewater may bypass the treatment because it cannot be processed by resin.

Other special drains of non-radioactive process water systems such as Component Cooling Water system flushes with biocides such as gluteraldehyde (100 ppm), methyl (bis) thiocyanate (10 ppm), tolyltriazole (60 ppm), Molybdate (1000 ppm) and nitrite (1200 ppm), and borated icemaking/ice removal operations, can be routed directly to the plant's monitor tanks without treatment. For maintenance purposes to prevent microbial growth, Component Cooling Water flushes are performed generating approximately 281,000 gallons per year of flushwater to the monitor tanks.

Borated icemaking/ice removal operations occur for maintenance of the plant's ice condenser systems. This process produces a solution of sodium tetraborate (approximately 2200 ppm as boron) that can be drained to the monitor tanks. This process takes place approximately every 18 months and may produce up to 30,000 gallons of sodium tetraborate solution.

Both the treated wastewater and the special drains are accumulated in the monitor tanks and sampled to ensure the waste meets the radiological requirements prior to being discharged into the Circulating Water System.

Periodically, due to equipment leaks and/or system upsets, a waste stream is generated that contains radioactively contaminated ethylene glycol and water. Incidental amounts of ethylene glycol generated from equipment leaks may be drained directly to the monitor tanks or treated by the radwaste processing system. Small amounts of ethylene glycol may be discharged to outfalls 001, 002, or 003.

Sulfur hexafluoride gas (SF₆) is utilized in the non-contact cooling water systems at the plant to detect leaks in various components such as the condensers. The gas is injected in the cooling water stream and discharged to outfalls 001, 002 or 003 at less than 54 ul/l.

Aryl sulfate liquid (NALCO Trasar 23299) is utilized in the non-contact cooling water systems at the plant to determine flow through various parts of the system. The liquid is injected into the service water system to reach a target concentration of approximately 2 mg/l. The service water is discharged to Outfalls 001, 002, or 003, which would, in turn, discharge at less than 0.15 mg/l. The liquid is also injected into the circulating water system to reach a target concentration of approximately 2 mg/l.

Control Room Air Conditioning (CRAC) testing: Approximately 1440 gallons/yr. of CRAC water may mix with ESW and then be discharged to the forebay during a monthly test of the system. CRAC water is demineralized water, and may contain up to: 2000 ppm nitrite [Calgon LCS 60, Betz Corrrshield NT 4205, BETZ CORRSHIED NT 4201, Betz Corrrshield NT 4203, or equivalent], 100 ppm gluteraldehyde [from Betz Biotrol 107 (Spectrus NX 1105), Calgon H-300, or equivalent], 60 ppm tolyltriazole [from Calgon LCS-60, Betz Copper-Trol Cu-1, Betz Corrrshield NT 4205, BETZ CORRSHIED NT 4201, Betz Corrrshield NT 4203, or equivalent], 10 ppm methyl (bis) thiocyanate (from Betz 3610), 1000 ppm molybdate from Betz Corrrshield MD 4103 and 25 ppm aryl sulfate (from NALCO 22199).

Three roadway storm drains route small amounts of stormwater from a small section of roadway that traverses over the Circulating Water Forebay. The three storm drains are designed to route accumulated stormwater from this small roadway to the forebay below. A small amount of de-icing compound used on this section of road could potentially enter these small (Approximately 8") gratings. Screened material collected from the plant's intakes is also stored in this area in designated trash dumpsters. Fish exudates are now drained to the forebay as recommended by the MDEQ stormwater and NPDES inspection team (M. Fields and J. Molloy 1997).

During upset conditions it is possible to overflow the contents of the Turbine Room Sump (See Outfall 00H) to Outfalls 001, 002 and/or 003 if the flow path to the on-site absorption pond cannot be used.

OUTFALL 002 - Unit 2 Circulating Water Discharge

Outfall 002 is a non-contact cooling water discharge. The majority of non-contact cooling water (Circulating Water System, ~920,00 GPM) is used to condense the steam exhausting from steam driven turbines. Non-contact cooling water is drawn from Lake Michigan approximately one-half mile from shore through three 16 ft. diameter tunnels. Water enters the tunnels via intake cribs at an approximate velocity of 1.3 feet per second. The water enters to a forebay where it is screened to remove large debris that may be entrained in the water. It is routed through the Unit 2 condensers and then discharged to Lake Michigan through an 18 foot diameter tunnel. The water exits the tunnels through high velocity discharges at a rate of approximately 13 feet per second approximately 1/4 mile from shore. Outfall 002 also includes internal Outfalls (as designated by the Michigan Department of Environmental Quality) steam generator Blowdown (00A, 00B), Plant Heating Boiler (00C), Reverse Osmosis Unit (00G), and the Turbine Room Sump Emergency Overflow (00H) described in detail later in this document.

Outfall 002 also may contain the effluent flow from both Units' Essential Service Water (ESW) systems, both Units' Non-Essential Service Water (NESW) system, and monitor tank releases. ESW (~40,000 GPM) is Lake Michigan water taken from the forebay that is used to provide cooling to safety-related equipment. NESW (~18,000 GPM) is also Lake Michigan water taken from the forebay used for

non-contact cooling for various plant systems including oil coolers, a source of water for the demineralized makeup system (MUP), and a water supply for non-safety related equipment. Monitor tank releases (~15,000 to 20,000 gallons per event) are regulated by the NRC and consist of wastewater from various system and equipment leakage that may be generated within the auxiliary building area. Minor leakage from systems containing lube oil, hydrazine, carbohydrazide, ethanolamine or closed-loop cooling systems containing a maximum concentration of gluteraldehyde (100 ppm), methyl (bis) thiocyanate (10 ppm), tolyltriazole (60 ppm), Molybdate (1000 ppm), and nitrite (1200 ppm), may be discharged via monitor tank releases.

The non-contact cooling water for the Circulating Water, the ESW and the NESW, and Miscellaneous Sealing and Cooling Water Systems is treated for biological control using sodium hypochlorite. This same water is periodically treated using a non-oxidizing biocide to eradicate zebra mussels from the cooling systems. The biocides (Betz Spectrus CT-1300, Betz CT-4, Calgon H-130M, Calgon EVAC and NALCO Macro-Trol 9380) are all polyquats, and are used as required to protect plant systems while meeting water quality based effluent limits. The treatments can be directed to various critical plant systems from the intake structures through the entire plant cooling system, including the Circulating Water System, ESW and NESW systems and other non-contact cooling water. The biocide may be added to the systems via a chemical injection pipeline through a ring header located inside the intake crib, or directly applied at a specific system. A chemical injection pipeline is installed inside the intake piping and is designed to feed chemicals from inside the plant. The intake chemical injection header may be stored with chemical inside the pipe to prevent zebra mussel infestation. The header may also be leak checked using approved dyes such as fluorescein, or other indicators such as Nalco Trasar 23299. Non-contact cooling systems biocide treatments are dependent upon zebra mussel infestation. Concentrations and chemical feed points are chosen to minimize the amount of biocide required and to maximize the efficacy on zebra mussels. Bentonite clay may be added to detoxify the biocide prior to discharge. The plant non contact cooling water systems may be treated at the concurrently or individually to allow more efficient use of chemicals. Plant systems are treated to assure safe operation of the nuclear generating units.

The piping used to apply chemicals is regularly cleaned of calcium carbonate scale buildup. A small amount of weak acid cleaner such as Betz FerroQuest FQ LP 7200 may be used to remove accumulated carbonate scale deposits. The accumulated deposits will be discharged via Outfalls 002/003. Circulating water will dilute the weak acid prior to discharge to Lake Michigan.

Condensate flushes are performed periodically to purge the plant's secondary water system from layup chemistry specifications during shutdown conditions to startup chemistry specifications prior to startup of the unit. Water containing up to 4 ppm hydrazine [Betz Control OS5035, Betz Control OS5010, NALCO 19H], 10 ppm carbonylhydrazide (NALCO 1250 plus, or equivalent), 100 ppm ethanolamine (Betz Powerline 1440, Betz Powerline 1480, NALCO 92UM001), is overboarded to Outfall 002 as required to remove contaminants to meet desired startup secondary Chemistry specifications. This flowrate averages 70 GPM, but may reach 600 GPM for short periods of time. The flowrate is dependent on chemistry specification parameters and makeup water availability. The maximum output from the MUP is approximately 600 GPM or 864,000 GPD. (See Outfalls 00A, 00B for further description.)

Monitor tanks receive treated water from the auxiliary building radioactive waste removal system and other sources such as ice production and removal processes from the ice condenser systems and other radioactively contaminated wastes generated at the facility. This system handles wastes generated from the reactor coolant pump seal leakoffs, the refueling cavity water, equipment leaks, floor drains, valve stem leakoffs, system sampling, and waste sample solutions. It also handles laboratory wastes from the radiochemistry analysis in the hot chemical laboratory, system equipment drains, non-contact cooling water, ice production/removal and decontamination processes and any contaminated liquid waste generated in the auxiliary building area. The wastes are collected in one of several tanks and are treated when enough water is collected. The treatment utilizes a demineralizer system to minimize radioactive contaminants. A small amount of wastewater may bypass the treatment because it cannot be processed by resin.

Other special drains of non-radioactive process water systems such as Component Cooling Water system flushes with biocides such as gluteraldehyde (100 ppm), methyl (bis) thiocyanate (10 ppm), tolyltriazole (60 ppm), Molybdate (1000 ppm) and nitrite (1200 ppm), and borated icemaking/ice removal operations, can be routed directly to the plant's monitor tanks without treatment. For maintenance purposes to prevent microbial growth, Component Cooling Water flushes are performed generating approximately 281,000 gallons per year of flushwater to the monitor tanks.

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Both the treated wastewater and the special drains are accumulated in the monitor tanks and sampled to ensure the waste meets the radiological requirements prior to being discharged into the Circulating Water System.

Periodically, due to equipment leaks and/or system upsets, a waste stream is generated that contains radioactively contaminated ethylene glycol and water. Incidental amounts of ethylene glycol generated from equipment leaks may be drained directly to the monitor tanks or treated by the radwaste processing system. Small amounts of ethylene glycol may be discharged to outfalls 001, 002, or 003.

Sulfur hexafluoride gas (SF₆) is utilized in the non-contact cooling water systems at the plant to detect leaks in various components such as the condensers. The gas is injected in the cooling water stream and discharged to outfalls 001, 002 or 003 at less than 54 u/l.

Aryl sulfate liquid (NALCO Trasar 23299) is utilized in the non-contact cooling water systems at the plant to determine flow through various parts of the system. The liquid is injected into the service water system to reach a target concentration of approximately 2 mg/l. The service water is discharged to Outfalls 001, 002, or 003, which would, in turn, discharge at less than 0.15 mg/l. The liquid is also injected into the circulating water system to reach a target concentration of approximately 2 mg/l.

Control Room Air Conditioning (CRAC) testing: Approximately 1440 gallons/yr. of CRAC water may mix with ESW and then be discharged to the forebay during a monthly test of the system. CRAC water is demineralized water, and may contain up to: 2000 ppm nitrite [Calgon-LCS 60, Betz Corrshield NT 4205, BETZ CORRSHIED NT 4201, Betz Corrshield NT 4203, or equivalent], 100 ppm gluteraldehyde [from Betz Biotrol 107 (Spectrus NX 1105), Calgon H-300, or equivalent], 60 ppm tolyl triazole [from Calgon LCS-60, Betz Copper-Trol Cu-1, Betz Corrshield NT 4205, BETZ CORRSHIED NT 4201, Betz Corrshield NT 4203, or equivalent], 10 ppm methyl (bis) thiocyanate (from Betz 3610), 1000 ppm molybdate from Betz Corrshield MD 4103 and 25 ppm aryl sulfate (from NALCO 22199).

Three roadway storm drains route small amounts of stormwater from a small section of roadway that traverses over the Circulating Water Forebay. The three storm drains are designed to route accumulated stormwater from this small roadway to the forebay below. A small amount of de-icing compound used on this section of road could potentially enter these small (Approximately 8") gratings. Screened material collected from the plant's intakes is also stored in this area in designated trash dumpsters. Fish exudates are now drained to the forebay as recommended by the MDEQ stormwater and NPDES inspection team (M. Fields and J. Molloy 1997).

During upset conditions it is possible to overflow the contents of the Turbine Room Sump (See Outfall 00H) to Outfalls 001, 002 and/or 003 if the flow path to the on-site absorption pond cannot be used.

OUTFALL 003 - Deicing Discharge

Outfall 003 is a deicing discharge which is used when water temperatures approach freezing temperatures. A portion of the flow from Outfall 001 and /or Outfall 002 is directed through the center intake tunnel to temper the intake water and prevent ice buildup on the intake structures which could restrict intake flow. The velocity at the other two intake structures during de-icing mode increases to approximately 1.9 feet per second. Discharge velocity will be less than 13 feet per second since a portion of the discharge is routed out the center intake tunnel.

The Essential and Non-Essential Service Water System (ESW and NESW) may be recirculated with a combination of Circulating Water Pumps in service to raise the forebay temperature to prevent frazil ice formation during cold weather periods. During shutdown conditions when normal operating heat addition is not available, portable heat addition units may be placed in the forebay to prevent frazil ice formations that may prevent flow to safety systems in the plant.

OUTFALL 00A - Unit 1 Steam Generator Blowdown

The steam generators (part of the secondary water system) require ultra high purity water for operation. Makeup water used in the steam generators is withdrawn from the intake forebay (or from Lake Township water supply or a blending of both sources) and treated so most natural impurities are removed through sedimentation, filtration, reverse osmosis, and demineralization. Impurities concentrate in the steam

generators as the water is turned to steam and must be removed to protect the steam turbines and heat transfer surfaces of the steam generators. The impurities are removed by continuously draining a portion of the water from the steam generators in a process called "blowdown".

In the steam generator, steam is separated from the water, further heated, and then routed to the turbines. When the steam separates from the water, the impurities remain in the water, concentrating in the steam generator. Blowdown consists of two forms, a liquid portion (700 gpm max) and a wet steam portion, which is exhausted to the atmosphere. The liquid portion of the steam generator blowdown is discharged to the greenhouse forebay either directly (Normal Flash Tank), or after processing through mixed bed demineralizers. Impurities in this discharge may consist of small quantities of insoluble iron and copper or impurities from the Circulating Water System used to cool the condensers should condenser tube leaks occur. Steam generator additives consist of ethanalamine (Betz Powerline 1440, Betz Powerline 1480, NALCO 92UM001) for pH adjustment, hydrazine [Betz Control OS5035, Betz Control OS5010, NALCO 19H] and/or carbohydrazide (NALCO 1250 plus, or equivalent) for oxygen scavenging.

When the units are not operating, the steam generators are placed in wet layup conditions to protect against corrosion during storage. Layup water is periodically discharged through the outfall to the Circulating Water Forebay. The layup water contains a maximum concentration of 400 ppm hydrazine [Betz Powerline Control OS5035, Betz Control OS5010, NALCO 19H] and/or 40 ppm carbohydrazide (NALCO 1250 plus, or equivalent), and/or 100 ppm ethanalamine (Betz Powerline 1440, Betz Powerline 1480, NALCO 92UM001). The waste strength of this discharge is reduced through mixing with Outfalls 001, 002, or 003.

During the Sludge Lancing Process, demineralized water or secondary water is used to pressure clean the steam generators during outage periods. The water is recirculated through temporary filters to remove entrained solids. The major constituent of the solids is iron oxide from the steam generators. The water is then returned to the steam generators and can be drained to Outfalls 00A, 00B, to Outfall 001, 002, 003, 00D or 00H. The suspended solids are analyzed for radioactivity prior to disposal.

OUTFALL 00B - Unit 2 Steam Generator Blowdown

The steam generators (part of the secondary water system) require ultra high purity water for operation. Makeup water used in the steam generators is withdrawn from the intake forebay (or from Lake Township

water supply or a blending of both sources) and treated so most natural impurities are removed through sedimentation, filtration, reverse osmosis, and demineralization. Impurities concentrate in the steam generators as the water is turned to steam and must be removed to protect the steam turbines and heat transfer surfaces of the steam generators. The impurities are removed by continuously draining a portion of the water from the steam generators in a process called "blowdown".

In the steam generator, steam is separated from the water, further heated, and then routed to the turbines. When the steam separates from the water, the impurities remain in the water, concentrating in the steam generator. Blowdown consists of two forms, a liquid portion (700 gpm max) and a wet steam portion, which is exhausted to the atmosphere. The liquid portion of the steam generator blowdown is discharged to the screenhouse forebay either directly (Normal Flash Tank), or after processing through mixed bed demineralizers. Impurities in this discharge may consist of small quantities of insoluble iron and copper or impurities from the Circulating Water System used to cool the condensers should condenser tube leaks occur. Steam generator additives consist of ethanolamine (Betz Powerline 1440, Betz Powerline 1480, NALCO 92UM001) for pH adjustment, hydrazine [Betz Control OS5035, Betz Control OS5010, NALCO 19H] and/or carbohydrazide (NALCO 1250 plus, or equivalent) for oxygen scavenging.

When the units are not operating, the steam generators are placed in wet layup conditions to protect against corrosion during storage. Layup water is periodically discharged through the outfall to the Circulating Water Forebay. The layup water contains a maximum concentration of 400 ppm hydrazine [Betz Powerline Control OS5035, Betz Control OS5010, NALCO 19H] and/or 40 ppm carbohydrazide (NALCO 1250 plus, or equivalent), and/or 100 ppm ethanolamine (Betz Powerline 1440, Betz Powerline 1480, NALCO 92UM001). The waste strength of this discharge is reduced through mixing with Outfalls 001, 002, or 003.

During the Sludge Lancing Process, demineralized water or secondary water is used to pressure clean the steam generators during outage periods. The water is recirculated through temporary filters to remove entrained solids. The major constituent of the solids is iron oxide from the steam generators. The water is then returned to the steam generators and can be drained to Outfalls 00A, 00B, to Outfall 001, 002, 003, 00D or 00H. The suspended solids are analyzed for radioactivity prior to disposal.

OUTFALL 00C - Plant Heating Boiler

A heating boiler (150,000 lb/hr capacity) operates to supply plant heating and auxiliary steam when Unit 1 and/or Unit 2 are out of service. The boiler is also fired periodically for testing purposes to ensure its availability.

During periods when not in operation, the heating boiler may be stored full of treated boiler water containing up to 400 ppm hydrazine [Betz Control OS5035, Betz Control OS5010, NALCO 19H] or 40 ppm carbohydrazide (NALCO 1250 plus, or equivalent) for oxygen scavenging and or 50 ppm ethanolamine (Betz Powerline 1440, Betz Powerline 1480, NALCO 92UM001) for corrosion protection. Prior to use, this "wet lay-up" water is drained to Outfall 00C via blowdown, which discharges to the intake forebay. The volume drained is approximately 600 gallons. This boiler may also be occasionally drained for maintenance activities, approximately 6,000 gallons of treated boiler water would be directed to Outfall 00C or 00D/00H for such purposes.

Impurities from the boiler water consisting primarily of insoluble iron and copper are discharged via blowdown (30 GPM) to the intake forebay during operation as needed for Chemistry control. Boiler water treatment additives consist of up to 15 ppm ethanolamine (Betz Powerline 1440, Betz Powerline 1480, NALCO 92UM001) for pH adjustment, up to 150 ppb hydrazine [Betz Control OS5035, Betz Control OS5010, NALCO 19H] and/or 150 ppb carbohydrazide (NALCO 1250 plus, or equivalent) for oxygen scavenging and 25 ppm aryl sulfate (from NALCO 22199) for flow testing purposes.

Just after boiler shutdown, the boiler may be placed in dry layup. The boiler contents (up to 6,000 gallons) are drained via blowdown to the intake forebay. Boiler water treatment additives consist of up to 3 ppm ethanolamine (Betz Powerline 1440, Betz Powerline 1480, NALCO 92UM001) for pH adjustment and up to 150 ppb hydrazine [Betz Control OS5035, Betz Control OS5010, NALCO 19H] and/or 150 ppb carbohydrazide (NALCO 1250 plus, or equivalent) for oxygen scavenging. The boiler is then dried out and stored empty. This process saves on chemicals and prevents unnecessary discharge of wet layup chemicals.

A smaller boiler may be installed to provide back-up heat if the permanent heating boiler was out of service. This back-up boiler may be located outdoors on the West Side of the turbine building. The

blowdown line is directed to the Unit One forebay, near the same discharge point as the permanently installed heating boiler.

The same boiler treatment chemistry will be maintained in the back-up boiler as is used in the permanent heating boiler. The back-up boiler treatment additives consist of ethanolamine (Betz Powerline 1440, Betz Powerline 1480, NALCO 92UM001) for pH adjustment, and hydrazine [Betz Powerline Cortrol OS5035, Betz Cortrol OS5010, NALCO 19H] and/or carbonylhydrazide (NALCO 1250 plus, or equivalent) for oxygen scavenging. This boiler may be occasionally drained for maintenance activities, approximately 6,000 gallons of treated boiler water would be directed to Outfall 00C for such purposes. Impurities from the boiler water consisting primarily of insoluble iron and copper are discharged via blowdown (30 GPM maximum) to the intake forebay during operation as needed for Chemistry control.

OUTFALL 00G - Reverse Osmosis System

The Reverse Osmosis System (RO) is used to assist in the removal of dissolved solids from the lake water prior to demineralization. Reject water flow is directed to the forebay, which leads to Outfalls 001, 002, and 003. Reject water flow rates may reach up to 0.360 MGD. The RO system must maintain very clean membranes to assure efficient operation and purity of water. Several methods are used to maintain this level of cleanliness from scale and biofouling. Hydrochloric acid or sulfuric acid is fed at approximately 1.3 GPH continually when the RO is in service to lower the pH to reduce the scaling tendencies of the water. The reject water from the RO unit consists of concentrated Lake Michigan water and a small amount of acid that inhibits scale buildup in the membranes.

Approximately once per month, a flush is performed using approximately 1,000 gallons of a nominal 0.05% hydrochloric acid solution. This is followed with approximately 1,000 gallons of a nominal 0.1% sodium hydroxide solution. This flush will dissolve any scale that deposits on the membranes. The total amount of flushing solution will average approximately 5,000 gallons per event. Sodium bisulfite is used to preserve the membranes during long-term shutdown periods. Approximately 15 lbs. of sodium bisulfite per year is used in this manner.

