6203

G-000-104 .118

SUBMITTAL OF FMPC PROJECTS 5-102, GRAPHITE MILLING MACHINE, AND PLANT 6 SUMP AND WASTE TREATMENT SYSTEM IMPROVEMENTS FOR A DETERMINATION UNDER 40 CFR 61.06 AS TO WHETHER EPA ADMINISTRATOR APPROVAL IS REQUIRED FOR PROJECTED WORK

11/23/88

DOE-140-89
DOE-FN USEPA
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LETTER

Department of Energy
Oak Ridge Operations
P.O. Box 2001
Oak Ridge, Tennessee 37831—

6203

November 23, 1988
DOE 140-89

Mr. David Kee, Director
Air and Radiation Division
U. S. Environmental Protection Agency
Region V, Mail Code 5AC-26
230 South Dearborn Street, 13th Floor
Chicago, Illinois 60604

Dear Mr. Kee:

SUBMITTAL OF FMPC PROJECTS 5-102, GRAPHITE MILLING MACHINE, AND PLANT 6 SUMP AND WASTE TREATMENT SYSTEM IMPROVEMENTS FOR A DETERMINATION UNDER 40 CFR 61.06 AS TO WHETHER EPA ADMINISTRATOR APPROVAL IS REQUIRED FOR PROJECTED WORK

Reference is made to a letter dated January 11, 1988, from J. A. Reafsnyder to Bill Franz, subject: "Demonstration of Compliance with National Emission Standards for Hazardous Air Pollutants (NESHAPS) - Feed Materials Production Center (FMPC)."

Enclosed are two applications for a determination by the administrator under 40 CFR 41.06 of whether the equipment to be installed is a modification of the source (the entire FMPC site) as defined by 40 CFR 61.15. If so, please consider the submittals as applications to modify under the requirements of 40 CFR 61.07. These are very minor sources of the same magnitude as the fourteen (14) submitted on August 9, 1988, for a similar determination.

The application format followed is that required by the Ohio EPA for permits to install (PTIs). Calculation of dose equivalents follows the same methodology as that in the previous submittals and is based on the 1986 computations provided in the computer printouts enclosed with the reference letter.

We would appreciate a timely review of these applications under 40 CFR 61.06 and 61.07 if the latter is applicable. If you have

any questions or require additional information, please contact Weldon Dillow of our Environmental Protection Division at FTS 626-1354.

Sincerely,

Mary E. Stone
for James A. Reafsnyder
Site Manager

SE-311:Dillow

Enclosures:

1. FMPC No. 5-102, Graphite Milling Machine -- Application for a Determination if Installation of FMPC No. 5-102 is a modification pursuant to 40 CFR 61.15.

2. FMPC Plant 6 Sump and Waste Water Treatment System -- Application for Determination if Plant 6 Sump and Waste Water Treatment System Improvements are a modification pursuant to 40 CFR 61.15.

cc w/o enclosures:

R. F. Hodanbosi, OEPA, Columbus
J. C. Tseng, EH-23, FOR
L. C. Goidell, SRO
M. L. Galper, WMCO
R. M. Neal, Lee Wan

Under OAC 3745-31-04, These signatures shall constitute personal affirmation that all statements or assertions of fact made in the application are true and complete, comply fully with applicable state requirements, and shall subject the signatory to liability under applicable state laws forbidding false or misleading statements.

Mary E. Stone 11/22/88

Authorized Signature (for facility) Date

for James A. Reafsnyder(DOE)
Site Manager

Title

U. S. Dept. of Energy
P. O. Box 398705
Cincinnati, Ohio 45239-8705

Address

ENCLOSURE 1

FMPC SOURCE 5-102

GRAPHITE MILLING MACHINE

6203-4

RESPONSES TO PTI APPLICATION QUESTION 1 THRU 15

1. **Describe the product or service to be produced by the applicant along with a description of the proposed source/facility.**

   New and used gaphite material is machined in Plant 5 to various part configurations, such as mold cups, crucible supports and tundish supports. These graphite parts support the metal casting operations which exclusively use graphite products when remelting uranium metal into ingots. The proposed source is a Cncinnati Milling Machine, Model No. 4 (R-9241) which will be used to machine graphite parts.

