

JUL 13 2009

FSO Arnold/mb	
7/10/09	
FSO Scott	
7/10/09	
FSO Bollinger	
7/10/09	
FSO Dr. Livingston	
7/10/09	

Mr. Al Keller
Illinois Environmental Protection Agency
Permit Section, Division of Water Pollution Control
P.O. Box 19276
Springfield, IL 62794-9276

Dear Mr. Keller:

SUBJECT: JOINT CONSTRUCTION AND OPERATING PERMIT APPLICATION
FOR INDUSTRIAL PRETREATMENT OF WASTEWATER FOR THE
PROPOSED ICPA FACILITY AT FERMILAB

I have enclosed for your review and approval a construction and operating permit application for pretreating wastewater generated in a proposed Integrated Cavity Processing Apparatus Facility (ICPA) at the Fermi National Accelerator Laboratory (Fermilab), Industrial Building 4. We plan to construct the facility where chemical metal etching activities will take place. The metal etching will generate wastewater that must be neutralized before discharging it to the sanitary sewer. The neutralization system will process both dilute acid wastes from polishing niobium and wastewater from an air scrubber.

Title 40 of the *Code of Federal Regulations*, Part 433.10 and Title 35 of the *Illinois Administrative Code*, Part 307.4300, regulate these activities as a National Categorical Pretreatment Standard. Consequently, they require a wastewater pretreatment permit from the Illinois Environmental Protection Agency with prior approval from the City of Batavia. The City of Batavia has provided its approval.

Fermilab has obtained a Class K (or industrial) Wastewater Treatment Works Operator certificate for pretreating wastewater for a Categorical Standard, as required by the IEPA. Mr. Chad Thompson received his certificate and will be the operator sampling and discharging treated wastewater to the sanitary sewer. We have included a copy of Mr. Thompson's certificate with the enclosed permit application.

JUL 13 2009

We request a review of this application at your first convenience. If you have any questions, please contact Sally Arnold at (630) 840-2239.

Sincerely,

Original Signed by
Dr. Joanna M. Livengood
Site Manager

Dr. Joanna M. Livengood
Site Manager

Enclosures

- 1) Application for Permit or Construction Approval WPC-PS-1
- 2) Schedule J: Industrial treatment works Construction or Pretreatment Works
- 3) Attachment 1: Fermilab Integrated Cavity Processing Apparatus in Industrial Building 4, Wastewater Neutralization System
- 4) Site Map
- 5) IEPA Certificate of Competency – Industrial Wastewater Treatment Works Operator
- 6) Schedule N: Waste Characteristics

bc: S. Arnold, w/o encls.
J. Scott, w/o encls.
N. Grossman, FNAL-ES&H, w/o encls.
K. Kosirog, FNAL-ES&H, w/o encls.



Illinois Environmental Protection Agency
 Permit Section, Division of Water Pollution Control
 P.O. Box 19276
 Springfield, Illinois 62794-9276

For IEPA Use:

Application for Permit or Construction Approval
 WPC-PS-1

1. Owner Name: U.S. Department of Energy, Fermi National Accelerator Laboratory
 Name of Project: Integrated Cavity Processing Apparatus in Industrial Building 4
 Township: Winfield County: DuPage

2. Brief Description of Project:
 The project includes the installation of an equalization tank and batch neutralization tank, chemical feed pump and auxiliary equipment and control to effectively neutralization of small volume of air scrubber wastewater from Niobium etching and electro-polishing process prior to discharge to the City of Batavia Municipal POTW.

3. Documents Being Submitted: If the Project involves any of the items listed below, submit the corresponding schedule, and check the appropriate boxes.

	<u>Schedule</u>		<u>Schedule</u>
Private Sewer Connection/Extension	A/B <input type="checkbox"/>	Spray Irrigation	H <input type="checkbox"/>
Sewer Extension Construct Only	C <input type="checkbox"/>	Septic Tanks	I <input type="checkbox"/>
Sewage Treatment Works	D <input type="checkbox"/>	Industrial Treatment/Pretreatment	J <input checked="" type="checkbox"/>
Excess Flow Treatment	E <input type="checkbox"/>	Waste Characteristics	N <input checked="" type="checkbox"/>
Lift Station/Force Main	F <input type="checkbox"/>	Erosion Control	P <input type="checkbox"/>
Fast Track Service Connection	FTP <input type="checkbox"/>	Trust Disclosure	T <input type="checkbox"/>
Sludge Disposal	G <input type="checkbox"/>		