The chemical cleaning involves several steps and may contain citric acid, hydrochloric acid, phosphoric acid, sodium hydroxide, and a neutral pH detergent. The periodic cleaning process averages approximately 10,000 gallons per event, diverted either to the Turbine Room Sump (Outfall 00H/00D), through the

Neutralization Tank to the Turbine Room Sump (Outfall 00H/00D), or to the Circulating Water Forebay (Outfall 001, 002, or 003).

OUTFALL 00H - Turbine Room Sump Emergency Overflow

Utility wastewater from within the plant is discharged via the turbine room sump (TRS) into an on-site absorption pond (Outfall 00D). The normal disposition of these wastewaters is to an on-site absorption pond, which eventually vents via groundwater to Lake Michigan. In the unlikely event that the normal flow path to the absorption pond is not available, the overflow line (Outfall 00H) will direct the TRS flow to the plant's intake forebay. The wastewaters associated with this Outfall include:

Wastes from the makeup water treatment system.

- **NESW: (144,000 GPD)** The main contributor to this waste stream is the degassifier pump seal water. Non-Essential Service Water (NESW) from Lake Michigan supplies the vacuum degassifier pumps which utilize up to 100 GPM to remove non-condensable gases (primarily carbon dioxide and oxygen) from the makeup plant water and exhausts them to the atmosphere.
- **Pre-filter backwash: (Estimated 98,000 GPD)** Six pre-filters are backwashed with Lake Michigan water to remove the suspended matter captured on the filter media. Alum solution (aluminum sulfate 0.5 lb. per gallon) is added to the pre-filter influent as a flocculent. The alum is added via a coagulant feed pump. Approximately 50 lb./day of alum is used in this process. The alum contained in the backwash is discharged in the form of insoluble aluminum hydroxide.
- **Carbon filter backwash: (Estimated 42,000 GPD)** Carbon filters are periodically backwashed with Lake Michigan water to the TRS. These filters primarily remove organics, chlorine and small amounts of iron.
- **Demineralizer regeneration: (Estimated 50,000 gallons per regeneration)** occurs 2-4 times per month when the RO is in service and more often when it is not in service. Dilute sulfuric acid and sodium hydroxide used by the system to regenerate the resin. Dilute sulfuric acid, sodium hydroxide, and contaminants from the demineralization process is discharged to the neutralization tank or TRS. The pH is then adjusted to between 5.5 and 9.0 with sulfuric acid, or sodium hydroxide prior to discharge.

- MUP Neutralization Tank provides a place for demineralization regeneration wastes, and Reverse Osmosis Unit cleaning flushes to be neutralized prior to being discharged to the TRS and ultimately the absorption pond. When the MUP resin beds are regenerated, up to 50,000 gallons of regeneration chemicals, and backwash waters are processed in the neutralization tank. The Reverse Osmosis cleaning flushes average approximately 5,000 gallons per event. When the water is neutralized, it is pumped to the TRS via a 2,000 GPM neutralization waste pump.
- The Retention Tank is periodically blown down, discharging small volumes of solid material removed by settling. The retention tank contains a mixture of Lake Township water and filtered Lake Michigan water waiting further processing by the Makeup Plant.
- The Reverse Osmosis System (RO) Cleaning. Normal reject water flow is to Lake Michigan via Outfall 00G. The RO system must maintain very clean membranes to assure efficient operation and purity of water. Several methods are used to maintain this level of cleanliness from scale and biofouling. Hydrochloric acid or sulfuric acid is fed at approximately 1.3 GPH continually when the RO is in service to lower the pH to reduce the scaling tendencies of the water. The reject water from the RO unit consists of concentrated Lake Michigan water and a small amount of acid that inhibits scale buildup in the membranes.

Approximately once per month, a flush is performed using approximately 1,000 gallons of a nominal 0.05% hydrochloric acid solution. This is followed with approximately 1,000 gallons of a nominal 0.1% sodium hydroxide solution. This flush will dissolve any scale that deposits on the membranes. The total amount of flushing solution will average approximately 5,000 gallons per event. Sodium bisulfite is used to preserve the membranes during long-term shutdown periods. Approximately 15 lbs. of sodium bisulfite per year is used in this manner.

The chemical cleaning involves several steps and may contain citric acid, hydrochloric acid, phosphoric acid, sodium hydroxide, and a neutral pH detergent. The periodic cleaning process averages approximately 10,000 gallons per event, diverted either to the Turbine Room Sump (Outfall 00H), through the Neutralization Tank to the Turbine Room Sump (Outfall 00H), or to the Circulating Water Forebay (Outfall 001, 002, or 003).

Waste from miscellaneous processes.

- During periods when not in operation, the heating boiler may be stored full of treated boiler water containing at most 400 ppm hydrazine [Betz Cortrol OS5035, Betz Cortrol OS5010, NALCO 19H] or 40 ppm carbohydrazide (NALCO 1250 plus, or equivalent) for oxygen scavenging and/or 50 ppm ethanolamine (Betz Powerline 1440, Betz Powerline 1480, NALCO 92UM001) for corrosion protection. Prior to use, this "wet lay-up" water is drained to the TRS. The volume drained is approximately 600 gallons.
- The Circulating Water System cooling water contained in the condensers during shutdowns are periodically drained to the TRS. (Six condenser halves and 2 feedpump condensers, approximately 37,000 gallons of lake water per half).
- The Component Cooling Water system (CCW) is periodically drained to allow for equipment inspection, maintenance or repair. This system uses demineralized water from the makeup plant as its source of makeup water along with a maximum of: 1200 ppm nitrite [from Calgon LCS 60, Betz Corrshield NT 4205, BETZ CORRSHIED NT 4201, Betz Corrshield NT 4203, or equivalent], 100 ppm gluteraldehyde [from Betz Spectrus NX 1105, Calgon H-300, or equivalent], methyl (bis) thiocyanate (10 ppm) [from Betz 3610 or equivalent], 60 ppm tolyltriazole (from Betz Copper-Trol Cu-1, Calgon LCS-60, or equivalent)), 1000 ppm molybdate from Betz Corrshield MD 4103, and 25 ppm aryl sulfate (from NALCO 22199). The infrequent drainings release approximately 60,000 gallons of treated water to the TRS per year.
- There are four Emergency Diesel Generators that are each cooled by an Emergency Diesel Generator cooling jacket water system (DJW), which employs chemical control for corrosion with a maximum of 2000 ppm nitrite [Calgon LCS 60 or Betz Corrshield NT 4205, BETZ CORRSHIED NT 4201, Betz Corrshield NT 4203 or equivalent], 100 ppm gluteraldehyde [Betz Spectrus NX 1105, Calgon H-300, or equivalent], methyl (bis) thiocyanate (10 ppm) [from Betz 3610 or equivalent], 60 ppm tolyltriazole [Betz Copper-Trol Cu-1, Calgon LCS-60, or equivalent]), 1000 ppm molybdate from Betz Corrshield MD 4103, and 25 ppm aryl sulfate [from NALCO 22199].

This system is drained through the floor drains to the TRS when maintenance is performed. Each system volume is approximately 1000 gallons. Any system leaks would also be directed to the floor drain during normal operations.

- **Control Room Air Conditioning (CRAC) drains:** Approximately 1440 gallons/yr. of CRAC water is drained to the TRS. CRAC Water is demineralized water, and may contain up to: 2000 ppm nitrite [Calgon LCS 60, Betz Corrsshield NT 4205, BETZ CORRSHIED NT 4201, Betz Corrsshield NT 4203 or equivalent], 100 ppm gluteraldehyde [Betz Spectrus NX 1105, Calgon H-300, or equivalent], methyl (bis) thiocyanate (10 ppm) [from Betz 3610 or equivalent], 60 ppm tolyltriazone (Calgon LCS-60, Betz Copper-Trol Cu-1, or equivalent)), 1000 ppm molybdate from Betz Corrsshield MD 4103, and 25 ppm aryl sulfate (NALCO 22199). The system may be flushed with demineralized water, and when completed, corrosion control chemicals will be added back to the system. No additions of corrosion controlling chemicals are done during the demineralized water flush.
- **The Essential Service Water systems (ESW) and Non-Essential Service Water systems (NESW)** are also periodically drained to allow for equipment inspection, maintenance, or repair. These drains may discharge Lake Michigan water used for non-contact cooling into the TRS. This water may be chlorinated for zebra mussel control. During some special treatment periods, this water may contain zebra mussel biocides, used as a molluscicide for zebra mussel control. Periodically, components of the ESW or NESW systems may be chemically cleaned to remove iron deposits using vendor supplied cleaning solution such as EDTA (ethylenediaminetetraacetic acid) or ascorbic acid, acetic acid and ammonia. These wastes could either be drained to the TRS or Lake Michigan via Outfall 001, 002, or 003.
- **During wet lay-up, the steam generators are stored full of water with up to 400 ppm of hydrazine** from Betz Cortrol OS5035, Betz Cortrol OS5010, NALCO 19H or 40 ppm carbonylhydrazide (NALCO 1250 plus, or equivalent) and 100 ppm ethanolamine (Betz Powerline 1440, Betz Powerline 1480, NALCO 92UM001) are added for corrosion control. The water may also contain up to 20 ppm boron. This water is normally drained to surface water via NPDES Outfalls 00A or 00B, but may be drained to the TRS in some instances. Drain volume will be approximately 32,000 gallons for each of the unit's four steam generators.
- **The Miscellaneous Drain Tanks can be aligned to discharge to the TRS.** As much as 350,000 gallons per day per unit may be directed to the TRS to control the chemistry limitations on the secondary water systems. Water chemistry is primarily the same as in the steam generators. This type of batch drain occurs in concert with condensate flushing activities, or it may occur during normal operation to adjust

system chemistry. The overboarded water is normal secondary water. It may contain a mixture of ethanolamine, hydrazine [Betz Cortrol OS5035, Betz Cortrol OS5010, NALCO 19H], or carbonylhydrazide (NALCO 1250 plus, or equivalent). Maximum flows may approach 240 GPM as makeup plant water supplies can deliver.

- Condensate flushes are performed periodically to clean up the plant's secondary system prior to startup, and can be discharged to the TRS. Water containing up to 4 ppm hydrazine [Betz Cortrol OS5035, Betz Cortrol OS5010, NALCO 19H], 10 ppm carbonylhydrazide (NALCO 1250 plus, or equivalent), 100 ppm ethanolamine (Betz Powerline 1440, Betz Powerline 1480, NALCO 92UM001), is overboard to the TRS as required to remove contaminants. This flow rate averages 70 GPM, but may reach 600 GPM for short periods of time. The flow rate is dependent on water demands in the plant. Maximum output from the MUP is approximately 600 GPM.
- Around the plant, miscellaneous sumps collect an estimated 45,000 GPD of water from various equipment drains (ESW pipe tunnel sump). Water and condensate leaks from valves and pumps (Circulating Water condenser pit sumps, ESW pipe tunnel sump, heater drain pump room sump, screen wash pump room sump, acid and caustic room sumps, elevator pit sumps, screenhouse electrical equipment enclosure sump) will also be drained to the TRS. Steam jet air ejector drains also are directed to the heater drain pump room sump prior to pumping to the TRS. Betz FerroQuest FQ LP 7200 may be added to this sump to prevent scale buildup.
- Miscellaneous floor drains are located throughout the plant to provide a safe working environment by routing spilled or leaked water to the TRS. The major chemical influx into these drains is from general floor cleaning products used to maintain the floors. Also routed to the TRS through the floor drains are fire protection water, chlorinated Lake Township water, drinking water, cooling water (ESW/NESW), and drains from bioboxes used to monitor the zebra mussel control measures and other chemical control monitors. The bioboxes will discharge chlorine and zebra mussel biocides during periods when the Service Water Systems are treated with previously mentioned biological control agents.
- Chemical feed tank drains (drains are limited to emergencies only). There are eight chemical feed tanks that are approximately 200 gallons each that contain hydrazine [Betz Cortrol OS5035, Betz Cortrol OS5010, NALCO 19H] at approximately 2%, ethanolamine (Betz Powerline 1440, Betz Powerline 1480, NALCO 92UM001), at approximately 5%, carbonylhydrazide (NALCO 1250 plus, or

equivalent), approximately 2%. Normal process will be to collect these tank volumes to be reused whenever possible.

- **Chemical cleaning tank drains:** During refueling and maintenance outages, the chemical cleaning tank, and or temporary tanks may be used to mix borax (sodium tetraborate @ approximately 2000 ppm as boron) solutions for ice making operations. Small portions of the system may be drained to the TRS. In the unlikely event that a full tank is drained, approximately 3500 gallons will be directed to the TRS.
- **Non-radiological chemical lab sink and floor drains** are routed to the TRS for disposal. The drains carry water and the wastes generated while performing analyses and preparing laboratory standard including those on the attached list. Also discharged will be glassware cleaning and normal laboratory cleaning wastes. The average volume directed to the TRS is estimated to be 500 -1000 GPD.
- **Secondary sample water from continuous analyzers** are routed to drains which discharge to the TRS and/or the miscellaneous drain tank. The analyzers are on the cycles that may contain as much as 150 ppb hydrazine from either a direct feed or (as a breakdown product of carbohydrazide, and 2.5 ppm ethanolamine. The analyzers measure corrosion transport at an average flow of 1440 gallons per day when in operation.
- **Miscellaneous sealing and cooling water (MSCW)** supplies cooling and sealing water to the TRS pumps, Condensate Booster Pumps, Circulating Water Pumps, Vacuum Priming Pumps, Drain Seal Reservoir Tanks, MSCW pump sealing water, screen wash pumps sealing water, and Drain Sample Coolers. The flow per day may reach approximately 576,000 gallons; this water is filtered and chlorinated Lake Michigan water .
- **Non-essential service water** supplies approximately 53,000 GPD of non-contact cooling water to various sample coolers throughout the plant's turbine building.

- Chemical spills that enter the TRS may be neutralized within the sump to prevent a discharge to the environment. The potential for spills to the TRS exists for the following chemicals with the proposed neutralizers listed:

<u>Chemical</u>	<u>Associated Neutralizer</u>
Sulfuric acid	Sodium hydroxide
Sodium hydroxide	Sulfuric acid
Sodium hypochlorite	Sodium thiosulfate
Hydrazine/Carbohydrazide	NESW (lake water), Hydrogen peroxide, sodium hypochlorite.
Ethanolamine	Sodium Hypochlorite, Hydrogen Peroxide, or ozone.
Ethylene glycol	Hydrogen peroxide

Reduction of hydrazine/carbohydrazide and ETA prior to discharge to the absorption pond may include additions of chemicals such as sodium hypochlorite, hydrogen peroxide, or ozone to the Turbine Room Sump in batches, or to the discharge piping as continuous treatment. A downstream treatment system provided by a vendor may be used to break down the hydrazine/carbohydrazide and ETA.

ADDITIONAL CHEMICAL LAB ANALYSES

Additional Information
 General Section
 Item 11
 Donald C. Cook Nuclear Plant
 Groundwater Permit Application

Plant Chemistry Lab (To Outfall 00H/00D)

Laboratory sink drains from the 633' Turbine lab are directed to the 90,000 gallon Turbine Room Sump. The sump contents are normally directed to the groundwater discharge (outfall 00D). Occasionally the Emergency by-pass may be utilized and the sump's contents will be discharged to the surface water discharge (outfall 00H). The following analyses are performed in the lab. Laboratory wastes from the analyses are discarded in the sink.

Parameter	Analysis Method
Nitrite	HACH DR-2000 Method 373, HACH DR 2010 Method 373
Hydrazine	ASTM D-1385 -88
Oil and Grease	EPA-600-4-79-020 Method 413.1
pH	Standard Methods for the examination of Water and Wastewater, ASTM-1293
Total Phosphorus	EPA-600-4-79-020 Method 365.3
Sulfate	EPA-600-4-79-020 Method 375.4
Total Residual Chlorine	EPA-600-4-79-020 Method 330.5
Ethanolamine (ETA)	Betz Standard Operating Procedure. 9Betz proprietary Method adapted from HACH Dr-2000 1,2- Naphthoquinone-4-sulfonic acid Method.
ICP Metals	Standard Methods for Examination of water and wastewater - 17 th ed. 1989, 3120B.
Tolyltriazole	HACH DR-2000 Method 730
Carbohydrazide	HACH DR-2000 Method 732 HACH DR-2010 Method 182
N,N Diethylhydroxylamine (DEHA)	HACH DR-2010 Method 182
Silica	ASTM D 859-88

GROUNDWATER DISCHARGES

OUTFALL 00D - Turbine Room Sump

Utility wastewater from within the plant is discharged via the turbine room sump (TRS) into an on-site absorption pond (Outfall 00D). The normal disposition of these wastewaters is to an on-site absorption pond, which eventually vents via groundwater to Lake Michigan. In the unlikely event that the normal flow path to the absorption pond is not available, the overflow line (Outfall 00H) will direct the TRS flow to the plant's intake forebay. The wastewaters associated with this Outfall include:

Wastes from the makeup water treatment system.

- **NESW: (144,000 GPD)** The main contributor to this waste stream is the degassifier pump seal water. Non-Essential Service Water (NESW) from Lake Michigan supplies the vacuum degassifier pumps which utilize up to 100 GPM to remove non-condensable gases (primarily carbon dioxide and oxygen) from the makeup plant water and exhausts them to the atmosphere.
- **Pre-filter backwash: (Estimated 98,000 GPD)** Six pre-filters are backwashed with Lake Michigan water to remove the suspended matter captured on the filter media. Alum solution (aluminum sulfate 0.5 lb. per gallon) is added to the pre-filter influent as a flocculent. The alum is added via a coagulant feed pump. Approximately 50 lb./day of alum is used in this process. The alum contained in the backwash is discharged in the form of insoluble aluminum hydroxide.
- **Carbon filter backwash: (Estimated 42,000 GPD)** Carbon filters are periodically backwashed with Lake Michigan water to the TRS. These filters primarily remove organics, chlorine and small amounts of iron.
- **Demineralizer regeneration: (Estimated 50,000 gallons per regeneration)** occurs 2-4 times per month when the RO is in service and more often when it is not in service. Dilute sulfuric acid and sodium hydroxide used by the system to regenerate the resin. Dilute sulfuric acid, sodium hydroxide, and contaminants from the demineralization process is discharged to the neutralization tank or TRS. The pH is then adjusted to between 5.5 and 9.0 with sulfuric acid, or sodium hydroxide prior to discharge.

- MUP Neutralization Tank provides a place for demineralization regeneration wastes, and Reverse Osmosis Unit cleaning flushes to be neutralized prior to being discharged to the TRS and ultimately the absorption pond. When the MUP resin beds are regenerated, up to 50,000 gallons of regeneration chemicals, and backwash waters are processed in the neutralization tank. The Reverse Osmosis cleaning flushes average approximately 5,000 gallons per event. When the water is neutralized, it is pumped to the TRS via a 2,000 GPM neutralization waste pump.
- The Retention Tank is periodically blown down, discharging small volumes of solid material removed by settling. The retention tank contains a mixture of Lake Township water and filtered Lake Michigan water waiting further processing by the Makeup Plant.
- The Reverse Osmosis System (RO) Cleaning. Normal reject water flow is to Lake Michigan via Outfall 00G. The RO system must maintain very clean membranes to assure efficient operation and purity of water. Several methods are used to maintain this level of cleanliness from scale and biofouling. Hydrochloric acid or sulfuric acid is fed at approximately 1.3 GPH continually when the RO is in service to lower the pH to reduce the scaling tendencies of the water. The reject water from the RO unit consists of concentrated Lake Michigan water and a small amount of acid that inhibits scale buildup in the membranes.

Approximately once per month, a flush is performed using approximately 1,000 gallons of a nominal 0.05% hydrochloric acid solution. This is followed with approximately 1,000 gallons of a nominal 0.1% sodium hydroxide solution. This flush will dissolve any scale that deposits on the membranes. The total amount of flushing solution will average approximately 5,000 gallons per event. Sodium bisulfite is used to preserve the membranes during long-term shutdown periods. Approximately 15 lbs. of sodium bisulfite per year is used in this manner.

The chemical cleaning involves several steps and may contain citric acid, hydrochloric acid, phosphoric acid, sodium hydroxide, and a neutral pH detergent. The periodic cleaning process averages approximately 10,000 gallons per event, diverted either to the Turbine Room Sump (Outfall 00H), through the Neutralization Tank to the Turbine Room Sump (Outfall 00H), or to the Circulating Water Forebay (Outfall 001, 002, or 003).

Waste from miscellaneous processes.

- During periods when not in operation, the heating boiler may be stored full of treated boiler water containing at most 400 ppm hydrazine [Betz Control OS5035, Betz Control OS5010, NALCO 19H] or 40 ppm carbonylhydrazide (NALCO 1250 plus, or equivalent) for oxygen scavenging and/or 50 ppm ethanolamine (Betz Powerline 1440, Betz Powerline 1480, NALCO 92UM001) for corrosion protection. Prior to use, this "wet lay-up" water is drained to the TRS. The volume drained is approximately 600 gallons.
- The Circulating Water System cooling water contained in the condensers during shutdowns are periodically drained to the TRS. (Six condenser halves and 2 feedpump condensers, approximately 37,000 gallons of lake water per half).
- The Component Cooling Water system (CCW) is periodically drained to allow for equipment inspection, maintenance or repair. This system uses demineralized water from the makeup plant as its source of makeup water along with a maximum of: 1200 ppm nitrite [from Calgon LCS 60, Betz Corrshield NT 4205, BETZ CORRSHIED NT 4201, Betz Corrshield NT 4203, or equivalent], 100 ppm gluteraldehyde [from Betz Spectrus NX 1105, Calgon H-300, or equivalent], methyl (bis) thiocyanate (10 ppm) [from Betz 3610 or equivalent], 60 ppm tolyltriazole (from Betz Copper-Trol Cu-1, Calgon LCS-60, or equivalent)), 1000 ppm molybdate from Betz Corrshield MD 4103, and 25 ppm aryl sulfate (from NALCO 22199). The infrequent drainings release approximately 60,000 gallons of treated water to the TRS per year.
- There are four Emergency Diesel Generators that are each cooled by an Emergency Diesel Generator cooling jacket water system (DJW), which employs chemical control for corrosion with a maximum of 2000 ppm nitrite [Calgon LCS 60 or Betz Corrshield NT 4205, BETZ CORRSHIED NT 4201, Betz Corrshield NT 4203 or equivalent], 100 ppm gluteraldehyde [Betz Spectrus NX 1105, Calgon H-300, or equivalent], methyl (bis) thiocyanate (10 ppm) [from Betz 3610 or equivalent], 60 ppm tolyltriazole [Betz Copper-Trol Cu-1, Calgon LCS-60, or equivalent]), 1000 ppm molybdate from Betz Corrshield MD 4103, and 25 ppm aryl sulfate [from NALCO 22199].