2. **List the name and quantity of all materials and chemicals (solid, liquid, or gaseous) that will be used or produced by the source facility.**

   Various new and used rough graphite parts will be supplied to the proposed milling machine at an average rate of 25 pounds per hour with the product produced at approximately the same rate and quantity.

3. **State the reason for the application. Is this a new installation, modification to an existing source/facility, or startup of a source/facility that has been permanently shutdown for _____years?**

   A permit to install application is required for the milling machine since it is a new source.

4. **Has a previous Ohio EPA application or plan submission been filed for this source/facility? If so, state the date and type of the application previously submitted.**

   No previous Ohio EPA application or plan submittal has been filed for this source.

5. **Will the proposed source/facility comply with all rules, laws, and regulations of Ohio EPA and U.S. EPA?**

   The proposed installation has been designed to operate in compliance with all applicable rules, laws, and regulations of Ohio and U.S. EPA.

6. **State the amount of each air contaminant (actual emissions) from each source in pounds per hour and tons per year at maximum and average conditions.**

The amount of air contaminants (estimated emissions) from the proposed source is as shown:

Estimated Emissions in lbs/hr and tons/yr:

	(lbs/hr)	(ton/yr)
Average Particulates	2.37×10^{-5}	9.95×10^{-5}
Average Uranium	2.86×10^{-7}	1.20×10^{-6}
Maximum Particulates	2.37×10^{-5}	1.04×10^{-4}
Maximum Uranium	2.86×10^{-7}	1.25×10^{-6}

Although only graphite materials will be milled by the proposed source, some uranium contamination may be present with the graphite. Consequently, emission from the milling operation may include uranium. Emission estimates showing assumptions and calculations are included with this application.

7. **Are the proposed sources required to comply with the following federal requirements?**
   - i. **New Source Performance Standards (NSPS)**
   - ii. **National Emission Standards for Hazardous Air Pollutants (NESHAP)**
   - iii. **Prevention of Significant Deterioration (PSD)**
   - iv. **Appendix "S" - Emission Offset Policy**

The proposed source is required to comply with the following federal requirements:

i.	New Source Performance Standards	NO
ii.	National Emission Standards for Hazardous Air Pollutants	YES
iii.	Prevention of Significant Deterioration	NO
iv.	Appendix "S" Emission Offset Policy	NO

8. **Will the proposed source employ Best Available Technology?**
The best available technology used will employ a high efficiency fabric dust collector which is presently used to control the other permitted sources in the operation.

9. **Will the proposed source cause the significant deterioration of air quality?**

The source will not cause the significant deterioration of air quality.

10. **Will the proposed source interfere with the attainment or maintenance of the ambient air quality standards?**

The source does not interfere with the attainment or maintenance of the ambient air quality standard.

ambient air quality standard.

11. **Describe any source monitoring, emission monitoring, or control equipment monitoring devices to be installed by the applicant.**

    The source exhausts to stack EP5-17 which is equipped with a custom developed isokinetic fixed single point sampler and a Model 177 Geiger-Muller tube radiation detector.

12. **Will the proposed sources involve the use of asbestos, benzene, beryllium, mercury, or vinyl chloride?**

    No.

13. **Complete and attach an anticipated construction schedule for each proposed source.**

    No schedule is required due to simplicity of making the installation. The source will be installed as soon as the permit to install is issued.

14. **Please include the estimated cost of any air pollution control equipment to be installed on the proposed source.**

    Not applicable. Existing Control System G5-262 will be utilized.

15. **An appendix for each air contaminant source must accompany this application. From the following description of the appendices, determine which should accompany your application.**

    See attached Appendix A.

METHODOLOGY FOR CALCULATING THE DOSE TO THE MAXIMALLY EXPOSED MEMBERS OF THE PUBLIC FROM PLANT 5 MILLING MACHINE FMPC 5-102

I. Plant 5 Equipment

By letter dated January 11, 1988, DOE/ORO transmitted AIRDOS-EPA Computer code printouts of the dose equivalents to the maximally exposed offsite members of the public from emissions from Plant 5 for 1986. Also by letter dated August 4, 1988, DOE/ORO provided AIRDOS-EPA computer code printouts validating that the maximally exposed resident lives 1108 meters north of the plant center--the same location as used in the 1986 Plant 5 calculations.