Plans: Title N/A
 _____ No. of Pages: _____

Specifications: Title N/A
 _____ No. of Books/Pages: _____

Other Documents: Site Map and Process schematic have been provided with Schedule J (attached)
 (Please Specify)

3.1 Illinois Historic Preservation Agency approval letter: Yes No

4. Land Trust: Is the project identified in item number 1 herein, for which a permit is requested, to be constructed on land which is the subject of a trust? Yes No

If yes, Schedule T (Trust Disclosure) must be completed and item number 7.1.1 must be signed by a beneficiary, trustee or trust officer.

5. This is an Application for (Check Appropriate Line):
 A. Joint Construction and Operating Permit
 B. Authorization to Construct (See Instructions) NPDES Permit No. IL00 26123
 C. Construct Only Permit (Does Not Include Operations)
 D. Operate Only Permit (Does Not Include Construction)

6. Certifications and Approval:

6.1 Certificate by Design Engineer (When required: refer to instructions)

I hereby certify that I am familiar with the information contained in this application, including the attached schedules indicated above, and that to the best of my knowledge and belief such information is true, complete and accurate. The plans and specifications (specifications other than Standard Specifications or local specifications on file with this Agency) as described above were prepared by me or under my direction.

Engineer Name: Brain O'Neil

Registration Number: 062 - 046834
(3 digits) (6 digits)

Firm: AECOM Environment

Address: 27755 Diehl Road

City: Warrenville State: IL Zip: 60555



Phone No: (630) 836-1700

Signature X Brain P O'Neil Date: 5/11/09

7. Certifications and Approvals for Permits:

7.1 Certificate by Applicant(s)

I/We hereby certify that I/we have read and thoroughly understand the conditions and requirements of this Application, and am/are authorized to sign this application in accordance with the Rules and Regulations of the Illinois Pollution Control Board. I/We hereby agree to conform with the Standard Conditions and with any other Special Conditions made part of this Permit.

7.1.1 Name of Applicant for Permit to Construct: _____

U.S. Department of Energy, Fermi National Accelerator Laboratory

Address: P.O. Box 2000

City: Batavia State: IL Zip Code: 60510

Signature X _____ Date: _____

Printed Name: Dr. Joanna M. Livengood Phone No: (630) 840-3281

Title: Manager, DOE Fermi Site Office

Organization: N/A

7.1.2 Name of Applicant for Permit to Own and Operate: _____

U.S. Department of Energy, Fermi National Accelerator Laboratory

Address: P.O. Box 2000

City: Batavia State: IL Zip Code: 60510

Signature X Joanna M Livengood Date: 6/16/09

Printed Name: Dr. Joanna M. Livengood Phone No: (630) 840-3281

Title: Manager, DOE Fermi Site Office

7.2 Attested (Required When Applicant is a Unit of Government)

Signature X Walter E. Palmer Date: 6/16/09

Title: Contracting Officer, Office of Science, Dept. of Energy
(City Clerk, Village Clerk, Sanitary District Clerk, Etc.)

7.3 Applications from non-governmental applicants which are not signed by the owner, must be signed by a principal executive officer of at least the level of vice president, or a duly authorized representative.

7.4 Certificate By Intermediate Sewer Owner

I hereby certify that (Please check one):

- 1. The sewers to which this project will be tributary have adequate reserve capacity to transport the wastewater that will be added by this project without causing a violation of the environmental Protection Act or Subtitle C, Chapter I, or
- 2. The Illinois Pollution Control Board, in PCB _____ dated _____ granted a variance from Subtitle C, Chapter I to allow construction of facilities that are the subject of this application.

Name and location of sewer system to which this project will be tributary:

8-inch Sanitary Sewer (Wintergreen Terrace)

Sewer System Owner: City of Potomac

Address: 100 N. Island Avenue

City: Potomac State: IL Zip Code: 60510

Signature X [Signature] Date: 6/22/09

Printed Name: Byron R. Johnson Phone No: 630.454.2320

Title: Superintendent of Wastewater

7.4.1 Additional Certificate By Intermediate Sewer Owner

I hereby certify that (Please check one):

- 1. The sewers to which this project will be tributary have adequate reserve capacity to transport the wastewater that will be added by this project without causing a violation of the environmental Protection Act or Subtitle C, Chapter I, or
- 2. The Illinois Pollution Control Board, in PCB _____ dated _____ granted a variance from Subtitle C, Chapter I to allow construction facilities that are the subject of this application.
- 3. Not applicable