This system is drained through the floor drains to the TRS when maintenance is performed. Each system volume is approximately 1000 gallons. Any system leaks would also be directed to the floor drain during normal operations.

- **Control Room Air Conditioning (CRAC) drains:** Approximately 1440 gallons/yr. of CRAC water is drained to the TRS. CRAC Water is demineralized water, and may contain up to: 2000 ppm nitrite [Calgon LCS 60, Betz Corrrshield NT 4205, BETZ CORRSIED NT 4201, Betz Corrrshield NT 4203 or equivalent], 100 ppm gluteraldehyde [Betz Spectrus NX 1105, Calgon H-300, or equivalent], methyl (bis) thiocyanate (10 ppm) [from Betz 3610 or equivalent], 60 ppm tolyltriazole (Calgon LCS-60, Betz Copper-Trol Cu-1, or equivalent)), 1000 ppm molybdate from Betz Corrrshield MD 4103, and 25 ppm aryl sulfate (NALCO 22199). The system may be flushed with demineralized water, and when completed, corrosion control chemicals will be added back to the system. No additions of corrosion controlling chemicals are done during the demineralized water flush.
- **The Essential Service Water systems (ESW) and Non-Essential Service Water systems (NESW)** are also periodically drained to allow for equipment inspection, maintenance, or repair. These drains may discharge Lake Michigan water used for non-contact cooling into the TRS. This water may be chlorinated for zebra mussel control. During some special treatment periods, this water may contain zebra mussel biocides, used as a molluscicide for zebra mussel control. Periodically, components of the ESW or NESW systems may be chemically cleaned to remove iron deposits using vendor supplied cleaning solution such as EDTA (ethylenediaminetetraacetic acid) or ascorbic acid, acetic acid and ammonia. These wastes could either be drained to the TRS or Lake Michigan via Outfall 001, 002, or 003.
- **During wet lay-up, the steam generators** are stored full of water with up to 400 ppm of hydrazine from Betz Control OS5035, Betz Control OS5010, NALCO 19H or 40 ppm carbohydrazide (NALCO 1250 plus, or equivalent) and 100 ppm ethanolamine (Betz Powerline 1440, Betz Powerline 1480, NALCO 92UM001) are added for corrosion control. The water may also contain up to 20 ppm boron. This water is normally drained to surface water via NPDES Outfalls 00A or 00B, but may be drained to the TRS in some instances. Drain volume will be approximately 32,000 gallons for each of the unit's four steam generators.

- The **Miscellaneous Drain Tanks** can be aligned to discharge to the TRS. As much as 350,000 gallons per day per unit may be directed to the TRS to control the chemistry limitations on the secondary water systems. Water chemistry is primarily the same as in the steam generators. This type of batch drain occurs in concert with condensate flushing activities, or it may occur during normal operation to adjust system chemistry. The overboarded water is normal secondary water. It may contain a mixture of ethanolamine, hydrazine [Betz Cortrol OS5035, Betz Cortrol OS5010, NALCO 19H], or carbonylhydrazide (NALCO 1250 plus, or equivalent). Maximum flows may approach 240 GPM as makeup plant water supplies can deliver.
- **Condensate flushes** are performed periodically to clean up the plant's secondary system prior to startup, and can be discharged to the TRS. Water containing up to 4 ppm hydrazine [Betz Cortrol OS5035, Betz Cortrol OS5010, NALCO 19H], 10 ppm carbonylhydrazide (NALCO 1250 plus, or equivalent), 100 ppm ethanolamine (Betz Powerline 1440, Betz Powerline 1480, NALCO 92UM001), is overboarded to the TRS as required to remove contaminants. This flow rate averages 70 GPM, but may reach 600 GPM for short periods of time. The flow rate is dependent on water demands in the plant. Maximum output from the MUP is approximately 600 GPM.
- Around the plant, miscellaneous sumps collect an estimated 45,000 GPD of water from various equipment drains (ESW pipe tunnel sump). Water and condensate leaks from valves and pumps (Circulating Water condenser pit sumps, ESW pipe tunnel sump, heater drain pump room sump, screen wash pump room sump, acid and caustic room sumps, elevator pit sumps, greenhouse electrical equipment enclosure sump) will also be drained to the TRS. Steam jet air ejector drains also are directed to the heater drain pump room sump prior to pumping to the TRS. Betz FerroQuest FQ LP 7200 may be added to this sump to prevent scale buildup.
- **Miscellaneous floor drains** are located throughout the plant to provide a safe working environment by routing spilled or leaked water to the TRS. The major chemical influx into these drains is from general floor cleaning products used to maintain the floors. Also routed to the TRS through the floor drains are fire protection water, chlorinated Lake Township water, drinking water, cooling water (ESW/NESW), and drains from bioboxes used to monitor the zebra mussel control measures and other chemical control monitors. The bioboxes will discharge chlorine and zebra mussel biocides during periods when the Service Water Systems are treated with previously mentioned biological control agents.

- **Chemical feed tank drains** (drains are limited to emergencies only). There are eight chemical feed tanks that are approximately 200 gallons each that contain hydrazine [Betz Control OS5035, Betz Control OS5010, NALCO 19H] at approximately 2%, ethanolamine (Betz Powerline 1440, Betz Powerline 1480, NALCO 92UM001), at approximately 5%, carbonylhydrazide (NALCO 1250 plus, or equivalent), approximately 2%. Normal process will be to collect these tank volumes to be reused whenever possible.
- **Chemical cleaning tank drains:** During refueling and maintenance outages, the chemical cleaning tank, and or temporary tanks may be used to mix borax (sodium tetraborate @ approximately 2000 ppm as boron) solutions for ice making operations. Small portions of the system may be drained to the TRS. In the unlikely event that a full tank is drained, approximately 3500 gallons will be directed to the TRS.
- **Non-radiological chemical lab sink and floor drains** are routed to the TRS for disposal. The drains carry water and the wastes generated while performing analyses and preparing laboratory standard including those on the attached list. Also discharged will be glassware cleaning and normal laboratory cleaning wastes. The average volume directed to the TRS is estimated to be 500 -1000 GPD.
- **Secondary sample water** from continuous analyzers are routed to drains which discharge to the TRS and/or the miscellaneous drain tank. The analyzers are on the cycles that may contain as much as 150 ppb hydrazine from either a direct feed or (as a breakdown product of carbonylhydrazide, and 2.5 ppm ethanolamine. The analyzers measure corrosion transport at an average flow of 1440 gallons per day when in operation.
- **Miscellaneous sealing and cooling water (MSCW)** supplies cooling and sealing water to the TRS pumps, Condensate Booster Pumps, Circulating Water Pumps, Vacuum Priming Pumps, Drain Seal Reservoir Tanks, MSCW pump sealing water, screen wash pumps sealing water, and Drain Sample Coolers. The flow per day may reach approximately 576,000 gallons; this water is filtered and chlorinated Lake Michigan water .

- Non-essential service water supplies approximately 53,000 GPD of non-contact cooling water to various sample coolers throughout the plant's turbine building.
- Chemical spills that enter the TRS may be neutralized within the sump to prevent a discharge to the environment. The potential for spills to the TRS exists for the following chemicals with the proposed neutralizers listed:

<u>Chemical</u>	<u>Associated Neutralizer</u>
Sulfuric acid	Sodium hydroxide
Sodium hydroxide	Sulfuric acid
Sodium hypochlorite	Sodium thiosulfate
Hydrazine/carbohydrazide	NESW (lake water), Hydrogen peroxide, sodium hypochlorite.
Ethanolamine	Sodium Hypochlorite, Hydrogen Peroxide, or ozone.
Ethylene glycol	Hydrogen peroxide

Reduction of hydrazine/carbohydrazide and ETA prior to discharge to the absorption pond may include additions of chemicals such as sodium hypochlorite, hydrogen peroxide, or ozone to the Turbine Room Sump in batches, or to the discharge piping as continuous treatment. A downstream treatment system provided by a vendor may be used to break down the hydrazine/carbohydrazide and ETA.

ADDITIONAL CHEMICAL LAB ANALYSES

Additional Information
 General Information
 Item 11
 Donald C. Cook Nuclear Plant
 Groundwater Discharge Permit Application

Plant Chemistry Lab (To Outfall 00H/00D)

Laboratory sink drains from the 633' Turbine lab are directed to the 90,000 gallon Turbine Room Sump. The sump contents are normally directed to the groundwater discharge (outfall 00D). Occasionally the Emergency by-pass may be utilized and the sump's contents will be discharged to the surface water discharge (outfall 00H). The following analyses are performed in the lab. Laboratory wastes from the analyses are discarded in the sink.

Parameter	Analysis Method
Nitrite	HACH DR-2000 Method 373, HACH DR 2010 Method 373
Hydrazine	ASTM D-1385 -88
Oil and Grease	EPA-600-4-79-020 Method 413.1
pH	Standard Methods for the examination of Water and Wastewater, ASTM-1293
Total Phosphorus	EPA-600-4-79-020 Method 365.3
Sulfate	EPA-600-4-79-020 Method 375.4
Total Residual Chlorine	EPA-600-4-79-020 Method 330.5
Ethanolamine (ETA)	Betz Standard Operating Procedure. 9Betz proprietary Method adapted from HACH Dr-2000 1,2- Naphthoquinone-4-sulfonic acid Method.
ICP Metals	Standard Methods for Examination of water and wastewater - 17 th ed. 1989, 3120B.
Tolyltriazole	HACH DR-2000 Method 730
Carbohydrazide	HACH DR-2000 Method 732 HACH DR-2010 Method 182
N,N Diethylhydroxylamine (DEHA)	HACH DR-2010 Method 182
Silica	ASTM D 859-88

OUTFALL 00E – Sanitary Waste Discharges

The system operates at a designed flow of 50,000 GPD with a maximum flow capacity of 60,000 GPD. The Sequencing Batch Reactor (SBR) system treats the wastewater and discharges to an effluent tank where it can be filtered prior to discharge to one of two seepage lagoons. The lagoons discharge into the groundwater with the ultimate disposition venting to Lake Michigan. The sludge removed from the digester tank basins is taken to a local POTW (public owned treatment works) for disposal or dewatered and disposed of as low level radioactive waste.

To aid in the settling process, flocculents such as ferric chloride, pH controllers such as magnesium hydroxide, or polymers (such as Axchem AF4500) are added to the process. To selectively enhance biosolids, bioaugmentation nutrients (such as Bioprime Dosfolat) are added to the process. This is a nutrient that encourages the growth of beneficial microbes in the activated sludge. Sodium hypochlorite is added in small amounts to the process to control filamentous bacteria growth if needed. Sodium hypochlorite and detergent are also added to the sand filters to clean them periodically. These are then backwashed into the equalization basin to be reprocessed by the SBR treatment process.

Plant sanitary waste consists of shower and rest room facilities, and janitor washbasins located throughout the Plant's non-radiological property. Kitchen wastes are generated from the plant cafeteria, the Cook Energy Information Center and Training buildings.

The chemistry training laboratory discharges to the sewage treatment plants through a limestone bed neutralization tank. The chemistry lab is used to train technicians on analyses performed in the plant. The discharge from the lab carries water and wastes generated while performing analyses and preparing laboratory standards including those on the attached list. The training building HVAC system also drains through the limestone bed.

The wastewater treatment plant laboratory discharges to the sewage treatment plants. The discharge from the lab carries water and wastes generated from performing analyses and preparing laboratory standards used for compliance monitoring of the sewage treatment plant under groundwater discharge permit M00988.

Portable toilet wastes on the plant site may be collected and discharged to the sewage treatment plants. A biodegradable deodorant is used in the portable toilets. Sludge effluent waste may also be recycled through the plants to decrease the amount of sludge for processing when possible.

Miscellaneous rinsing of waste receptacles and possible cleaning operations waste, utilizing various detergents, may be rinsed to the sewage treatment plants.

TAB 8
Page 36 Part 4
Treatment Codes

Rule 323.2218
Discharge permits
Part 4 Treatment Codes

Turbine Room Sump Outfall 00D

The Turbine Room Sump (TRS) provides commingling wastes for neutralization and discharge to Outfall 00D. An on-line pH controller and isolation valve ensures that the effluent discharge is within permit limits for pH (B1b). Dilute acid or caustic is added to the wastewater to achieve a pH level required for discharge. The effluent is discharged to an on-site absorption pond, where it percolates into the ground (A-1f). Non contact cooling water, air compressor condensate also discharges to the TRS. Flow measurement, visual observation and sampling is required under the current permit.

- MUP Neutralization Tank provides a place for demineralization regeneration wastes, and Reverse Osmosis Unit cleaning flushes to be neutralized prior to being discharged to the TRS and ultimately the absorption pond. When the MUP resin beds are regenerated, up to 50,000 gallons of regeneration chemicals, and backwash waters are processed in the neutralization tank. The Reverse Osmosis cleaning flushes average approximately 5,000 gallons per event. When the water is neutralized, it is pumped to the TRS via a 2,000 GPM neutralization waste pump.
- Demineralizer regeneration: (Estimated 50,000 gallons per regeneration) occurs 2-4 times per month when the RO is in service and more often when it is not in service. Dilute sulfuric acid and sodium hydroxide are used by the system to regenerate the resin. Dilute sulfuric acid, sodium hydroxide, and contaminants from the demineralization process are discharged to the neutralization tank or TRS. The pH is then adjusted to between 5.5 and 9.0 with sulfuric acid, or sodium hydroxide prior to discharge.
- Chemical spills that enter the TRS may be neutralized within the sump to prevent a discharge to the environment. The potential for spills to the TRS exists for the following chemicals with the proposed neutralizers listed:

<u>Chemical</u>	<u>Associated Neutralizer</u>
Sulfuric acid	Sodium hydroxide
Sodium hydroxide	Sulfuric acid
Sodium hypochlorite	Sodium thiosulfate
Hydrazine/Carbohydrazide	NESW (lake water), Hydrogen peroxide, sodium hypochlorite.
Ethanolamine	Sodium Hypochlorite, Hydrogen Peroxide, or ozone.
Ethylene glycol	Hydrogen peroxide

Reduction of hydrazine and ETA prior to discharge to the absorption pond may include additions of chemicals such as sodium hypochlorite, hydrogen peroxide, or ozone to the Turbine Room Sump in batches, or to the discharge piping as continuous treatment. A downstream treatment system provided by a vendor may be used to break down the hydrazine and ETA.

OUTFALL 00E – Sanitary Waste Discharges

The sequencing batch reactor is maintained by licensed operators under contract to Indiana Michigan Power. The contract manager is also a licensed wastewater operator. The system operates at a designed flow of 50,000 GPD with a maximum flow capacity of 60,000 GPD. The Sequencing Batch Reactor (SBR) system treats the wastewater using the activated sludge process (C-3a and C-3b). The treated effluent discharges to an effluent tank where it can be filtered (A-2b) prior to discharge to one of two seepage lagoons (A-1f). The lagoons discharge into the groundwater with the ultimate disposition venting to Lake Michigan. The sludge removed from the digester tank basins is taken to a local POTW (public owned treatment works) for disposal or dewatered and disposed as low level radioactive waste.

To aid in the settling process, flocculents such as ferric chloride, pH controllers such as magnesium hydroxide, or polymers (such as Axchem AF4500) are added to the process. To selectively enhance biosolids, bioaugmentation nutrients (such as Bioprime Dosfolat) are added to the process. This is a nutrient that encourages the growth of beneficial microbes in the activated sludge. Sodium hypochlorite is added in small amounts to the process to control filamentous bacteria growth if needed. Sodium hypochlorite and detergent are also added to the sand filters to clean them periodically. These are then backwashed into the equalization basin to be reprocessed by the SBR treatment process.

Compliance with rule 2222:

These plant discharges meet the requirement of R323.2222.2.ii by complying with the effluent standards of part 2222, groundwater standards of part 2222, or both. A single exception exists for iron concentration in monitoring well EW13 where iron fouling bacteria are naturally present in the groundwater. Plant effluent is in compliance with the groundwater standard for iron, but naturally occurring iron bacteria shows up in one of the monitoring wells. Upgradient monitoring well EW-8 monitoring history shows Mercury levels at 0.0035 ug/l. The remaining monitoring wells are below the 0.0013 ug/l limit. This is not a permit exceedence since there are no limits on upgradient wells.

TAB 9
Page 38 Part 4b
Facility Compliance
history

History of CNPs Compliance with Effluent and Groundwater Permit Limits and Sampling Frequency.

Cook Nuclear Plant's groundwater discharges are in compliance with the effluent limits established in the Groundwater Permit M00988. There were a few problems dealing with sample contamination in Method 1631 (low level mercury) in the first round of monitoring which resulted in high levels of mercury being detected but these problems did not repeat in subsequent sampling. Iron fouling bacteria has influenced several wells including the background well. However, in general, concentrations of pollutants in the groundwater are far below the effluent limits and there is no indication that the concentrations of pollutants are trending upward. In fact, there are only four parameters that have concentrations near the groundwater effluent limits (iron, mercury, selenium, and silver). The background well EW-8 shows a similar trend for these four parameters, indicating that the natural groundwater has a potential for exceeding the effluent limits and influencing the monitoring wells.

The history of Cook Nuclear Plants groundwater compliance is discussed in greater detail in the following sections:

1. Process Wastewater/Turbine Room Sump Discharge (Outfall 00D)..... 1
2. Sanitary Wastewater (Sequencing Batch Reactor) Discharge (Outfall 00E)..... 2
3. Groundwater Monitoring (Wells EW-1A, EW-12, EW-13, EW-19, and Background Well EW-8)..... 3

The observations made are based on a review of the monitoring data for the years 2002 through 2004. Monitoring data determined to be less than the Method Detection Limit (MDL) were treated as ½ the MDL for statistical calculations. (ref USEPA SW846)

1. Process Wastewater/Turbine Room Sump Discharge (Outfall 00D).

The Turbine Room Sump discharge is regulated by Part I.A.2. of the permit as follows:

Part I.A.2. Process Wastewater, STP, Lagoons and Seepage Beds					
Outfall	Parameter	Limit	Units	Measurement Frequency	Sample Type
00D EF-1 EQ-1	Flow	2,400,000	gpd	Daily	Total
	Sodium (dissolved)		mg/l	Weekly	**
	pH	5.5 to 9.0	SU	Continuous	Grab
	Sulfate	250	mg/l	Weekly	**
	Carbohydrazide/Hydrazine	NA		Weekly	Grab
	Ethanolamine	NA		Weekly	Grab
	Oil	NA		Daily	Visual Observation

** = 24 hour composite samples.

Monitoring data for the Turbine Room Sump Discharge are summarized in Tables 1 & 2.

Flow is typically less than 500,000 gpd with an average of 0.284 MGD.

Sodium in the discharge ranged from 2.3 to 691 mg/l and averaged 23.7 mg/l. The sodium discharge is the result of regenerating ion exchange resins. Both cation and anion resins are regenerated and the spent regeneration solutions neutralize each other in the turbine room sump, or pumped to the neutralization tank where they are neutralized. The treated effluent is controlled by an in line pH monitor that prevents discharges less than pH 6.3, and greater than pH 8.2 values.

As discussed above, the pH of the turbine room sump discharge is dependent upon the regeneration of the ion exchange resins. The cation resin is regenerated with sulfuric acid and the anion resin is

regenerated with sodium hydroxide. The pH of the resultant mixture of spent regeneration solutions in the turbine room sump generally ranges from 6.3 to 8.2 S.U. Sulfuric acid and sodium hydroxide to adjust pH prior to pump to TRS or absorption pond.

Sulfate in the discharge ranged from 17 to 840 mg/l and averaged 67 mg/l. As discussed above, the sulfate discharge is the result of regenerating ion exchange resins. The sulfate concentration exceeded 250 mg/l in 8 of 163 observations. 95% of all the observations are below the 250 mg/l effluent limit.

Carbohydrazide is used as a replacement for hydrazine for safe handling reasons. The carbohydrazide converts to Hydrazine, carbon dioxide and nitrogen in the plant's steam cycle. Hydrazine in the effluent ranged from 2 to 18,700 ug/l. The average discharge concentration was 389 ug/l and 90% of all the observations are less than 164 ug/l.

Ethanolamine in the effluent ranged from 0.4 to 81.3 mg/l. The average discharge concentration was 2.9 mg/l and 95% of all the observations are less than 7 mg/l.

There is no indication that the concentrations of pollutants are trending upward at GW well 12.

The TRS is designed with the discharge piping outlets/pumps at the bottom of the tank. This configuration will allow spilled oil to remain in the TRS to be recovered instead of being discharged to the environment. The sump has a working capacity of approximately 82,855 gallons.

The absorption pond receives the effluent from the TRS. A solar powered mixing pump recirculates the pond's contents to ensure proper mixing and additional biological treatment.

2. Sanitary Wastewater (Sequencing Batch Reactor) Discharge (Outfall 00E).

The sanitary wastewater discharge is regulated by Part I.A.2. of the permit as follows:

Part I.A.2.: Process Wastewater, STP, Lagoons and Seepage Beds					
00E Effluent EQ-2	Flow	60,000	gpd	Daily	Total
	BOD ₅	35	mg/l	Weekly	Grab
	TIN (max)	85	mg/l	Weekly	Calculation
	TIN (monthly avg)	50	mg/l	Weekly	Calculation
	Ammonia (N)		mg/l	Weekly	**
	Nitrite (N)		mg/l	Weekly	**
	Nitrate (N)		mg/l	Weekly	**
	Phosphorus, Total	15	mg/l	Weekly	**
	pH	5.5 to 9.0	S.U.	Weekly	Grab
	Total Dissolved Solids		mg/l	Weekly	**

** = 24 hour composite samples.

Monitoring data for the sanitary wastewater discharge are summarized in Tables 3 & 4.

The maximum flow through the sewage treatment plant was 45,680 gpd which is below the design flow of 60,000 gpd.

The sequencing batch reactors reduce the BOD₅ concentration by about 98% (far better than the 85% reduction requirement). The maximum concentration of BOD₅ in the discharge was 13.8 mg/l and the highest monthly average concentration was 6.9 mg/l.

The maximum concentration of Total Inorganic Nitrogen (TIN) was 51.0 mg/l compared to the effluent limit of 85 mg/l. The highest monthly average concentration of TIN was 45.6 mg/l compared to the effluent limit of 50 mg/l. There is no upward trend.

The limitation for ammonia nitrogen is an 85% reduction from the influent level. Based on the maximum amount of ammonia, the percent reduction is 87.3%. Based on the monthly average amount of ammonia, the percent reduction is 95.9%.