II. The Plant 5 1986 printouts indicated the following:

Uranium Emissions

U-234 - 1.55×10^{-3} Ci or 0.25 g
U-235 - 7.7×10^{-5} Ci or 36 g
U-238 - 1.65×10^{-3} Ci or 4955 g
Total U - 3.3×10^{-3} Ci or 4991 g

Dose equivalents from Plant 5 1986 emissions which includes uranium, fission products, radium, thorium, neptunium, and plutonium were calculated to be:

Effective committed dose equivalent -- 1.83×10^{-1} mrem
Lung committed dose equivalent -- 1.14 mrem
Endosteal bone committed dose equivalent -- 1.10 mrem

Then the committed dose equivalents from the increased emissions from the new Plant 5 Cincinnati Milling Machine Model No. 4, FMPC Source 5-102, which are estimated to be 2.4×10^{-3} pounds or 1.1 grams per year of uranium with the other radionuclides are:

Effective Committed Dose Equivalent

$$\frac{1.1\ g}{4.991 \times 10^{3} g} \times 1.83 \times 10^{-1}\ \text{mrem} = 4 \times 10^{-5}\ \text{mrem}$$

Lung Committed Dose Equivalent

$$\frac{1.1\ g}{4.991 \times 10^{3} g} \times 1.14\ \text{mrem} = 2.5 \times 10^{-4}\ \text{mrem}$$

Endosteal Bone Committed Dose Equivalent

$$\frac{1.1 g}{4.991 \times 10^{3} g} \times 1.10\ \text{mrem} = 2.4 \times 10^{-4}\ \text{mrem}$$

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Check Appropriate Box(es)

___ Air Discharge

___ Water Discharge to New Source Treatment Works

___ Solid Waste Disposal Facility

___ Hazardous Waste Disposal Facility

For Office Use Only

6203 - -

PTI Application No. _____

Date Received _____

Premise No. _____

OHIO ENVIRONMENTAL PROTECTION AGENCY
Application for Permit to Install

U. S. Department of Energy - Feed Materials Production Center (FMPC)
Applicant's Name

P. O. Box 398705
Mailing Address

Cincinnati	Hamilton	Ohio	45239	(513) 576-6200
City	County	State	Zip Code	Telephone Number

Mary Stone, DOE/FMPC (513)738-6656
Person to contact (Name and Title and Telephone Number)

FMPC is located near Fernald, Ohio at 7400 Willey Road
Location of Proposed Facility (State the location as completely and precisely as possible)*

Crosby Township
City or Township — County — Zip Code

2819
Standard Industrial Classification Code

Directions: A Permit to Install is required for new or modified source of pollution under the provisions of OAC Rule 3745-31. An application cannot be considered complete unless all applicable questions are answered and the required information has been submitted. This application must be signed in accordance with OAC Rule 3745-31-04(B) or it cannot be accepted.

Applicants for permits involving air emissions or wastewater treatment facilities will be required to pay a permit to install fee as shown in Section 3745.11(B) and (C) of the Ohio Revised Code. This fee is payable fifteen days after the date of final issuance of the permit.

Name of new or modified source or facility: Plant 5 - Graphite Cutting - Cinti. Milling

Product of new or modified source/facility: Miscellaneous Graphite Machine Model No. 4

(5-10

Will the proposed source/facility involve any of the following: Check all that apply.

A. _x_ Air Discharge
B. ___ Wastewater Treatment Works
C. ___ Solid Waste Disposal Facility
D. ___ Hazardous Waste Disposal Facility

*Example: "The source will be constructed on a 20 Acre plot to be located on Franklin Township Road No. 17, approximately 1¼ miles north of the intersection of State Route 99 and Franklin Township Road No. 17."

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EPA-3150

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Premise No. ___/___/___/___
Source No. ___/___
Application No. ___/___

APPENDIX A, PROCESS

PROCESS DATA

1. Name of process Graphite Shop Milling

2. End product of this process Miscellaneous Graphite Parts

3. Primary process equipment Cincinnati Milling Machine - Model No. 4

   Your identification 5-102 Year Installed 1988

4. Manufacturer Cincinnati Milling Machine Make or model No. 4

5. Capacity of equipment (lbs./hr): Rated 560 Max. 560

6. Method of exhaust ventilation: [X] Stack [ ] Window fan [ ] Roof vent
   [ ] Other, describe
   Are there multiple exhausts? [ ] Yes [X] No