Name and location of sewer system to which this project will be tributary:

Sewer System Owner: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Signature X _____ Date: _____

Printed Name: _____ Phone No: _____

Title: _____

7.5 Certificate By Waste Treatment Works Owner

I hereby certify that (Please check one):

- 1. The waste treatment plant to which this project will be tributary has adequate reserve capacity to treat the wastewater that will be added by this project without causing a violation of the Environmental Protection Act or Subtitle C, Chapter I, or
- 2. The Illinois Pollution Control Board, in PCB _____ dated _____ granted a variance from Subtitle C, Chapter I to allow construction and operation of the facilities that are the subject of this application.
- 3. Not applicable

I also certify that, if applicable, the industrial waste discharges described in the application are capable of being treated by the treatment works.

Name of Waste Treatment Works: City of Batavia WWTP

Waste Treatment Works Owner: City of Batavia

Address: 400 S. Shumway Avenue

City: Batavia State: IL Zip Code: 60510

Signature X [Signature] Date: 6/19/09

Printed Name: Dylan Richardson Phone No: 630-454-2320

Title: Superintendent of Wastewater

Please return completed form to the following address:

Illinois Environmental Protection Agency
Permit Section, Division of Water Pollution Control
P.O. Box 19276
Springfield, Illinois 62794-9276

This Agency is authorized to require this information under Illinois Revised Statutes, 1979, Chapter 111 1/2, Section 1039. Disclosure of this information is required under that Section. Failure to do so may prevent this form from being processed and could result in your application being denied. This form has been approved by the Forms Management Center.

FOR IEPA USE:
LOG #
DATE RECEIVED:

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF WATER POLLUTION CONTROL
PERMIT SECTION

Springfield, Illinois 62706

SCHEDULE J INDUSTRIAL TREATMENT WORKS CONSTRUCTION OR PRETREATMENT WORKS

1. NAME AND LOCATION:

- 1.1 Name of project Integrated Cavity Processing Apparatus in Industrial Building 4
- 1.2 Plant Location
- 1.2.1 SE 19 39N 9E 3rd
Quarter Section Section Township Range P.M.
- 1.2.2 Latitude 41 deg. 50 min. 28 sec. "NORTH"
- 1.2.3 Longitude 88 deg. 15 min. 07 sec. "WEST"
- 1.2.3 Name of USGS Quadrangle Map (7.5 or 15 minute) Naperville

2. NARRATIVE DESCRIPTION AND SCHEMATIC WASTE FLOW DIAGRAM: (see instructions)

Installation of an equalization tank and batch neutralization tank, chemical feed pumps and auxiliary equipment and control to effectively neutralization of small volume of air scrubber wastewater (See Attach. 1 and Attach. 2)

2.1 PRINCIPAL PRODUCTS:

Wastewater from Niobium etching polishing and air scrubber associated with process.

2.2 PRINCIPAL RAW MATERIALS:

Niobium, water, and acids (sulfuric, nitric, phosphoric and hydrofluoric).

3. DESCRIPTION OF TREATMENT FACILITIES:

- 3.1 Submit a flow diagram through all treatment units showing size, volumes, detention times, organic loadings, surface settling rate, weir overflow rate, and other pertinent design data. Include hydraulic profiles and description of monitoring systems.
- 3.2 Waste Treatment Works is: Batch , Continuous , No. of Batches/day <1 , No. of Shifts/day 1
- 3.3 Submit plans and specifications for proposed construction.
- 3.4 Discharge is: Existing ; Will begin on 04/01/10 .

4. DIRECT DISCHARGE IS TO: Receiving Stream Municipal Sanitary Sewer Municipal storm or municipal combined sewer

If receiving stream or storm sewer are indicated complete the following:

Name of receiving stream n/a ; tributary to _____ ;
tributary to _____ ; tributary to _____ ;

5. Is the treatment works subject to flooding? Yes No If so, what is the maximum flood elevation of record (in reference to the treatment works datum) and what provisions have been made to eliminate the flooding hazard?

6. APPROXIMATE TIME SCHEDULE: Estimated construction schedule:

Start of Construction 08/01/09 ; Date of Completion 10/01/09
Operation Schedule _____ ; Date Operation Begins 04/01/10
100% design load to be reached by year 2010 .