Total phosphorus is consistently below the 15 mg/l effluent limit. The maximum concentration of phosphorus in the discharge was 9.3 mg/l and the monthly average concentration was 4.8 mg/l.

pH in the sewage treatment plant ranged from 6.9 to 8.8 S. U. No pH adjustments to the effluent are required.

The maximum concentration of Total Suspended Solids (TSS) in the discharge was 46.0 mg/l and the highest monthly average concentration was 8.6 mg/l. The limitation for TSS is an 85% reduction from the influent level. Based on the maximum amount of TSS, the percent reduction is 92.6%. Based on the monthly average amount of TSS, the percent reduction is 98.1%.

3. Groundwater Monitoring (Wells EW-1A, EW-12, EW-13, EW-19, and Background Well EW-8).

The groundwater is regulated by Part I.B.2. of the permit as follows (limitations are for Wells EW-1A, EW-12, EW-13, EW-19):

PARAMETERS	CONCENTRATION LIMITATIONS	FREQUENCY OF ANALYSIS	SAMPLE TYPE
Static Water Elevation	USGS-F	Quarterly	Measurement
pH	S.U.	Quarterly	Grab
Chloride	250 mg/l	Quarterly	Grab
Specific Conductance	umhos/cm	Quarterly	Grab
Total Inorganic Nitrogen*	5 mg/l	Quarterly	Grab
Ammonia Nitrogen	mg/l	Quarterly	Calculation
Nitrite Nitrogen	mg/l	Quarterly	Grab
Nitrate Nitrogen	mg/l	Quarterly	Grab
Total Phosphorus	1 mg/l	Quarterly	Grab
Sulfate	**	Quarterly	Grab
Dissolved Sodium	**	Quarterly	Grab
Total Dissolved Solids	**	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	30.0 ug/l	Annually	Grab

PARAMETERS	CONCENTRATION LIMITATIONS	FREQUENCY OF ANALYSIS	SAMPLE TYPE
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 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 (TOC)	mg/l	Annually	Grab
Phenols	mg/l	Annually	Grab
Hydrazine	10 ug/l	Quarterly	Grab
Ethanolamine	2 mg/l	Quarterly	Grab

The groundwater monitoring data is summarized in Tables 5 through 9.

In general, the concentration of chemical constituents in the groundwater are far below the groundwater limitations (in many cases by more than one order of magnitude). Therefore, only the exceptions are discussed.

Total Inorganic Nitrogen (TIN)

The maximum TIN concentration at Well EW-1A is 4.87 mg/l compared to the effluent limit of 5.0 mg/l. However, the average maximum concentration is 2.49 mg/l. Well EW-1A is the only well with a high concentration of TIN. The well with the next highest concentration is the background well EW-8. There is no upward trend in the data for any of the wells.

Iron

Wells EW-13 and EW-19 show high concentrations of iron due to iron fouling bacteria. The highest concentration of iron detected in Well EW-13 was 5.79 mg/l. The highest concentration of iron detected in Well EW-19 was 1.73 mg/l. Both Wells EW-13 and EW-19 are off-gradient wells near the extremities of the plant property. Well EW-8, the background well, also shows a high concentration of iron, although much lower than that of Wells EW-13 and EW-19. The maximum concentration of iron at Well EW-8 is 0.11 mg/l. The natural groundwater appeared to have a tendency to support iron fouling bacteria which has a potential influence on the Cook Nuclear Plant monitoring wells.

Mercury

The mercury effluent limit (0.0013 ug/l) was exceeded once at Well EW-1A and once at Well EW-12. Each of these exceedences was during the first sampling event and may have been due to contamination during sampling. Sampling was performed using a new low level mercury procedure, Method 1631. Resampling and subsequent sampling at these wells showed that mercury is in compliance with the mercury groundwater effluent limit. In contrast, all samples taken at the background well EW-8 exceed the groundwater standard.

Selenium

Selenium is generally less than the method detection limit (MDL). However, since the MDL is very close to the groundwater standard, results of the statistical analysis indicate a potential to exceed the standard. However, because selenium is generally less than detectable and there is no upward trend, selenium should not be a concern. Again, the greatest concentrations were found in the background well EW-8.

Silver

Silver was always less than the method detection limit (MDL). Since the MDL is very close to the groundwater standard, results of the statistical analysis indicate a potential to exceed the standard. However, because silver is always less than detectable and there is no upward trend, silver should not be a concern.

Table 1. Cook Nuclear Plant
Compliance with Effluent Limits (Turbine Room Sump Discharge)

Date	Sample Location	EF-1	EQ -1		EQ -1	EQ -1	EQ -1	EQ -1	EQ -1
	PARAMETER	Flow	pH		Dissolved Sodium	Sulfate	Hydrazine	Ethanolamine	Oil Sheen
	LIMITS	2.4	5.5 - 9.0			250 (AVG)			
	UNITS	MGD	Low	High	mg/l	mg/l	ug/l	mg/l	Sat/Unsat
					7.0	43	<3	<0.7	Sat
					7.6	34	<3	<0.7	Sat
					8.0	38	<3	<0.7	Sat
					9.9	25	206	2.9	Sat
Jan-02		0.289	6.3	8.2	6.7	34	14	1.2	Sat
					6.8	27	14	<0.7	Sat
					7.6	26	9	1.0	Sat
Feb-02		0.284	6.3	8.2	8.3	35	<3	1.4	Sat
					11.0	34	35	2.6	Sat
					9.3	28	<3	0.7	Sat
					7.8	47	<3	<0.7	Sat
Mar-02		0.306	6.3	8.2	7.6	36	<3	0.9	Sat
					5.7	40	15	2.0	Sat
					5.4	44	4	3.1	Sat
					6.2	28	<3	<0.7	Sat
					7.4	23	<3	<0.7	Sat
Apr-02		0.281	6.3	8.2	6.6	23	<3	<0.7	Sat
					6.6	23	<3	<0.7	Sat
					6.7	38	<3	<0.7	Sat
					5.8	33	8,100	23.6	Sat
					5.1	31	5	1.0	Sat
May-02		0.369	6.3	8.2	210.0	80	<3	<0.7	Sat
					5.3	27	14,040	33.4	Sat
					3.6	23	159	1.6	Sat
					494.0	92	186	1.9	Sat
Jun-02		0.391	6.3	8.2	4.5	39	35	1.8	Sat
					7.1	47	<3	<0.7	Sat
					5.8	38	<3	<0.7	Sat
					5.5	53	<3	<0.7	Sat
					6.1	48	<3	<0.7	Sat
Jul-02		0.311	6.3	8.2	3.7	35	3	2.2	Sat
					3.8	20	4,640	15.1	Sat
					6.5	29	<3	<0.7	Sat
					6.2	49	<3	1.3	Sat
Aug-02		0.291	6.3	8.2	7.4	57	<3	1.5	Sat
					5.7	49	<3	1.2	Sat
					5.8	53	<3	2.3	Sat
					5.1	42	11	3.8	Sat
					5.1	41	22	3.6	Sat
Sep-02		0.288	6.3	8.4	5.5	52	8	<0.7	Sat
					5.5	52	8	<0.7	Sat
					5.8	410	<10	<1	Sat
					6.5	35	14.4	1.14	Sat
					5.7	40	<10	1.31	Sat
					5.8	35	<10	1.22	Sat
					40	<10	<1	<1	Sat
Oct-02		0.232	6.3	8.2	34	840			Sat
					6.1	39	<10	<1	Sat
					6.1	35	<10	<1	Sat
					6.9	38	361	3.05	Sat
Nov-02		0.278	6.1	8.2	193.0	18	<10	<1	Sat
					4.5	38			Sat
					4.6	43	445	14.8	Sat
					4.1	840	37.9	2.6	Sat
					5.7	58	48	3.8	Sat

COF

Table 1. Cook Nuclear Plant
Compliance with Effluent Limits (Turbine Room Sump Discharge)

Date	Sample Location	EF-1	EQ -1		EQ -1	EQ -1	EQ -1	EQ -1	
	PARAMETER	Flow	pH		Dissolved Sodium	Sulfate	Hydrazine	Ethanolamine	Oil Sheen
	LIMITS	2.4	5.5 - 9.0			250 (AVG)			
	UNITS	MGD	Low	High	mg/l	mg/l	ug/l	mg/l	Sat/Unsat
Dec-02					4.7	28	<10	<1	Sat
					6.2	35			Sat
						42			Sat
		0.379	2.4	8.2		45.6			Sat
Jan-03					85.6	53	<3	2.7	Sat
					6.6	48	<3	3.8	Sat
					8.1	250	735	5.0	Sat
		0.0398	6.3	8.2	5.3	27	240	2.6	Sat
Feb-03					3.0				Sat
					5.3	23	<3	2.3	Sat
					3.4	39	20	3.8	Sat
		0.388	6.3	8.2	5.0	76	<3	4.4	Sat
Mar-03					4.7	39	<3	3.7	Sat
					4.9	45	<3	2.4	Sat
					6.8	43	<3	<0.7	Sat
		0.2999	6.2	8.9	45.5	129	<3	0.81	Sat
Apr-03					33.5	62	<3	1.4	Sat
					6.2	56	<3	0.9	Sat
					7.6	53	<3	2.9	Sat
		0.288	6.3	8.2	5.4	49	<3	3.1	Sat
May-03					6.3	45	146	4.7	Sat
					4.2	18	<3	<0.7	Sat
					6.6	26	7.5	2.5	Sat
		0.347	6.3	8.2	5.9	31	51.3	1.7	Sat
Jun-03					3.5	34	<3	81.3	Sat
							18,700		Sat
					5.3	21	<3	<0.7	Sat
		0.305	6.3	8.2	5.5	33	1,930	10.6	Sat
Jul-03					3.6	18	128	1.1	Sat
					4.3	27	6.8	0.8	Sat
					6.5	25	<3	1.2	Sat
		0.287	6.3	8.2	26.8	48	<3	1.3	Sat
Aug-03					57.2	142	<3	1.0	Sat
					7.0	32	<3	0.8	Sat
					7.4	40	<3	<0.7	Sat
		0.334	6.3	8.2	9.8	45	7.9	4.0	Sat
Sep-03					6.1	59	<3	1.2	Sat
					3.3	23	2,620	4.2	Sat
					3.3	31	49.9	<0.7	Sat
		0.28	6.3	8.2	4.4	50	<3	<0.7	Sat
Oct-03					691.0	72	<3	1.3	Sat
					4.9	54	<3	1.1	Sat
					8.2	270	<3	1.4	Sat
		0.298	6.3	8.2	7.0		8.1	<0.7	Sat
Nov-03					5.6	52	<3	1.2	Sat
					8.2	58	<3	1.7	Sat
					14.8	50	140	1.4	Sat
		0.322	6.3	8.2	5.8	44	<3	1.2	Sat
					47			Sat	
					20.0	48	630	4.1	Sat
					5.5	46	5	3.0	Sat
					5.5	41	<3	1.4	Sat
					3.7	42	107	4.7	Sat
					8.2	262	<3	<0.7	Sat
					6.6	42	<3	2.2	Sat

CO2

Table 1. Cook Nuclear Plant
Compliance with Effluent Limits (Turbine Room Sump Discharge)

Date	Sample Location	EF-1	EQ -1		EQ -1	EQ -1	EQ -1	EQ -1	
	PARAMETER	Flow	pH		Dissolved Sodium	Sulfate	Hydrazine	Ethanolamine	Oil Sheen
	LIMITS	2.4	5.5 - 9.0			250 (AVG)			
	UNITS	MGD	Low	High	mg/l	mg/l	ug/l	mg/l	Sat/Unsat
Dec-03					6.4	52	7	2.1	Sat
					5.6	42	16	3.7	Sat
		0.279	6.3	8.2	5.4	48	5	2.6	Sat
Jan-04					7.2	46	1,233	6.4	Sat
					6.3	41	2,376	11.5	Sat
					8.9	49	8	1.6	Sat
		0.2831	6.3	8.2	7.1	54	<3	1.2	Sat
Feb-04					6.5	340	9	<0.7	Sat
					6.4	46	<3	1.3	Sat
					7.4	47	<3	<0.7	Sat
		0.258	6.3	8.2	6.8	66	<3	0.8	Sat
Mar-04					5.3	47	10	1.3	Sat
					69.9	45	<3	2.8	Sat
					7.0	205	9	2.9	Sat
					5.3	55	<3	1.1	Sat
					6.7	49	<3	1.6	Sat
		0.262	6.3	8.2		46			Sat
Apr-04					3.5	280	85	3.7	Sat
					4.5	39	119	2.2	Sat
					134.0	250	<3	0.8	Sat
					81.9	60	<3	<0.7	Sat
		0.321	6.3	8.2	6.8				Sat
May-04					5.6	56	7.2	1.2	Sat
					5.9	55	<3	1.3	Sat
					6.5	39	<3	1.0	Sat
					4.7	54	5.8	1.2	Sat
		0.223	6.3	8.2			12.8	1.6	Sat
Jun-04					308.0	44	<3	2.74	Sat
					5.2	45	<3	2.62	Sat
					5.1	52	<3	1.19	Sat
					5.8	39	4.3	2.46	Sat
			6.3	8.2	4.7	48			Sat
Jul-04					5.4	38	<3	1.8	Sat
					4.9	43	<3	2.6	Sat
					56.4	48	<3	1.8	Sat
		0.243	6.3	8.2	6.1	54	<3	1.4	Sat
Aug-04					4.6	63	3.8	2.3	Sat
					4.1	52	<3	2.3	Sat
					5.8	59	<3	0.9	Sat
					5.1	48	<3	<0.7	Sat
		0.236	6.3	8.2		44	<3	2.5	Sat
Sep-04					4.7	53	<3	<0.7	Sat
					5.1	50	<3	1.3	Sat
					4.6	48	<3	2.0	Sat
					4.4	56	<3	1.3	Sat
		0.229	6.3	8.8	5.0				Sat
Oct-04					5.4	17	13	1.6	Sat
					3.8	23	3,660	15.1	Sat
					5.4	340	<3	<0.7	Sat
					4.3	20	<3	1.7	Sat
		0.233	6.3	8.2			<3	1.4	Sat
Nov-04					4.4	21	6	1.3	Sat
					3.7	17	60	1.3	Sat
					4.4	28	17	1.8	Sat
					2.3	35	<3	<0.7	Sat
		0.269	6.3	8.2	11.9	27	6.5	1.1	Sat
					5.5	47	14	5.5	Sat

003

Table 1. Cook Nuclear Plant
Compliance with Effluent Limits (Turbine Room Sump Discharge)

Date	Sample Location	EF-1	EQ -1		EQ -1	EQ -1	EQ -1	EQ -1	EQ -1
PARAMETER	Flow	pH		Dissolved Sodium	Sulfate	Hydrazine	Ethanolamine	Oil Sheen	
LIMITS	2.4	5.5 - 9.0			250 (AVG)				
UNITS	MGD	Low	High	mg/l	mg/l	ug/l	mg/l	Sat/Unsat	
Dec-04				6.4	46	<3	1.7	Sat	
				5.1	34	<3	2.5	Sat	
	0.224	6.3	8.2	423.0	125	<3	1.6	Sat	
	No. Observations			159	163	159	158	Sat	
	Minimum		2.4	2.3	17	2	0.4	Sat	
Average	0.284			23.7	67	389	2.9	Sat	
Maximum		8.9		691.0	840	18,700	81.3	Sat	
90th Percentile				16	75	164	4		
Summary				82.3	250.0	1302.7	7.0		

CO4

Table 2. Cook Nuclear Plant
Compliance with Effluent Limits (Turbine Room Sump)

Date	Sample Location	EF-1	EQ -1		EQ -1	EQ -1	EQ -1	EQ -1	EQ -1
	PARAMETER	Flow	pH		Dissolved Sodium	Sulfate	Hydrazine	Ethanolamine	Oil Sheen
	LIMITS	2.4	5.5 - 9.0			250 (AVG)			
	UNITS	MGD	Low	High	mg/l	mg/l	ug/l	mg/l	Sat/Unsat
					7.0	43	2	0.4	Sat
					7.6	34	2	0.4	Sat
					8.0	38	2	0.4	Sat
					9.9	25	206	2.9	Sat
Jan-02		0.289	6.3	8.2	6.7	34	14	1.2	Sat
					6.8	27	14	0.4	Sat
					7.6	26	9	1.0	Sat
					8.3	35	2	1.4	Sat
Feb-02		0.284	6.3	8.2	11.0	34	35	2.6	Sat
					9.3	28	2	0.7	Sat
					7.8	47	2	0.4	Sat
					7.6	36	2	0.9	Sat
Mar-02		0.306	6.3	8.2	5.7	40	15	2.0	Sat
					5.4	44	4	3.1	Sat
					6.2	28	2	0.4	Sat
					7.4	23	2	0.4	Sat
					6.6	23	2	0.4	Sat
Apr-02		0.281	6.3	8.2		38	2	0.4	Sat
					6.7				Sat
					5.8	33	8,100	23.6	Sat
					5.1	31	5	1.0	Sat
					210.0	80	2	0.4	Sat
May-02		0.369	6.3	8.2	5.3	27	14,040	33.4	Sat
					3.6	23	159	1.6	Sat
					494.0	92	186	1.9	Sat
					4.5	39	35	1.8	Sat
Jun-02		0.391	6.3	8.2	7.1	47	2	0.4	Sat
					5.8	38	2	0.4	Sat
					5.5	53	2	0.4	Sat
					6.1	48	2	0.4	Sat
					3.7	35	3	2.2	Sat
Jul-02		0.311	6.3	8.2	3.8	20	4,640	15.1	Sat
					6.5	29	2	0.4	Sat
					6.2	49	2	1.3	Sat
					7.4	57	2	1.5	Sat
Aug-02		0.291	6.3	8.2	5.7	49	2	1.2	Sat
					5.8	53	2	2.3	Sat
					5.1	42	11	3.8	Sat
					5.1	41	22	3.6	Sat
					5.5	52	8	0.4	Sat
Sep-02		0.288	6.3	8.4			2	1.8	Sat
					5.8	410	5	1	Sat
					6.5	35	14.4	1.14	Sat
					5.7	40	5	1.31	Sat
					5.8	35	5	1.22	Sat
						40	5	1	Sat
						34			Sat
Oct-02		0.232	6.3	8.2		840			Sat
					6.1	39	5	1	Sat
					6.1	35	5	1	Sat
					6.9	38	361	3.05	Sat
					193.0	18	5	1	Sat
Nov-02		0.278	6.1	8.2	4.5	38			Sat
					4.6	43	445	14.8	Sat
					4.1	840	37.9	2.6	Sat
					5.7	58	48	3.8	Sat

C05

Table 2. Cook Nuclear Plant
Compliance with Effluent Limits (Turbine Room Sump)

Date	Sample Location	EF-1	EQ -1		EQ -1	EQ -1	EQ -1	EQ -1	EQ -1
	PARAMETER	Flow	pH		Dissolved Sodium	Sulfate	Hydrazine	Ethanolamine	Oil Sheen
	LIMITS	2.4	5.5 - 9.0			250 (AVG)			
	UNITS	MGD	Low	High	mg/l	mg/l	ug/l	mg/l	Sat/Unsat
Dec-02					4.7	28	5	1	Sat
					6.2	35			Sat
						42			Sat
		0.379	2.4	8.2		45.6			Sat
Jan-03					85.6	53	2	2.7	Sat
					6.6	48	2	3.8	Sat
					8.1	250	735	5.0	Sat
					5.3	27	240	2.6	Sat
		0.0398	6.3	8.2	3.0				Sat
Feb-03					5.3	23	2	2.3	Sat
					3.4	39	20	3.8	Sat
					5.0	76	2	4.4	Sat
		0.388	6.3	8.2	4.7	39	2	3.7	Sat
Mar-03					4.9	45	2	2.4	Sat
					6.8	43	2	0.4	Sat
					45.5	129	2	0.81	Sat
					33.5	62	2	1.4	Sat
		0.2999	6.2	8.9			2	0.4	Sat
Apr-03					6.2	56	2	0.9	Sat
					7.6	53	2	2.9	Sat
					5.4	49	2	3.1	Sat
					6.3	45	146	4.7	Sat
		0.288	6.3	8.2	4.3	49			Sat
May-03					4.2	18	2	0.4	Sat
					6.6	26	7.5	2.5	Sat
					5.9	31	51.3	1.7	Sat
					3.5	34	2	81.3	Sat
		0.347	6.3	8.2			18,700		Sat
Jun-03					5.3	21	2	0.4	Sat
					5.5	33	1,930	10.6	Sat
					3.6	18	128	1.1	Sat
		0.305	6.3	8.2	4.3	27	6.8	0.8	Sat
Jul-03					6.5	25	2	1.2	Sat
					26.8	48	2	1.3	Sat
					57.2	142	2	1.0	Sat
					7.0	32	2	0.8	Sat
		0.287	6.3	8.2	7.4	40	2	0.4	Sat
Aug-03					9.8	45	7.9	4.0	Sat
					6.1	59	2	1.2	Sat
					3.3	23	2,620	4.2	Sat
		0.334	6.3	8.2	3.3	31	49.9	0.4	Sat
Sep-03					4.4	50	2	0.4	Sat
					691.0	72	2	1.3	Sat
					4.9	54	2	1.1	Sat
					8.2	270	2	1.4	Sat
		0.28	6.3	8.2	7.0		8.1	0.4	Sat
Oct-03					5.6	52	2	1.2	Sat
					8.2	58	2	1.7	Sat
					14.8	50	140	1.4	Sat
					5.8	44	2	1.2	Sat
		0.298	6.3	8.2		47			Sat
Nov-03					20.0	48	630	4.1	Sat
					5.5	46	5	3.0	Sat
					5.5	41	2	1.4	Sat
		0.322	6.3	8.2	3.7	42	107	4.7	Sat
					8.2	262	2	0.4	Sat
				6.6	42	2	2.2	Sat	

COG

Table 2. Cook Nuclear Plant
Compliance with Effluent Limits (Turbine Room Sump)

Date	Sample Location	EF-1	EQ -1		EQ -1	EQ -1	EQ -1	EQ -1	EQ -1
	PARAMETER	Flow	pH		Dissolved Sodium	Sulfate	Hydrazine	Ethanolamine	Oil Sheen
	LIMITS	2.4	5.5 - 9.0			250 (AVG)			
	UNITS	MGD	Low	High	mg/l	mg/l	ug/l	mg/l	Sat/Unsat
Dec-03					6.4	52	7	2.1	Sat
					5.6	42	16	3.7	Sat
		0.279	6.3	8.2	5.4	48	5	2.6	Sat
Jan-04					7.2	46	1,233	6.4	Sat
					6.3	41	2,376	11.5	Sat
					8.9	49	8	1.6	Sat
		0.2831	6.3	8.2	7.1	54	2	1.2	Sat
					6.5	340	9	0.4	Sat
Feb-04					6.4	46	2	1.3	Sat
					7.4	47	2	0.4	Sat
		0.258	6.3	8.2	6.8	66	2	0.8	Sat
Mar-04					5.3	47	10	1.3	Sat
					69.9	45	2	2.8	Sat
					7.0	205	9	2.9	Sat
					5.3	55	2	1.1	Sat
					6.7	49	2	1.6	Sat
		0.262	6.3	8.2	46				Sat
Apr-04					3.5	280	85	3.7	Sat
					4.5	39	119	2.2	Sat
					134.0	250	2	0.8	Sat
					81.9	60	2	0.4	Sat
		0.321	6.3	8.2	6.8				Sat
May-04					5.6	56	7.2	1.2	Sat
					5.9	55	2	1.3	Sat
					6.5	39	2	1.0	Sat
					4.7	54	5.8	1.2	Sat
		0.223	6.3	8.2			12.8	1.6	Sat
Jun-04					308.0	44	2	2.74	Sat
					5.2	45	2	2.62	Sat
					5.1	52	2	1.19	Sat
					5.8	39	4.3	2.46	Sat
					4.7	48			Sat
Jul-04					5.4	38	2	1.8	Sat
					4.9	43	2	2.6	Sat
					56.4	48	2	1.8	Sat
		0.243	6.3	8.2	6.1	54	2	1.4	Sat
Aug-04					4.6	63	3.8	2.3	Sat
					4.1	52	2	2.3	Sat
					5.8	59	2	0.9	Sat
					5.1	48	2	0.4	Sat
		0.236	6.3	8.2		44	2	2.5	Sat
Sep-04					4.7	53	2	0.4	Sat
					5.1	50	2	1.3	Sat
					4.6	48	2	2.0	Sat
					4.4	56	2	1.3	Sat
		0.229	6.3	8.8	5.0				Sat
Oct-04					5.4	17	13	1.6	Sat
					3.8	23	3,660	15.1	Sat
					5.4	340	2	0.4	Sat
					4.3	20	2	1.7	Sat
		0.233	6.3	8.2			2	1.4	Sat
Nov-04					4.4	21	6	1.3	Sat
					3.7	17	60	1.3	Sat
					4.4	28	17	1.8	Sat
					2.3	35	2	0.4	Sat
		0.269	6.3	8.2	11.9	27	6.5	1.1	Sat
					5.5	47	14	5.5	Sat

Table 2. Cook Nuclear Plant
Compliance with Effluent Limits (Turbine Room Sump)

Date	Sample Location	EF-1	EQ -1		EQ -1	EQ -1	EQ -1	EQ -1	EQ -1
	PARAMETER	Flow	pH		Dissolved Sodium	Sulfate	Hydrazine	Ethanolamine	Oil Sheen
	LIMITS	2.4	5.5 - 9.0			250 (AVG)			
	UNITS	MGD	Low	High	mg/l	mg/l	ug/l	mg/l	Sat/Unsat
Dec-04					6.4	46	2	1.7	Sat
					5.1	34	2	2.5	Sat
		0.224	6.3	8.2	423.0	125	2	1.6	Sat
Summary	No. Observations				159	163	159	158	Sat
	Minimum		2.4		2.3	17.0	1.5	0.4	Sat
	Average	0.284			23.7	67.0	388.7	2.9	Sat
	Maximum		8.9		691.0	840.0	18,700.0	81.3	Sat
	90th Percentile				16	75	164	4	
	95th Percentile				82.3	250.0	1302.7	7.0	

COB

Ta...ok Nuclear Plant
Compliance with STP Limits

Sample Location	Maximum						Monthly Average Flow					
	EF-2	IQ-2	IQ-2	IQ-2	IQ-2	IQ-2	EF-2	IQ-2	IQ-2	IQ-2	IQ-2	IQ-2
Parameter	Daily Maximum Flow	BOD5	Ammonia(N)	T. Phosphorus	pH	TSS	Monthly Average Flow	BOD5	Ammonia(N)	T. Phosphorus	pH	TSS
Units	gpd	mg/l	mg/l	mg/l	S.U.	mg/l	gpd	mg/l	mg/l	mg/l	S.U.	mg/l
Date												
Jan-02	45,680	294	95.1	22.5	8.2 to 8.8	405	29,328	185	83.1	20.3	NA	164
Feb-02	36,420	611	107.0	12.3	7.2 to 8.6	534	29,921	314	81.3	9.5	NA	271
Mar-02	34,830	339	90.8	16.5	7.9 to 8.5	297	25,866	253	52.6	7.0	NA	175
Apr-02	37,600	350	88.0	10.5	7.7 to 8.6	413	27,449	205	55.1	7.3	NA	222
May-02	40,320	563	117.0	11.8	8.3 to 8.7	562	34,263	406	92.0	11.3	NA	380
Jun-02	27,450	567	83.9	10.3	8.1 to 8.6	456	19,740	443	61.2	7.7	NA	350
Jul-02	33,050	540	78.2	11.3	8.0 to 8.6	410	17,711	324	51.4	9.0	NA	269
Aug-02	26,350	357	139.0	11.3	8.0 to 8.6	381	17,525	288	65.0	9.7	NA	311
Sep-02	22,810	391	66.4	37.5	8.3 to 8.7	332	15,602	297	53.5	14.0	NA	274
Oct-02	25,240	435	67.0	10.3	8.2 to 8.6	341	18,670	268	56.2	7.9	NA	222
Nov-02	28,270	217	93.7	13.5	8.4 to 8.7	277	18,970	188	64.1	9.2	NA	163
Dec-02	28,780	316	88.1	26.3	8.4 to 8.7	365	18,766	275	61.7	12.5	NA	279
Jan-03	27,180	344	83.6	9.5	8.2 to 8.6	492	17,890	279	70.0	7.5	NA	334
Feb-03	38,030	367	97.7	11.0	8.5 to 8.8	369	17,075	280	69.3	8.6	NA	275
Mar-03	20,180	437	80.0	8.0	8.3 to 8.7	358	13,366	382	71.7	7.2	NA	270
Apr-03	28,830	480	83.4	9.8	8.5 to 8.8	529	17,180	444	71.3	8.5	NA	408
May-03	33,990	516	113.0	10.5	8.4 to 8.7	619	27,285	430	103.9	9.5	NA	443
Jun-03	30,730	410	117.0	10.0	8.5 to 8.6	495	19,577	336	75.5	8.8	NA	425
Jul-03	21,900	438	76.7	9.0	8.2 to 8.5	523	14,932	326	66.3	7.6	NA	325
Aug-03	27,600	322	72.3	8.8	8.3 to 8.6	359	17,635	289	68.3	7.9	NA	278
Sep-03	27,810	373	77.3	9.1	8.4 to 8.6	265	16,119	347	63.3	7.8	NA	226
Oct-03	35,370	348	121.0	9.3	8.3 to 8.6	439	20,520	283	96.6	7.3	NA	344
Nov-03	35,690	357	138.0	9.5	8.4 to 8.5	431	24,260	292	111.9	7.8	NA	308
Dec-03	22,290	446	77.4	14.0	8.2 to 8.5	378	14,640	224	66.2	9.4	NA	298
Jan-04	20,510	304	83.1	9.0	8.4 to 8.5	314	14,814	298	68.9	7.1	NA	282
Feb-04	30,860	315	86.9	9.8	8.2 to 8.4	321	17,961	275	71.8	7.8	NA	246
Mar-04	24,290	319	80.4	9.0	8.4 to 8.7	350	16,018	273	68.2	7.9	NA	264
Apr-04	23,090	298	75.2	10.3	8.2 to 8.4	326	16,253	263	69.9	8.7	NA	279
May-04	36,180	295	76.8	8.5	8.2 to 8.6	301	16,255	238	68.0	7.6	NA	250
Jun-04	28,570	281	105.0	11.5	8.2 to 8.5	293	16,143	260	80.6	8.2	NA	240
Jul-04	24,980	328	66.3	13.3	8.2 to 8.6	335	17,445	265	59.9	11.5	NA	261
Aug-04	31,540	427	55.5	13.9	8.3 to 8.5	409	21,973	343	44.3	9.7	NA	314
Sep-04	35,230	410	126.1	9.3	8.2 to 8.8	350	20,854	345	84.6	8.5	NA	237
Oct-04	38,140	344	110.0	11.0	8.1 to 8.5	242	28,493	289	92.4	9.7	NA	217
Nov-04	31,410	273	81.3	9.0	8.4 to 8.7	441	17,973	255	68.8	7.8	NA	282
Dec-04	28,500	319	73.8	45.0	6.9 to 8.8	258	15,525	243	67.8	29.6	NA	202
No. Observations	36	36	36.0	36.0		36	36	36	36.0	36.0		36
Minimum	20,180	217	55.5	8.0	6.9	242	13,366	185	44.3	7.0		163
Average	30,269	381	90.9	13.1		388	19,833	297	71.0	9.7		280
Maximum	45,680	611	139.0	45.0	8.8	619	34,263	444	111.9	29.6		443
90th Percentile	37,815	528	119.0	19.5		526	27,971	394	92.2	12.0		365
95th Percentile	38,685	564	129.1	29.1		541	29,476	433	98.4	15.6		412

Clark Nuclear Plant
Compliance with STP Limits

Sample Location	Maximum										Monthly Average Flow							
	EQ-2	EQ-2	EQ-2	EQ-2	EQ-2	EQ-2	EQ-2	EQ-2	EQ-2	EQ-2	EQ-2	EQ-2	EQ-2	EQ-2	EQ-2	EQ-2	EQ-2	EQ-2
Parameter	BOD5	Total Inorganic Nitrogen, Max	Total Inorganic Nitrogen, Mo. Avg	Ammonia(N)	Nitrite (N)	Nitrate (N)	T. Phosphorus	pH	TSS	BOD5	Total Inorganic Nitrogen, Max	Total Inorganic Nitrogen, Mo. Avg	Ammonia(N)	Nitrite (N)	Nitrate (N)	T. Phosphorus	pH	TSS
Units	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	S.U.	mg/l
Date																		
Jan-02	11.1	51.0	NA	8.2	1.85	46.6	8.8	6.7 to 8.2	46.0	5.7	NA	30.5	3.0	0.59	27.7	3.2	NA	8.6
Feb-02	9.9	30.6	NA	11.5	2.88	29.9	9.3	7.2 to 8.3	7.3	6.9	NA	20.8	2.4	1.35	19.7	3.4	NA	4.2
Mar-02	7.9	22.0	NA	3.7	5.58	21.5	6.0	6.8 to 7.8	6.8	5.3	NA	19.9	1.3	1.69	19.5	2.2	NA	1.6
Apr-02	9.0	28.7	NA	2.8	3.28	27.7	7.6	7.4 to 8.1	3.7	4.8	NA	16.6	0.8	1.42	15.6	1.6	NA	1.3
May-02	13.8	26.7	NA	6.5	2.15	21.7	5.9	6.7 to 7.7	8.6	6.7	NA	22.6	3.1	0.92	18.4	3.3	NA	2.9
Jun-02	5.8	16.4	NA	0.8	0.25	16.3	1.1	6.9 to 7.8	2.8	3.7	NA	8.0	0.2	0.08	7.8	0.7	NA	1.5
Jul-02	7.4	24.7	NA	1.2	1.26	23.5	1.4	7.2 to 7.7	3.0	4.6	NA	15.2	0.4	0.20	14.5	0.7	NA	1.3
Aug-02	4.7	16.8	NA	6.9	0.12	16.7	3.5	6.9 to 7.8	4.2	2.9	NA	11.7	0.8	0.03	9.8	1.2	NA	1.2
Sep-02	3.4	11.5	NA	0.7	0.08	11.5	6.3	7.3 to 8.0	1.2	2.3	NA	8.9	0.1	0.02	8.9	1.8	NA	0.5
Oct-02	2.7	23.2	NA	3.9	0.19	23.2	4.0	7.4 to 8.0	0.8	1.7	NA	18.1	0.5	0.03	17.7	1.5	NA	0.3
Nov-02	3.8	26.9	NA	3.3	0.14	26.9	1.5	7.5 to 8.0	2.2	2.4	NA	17.8	1.0	0.04	16.4	1.1	NA	0.9
Dec-02	2.1	43.8	NA	0.2	0.01	43.8	1.5	6.8 to 8.0	1.0	1.7	NA	28.3	0.1	0.01	28.2	1.1	NA	0.6
Jan-03	8.1	48.3	NA	0.2	0.10	48.3	2.3	7.5 to 8.0	3.6	2.8	NA	41.8	0.1	0.04	41.7	0.9	NA	1.6
Feb-03	3.5	48.6	NA	0.5	0.01	48.6	1.1	7.2 to 7.9	2.8	2.3	NA	45.6	0.1	0.01	45.6	0.1	NA	1.2
Mar-03	7.9	47.8	NA	2.3	0.06	47.8	0.8	7.0 to 7.7	2.0	3.9	NA	40.6	0.3	0.02	40.0	0.5	NA	1.1
Apr-03	6.3	33.0	NA	1.0	0.09	33.0	2.5	7.0 to 8.3	1.7	3.8	NA	20.2	0.3	0.03	19.9	1.0	NA	1.0
May-03	11.6	24.3	NA	5.4	0.36	24.3	1.3	7.3 to 7.5	4.8	6.6	NA	15.9	2.7	0.21	13.9	0.8	NA	2.0
Jun-03	8.2	29.3	NA	3.1	0.90	26.1	0.8	7.0 to 7.5	7.0	5.1	NA	21.6	1.4	0.36	19.5	0.6	NA	3.0
Jul-03	4.4	27.8	NA	2.4	0.41	25.3	1.1	6.9 to 8.0	1.4	3.2	NA	21.3	0.64	0.10	20.7	0.8	NA	0.9
Aug-03	5.3	20.4	NA	0.1	0.08	20.4	1.5	7.1 to 7.3	1.0	4.1	NA	14.5	0.05	0.03	14.5	1.1	NA	0.7
Sep-03	6.2	12.5	NA	0.1	0.01	12.4	1.4	7.1 to 7.4	0.6	4.7	NA	9.6	0.03	0.01	9.6	1.0	NA	0.3
Oct-03	6.6	25.1	NA	2.3	0.31	25.0	1.0	7.1 to 7.6	3.0	3.0	NA	16.2	1.00	0.15	15.0	0.7	NA	1.6
Nov-03	4.2	24.3	NA	3.1	0.51	20.6	1.4	7.1 to 7.6	3.8	2.9	NA	16.8	1.80	0.30	14.6	1.0	NA	1.4
Dec-03	4.4	46.5	NA	2.4	0.37	46.1	3.6	6.9 to 7.3	2.1	3.0	NA	35.7	1.60	0.17	34.0	1.8	NA	0.6
Jan-04	3.1	46.8	NA	2.0	0.68	46.7	1.5	7.2 to 7.4	3.6	2.9	NA	39.0	1.00	0.26	37.8	1.2	NA	1.7
Feb-04	3.0	21.4	NA	2.3	0.31	20.1	2.8	7.0 to 7.4	2.4	2.2	NA	17.4	1.50	0.19	15.7	2.2	NA	1.5
Mar-04	3.1	33.4	NA	3.1	0.62	30.9	1.1	7.1 to 7.5	7.6	2.5	NA	26.3	1.50	0.27	24.5	0.9	NA	2.8
Apr-04	3.6	8.7	NA	7.0	0.40	7.3	0.9	7.2 to 7.3	2.8	2.8	NA	6.6	3.00	0.20	3.4	0.7	NA	1.8
May-04	3.6	9.3	NA	3.5	0.20	5.6	1.6	7.1 to 7.8	3.4	3.2	NA	6.1	3.00	0.10	3.0	1.2	NA	2.1
Jun-04	3.1	17.2	NA	2.1	0.20	14.8	2.3	7.0 to 7.4	4.2	3.0	NA	11.8	1.60	0.20	10.0	1.4	NA	2.3
Jul-04	3.0	22.1	NA	4.1	0.60	21.2	1.5	6.8 to 7.2	3.2	2.4	NA	13.8	2.40	0.40	11.0	0.9	NA	2.3
Aug-04	3.1	15.1	NA	2.2	0.60	14.9	2.4	7.0 to 7.3	4.0	2.3	NA	9.2	1.10	0.30	7.8	1.4	NA	2.3
Sep-04	5.6	25.1	NA	8.6	0.80	26.6	1.4	7.1 to 7.5	2.8	2.5	NA	16.3	3.50	0.40	15.1	1.0	NA	2.1
Oct-04	6.3	17.9	NA	5.6	0.66	12.4	1.9	6.9 to 7.1	3.7	2.5	NA	11.9	4.60	0.40	7.0	1.5	NA	2.2
Nov-04	3.3	41.2	NA	17.6	0.48	23.4	3.8	7.1 to 7.6	3.8	2.9	NA	24.7	4.40	0.25	18.9	1.7	NA	1.8
Dec-04	4.5	43.0	NA	0.1	0.01	43.0	8.3	6.4 to 8.1	2.3	2.9	NA	36.0	0.10	0.01	35.9	4.8	NA	1.4
No. Observations	36	36		36	36	36	36		36	36		36	36	36	36	36		36
Minimum	2.1	8.7		0.1	0.01	5.6	0.6	6.4	0.6	1.7		6.1	0.03	0.01	3.0	0.1		0.3
Average	5.7	28.1		3.6	0.74	26.5	2.9		4.6	3.5		20.5	1.43	0.30	19.0	1.4		1.8
Maximum	13.8	51.0		17.6	5.58	48.6	9.3	8.3	46.0	6.9		45.6	4.60	1.69	45.6	4.8		8.6
90th Percentile	9.5	47.3		7.6	2.00	46.7	7.0		7.2	5.5		37.5	3.05	0.76	36.9	2.7		2.9
95th Percentile	11.2	48.4		9.3	2.98	47.9	8.4		7.9	6.6		40.9	3.73	1.37	40.4	3.3		3.3

Table 5. Cook Nuclear Plant
Compliance with Groundwater Limits Well 1A

Date	Static Water Elevation Feet	pH S.U.	Chloride mg/l	Specific Conductance umhos/cm	Total Inorganic Nitrogen mg/l	Ammonia Nitrogen mg/l	Nitrite Nitrogen mg/l	Nitrate Nitrogen mg/l	Total Phosphorus mg/l	Sulfate mg/l	Dissolved Sodium mg/l	Total Dissolved Solids mg/l	Total Alkalinity mg/l	Bicarbonate mg/l	Dissolved Aluminum ug/l	Dissolved Barium ug/l	Dissolved Boron ug/l	Dissolved Cadmium ug/l	Dissolved Calcium mg/l	Dissolved Chromium ug/l	Dissolved Copper ug/l	Dissolved Iron ug/l	Dissolved Lead ug/l	Dissolved Manganese ug/l	Dissolved Magnesium mg/l	Dissolved Inorganic Mercury ug/l	Dissolved Nickel ug/l	Dissolved Potassium mg/l	Dissolved Selenium ug/l	Dissolved Silver ug/l	Dissolved Zinc ug/l	Total Organic Carbon (TOC) mg/l	Phenols mg/l	Hydrazine ug/l	Ethanolamine mg/l	Fluoride mg/l		
Jan-02	604 51	7.1	10	467	1.70	<0.01	0.24	1.46	0.01	134	47.0	285																										
Apr-02	604 95	7.0	12	474	2.94	<0.01	0.05	2.89	<0.01	121	56.2	289																										
Jul-02	606 14	7.2	12	399	3.19	0.40	0.02	2.77	<0.01	91	37.3	218	79	79	<50	10	50	<0.5	27.8	<2	<1	<10	3	<5	10.2	0.0081	<2	1.2	4	<0.2	<4	3	0.001	<3				
Aug-02																																						
Oct-02	604 67	7.0	11	450	0.39	0.06	0.03	0.30	0.06	136	43.9	267																										
Jan-03	604 84	6.6	16	448	1.11	0.07	0.15	0.89	<0.01	110	30.8	255																										
Apr-03	604 14	6.9	4	512	3.76	0.40	0.02	3.34	<0.01	141	62.2	288																										
Jul-03	604 37	6.6	16	385	2.38	0.32	0.01	2.05	<0.01	86	33.2	279	78	78	<50	16	40	<0.5	28.2	<2	<1	<10	<1	10	9.9	<0.0005	<2	1.5	<1	<0.2	<4	2	<0.001	<3				
Oct-03	603 64	6.5	4	231	1.05	0.52	<0.01	0.53	0.14	30	16.5	131																										
Jan-04	603 14	6.5	8	566	2.48	0.70	<0.01	1.78	<0.01	158	47.4	322																										
Apr-04	604 54	7.3	8	436	3.45	0.19	<0.01	3.26	<0.01	114	39.6	274																										
Jul-04	603 89	6.8	11	452	4.87	<0.01	0.04	4.83	<0.01	96	40.5	327	78	78	<50	17	<40	<0.5	32.3	<2	<1	<10	<1	<10	12.6	<0.0005	<2	0.7	<5	<0.2	<4	1	<0.001	<3				
Oct-04	603 13	6.8	11	546	2.61	0.06	0.04	2.51	<0.01	137	57.4	287																										
No. Observations	12	12	12	12	12	9	12	12	3	12	12	12	3	3	0	3	2	0	3	0	0	0	1	1	3	2	0	3	1	0	0	3	1	0	0	1	0	
Minimum	6.5	4	231	0.39	0.06	0.01	0.30	0.01	30	16.5	131.0	78	78	0	10	40	0	27.8	0	0	0	3	10	9.9	0.0012	0	0.7	4.0	0	0	1.0	0	0	0	0	0.3		
Average	6.88	10.25	447.17	2.49	0.23	0.05	2.22	0.02	112.83	42.67	268.50	78.33	78.33	25.00	14.33	36.67	0.25	29.43	1.00	0.50	5.00	1.33	5.83	10.90	0.0047	1.1	4.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.3			
Maximum	7.3	16	566	4.87	0.70	0.24	4.83	0.14	158	62.2	327.0	79	79	25	17	50	0	32.3	79	0	0	3	10	12.6	0.0081	0	1.5	4.0	0	0	3.0	0	0	0	0	0.3		
90th Percentile	7.2	15.6	542.6	3.73	0.51	0.14	3.33	0.06	140.6	57.3	318.7	78.8	78.8	25	16.8	48	0.25	31.48	1	0.5	5	2.5	9	12.12	0.00603	1	1.44	3.7	0.1	2	2.8	0.0009	1.5	0.35	0.275			
95th Percentile	7.2	16	555	4.26	0.60	0.19	4.01	0.10	148.65	59.6	324.25	78.9	78.9	25	18.9	49	0.25	31.89	1	0.5	5	2.75	9.5	12.36	0.00705	1	1.47	3.85	0.1	2	2.9	0.00095	1.5	0.35	0.2875			