7. DESIGN LOADINGS

- 7.1 Design population equivalent (one population equivalent is 100 gallons of wastewater per day, containing 0.17 pounds of BOD₅ and 0.20 pounds of suspended solids;
BOD n/a ; Suspended Solids n/a ; Flow n/a .
- 7.2 Design Average Flow Rate n/a MGD.

- 7.3 Design Maximum Flow Rate 200 GPD MGD.
- 7.4 Design Minimum Flow Rate 0 GPD MGD.
- 7.5 Minimum 7-day, 10-year low flow n/a cfs n/a MGD.
Minimum 7-day, 10-year flow obtained from n/a
- 7.6 Dilution Ratio n/a ; _____.

8. FLOW TO TREATMENT WORKS (if existing):

- 8.1 Flow (last 12 months)
 - 8.1.1 Average Flow n/a MGD
 - 8.1.2 Maximum Flow n/a MGD
- 8.2 Equipment used in determining above flows

9. Has a preliminary engineering report for this project been submitted to this Agency for Approval?

Yes No . If so, when was it submitted and approved. Date Submitted N/A
 Certification # _____
 Dated _____

10. List Permits previously issued for the facility:

Modified NPDES Permit No. IL0026123 effective 8/1/2008.
 Wastewater for this application will discharge to the City of Batavia Municipal Sanitary sewer

11. Describe provisions for operation during contingencies such as power failures, flooding, peak loads, equipment failure, maintenance shut downs and other emergencies.

N/A - Batch operation; System will be shut down and no wastewater will be discharged.

12. Complete and submit Schedule G if sludge disposal will be required by this facility.

13. WASTE CHARACTERISTICS: Schedule N must be submitted.

14. TREATMENT WORKS OPERATOR CERTIFICATION: List names and certification numbers of certified operators:

Chad M. Thompson - IEPA Industrial Wastewater Treatment Operator issue date 1/6/2009 (No certification number was provided.)

Schedule J: Application for Construction/Operation Permit for Industrial Treatment/Pretreatment Works

Attachment 1

FERMI LAB
INTEGRATED CAVITY PROCESSING APPARATUS
IN INDUSTRIAL BUILDING 4

Wastewater Neutralization System

2. Narrative Description

The Wastewater neutralization system will process the dilute acid wastes from the niobium ⁽¹⁾ polishing process and blowdown wastewater from the process-related air scrubber prior to discharge to the City of Batavia Municipal Public Owned Treatment Works.

The dilute acid wastewater and scrubber blowdown may include salts of niobium, products of hydrofluoric, sulfuric, nitric and/or phosphoric acids. The wastewater is generated in 75-liter (approx. 20 gallon) batches at a frequency of not more than twice a week. The polishing wastewater and the blowdown from the air scrubber are accumulated in a 300-gallon equalization tank. Once a sufficient volume of wastewater is collected, the volume is transferred via gravity to a 400 gallon neutralization tank. Caustics or acids, H₂SO₄ and NaOH, will then be added to the neutralization tank. A control system has been designed to monitor pH and the chemical addition to achieve the required pH set point. The contents of the neutralized wastewater will be discharged to the sewer approximately once per month. Each neutralized batch of wastewater is sampled prior to discharge to the Fermi Lab sanitary sewer system. The Fermi Lab sanitary sewer discharges to the City of Batavia Municipal Sanitary sewer system.

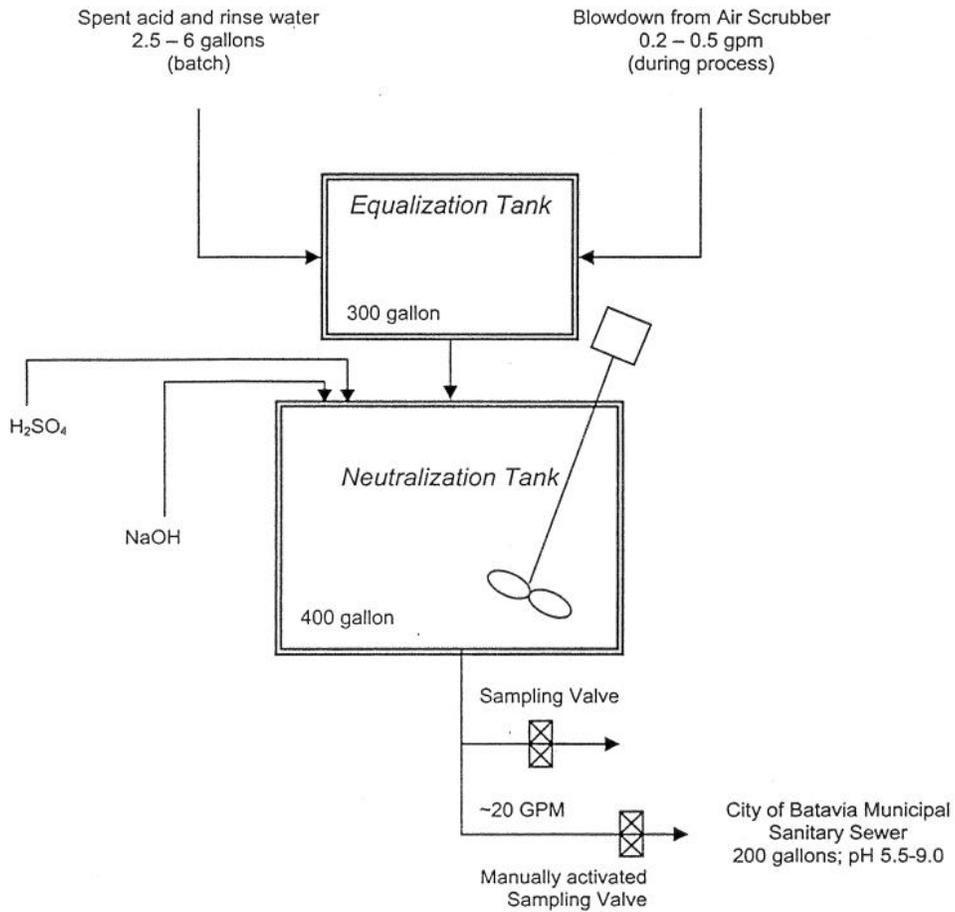
⁽¹⁾ Niobium is a lustrous, grey, ductile, paramagnetic metal in group 5 of the periodic table that takes on a bluish tinge when exposed to air at room temperature for extended periods. Niobium is a refractory metal with a very high melting point (> 2,000 °C), and is used primarily as a strengthening agent in steels. Precautions: Niobium has no known biological role. While niobium dust is an eye and skin irritant and a potential fire hazard, elemental niobium on a larger scale is physiologically inert (and thus hypoallergenic) and harmless. It is frequently used in jewelry and has been tested for use in some medical implants. Niobium-containing compounds are rarely encountered by most people, but some are toxic and should be treated with care. The short and long term exposure to niobates and niobium chloride, two chemicals that are water soluble, have been tested in rats. Rats treated with a single injection of niobium pentachloride or niobates show a median lethal dose (LD50) between 10 and 100 mg/kg. For oral administration the toxicity is lower; a study with rats yielded a LD50 after seven days of 940 mg/kg. (Ref. <http://en.wikipedia.org/wiki/Niobium>)

Schedule J: Application for Construction/Operation Permit for Industrial Treatment/Pretreatment Works