Table 6. Cook Nuclear Plant
Compliance with Groundwater Limits Well 12

Date	State Water Elevation	pH	Chloride	Specific Conductance	Total Inorganic Nitrogen*	Ammonia Nitrogen	Nitrite Nitrogen	Nitrate Nitrogen	Total Phosphorus	Sulfate	Dissolved Sodium	Total Dissolved Solids	Total Alkalinity	Bicarbonate	Dissolved Aluminum	Dissolved Barium	Dissolved Boron	Dissolved Cadmium	Dissolved Calcium	Dissolved Chromium	Dissolved Copper	Dissolved Iron	Dissolved Lead	Dissolved Manganese	Dissolved Magnesium	Dissolved Inorganic Mercury	Dissolved Nickel	Dissolved Potassium	Dissolved Selenium	Dissolved Silver	Dissolved Zinc	Total Organic Carbon (TOC)	Phenols	Hydrazine	Ethanolamine	Fluoride		
	Feet	S.U.	mg/l	umhos/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	
Jan-02	592.26	7.4	12	376	0.25	0.25	<0.01	<0.01	0.08	67	31.6	214																										
Apr-02	592.75	7.4	10	508	0.27	0.27	<0.01	<0.01	<0.01	128	37.0	264																										
Jul-02	593.26	8.0	13	545	0.26	0.26	<0.01	<0.01	0.01	146	55.3	324	109	108	<50	15	90	<0.5	39.9	<2	<1	<280	2	96	12.6	0.0136	<2	1.1	2	<0.2	<4	3	<0.001	<3	<0.7		0.1	
Aug-02																										0.0006												
Oct-02	592.69	8.0	11	591	0.28	0.28	<0.01	<0.01	0.08	156	60.9	352																										
Jan-03	592.30	8.0	16	520	0.27	0.27	<0.01	<0.01	0.03	134	58.1	315																										
Apr-03	592.44	7.8	10	543	0.26	0.25	0.01	<0.01	<0.01	137	56.7	285																										
Jul-03	592.91	7.8	12	490	0.30	0.23	<0.01	0.07	<0.01	120	53.0	351	108	108	<50	15	70	<0.5	33.4	<2	<1	260	1	83	10.7	<0.0005	<2	1	<1	<0.2	<4	2	<0.001	<3	<0.7			
Oct-03	592.35	7.2	4	465	0.28	0.24	<0.01	0.04	0.10	114	41.8	289																										
Jan-04	592.37	7.4	10	550	0.23	0.23	<0.01	<0.01	0.03	119	46.5	301																										
Apr-04	592.38	7.4	8	520	0.24	0.24	<0.01	<0.01	0.03	141	47.8	320																										
Jul-04	592.65	7.9	7	468	0.24	0.20	<0.01	0.04	0.03	115	51.7	309	105	104	<50	15	70	<0.5	32	<2	<1	260	<1	80	9.8	<0.0005	<2	0.9	<5	<0.2	<4	2	<0.001	<3	<0.7			
Oct-04	592.23	7.6	9	460	0.21	0.18	<0.01	0.03	0.01	95	43.2	238																										
No. Observations	12	12	12	12	12	12	12	12	12	12	12	12	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	
Minimum	7.2	4.0	376.0	0.2	0.2	0.0	0.0	0.0	0.0	67.0	31.6	214.0	105.0	104.0	0.0	15.0	70.0	0.0	32.0	0.0	0.0	260.0	1.0	80.0	9.8	0.0	0.0	0.9	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.1		
Average	7.7	10.2	503.0	0.3	0.2	0.0	0.0	0.0	0.0	122.7	48.6	296.8	107.3	106.7	#DIV/0!	15.0	76.7	#DIV/0!	35.1	#DIV/0!	#DIV/0!	266.7	1.5	86.3	11.0	0.0	#DIV/0!	1.0	2.0	#DIV/0!	#DIV/0!	2.3	#DIV/0!	#DIV/0!	#DIV/0!	0.1		
Maximum	8.0	16.0	591.0	0.3	0.3	0.0	0.1	0.1	0.1	156.0	60.9	352.0	109.0	108.0	0.0	15.0	90.0	0.0	39.9	0.0	0.0	280.0	2.0	96.0	12.6	0.0	0.0	1.1	2.0	0.0	0.0	3.0	0.0	0.0	0.0	0.1		
90th Percentile	8.0	12.9	549.5	0.3	0.3	0.0	0.1	0.1	0.1	145.5	58.0	348.3	108.8	108.0	#NUM!	15.0	86.0	#NUM!	38.6	#NUM!	#NUM!	276.0	1.9	93.4	12.2	0.0	#NUM!	1.1	2.0	#NUM!	#NUM!	2.8	#NUM!	#NUM!	#NUM!	0.1		
95th Percentile	8.0	14.4	568.5	0.3	0.3	0.0	0.1	0.1	0.1	150.5	59.4	351.5	108.9	108.0	#NUM!	15.0	88.0	#NUM!	39.3	#NUM!	#NUM!	278.0	2.0	94.7	12.4	0.0	#NUM!	1.1	2.0	#NUM!	#NUM!	2.9	#NUM!	#NUM!	#NUM!	0.1		
No. Observations	12.0	12	12	12.00	12.00	12.00	12.00	12.00	12	12.0	12	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	12	12	2		
Minimum	7.2	4	376	0.21	0.18	0.01	0.01	0.01	0.01	67	31.6	214	105	104	25	15	70	0.25	32	1	0.5	260	0.5	80	9.8	0.00025	1	0.9	0.5	0.1	2	2	0.0005	1.5	0.35	0.05		
Average	7.66	10.17	503.00	0.26	0.24	0.01	0.02	0.03	0.03	122.67	48.63	296.83	107.33	106.67	25.00	15.00	76.67	0.25	35.10	1.00	0.50	266.67	1.17	86.33	11.03	0.00	1.00	1.00	1.67	0.10	2.00	2.33	0.00	1.50	0.35	0.08		
Maximum	8.0	16	591	0.30	0.28	0.01	0.07	0.10	0.10	156	60.9	352	109	108	25	15	90	0.25	39.9	1	0.5	280	2	96	12.6	0.0136	1	1.1	2.5	0.1	2	3	0.0005	1.5	0.35	0.1		
90th Percentile	8.0	12.9	549.5	0.28	0.27	0.01	0.04	0.08	0.08	145.5	58.0	348.3	108.8	108	25	15	86	0.25	38.6	1	0.5	276	1.8	93.4	12.22	0.0097	1	1.08	2.4	0.1	2	2.8	0.0005	1.5	0.35	0.095		
95th Percentile	8.0	14.33	568.45	0.29	0.27	0.01	0.05	0.09	0.09	150.5	59.4	351.45	108.9	108	25	15	88	0.25	39.25	1	0.5	278	1.9	94.7	12.41	0.01165	1	1.09	2.45	0.1	2	2.9	0.0005	1.5	0.35	0.0975		

Table 7. Cook Nuclear Plant
Compliance with Groundwater Limits Well 13

Date	Static Water Elevation Feet	pH S.U.	Chloride mg/l	Specific Conductance umhos/cm	Total Inorganic Nitrogen* mg/l	Ammonia Nitrogen mg/l	Nitrite Nitrogen mg/l	Nitrate Nitrogen mg/l	Total Phosphorus mg/l	Sulfate mg/l	Dissolved Sodium mg/l	Total Dissolved Solids mg/l	Total Alkalinity mg/l	Bicarbonate mg/l	Dissolved Aluminum mg/l	Dissolved Barium mg/l	Dissolved Boron mg/l	Dissolved Cadmium mg/l	Dissolved Calcium mg/l	Dissolved Chromium mg/l	Dissolved Copper mg/l	Dissolved Iron mg/l	Dissolved Lead mg/l	Dissolved Manganese mg/l	Dissolved Magnesium mg/l	Dissolved Inorganic Mercury mg/l	Dissolved Nickel mg/l	Dissolved Potassium mg/l	Dissolved Selenium mg/l	Dissolved Silver mg/l	Dissolved Zinc mg/l	Total Organic Carbon (TOC) mg/l	Phenols mg/l	Hydrazine mg/l	Ethanolamine mg/l	Fluoride mg/l		
Jan-02	598.75	7.2	58	600	0.21	0.21	<0.01	<0.01	0.01	35	29.8	348							11	9	30			530	200	0.0021	<2	2.3	3	<0.2	<4	10	<0.001	<3	<0.7	<0.1		
Apr-02	600.35	6.9	41	558	0.18	0.18	<0.01	<0.01	<0.01	26	25.4	309																										
Jul-02	599.76	6.9	52	599	0.23	0.23	<0.01	<0.01	<0.01	36	31.4	337	188	188	<50	37	40	<0.5	64.4	<2	<1	5790	1	153	17.8	0.0021	<2	2.3	3	<0.2	<4	10	<0.001	<3	<0.7	<0.1		
Aug-02																										0.0009												
Oct-02	598.80	7.0	81	734	0.25	0.25	<0.01	<0.01	0.03	44	37.7	398																								<3	<0.7	<0.1
Jan-03	598.30	7.2	45	601	0.20	0.20	<0.01	<0.01	<0.01	55	34.0	343																									<3	<0.7
Apr-03	598.47	6.6	52	665	0.19	0.19	<0.01	<0.01	<0.01	51	33.2	399																									<3	1.7
Jul-03	599.10	6.9	57	646	0.33	0.24	<0.01	0.09	<0.01	128	42.8	366	182	182	<50	40	90	<0.5	63.5	<2	<1	5480	<1	136	18.1	0.0067	<2	2.4	<1	<0.2	<4	5	<0.001	<3	<0.7	<0.1		
Oct-03	598.25	6.7	85	693	0.30	0.25	<0.01	0.05	0.04	47	34.7	406																								<3	<0.7	
Jan-04	598.23	7.1	66	695	0.22	0.22	<0.01	<0.01	<0.01	43	39.9	371																									3	<0.7
Jan-04																																					<3	<0.7
Apr-04	598.60	7.1	51	598	0.21	0.21	<0.01	<0.01	0.02	45	27.8	375																									3.2	<0.7
Jul-04	598.75	7.0	59	645	0.28	0.24	<0.01	0.04	<0.01	59	38.7	435	201	201	<50	37	70	<0.5	68.8	<2	<1	4900	<1	120	19.5	0.00124	<2	2.4	<5	<0.2	<4	4	<0.001	<3	<0.7	<0.1		
Oct-04	598.04	7.1	61	735	0.31	0.31	<0.01	<0.01	<0.01	199	33.8	376																									<3	<0.7
No. Observations	12	12	12	12	12	12	0	3	4	12	12	12	3	3	0	3	3	0	3	0	0	3	1	3	3	4	0	3	1	0	0	3	0	2	1	0		
Minimum	6.6	41.0	558.0	0.2	0.2	0.0	0.0	0.0	26.0	25.4	309.0	182.0	182.0	0.0	37.0	40.0	0.0	63.5	0.0	0.0	4900.0	1.0	120.0	17.8	0.0	0.0	2.3	3.0	0.0	0.0	4.0	0.0	3.0	1.7	0.0			
Average	7.0	59.0	647.4	0.2	0.2	#DIV/0!	0.1	0.0	64.0	34.1	371.9	190.3	190.3	#DIV/0!	38.0	66.7	#DIV/0!	65.6	#DIV/0!	#DIV/0!	5390.0	1.0	136.3	18.5	0.0	#DIV/0!	2.4	3.0	#DIV/0!	#DIV/0!	6.3	#DIV/0!	3.1	1.7	#DIV/0!			
Maximum	7.2	85.0	735.0	0.3	0.3	0.0	0.1	0.0	199.0	42.8	435.0	201.0	201.0	0.0	40.0	90.0	0.0	68.8	0.0	0.0	5790.0	1.0	153.0	19.5	0.0	0.0	2.4	3.0	0.0	0.0	10.0	0.0	3.2	1.7	0.0			
90th Percentile	7.2	79.5	730.1	0.3	0.3	#NUM!	0.1	0.0	121.1	39.8	405.3	198.4	198.4	#NUM!	39.4	86.0	#NUM!	67.9	#NUM!	#NUM!	5728.0	1.0	149.6	19.2	0.0	#NUM!	2.4	3.0	#NUM!	#NUM!	9.0	#NUM!	3.2	1.7	#NUM!			
95th Percentile	7.2	82.8	734.5	0.3	0.3	#NUM!	0.1	0.0	160.0	41.2	419.1	199.7	199.7	#NUM!	39.7	88.0	#NUM!	68.4	#NUM!	#NUM!	5759.0	1.0	151.3	19.4	0.0	#NUM!	2.4	3.0	#NUM!	#NUM!	9.5	#NUM!	3.2	1.7	#NUM!			

No. Observations	12.0	12	12	12.00	12.00	12.00	12.00	12.00	12	12.0	12	12	3	3	3	3	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	3	13	12	2
Minimum	6.6	41	558	0.18	0.18	0.01	0.01	0.01	26	25.4	309	182	182	0.0	37	40	0.0	63.5	0.0	0.0	4900.0	0.5	120	17.8	0.00067	1	2.3	0.5	0.1	2	4	0.0005	1.5	0.35	0.05		
Average	6.98	59.00	647.42	0.24	0.23	0.01	0.02	0.01	64.00	34.10	371.92	190.33	190.33	25.00	38.00	66.67	0.25	65.57	1.00	0.50	5390.00	0.67	136.33	18.47	0.00	1.00	2.37	2.00	0.10	2.00	6.33	0.00	3.1	1.7	0.05		
Maximum	7.2	85	735	0.33	0.31	0.01	0.09	0.04	199	42.8	435	201	201	0.0	40	90	0.25	68.8	1	0.5	5790	1	153	19.5	0.0021	1	2.4	3	0.1	2	10	0.0005	3.2	1.7	0.05		
90th Percentile	7.2	79.5	730.1	0.31	0.25	0.01	0.05	0.03	121.1	39.8	405.3	198.4	198.4	0.0	39.4	86	0.25	67.92	1	0.5	5728	0.9	149.6	19.22	0.001842	1	2.4	2.9	0.1	2	9	0.0005	2.7	1.7	0.05		
95th Percentile	7.2	82.8	734.5	0.32	0.28	0.01	0.07	0.03	159.95	41.2	419.05	199.7	199.7	0.0	39.7	88	0.25	68.36	1	0.5	5759	0.95	151.3	19.36	0.001971	1	2.4	2.95	0.1	2	9.5	0.0005	3.08	1.7	0.05		

Table 8. Cook Nuclear Plant
Compliance with Groundwater Limits Well 19

Date	Static Water Elevation	pH	Chloride	Specific Conductance	Total Inorganic Nitrogen	Ammonia Nitrogen	Nitrite Nitrogen	Nitrate Nitrogen	Total Phosphorus	Sulfate	Dissolved Sodium	Total Dissolved Solids	Total Alkalinity	Bicarbonate	Dissolved Aluminum	Dissolved Barium	Dissolved Boron	Dissolved Cadmium	Dissolved Calcium	Dissolved Chromium	Dissolved Copper	Dissolved Iron	Dissolved Lead	Dissolved Manganese	Dissolved Magnesium	Dissolved Inorganic Mercury	Dissolved Nickel	Dissolved Potassium	Dissolved Selenium	Dissolved Silver	Dissolved Zinc	Total Organic Carbon (TOC)	Phenols	Hydrazine	Ethanolamine	Fluoride	
	Feet	S U	mg/l	umhos/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	
Jan-02	590.98	7.6	26	554	0.36	0.36	<0.01	<0.01	0.02	70	40.9	327																									
Apr-02	591.31	7.2	27	524	0.35	0.35	<0.01	<0.01	<0.01	53	35.0	304																									
Jul-02	592.1	7.6	29	547	0.35	0.35	<0.01	<0.01	<0.01	58	37.0	309	176	175	<50	19	80	<0.5	54.5	<2	<1	1530	<1	69	15.1	0.0026	<2	1.6	<1	<0.2	<4	6	<0.001	<3	<0.7		
Aug-02																																					
Oct-02	591.6	7.2	29	548	0.35	0.35	<0.01	<0.01	<0.01	43	34.7	306																									
Jan-03	590.4	7.6	32	533	0.35	0.35	<0.01	<0.01	<0.01	43	31.0	306																									
Apr-03	590.78	7.7	35	542	0.35	0.34	0.01	<0.01	<0.01	43	32.3	329																									
Jul-03	591.38	7.5	30	572	0.41	0.33	<0.01	0.08	<0.01	61	33.8	380	193	193	<50	26	110	<0.5	60.5	<2	<1	1730	<1	74	16.6	<0.0005	<2	1.7	<1	<0.2	<4	4	<0.001	<3	<0.7		
Oct-03	590.93	7.2	25	556	0.37	0.32	<0.01	0.05	0.02	64	33.5	341																									
Jan-04	590.65	6.9	29	569	0.33	0.32	<0.01	0.01	<0.01	60	27.4	321																									
Apr-04	590.68	7.0	30	518	0.34	0.34	<0.01	<0.01	<0.01	56	32.2	313																									
Jul-04	591.38	7.5	28	544	0.35	0.31	<0.01	0.04	<0.01	66	32.5	335	172	171	<50	23	100	<0.5	55.2	<2	<1	1710	<1	70	15.9	0.00107	<2	1.7	<5	<0.2	<4	4	<0.001	<3	<0.7		
Oct-04	591.18	7.0	30	594	0.37	0.35	<0.01	0.02	<0.01	55	26.6	300																									
No. Observations	12	12	12	12	12	12	1	5	2	12	12	12	3	3	0	3	3	0	3	0	0	3	0	3	3	0	3	0	0	0	0	3	0	0	0	1	0
Minimum	6.9	25.0	25	518.0	0.3	0.3	0.0	0.0	0.0	43.0	26.6	300.0	172.0	171.0	0.0	19.0	80.0	0.0	54.5	0.0	0.0	1530.0	0.0	69.0	15.1	0.0	0.0	1.6	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	
Average	7.3	29.2	30	550.1	0.4	0.3	0.0	0.0	0.0	56.0	33.1	322.6	180.3	179.7	#DIV/0!	22.7	96.7	#DIV/0!	56.7	#DIV/0!	#DIV/0!	1656.7	#DIV/0!	71.0	15.9	0.0	#DIV/0!	1.7	#DIV/0!	#DIV/0!	#DIV/0!	4.7	#DIV/0!	#DIV/0!	0.8	#DIV/0!	
Maximum	7.7	35.0	35	594.0	0.4	0.4	0.0	0.1	0.0	70.0	40.9	380.0	193.0	193.0	0.0	26.0	110.0	0.0	60.5	0.0	0.0	1730.0	0.0	74.0	16.6	0.0	0.0	1.7	0.0	0.0	0.0	6.0	0.0	0.0	0.8	0.0	
90th Percentile	7.6	31.8	31.8	571.7	0.4	0.4	0.0	0.1	0.0	65.8	36.8	340.4	189.6	189.4	#NUM!	25.4	108.0	#NUM!	59.4	#NUM!	#NUM!	1726.0	#NUM!	73.2	16.5	0.0	#NUM!	1.7	#NUM!	#NUM!	#NUM!	5.6	#NUM!	#NUM!	0.8	#NUM!	
95th Percentile	7.6	33.4	33.4	581.9	0.4	0.4	0.0	0.1	0.0	67.8	38.8	358.6	191.3	191.2	#NUM!	25.7	109.0	#NUM!	60.0	#NUM!	#NUM!	1728.0	#NUM!	73.6	16.5	0.0	#NUM!	1.7	#NUM!	#NUM!	#NUM!	5.8	#NUM!	#NUM!	0.8	#NUM!	