Attachment 2: Schematic Wastewater Flow Diagram

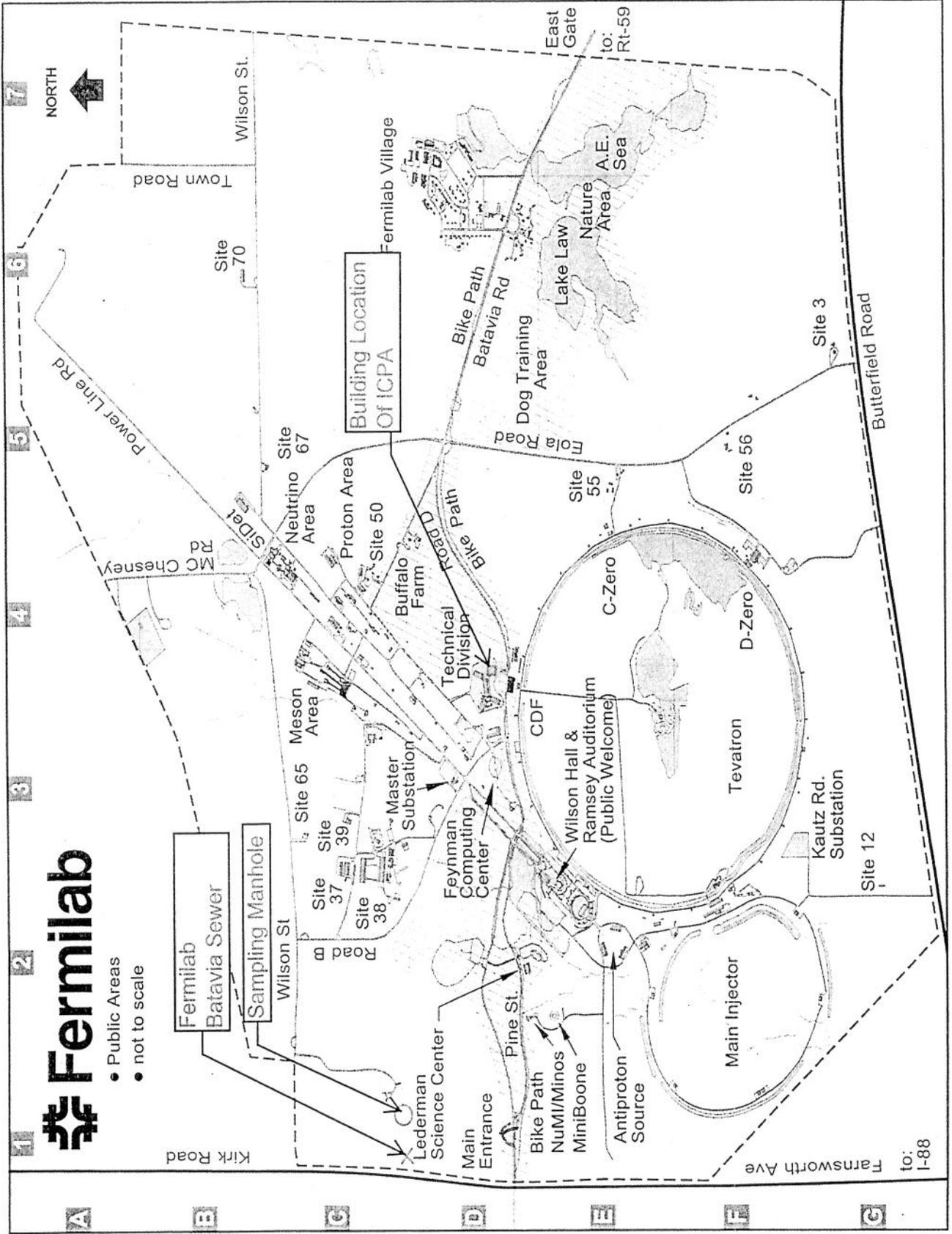
FERMI LAB
INTEGRATED CAVITY PROCESSING APPARATUS
IN INDUSTRIAL BUILDING 4

Niobium etching and electro-polishing process Wastewater Neutralization System



Fermilab

- Public Areas
- not to scale



I-88
to:

Environmental Protection Agency State of Illinois

CHAD M. THOMPSON

having fulfilled the requirements therefore, is hereby awarded this
Certificate of Competency

as an

Industrial

Wastewater Treatment Works Operator

F E R M I N A T I O N A L A C C E L E R A T O R L A B .

D I R E C T D I S C H A R G E A N D P R E T R E A T M E N T
B A T A V I A



issued January 6, 2009

Douglas D. Scott

Director

CONSTITUENT	RAW WASTE (mg/l)	TREATED EFFLUENT Avg. (mg/l) Max.	UPSTREAM (mg/l)	DOWNSTREAM SAMPLES (mg/l)
Copper				
Cyanide (total)				
Cyanide (readily released @ 150° F & pH 4.5)				
Dissolved Oxygen				
Fecal Coliform				
Fluoride	27,800	3,620 / 5,480	N/A	N/A
Hardness (as Ca CO ₃)				
Iron (total)				
Lead				
Manganese				
MBAS				
Mercury				
Nickel				
Nitrates (as N)	20,500	7,100 / 14,200	N/A	N/A
Oil & Grease (hexane solubles or equivalent)				
Organic Nitrogen (as N)				
pH	1.0	7 / 5.5-9	N/A	N/A
Phenols				
Phosphorous (as P)				
Radioactivity				
Selenium				
Silver				
Sulfate	63,000	7,900 / 15,800	N/A	N/A
Suspended Solids				
Total Dissolved Solids				
Zinc				
Others				
Phosphate	31,900	4,020 / 8,050	N/A	N/A