Table 9. Cook Nuclear Plant
Compliance with Groundwater Limits, Background Well 8

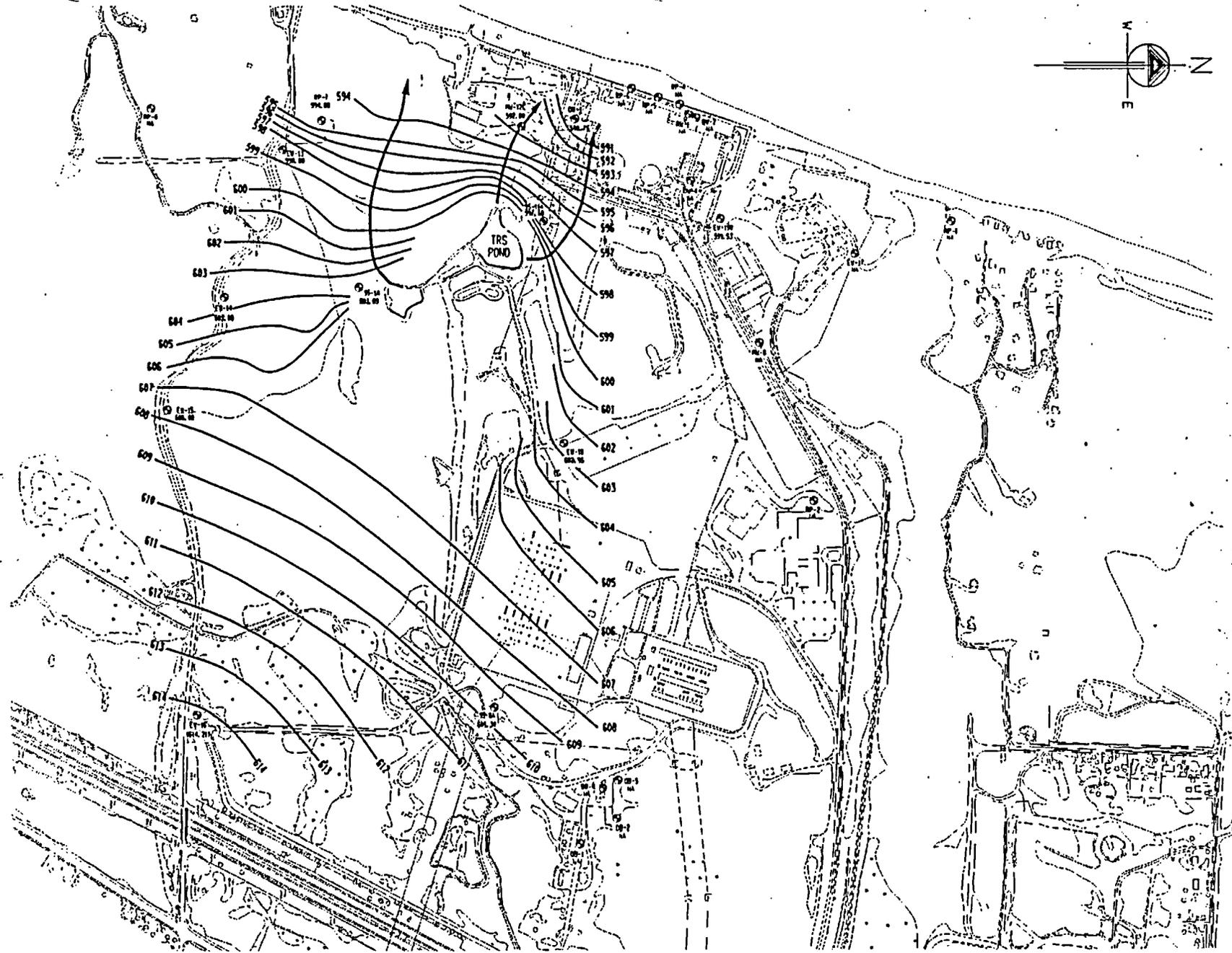
Date	Static Water Elevation	pH	Chloride	Specific Conductance	Total Inorganic Nitrogen*	Ammonia Nitrogen	Nitrite Nitrogen	Nitrate Nitrogen	Total Phosphorus	Sulfate	Dissolved Sodium	Total Dissolved Solids	Total Alkalinity	Bicarbonate	Dissolved Aluminum	Dissolved Barium	Dissolved Boron	Dissolved Cadmium	Dissolved Calcium	Dissolved Chromium	Dissolved Copper	Dissolved Iron	Dissolved Lead	Dissolved Manganese	Dissolved Magnesium	Dissolved Inorganic Mercury	Dissolved Nickel	Dissolved Potassium	Dissolved Selenium	Dissolved Silver	Dissolved Zinc	Total Organic Carbon (TOC)	Phenols	Hydrazine	Ethanolamine	Fluoride	
	Feet	S U	mg/l	umho/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Jan-02	604.29	7.0	65	625	0.02	0.02	<0.01	<0.01	<0.01	44	34.4	364			150	440	1900	2.2		11	9	30	10	530	200	0.0013	52		5	0.2	120			<3	<0.7		
Apr-02	604.58	6.4	33	410	<0.01	<0.01	<0.01	<0.01	<0.01	27	13.5	247																							<3	<0.7	0.1
Jul-02	603.97	7.1	33	498	1.16	0.04	<0.01	1.12	<0.01	28	18.9	289	175	175	<50	16	30	<0.5	60.1	<2	1	110	2	60	15.7	0.0072	<2	3.7	7	<0.2	<4	7	<0.001	<3	<0.7		
Aug-02																																					
Oct-02	602.85	6.7	46	520	0.03	0.03	<0.01	<0.01	0.05	31	31.2	293																							<3	<0.7	<0.1
Jan-03	602.67	7.0	64	665	0.02	0.02	<0.01	<0.01	<0.01	57	38.4	386																							<3	<0.7	
Apr-03	608.03	6.5	49	603	0.02	0.02	<0.01	<0.01	<0.01	34	33.1	344																							<3	<0.7	
Jul-03	608.29	6.8	61	547	0.16	0.01	0.01	0.14	<0.01	30	33.7	319	151	151	<50	25	50	<0.5	54.2	<2	<1	90	2	51	15.9	0.0035	<2	3.3	2	<0.2	<4	6	<0.001	<3	<0.7		
Oct-03	607.09	6.4	32	437	0.13	0.07	<0.01	0.06	0.08	38	17.3	282																							<3	<0.7	
Jan-04	607.81	6.6	49	573	0.03	0.03	<0.01	<0.01	<0.01	29	26.8	333																							<3	<0.7	
Apr-04	607.96	6.6	41	436	<0.01	<0.01	<0.01	<0.01	<0.01	28	18.1	289																							<3	<0.7	
Jul-04	607.86	6.9	38	473	0.30	0.01	<0.01	0.29	<0.01	33	19.8	318	143	143	<50	21	50	<0.5	51	<2	1	90	<1	50	14.3	0.00134	<2	2.3	<5	<0.2	<4	7	<0.001	<3	<0.7		
Oct-04	609.74	6.6	40	537	1.02	<0.01	<0.01	1.02	<0.01	33	23.6	272																							<3	<0.7	
No. Observations	12	12	12	12	10	9	1	5	2	12	12	12	3	3	0	3	3	0	3	0	2	3	2	3	3	4	0	3	2	0	0	3	0	1	0	1	
Minimum	6.4	32.0	410.0	0.0	0.0	0.0	0.1	0.1	0.1	27.0	13.5	247.0	143.0	143.0	0.0	16.0	30.0	0.0	51.0	0.0	1.0	90.0	2.0	50.0	14.3	0.0	0.0	2.3	2.0	0.0	0.0	6.0	0.0	3.0	0.0	0.1	
Average	6.7	45.9	527.0	0.3	0.0	0.0	0.5	0.1	0.1	34.3	25.7	311.3	156.3	156.3	#DIV/0!	20.7	43.3	#DIV/0!	55.1	#DIV/0!	1.0	96.7	2.0	53.7	15.3	0.0	#DIV/0!	3.1	4.5	#DIV/0!	#DIV/0!	6.7	#DIV/0!	3.0	#DIV/0!	0.1	
Maximum	7.1	65.0	665.0	1.2	0.1	0.0	1.1	0.1	0.1	57.0	38.4	386.0	175.0	175.0	0.0	25.0	50.0	0.0	60.1	0.0	1.0	110.0	2.0	60.0	15.9	0.0	0.0	3.7	7.0	0.0	0.0	7.0	0.0	3.0	0.0	0.1	
90th Percentile	7.0	63.7	622.8	1.0	0.0	0.0	1.1	0.1	0.1	43.4	34.3	362.0	170.2	170.2	#NUM!	24.2	50.0	#NUM!	58.9	#NUM!	1.0	106.0	2.0	58.2	15.9	0.0	#NUM!	3.6	6.5	#NUM!	#NUM!	7.0	#NUM!	3.0	#NUM!	0.1	
95th Percentile	7.0	64.5	643.0	1.1	0.1	0.0	1.1	0.1	0.1	49.9	36.2	373.9	172.6	172.6	#NUM!	24.6	50.0	#NUM!	59.5	#NUM!	1.0	108.0	2.0	59.1	15.9	0.0	#NUM!	3.7	6.8	#NUM!	#NUM!	7.0	#NUM!	3.0	#NUM!	0.1	

No. Observations	12.0	12	12	12.00	12.00	12.00	12.00	12.00	12.00	12	12	12	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	13	12	12
Minimum	6.4	32	410	0.01	0.01	0.01	0.01	0.01	0.01	27	13.5	247	143	143	25	16	30	0.25	51	1	0.5	90	0.5	50	14.3	0.00134	1	2.3	0.5	0.1	2	6	0.0005	1.5	0.35	0.35
Average	6.72	45.92	527.00	0.24	0.02	0.01	0.22	0.02	0.02	34.33	25.73	311.33	156.33	156.33	25.00	20.67	43.33	0.25	55.10	1.00	0.83	96.67	1.50	53.67	15.30	0.00	1.00	3.10	3.00	0.10	2.00	6.67	0.00	1.62	0.35	0.35
Maximum	7.1	65	665	1.16	0.07	0.01	1.12	0.08	0.08	57	38.4	386	175	175	25	25	50	0.25	60.1	1	1	110	2	60	15.9	0.0072	1	3.7	7	0.1	2	7	0.0005	3	0.35	0.35
90th Percentile	7.0	63.7	622.8	0.95	0.04	0.01	0.95	0.05	0.05	43.4	34.33	362	170.2	170.2	25	24.2	50	0.25	58.92	1	1	106	2	58.2	15.86	0.00609	1	3.62	5.65	0.1	2	7	0.0005	1.5	0.35	0.35
95th Percentile	7.0	64.45	643	1.08	0.05	0.01	1.07	0.06	0.06	49.85	36.2	373.9	172.6	172.6	25	24.6	50	0.25	59.51	1	1	108	2	59.1	15.88	0.006445	1	3.66	6.325	0.1	2	7	0.0005	2.1	0.35	0.35

TAB 10
Page 38 Part 4b
Static Water
Levels

Well Elevations					
Data taken 1/24/2005					
Well Number	Coordinates		Top of riser/pipe	Water level in ft. from top of pipe	Groundwater level (ft above sea level)
95-1A (RP-14)	N 179,676.6	E 1,393,844.6	660.99	57.3	603.69
95-8A (RP-3)	N 180,510.5	E 1,396,322.4	616.26	6.92	609.34
95-11A	N 180,811.1	E 1,393,446.8	609.4	11.8	597.6
MW-12C	N 180,678.0	E 1,392,881.9	610.9	18.1	592.8
EW-13 (RP-13)	N 179,215.26	E 1,393,019.93	641.75	42.95	598.8
EW#14 (RP-12)	N 178,857.96	E 1,393,902.49	620.08	17	603.08
EW-15 (RP-11)	N 178,512.86	E 1,394,569.77	614.38	6.3	608.08
EW#16 (RP-10)	N 178,689.61	E 1,396,361.82	630.83	16.62	614.21
EW-18	N 180,935.058	E 1,394,772.889	631.15	28.2	602.95
EW-19R (7/1/97)	N 181,888.72	E 1,393,435.52	612.48	20.95	591.53
OW-1	N 180,939.3	E 1,393,109.0	608.35	17.6	590.75
RP-7	N 179,447.797	E 1,392,848.135	675.104	80.5	594.604

TAB11
Page 38 Part 4b
Current GW contour
Map



STATIC WATER ELEVATIONS
MEASURED ON 1/24/2005

LEGEND

-  MONITORING WELL
-  POTENTIOMETRIC CONTOUR
-  DIRECTION OF GROUNDWATER FLOW

**DONALD C. COOK
NUCLEAR PLANT
POTENTIOMETRIC MAP
EXHIBIT 1**

TAB 12
Page 38 Part 4b
GW results,
Effluent Results

Tab 12 Page 38 Part 4b Groundwater and effluent data set. Approved quarterly monitoring reports.

Additional data set (2002 – 2004) are available under Tab 9 “Facility Compliance history”



Michigan Department of Environmental Quality Waste Management Division

COMPLIANCE MONITORING REPORT FORM

Required by Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA)

Facility Name 1 American Electric Power Company	Facility Name 2 D.C. Cook Nuclear Plant
Facility ID Number GWIII600	Authorization Number M00988
Jurisdiction: X WMD	DWRPD CIS
District: Kalamazoo	
Quarter: 3rd Year: 2004	

CERTIFICATION STATEMENT:

I certify, under penalty of law, that I have personally examined and am familiar with the information submitted in this document and all attachments. The information being submitted was collected and analyzed according to the approved methods specified in the groundwater discharge permit for this facility. Based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the 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

CERTIFIED OPERATOR (PRINT):	CERTIFICATION NUMBER:
Blair K. Zordell	4537

CERTIFIED OPERATOR (SIGNATURE):	DATE:
<i>Blair Zordell</i>	<i>10-14-04</i>

PRINCIPAL EXECUTIVE OFFICER (PRINT):	
<i>John Carlson</i>	<i>10-14-04</i>

PRINCIPAL EXECUTIVE OFFICER (SIGNATURE):	DATE:
<i>J.P.H.</i>	<i>10-14-04</i>

D.C. Cook Nuclear
 Plant
 1 Cook Place
 Bridgman , MI
 49106
 Permit # M 00988
 Part II.A.8

Outfall Description	Description of the circumstances	Cause of noncompliance	Period of non compliance	Steps to prevent recurrence
Groundwater Monitoring Wells #13 and #19 remain outside of permit limitations for dissolved iron.	Groundwater monitoring for dissolved iron exceeded the limit of 300 ug/l. (6 month background water quality study.) Sample date is July 19, 2004.	Natural GW occurrence.	1/14/01 - 7/19/04 (ongoing)	Letter submitted on April 11, 2001 requesting revision to the existing groundwater permit limits.

FLOW MONITORING

American Electric Power Company
Facility Name 1

Jul-04
Date

GW111600
ID Number

INFLUENT FLOW

Sample Location	Sampling Frequency	Limit (gallons)	Daily Maximum Flow	Monthly Average Flow	Cumulative Year to Date Flow	Number of Limit Exceedences

EFFLUENT FLOW

Sample Location	Sampling Frequency	Limit (gallons)	Daily Maximum Flow	Monthly Average Flow	Cumulative Year to Date Flow	Number of Limit Exceedences
EF-1	Daily	2,400,000 gpd	359,600	243,800	56,006,400	0
EF-2	Daily	60,000 gpd	24,980	17,445	3,493,246	0

INFLUENT QUALITY

American Electric Power Company
 Facility Name 1

Jul-04
 Date

GW111600
 ID Number

Sample Location	Sampling Frequency	Parameter	Units	Limit	Maximum Concentration	Monthly Average	Number of Limit Exceedences
IQ-2	Weekly	BOD5	mg/l		328	265	0
IQ-2	Weekly	Ammonia Nitrogen	mg/l		66.3	59.9	0
IQ-2	Weekly	Tot. Phosphorus	mg/l		13.3	11.5	0
IQ-2	Weekly	pH	s.u.		Min 8.2 Max 8.6	-	0
IQ-2	Weekly	Tot. Suspended Solids	mg/l		335	261	0

EFFLUENT QUALITY

American Electric Power Company

Facility Name 1

Jul-04

Date

GW111600

ID Number

Sample Location	Sampling Frequency	Parameter	Units	Limit: Rule 2227	Limit: Rule 2228	Maximum Concentration	Monthly Average	Number of Limit Exceedences
EQ-1	Weekly	Diss. Sodium	mg/l			56.4	18.2	0
EQ-1	Continuous	pH	s.u.	5.5 - 9.0		Min 6.3 Max 8.2	-	0
EQ-1	Weekly	Sulfate	mg/l	250 Mon. ave.		54	46	0
EQ-1	Weekly	Hydrazine	ug/l			<3	<3	0
EQ-1	Weekly	Ethanolamine	ug/l			2550	1890	0
EQ-1	Daily	Oil Sheen-absorption Pond	visual			-	SAT	0
EQ-2	Weekly	BOD5	mg/l	35		3.0	2.4	0
EQ-2	Weekly	Tot. Inorganic Nitrogen	mg/l	85 max		22.1	-	0
EQ-2	Weekly	Tot. Inorganic Nitrogen	mg/l	50 Mon. ave.		-	13.8	0
EQ-2	Weekly	Ammonia Nitrogen	mg/l			4.1	2.4	0
EQ-2	Weekly	Nitrite Nitrogen	mg/l			0.6	0.4	0
EQ-2	Weekly	Nitrate Nitrogen	mg/l			21.2	11.0	0
EQ-2	Weekly	Tot. Phosphorus	mg/l	15		1.5	0.9	0
EQ-2	Weekly	pH	s.u.	5.5 - 9.0		Min 6.8 Max 7.2	-	0
EQ-2	Weekly	Tot. Susp. Solids	mg/l			3.2	2.3	0

GROUNDWATER QUALITY

American Electric Power Company
Facility Name 1

Jul-04
Date

GW111600
ID Number

Parameter	Units	Sampling Frequency	Limit: Rule 2227	Limit: Rule 2228	EW-1A Compliance	EW-12 Compliance	EW-13 Compliance	EW-19 Compliance		
Static Water Elevation	Ft.	Quarterly			603.89	592.65	598.75	591.38		
pH	s.u.	Quarterly			6.8	7.9	7.0	7.5		
Chloride	mg/l	Quarterly	250		11	7	59	28		
Specific Conductivity	umho/cm	Quarterly			452	468	645	544		
Tot. Inorganic Nitrogen	mg/l	Quarterly	5		4.87	0.24	0.28	0.35		
Ammonia Nitrogen	mg/l	Quarterly			<0.01	0.20	0.24	0.31		
Nitrite Nitrogen	mg/l	Quarterly			0.04	<0.01	<0.01	<0.01		
Nitrate Nitrogen	mg/l	Quarterly			4.83	0.04	0.04	0.04		
Tot. Phosphorus	mg/l	Quarterly	1		<0.01	0.03	<0.01	<0.01		
Sulfate	mg/l	Quarterly			96	115	59	66		
Diss. Sodium	mg/l	Quarterly			40.5	51.7	38.7	32.5		
Tot. Diss. Solids	mg/l	Quarterly			327	309	435	335		
Tot. Alkalinity	mg/l	Annual			78	105	201	172		
Bicarbonate	mg/l	Annual			78	104	201	171		
Diss. Aluminum	ug/l	Annual	150		<50	<50	<50	<50		
Volume Purged	gallon	Quarterly			48	30	45	32		

GROUNDWATER QUALITY

American Electric Power Company
Facility Name 1

Jul-04
Date

GW111600
ID Number

Parameter	Units	Sampling Frequency	Limit: Rule 2227	Limit: Rule 2228	EW-1A Compliance	EW-12 Compliance	EW-13 Compliance	EW-19 Compliance		
Diss. Barium	ug/l	Annual	440		17	15	37	23		
Diss. Boron	ug/l	Annual	1900		<40	70	70	100		
Diss. Cadmium	ug/l	Annual	2.2		<0.5	<0.5	<0.5	<0.5		
Diss. Calcium	mg/l	Annual			32.3	32.0	68.8	55.2		
Diss. Chromium	ug/l	Annual	11		<2	<2	<2	<2		
Diss. Copper	ug/l	Annual	9		<1	<1	<1	<1		
Diss. Iron	ug/l	Annual	300		<10	260	4900	1710		
Diss. Lead	ug/l	Annual	10		<1	<1	<1	<1		
Diss. Managanese	ug/l	Annual	530		<10	80	120	70		
Diss. Magnesium	mg/l	Annual	200		12.6	9.8	19.5	15.9		
Diss. Inorganic Mercury	ug/l	Annual	0.0013		<0.0005	<0.0005	0.00124	0.00107		
Diss. Nickel	ug/l	Annual	52		<2	<2	<2	<2		
Diss. Potassium	mg/l	Annual			0.7	0.9	2.4	1.7		
Diss. Selenium	ug/l	Annual	5		<5	<5	<5	<5		
Diss. Silver	ug/l	Annual	0.2		<0.2	<0.2	<0.2	<0.2		

GROUNDWATER QUALITY

American Electric Power Company
Facility Name 1

Jul-04
Date

GW111600
ID Number

Parameter	Units	Sampling Frequency	Limit: ¹ Rule 2227	Limit: Rule 2228	EW-1A Compliance	EW-12 Compliance	EW-13 Compliance	EW-19 Compliance		
Diss. Zinc	ug/l	Annual	120		<4	<4	<4	<4		
Tot. Organic Carbon (TOC)	mg/l	Annual			1	2	4	4		
Phenols	mg/l	Annual			<0.001	<0.001	<0.001	<0.001		
Hydrazine	ug/l	Quarterly	10		<3	<3	<3	<3		
Ethanolamine	mg/l	Quarterly	2		<0.7	<0.7	<0.7	<0.7		

GROUNDWATER QUALITY

American Electric Power Company
Facility Name 1

Jul-04
Date

GW111600
ID Number

Parameter	Units	Sampling Frequency	Limit: Rule 2227	Limit: Rule 2228	EW-8 Upgrad ent				
Static Water Elevation	Ft.	Quarterly			607.86				
pH	s.u.	Quarterly			6.9				
Chloride	mg/l	Quarterly			38				
Specific Conductivity	umho/cm	Quarterly			473				
Tot. Inorganic Nitrogen	mg/l	Quarterly			0.30				
Ammonia Nitrogen	mg/l	Quarterly			0.01				
Nitrite Nitrogen	mg/l	Quarterly			<0.01				
Nitrate Nitrogen	mg/l	Quarterly			0.29				
Tot. Phosphorus	mg/l	Quarterly			<0.01				
Sulfate	mg/l	Quarterly			33				
Diss. Sodium	mg/l	Quarterly			19.8				
Tot. Diss. Solids	mg/l	Quarterly			318				
Tot. Alkalinity	mg/l	Annual			143				
Bicarbonate	mg/l	Annual			143				
Diss. Aluminum	ug/l	Annual			<50				
Volume Purged	Gallons	Quarterly			53				

GROUNDWATER QUALITY

American Electric Power Company
 Facility Name 1

Jul-04
 Date

GW111600
 ID Number

Parameter	Units	Sampling Frequency	Limit: Rule 2227	Limit: Rule 2228	EW-8 Upgrad ient					
Diss. Barium	ug/l	Annual			21					
Diss. Boron	ug/l	Annual			50					
Diss. Cadmium	ug/l	Annual			<0.5					
Diss. Calcium	mg/l	Annual			51.0					
Diss. Chromium	ug/l	Annual			<2					
Diss. Copper	ug/l	Annual			1					
Diss. Iron	ug/l	Annual			90					
Diss. Lead	ug/l	Annual			<1					
Diss. Managanese	ug/l	Annual			50					
Diss. Magnesium	mg/l	Annual			14.3					
Diss. Inorganic Mercury	ug/l	Annual			0.00134					
Diss. Nickel	ug/l	Annual			<2					
Diss. Potassium	mg/l	Annual			2.3					
Diss. Selenium	ug/l	Annual			<5					
Diss. Silver	ug/l	Annual			<0.2					

GROUNDWATER QUALITY

American Electric Power Company
Facility Name 1

Jul-04
Date

GW111600
ID Number

Parameter	Units	Sampling Frequency	Limit: Rule 2227	Limit: Rule 2228	EW-8 Upgradient					
Diss. Zinc	ug/l	Annual			<4					
Tot. Organic Carbon (TOC)	mg/l	Annual			7					
Phenols	mg/l	Annual			<0.001					
Hydrazine	ug/l	Quarterly			<3					
Ethanolamine	mg/l	Quarterly			<0.7					

FLOW MONITORING

American Electric Power Company
Facility Name 1

Aug-04
Date

GW111600
ID Number

INFLUENT FLOW

Sample Location	Sampling Frequency	Limit (gallons)	Daily Maximum Flow	Monthly Average Flow	Cumulative Year to Date Flow	Number of Limit Exceedences

EFFLUENT FLOW

Sample Location	Sampling Frequency	Limit (gallons)	Daily Maximum Flow	Monthly Average Flow	Cumulative Year to Date Flow	Number of Limit Exceedences
EF-1	Daily	2,400,000 gpd	372,300	233,000	63,229,900	0
EF-2	Daily	60,000 gpd	31,540	21,973	4,174,406	0

INFLUENT QUALITY

American Electric Power Company

Facility Name 1

Aug-04

Date

GW111600

ID Number

Sample Location	Sampling Frequency	Parameter	Units	Limit	Maximum Concentration	Monthly Average	Number of Limit Exceedences
IQ-2	Weekly	BOD5	mg/l		427	343	0
IQ-2	Weekly	Ammonia Nitrogen	mg/l		55.5	44.3	0
IQ-2	Weekly	Tot: Phosphorus	mg/l		13.9	9.7	0
IQ-2	Weekly	pH	s.u.		Min 8.3 Max 8.5	-	0
IQ-2	Weekly	Tot. Suspended Solids	mg/l		409	314	0

EFFLUENT QUALITY

American Electric Power Company
Facility Name 1

Aug-04
Date

GW111600
ID Number

Sample Location	Sampling Frequency	Parameter	Units	Limit: Rule 2227	Limit: Rule 2228	Maximum Concentration	Monthly Average	Number of Limit Exceedences
EQ-1	Weekly	Diss. Sodium	mg/l			5.8	4.9	0
EQ-1	Continuous	pH	s.u.	5.5 - 9.0		Min 6.3 Max 8.2	-	0
EQ-1	Weekly	Sulfate	mg/l	250 Mon. ave.		63	53	0
EQ-1	Weekly	Hydrazine	ug/l			4	<3	0
EQ-1	Weekly	Ethanolamine	ug/l			2,500	1,600	0
EQ-1	Daily	Oil Sheen-absorption Pond	visual			-	SAT	0
EQ-2	Weekly	BOD5	mg/l	35		3.1	2.3	0
EQ-2	Weekly	Tot. Inorganic Nitrogen	mg/l	85 max		15.1	-	0
EQ-2	Weekly	Tot. Inorganic Nitrogen	mg/l	50 Mon. ave.			9.2	0
EQ-2	Weekly	Ammonia Nitrogen	mg/l			2.2	1.1	0
EQ-2	Weekly	Nitrite Nitrogen	mg/l			0.6	0.3	0
EQ-2	Weekly	Nitrate Nitrogen	mg/l			14.9	7.8	0
EQ-2	Weekly	Tot. Phosphorus	mg/l	15		2.4	1.4	0
EQ-2	Weekly	pH	s.u.	5.5 - 9.0		Min 7.0 Max 7.3	-	0
EQ-2	Weekly	Tot. Susp. Solids	mg/l			4.0	2.3	0

FLOW MONITORING

American Electric Power Company
Facility Name 1

Sep-04

Date

GW111600
ID Number

INFLUENT FLOW

Sample Location	Sampling Frequency	Limit (gallons)	Daily Maximum Flow	Monthly Average Flow	Cumulative Year to Date Flow	Number of Limit Exceedences

EFFLUENT FLOW

Sample Location	Sampling Frequency	Limit (gallons)	Daily Maximum Flow	Monthly Average Flow	Cumulative Year to Date Flow	Number of Limit Exceedences
EF-1	Daily	2,400,000 gpd	292,400	228,600	70,089,200	0
EF-2	Daily	60,000 gpd	35,230	20,854	4,800,036	0

INFLUENT QUALITY

American Electric Power Company
 Facility Name 1

Sep-04
 Date

GW111600
 ID Number

Sample Location	Sampling Frequency	Parameter	Units	Limit	Maximum Concentration	Monthly Average	Number of Limit Exceedences
IQ-2	Weekly	BOD5	mg/l		410	345	0
IQ-2	Weekly	Ammonia Nitrogen	mg/l		126.1	84.6	0
IQ-2	Weekly	Tot. Phosphorus	mg/l		9.3	8.5	0
IQ-2	Weekly	pH	s.u.		Min 8.2 Max 8.8	-	0
IQ-2	Weekly	Tot. Suspended Solids	mg/l		350	237	0

EFFLUENT QUALITY

American Electric Power Company
Facility Name 1

Sep-04
Date

GW111600
ID Number

Sample Location	Sampling Frequency	Parameter	Units,	Limit: Rule 2227	Limit: Rule 2228	Maximum Concentration	Monthly Average	Number of Limit Exceedences
EQ-1	Weekly	Diss. Sodium	mg/l			5.1	4.8	0
EQ-1	Continuous	pH	s.u.	5.5 - 9.0		Min 6.3 Max 8.8	-	0
EQ-1	Weekly	Sulfate	mg/l	250 Mon. ave.		56	52	0
EQ-1	Weekly	Hydrazine	ug/l			<3	<3	0
EQ-1	Weekly	Ethanolamine	ug/l			2000	1200	0
EQ-1	Daily	Oil Sheen-absorption Pond	visual			-	SAT	0
EQ-2	Weekly	BOD5	mg/l	35		5.6	2.5	0
EQ-2	Weekly	Tot. Inorganic Nitrogen	mg/l	85 max		25.1	-	0
EQ-2	Weekly	Tot. Inorganic Nitrogen	mg/l	50 Mon. ave.		-	16.3	0
EQ-2	Weekly	Ammonia Nitrogen	mg/l			8.6	3.5	0
EQ-2	Weekly	Nitrite Nitrogen	mg/l			0.8	0.4	0
EQ-2	Weekly	Nitrate Nitrogen	mg/l			26.6	15.1	0
EQ-2	Weekly	Tot. Phosphorus	mg/l	15		1.4	1.0	0
EQ-2	Weekly	pH	s.u.	5.5 - 9.0		Min 7.1 Max 7.5	-	0
EQ-2	Weekly	Tot. Susp. Solids	mg/l			2.8	2.1	0



Michigan Department of Environmental Quality Waste Management Division

COMPLIANCE MONITORING REPORT FORM

Required by Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA)

Facility Name 1 American Electric Power Company		Facility Name 2 D.C. Cook Nuclear Plant	
Facility ID Number GWIII600		Authorization Number M00988	
Jurisdiction:	<input checked="" type="checkbox"/> WMD	<input type="checkbox"/> DWRPD	<input type="checkbox"/> CIS
District: Kalamazoo			
Quarter: 4th	Year:	2004	

CERTIFICATION STATEMENT:

I certify, under penalty of law, that I have personally examined and am familiar with the information submitted in this document and all attachments. The information being submitted was collected and analyzed according to the approved methods specified in the groundwater discharge permit for this facility. Based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the 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

CERTIFIED OPERATOR (PRINT): Blair K. Zordell	CERTIFICATION NUMBER: 4537
CERTIFIED OPERATOR (SIGNATURE): 	DATE: 1-14-05
PRINCIPAL EXECUTIVE OFFICER (PRINT): John P. Carlson	
PRINCIPAL EXECUTIVE OFFICER (SIGNATURE): 	DATE: 1-14-05

FLOW MONITORING

American Electric Power Company
Facility Name 1

Oct-04
Date

GW111600
ID Number

INFLUENT FLOW

Sample Location	Sampling Frequency	Limit (gallons)	Daily Maximum Flow	Monthly Average Flow	Cumulative Year to Date Flow	Number of Limit Exceedences

EFFLUENT FLOW

Sample Location	Sampling Frequency	Limit (gallons)	Daily Maximum Flow	Monthly Average Flow	Cumulative Year to Date Flow	Number of Limit Exceedences
EF-1	Daily	2,400,000 gpd	377,000	233,242	77,319,700	0
EF-2	Daily	60,000 gpd	38,140	28,493	5,683,306	0

FLOW MONITORING

American Electric Power Company
Facility Name 1

Nov-04
Date

GW111600
ID Number

INFLUENT FLOW

Sample Location	Sampling Frequency	Limit (gallons)	Daily Maximum Flow	Monthly Average Flow	Cumulative Year to Date Flow	Number of Limit Exceedences

EFFLUENT FLOW

Sample Location	Sampling Frequency	Limit (gallons)	Daily Maximum Flow	Monthly Average Flow	Cumulative Year to Date Flow	Number of Limit Exceedences
EF-1	Daily	2,400,000 gpd	472,200	268,590	85,377,400	0
EF-2	Daily	60,000 gpd	31,410	17,973	6,222,486	0

FLOW MONITORING

American Electric Power Company
Facility Name 1

Dec-04
Date

GW111600
ID Number

INFLUENT FLOW

Sample Location	Sampling Frequency	Limit (gallons)	Daily Maximum Flow	Monthly Average Flow	Cumulative Year to Date Flow	Number of Limit Exceedences

EFFLUENT FLOW

Sample Location	Sampling Frequency	Limit (gallons)	Daily Maximum Flow	Monthly Average Flow	Cumulative Year to Date Flow	Number of Limit Exceedences
EF-1	Daily	2,400,000 gpd	313,400	223,748	92,313,600	0
				"		
EF-2	Daily	60,000 gpd	28,500	15,525	6,703,756	0

INFLUENT QUALITY

American Electric Power Company
Facility Name 1

Oct-04
Date

GW111600
ID Number

Sample Location	Sampling Frequency	Parameter	Units	Limit	Maximum Concentration	Monthly Average	Number of Limit Exceedences
IQ-2	Weekly	BOD5	mg/l		344	289	0
IQ-2	Weekly	Ammonia Nitrogen	mg/l		110.0	92.4	0
IQ-2	Weekly	Tot. Phosphorus	mg/l		11.0	9.7	0
IQ-2	Weekly	pH	s.u.		Min 8.1 Max 8.5	-	0
IQ-2	Weekly	Tot. Suspended Solids	mg/l		242	217	0

INFLUENT QUALITY

American Electric Power Company
 Facility Name 1

Nov-04
 Date

GW111600
 ID Number

Sample Location	Sampling Frequency	Parameter	Units	Limit	Maximum Concentration	Monthly Average	Number of Limit Exceedences
IQ-2	Weekly	BOD5	mg/l		273	255	0
IQ-2	Weekly	Ammonia Nitrogen	mg/l		81.3	68.8	0
IQ-2	Weekly	Tot. Phosphorus	mg/l		9.0	7.8	0
IQ-2	Weekly	pH	s.u.		Min 8.4 Max 8.6	-	0
IQ-2	Weekly	Tot. Suspended Solids	mg/l		441	282	0

INFLUENT QUALITY

American Electric Power Company
 Facility Name 1

Dec-04
 Date

GW111600
 ID Number

Sample Location	Sampling Frequency	Parameter	Units	Limit	Maximum Concentration	Monthly Average	Number of Limit Exceedences
IQ-2	Weekly	BOD5	mg/l		319	243	0
IQ-2	Weekly	Ammonia Nitrogen	mg/l		73.8	67.8	0
IQ-2	Weekly	Tot. Phosphorus	mg/l		45.0	29.6	0
IQ-2	Weekly	pH	s.u.		Min 6.9 Max 8.8	-	0
IQ-2	Weekly	Tot. Suspended Solids	mg/l		258	202	0

EFFLUENT QUALITY

American Electric Power Company
Facility Name 1

Oct-04
Date

GW111600
ID Number

Sample Location	Sampling Frequency	Parameter	Units	Limit: Rule 2227	Limit: Rule 2228	Maximum Concentration	Monthly Average	Number of Limit Exceedences
EQ-1	Weekly	Diss. Sodium	mg/l			5.4	4.7	0
EQ-1	Continuous	pH	s.u.	5.5 - 9.0		Min 6.3 Max 8.2	-	0
EQ-1	Weekly	Sulfate	mg/l	250 Mon. ave.		340	100	0
EQ-1	Weekly	Hydrazine	ug/l			3660	735	0
EQ-1	Weekly	Ethanolamine	ug/l			15100	4000	0
EQ-1	Daily	Oil Sheen-absorption Pond	visual			-	SAT	0
EQ-2	Weekly	BOD5	mg/l	35		6.3	4.7	0
EQ-2	Weekly	Tot. Inorganic Nitrogen	mg/l	85 max		17.9	-	0
EQ-2	Weekly	Tot. Inorganic Nitrogen	mg/l	50 Mon. ave.		-	11.9	0
EQ-2	Weekly	Ammonia Nitrogen	mg/l			5.6	4.6	0
EQ-2	Weekly	Nitrite Nitrogen	mg/l			0.66	0.40	0
EQ-2	Weekly	Nitrate Nitrogen	mg/l			12.4	7.0	0
EQ-2	Weekly	Tot. Phosphorus	mg/l	15		1.9	1.5	0
EQ-2	Weekly	pH	s.u.	5.5 - 9.0		Min 6.9 Max 7.1	-	0
EQ-2	Weekly	Tot. Susp. Solids	mg/l			3.7	2.2	0

EFFLUENT QUALITY

American Electric Power Company
Facility Name 1

Nov-04
Date

GW111600
ID Number

Sample Location	Sampling Frequency	Parameter	Units	Limit: Rule 2227	Limit: Rule 2228	Maximum Concentration	Monthly Average	Number of Limit Exceedences
EQ-1	Weekly	Diss. Sodium	mg/l			11.9	5.3	0
EQ-1	Continuous	pH	s.u.	5.5 - 9.0		Min 6.3 Max 8.2	-	0
EQ-1	Weekly	Sulfate	mg/l	250 Mon. ave.		35	26	0
EQ-1	Weekly	Hydrazine	ug/l			60	18	0
EQ-1	Weekly	Ethanolamine	ug/l			1800	1100	0
EQ-1	Daily	Oil Sheen-absorption Pond	visual			-	SAT	0
EQ-2	Weekly	BOD5	mg/l	35		3.3	2.9	0
EQ-2	Weekly	Tot. Inorganic Nitrogen	mg/l	85 max		41.2	-	0
EQ-2	Weekly	Tot. Inorganic Nitrogen	mg/l	50 Mon. ave.		-	24.7	0
EQ-2	Weekly	Ammonia Nitrogen	mg/l			17.6	4.4	0
EQ-2	Weekly	Nitrite Nitrogen	mg/l			0.48	0.25	0
EQ-2	Weekly	Nitrate Nitrogen	mg/l			23.4	19.0	0
EQ-2	Weekly	Tot. Phosphorus	mg/l	15		3.8	1.7	0
EQ-2	Weekly	pH	s.u.	5.5 - 9.0		Min 7.1 Max 7.6	-	0
EQ-2	Weekly	Tot. Susp. Solids	mg/l			3.8	1.8	0

EFFLUENT QUALITY

American Electric Power Company
Facility Name 1

Dec-04
Date

GW111600
ID Number

Sample Location	Sampling Frequency	Parameter	Units	Limit: Rule 2227	Limit: Rule 2228	Maximum Concentration	Monthly Average	Number of Limit Exceedences
EQ-1	Weekly	Diss. Sodium	mg/l			423	110	0
EQ-1	Continuous	pH	s.u.	5.5 - 9.0		Min 6.3 Max 8.2	-	0
EQ-1	Weekly	Sulfate	mg/l	250 Mon. ave.		125	63	0
EQ-1	Weekly	Hydrazine	ug/l			14	4	0
EQ-1	Weekly	Ethanolamine	ug/l			5500	2800	0
EQ-1	Daily	Oil Sheen-absorption Pond	visual			-	SAT	0
EQ-2	Weekly	BOD5	mg/l	35		4.5	2.9	0
EQ-2	Weekly	Tot. Inorganic Nitrogen	mg/l	85 max		43.0	-	0
EQ-2	Weekly	Tot. Inorganic Nitrogen	mg/l	50 Mon. ave.		-	36.0	0
EQ-2	Weekly	Ammonia Nitrogen	mg/l			0.1	0.1	0
EQ-2	Weekly	Nitrite Nitrogen	mg/l			0.01	0.01	0
EQ-2	Weekly	Nitrate Nitrogen	mg/l			43.0	35.9	0
EQ-2	Weekly	Tot. Phosphorus	mg/l	15		8.3	4.8	0
EQ-2	Weekly	pH	s.u.	5.5 - 9.0		Min 6.4 Max 8.1	-	0
EQ-2	Weekly	Tot. Susp. Solids	mg/l			2.3	1.4	0

GROUNDWATER QUALITY

American Electric Power Company
Facility Name 1

Oct-04
Date

GW111600
ID Number

Parameter	Units	Sampling Frequency	Limit: Rule 2227	Limit: Rule 2228	EW-1A Compliance	EW-12 Compliance	EW-13 Compliance	EW-19 Compliance		
Static Water Elevation	Ft.	Quarterly			603.13	592.23	598.04	591.18		
pH	s.u.	Quarterly			6.8	7.6	7.1	7.0		
Chloride	mg/l	Quarterly	250		11	9	61	30		
Specific Conductivity	umho/cm	Quarterly			546	460	735	594		
Tot. Inorganic Nitrogen	mg/l	Quarterly	5		2.61	0.21	0.31	0.37		
Ammonia Nitrogen	mg/l	Quarterly			0.06	0.18	0.31	0.35		
Nitrite Nitrogen	mg/l	Quarterly			0.04	<0.01	<0.01	<0.01		
Nitrate Nitrogen	mg/l	Quarterly			2.51	0.03	<0.01	0.02		
Tot. Phosphorus	mg/l	Quarterly	1		<0.01	0.01	<0.01	<0.01		
Sulfate	mg/l	Quarterly			137	95	199	55		
Diss. Sodium	mg/l	Quarterly			57.4	43.2	33.8	26.6		
Tot. Diss. Solids	mg/l	Quarterly			287	238	376	300		
Tot. Alkalinity	mg/l	Annual								
Bicarbonate	mg/l	Annual								
Diss. Aluminum	ug/l	Annual	150							
Volume Purged	gallon	Quarterly			33	25	26	33		

GROUNDWATER QUALITY

American Electric Power Company
Facility Name 1

Oct-04
Date

GW111600
ID Number

Parameter	Units	Sampling Frequency	Limit: Rule 2227	Limit: Rule 2228	EW-1A Compliance	EW-12 Compliance	EW-13 Compliance	EW-19 Compliance		
Diss. Barium	ug/l	Annual	440							
Diss. Boron	ug/l	Annual	1900							
Diss. Cadmium	ug/l	Annual	2.2							
Diss. Calcium	mg/l	Annual								
Diss. Chromium	ug/l	Annual	11							
Diss. Copper	ug/l	Annual	9							
Diss. Iron	ug/l	Annual	300							
Diss. Lead	ug/l	Annual	10							
Diss. Managanese	ug/l	Annual	530							
Diss. Magnesium	mg/l	Annual	200							
Diss. Inorganic Mercury	ug/l	Annual	0.0013							
Diss. Nickel	ug/l	Annual	52							
Diss. Potassium	mg/l	Annual								
Diss. Selenium	ug/l	Annual	5							
Diss. Silver	ug/l	Annual	0.2							

GROUNDWATER QUALITY

American Electric Power Company
Facility Name 1

Oct-04
Date

GW111600
ID Number

Parameter	Units	Sampling Frequency	Limit: , Rule 2227	Limit: Rule 2228	EW-1A Compli ance	EW-12 Compli ance	EW-13 Compli ance	EW-19 Compli ance		
Diss. Zinc	ug/l	Annual	120							
Tot. Organic Carbon (TOC)	mg/l	Annual								
Phenols	mg/l	Annual								
Hydrazine	ug/l	Quarterly	10		<3	<3	<3	<3		
Ethanolamine	mg/l	Quarterly	2		<0.7	<0.7	<0.7	<0.7		

GROUNDWATER QUALITY

American Electric Power Company
Facility Name 1

Oct-04
Date

GW111600
ID Number

Parameter	Units	Sampling Frequency	Limit: Rule 2227	Limit: Rule 2228	EW-8 Upgrad ient					
Static Water Elevation	Ft.	Quarterly			609.74					
pH	s.u.	Quarterly			6.6					
Chloride	mg/l	Quarterly			40					
Specific Conductivity	umho/cm	Quarterly			537					
Tot. Inorganic Nitrogen	mg/l	Quarterly			.102					
Ammonia Nitrogen	mg/l	Quarterly			<0.01					
Nitrite Nitrogen	mg/l	Quarterly			<0.01					
Nitrate Nitrogen	mg/l	Quarterly			1.02					
Tot. Phosphorus	mg/l	Quarterly			<0.01					
Sulfate	mg/l	Quarterly			33					
Diss. Sodium	mg/l	Quarterly			23.6					
Tot. Diss. Solids	mg/l	Quarterly			272					
Tot. Alkalinity	mg/l	Annual								
Bicarbonate	mg/l	Annual								
Diss. Aluminum	ug/l	Annual								
Volume Purged	Gallons	Quarterly			30					

GROUNDWATER QUALITY

American Electric Power Company
Facility Name 1

Oct-04
Date

GW111600
ID Number

Parameter	Units	Sampling Frequency	Limit: Rule 2227	Limit: Rule 2228	EW-8 Upgradient					
Diss. Barium	ug/l	Annual								
Diss. Boron	ug/l	Annual								
Diss. Cadmium	ug/l	Annual								
Diss. Calcium	mg/l	Annual								
Diss. Chromium	ug/l	Annual								
Diss. Copper	ug/l	Annual								
Diss. Iron	ug/l	Annual								
Diss. Lead	ug/l	Annual								
Diss. Managanese	ug/l	Annual								
Diss. Magnesium	mg/l	Annual								
Diss. Inorganic Mercury	ug/l	Annual								
Diss. Nickel	ug/l	Annual								
Diss. Potassium	mg/l	Annual								
Diss. Selenium	ug/l	Annual								
Diss. Silver	ug/l	Annual								

GROUNDWATER QUALITY

American Electric Power Company
Facility Name 1

Oct-04
Date

GW111600
ID Number

Parameter	Units	Sampling Frequency	Limit: Rule 2227	Limit: Rule 2228	EW-8 Upgradient					
Diss. Zinc	ug/l	Annual								
Tot. Organic Carbon (TOC)	mg/l	Annual								
Phenols	mg/l	Annual								
Hydrazine	ug/l	Quarterly			<3					
Ethanolamine	mg/l	Quarterly			<0.7					

D.C. Cook Nuclear
Plant
1 Cook Place
Bridgman , MI
49106
Permit # M 00988
Part II.A.8

Outfall Description	Description of the circumstances	Cause of noncompliance	Period of non compliance	Steps to prevent recurrence
No exceedences				