OPERATING DATA

7. Normal operating schedule: 24 hrs./day, 7 days/wk., 50 wks./year.

8. Percent annual production (finished units) by season:
   Winter 25 Spring 25 Summer 25 Fall 25

9. Hourly production rates (lbs.): Average 25 Maximum 25

10. Annual production (indicate units) 75 tons
    Projected percent annual increase in production 0

11. Type of operation: [ ] Continuous [X] Batch

12. If batch, indicate Minutes per cycle 480 Minutes between cycles varies

13. Materials used in process:

List of Raw Materials	Principal Use	Amount (lbs./hr
Graphite	Misc. Graphite Parts	25

14. A PROCESS FLOW DIAGRAM MUST BE INCLUDED WITH THIS APPENDIX. Show entry and exit points of all raw materials, intermediate products, by-products and finished products. Label all materials including airborne contaminants and other waste materials. Label the process equipment and control equipment.

CONTROL EQUIPMENT

0203-

Control Equipment Code:

(A) Settling chamber
(B) Cyclone
(C) Multiple cyclone
(D) Electrostatic precipitator
(E) Fabric filter
(F) Spray chamber
(G) Cyclonic scrubber
(H) Impingement scrubber
(I) Orifice scrubber
(J) Venturi scrubber
(K) Plate or tray tower
(L) Packed tower
(M) Adsorber
(N) Condenser
(O) Afterburner - catal
(P) Afterburner - therm
(Q) Other, describe

15. Control Equipment data:

Item	Primary Collector	Secondary Collector
(a) Type (See above code)	E	
(b) Manufacturer	Day Company	
(c) Model No.	84 AC 12 N	
(d) Year installed	1952	
(e) Your identification	G5-262	
(f) Pollutant Controlled	Particulates, incl. uranium	
(g) Controlled pollutant emission rate (if known)	See emission calculations, attached.	
(h) Pressure drop	2" - 4"	
(i) Design efficiency	95%	
(j) Operating efficiency	90%	

STACK DATA

16. Your stack identification EP5-17

17. Are other sources vented to this stack? [X] Yes [ ] No
If yes, identify sources 5-058, 5-059, 5-060, 5-061, 5-062, 5-063, 5-064, 5-065, 5

18. Type: [X] Round, top inside diameter dimension 23"
[ ] Rectangular, top inside dimensions (L) _____ x (W) _____

19. Height: Above roof 17 ft., above ground 57 ft.

20. Exit gas: Temp. 100 °F, Volume 7042 ACFM, Velocity 2441 ft./min.

21. Continuous monitoring equipment: [X] Yes [ ] No
If yes, indicate: Type Fixed Point Isokinetic, Manufacturer Custom Developed
Make or Model N/A, Pollutant(s) monitored Particulates incl. urar

If yes, indicate: Type Radiation Monitor, Manufacturer Ludlum
Make or Model 177 Ratemeter with Geiger-Muller Tube, Pollutant(s) monitored Radioactive contents of Particulate

22. Emission data: Emissions from this source have been determined and such data is included with this appendix: [X] Yes [ ] No
If yes, check method: [X] Stack Test [X] Emission factor [ ] Material balan

Completed by J. Fry/E. Lamme'/T. Walsh, Date 5/13/88

ASSUMPTIONS AND EMISSION FACTORS

1. Assume that based on filter analysis, the total estimated emission for particulates in one year from the nine existing sources (see Process Flow Diagram) which are controlled by Control Equipment G5-262 is 4.98 lbs/yr. Assume that uranium emissions based on filter analysis from G5-262 is 0.06 lbs/yr.

2. Assume that the amount of particulate and uranium emissions are directly proportional to the hourly material input to each machine.

Source ID Number	Material Inputs (lb/hr)
5-063	125
5-064	250
5-065	25
5-066	0.5
5-058	12.5
5-059	20.8
5-060	0.2
5-061	150.0
5-062	50.0
TOTAL	634

a. Therefore, new source 5-102 will comprise approximately 4% (25 lbs/hr from 5-102) of the particulate and uranium emissions from (634 lbs/hr - total) G5-262.

b. 4.98 $\frac{\text{lbs}}{\text{yr.}}$ (total particulate emissions from G5-262) x .04 (fraction attributed to new source 5-102).
= 0.199 lbs/hr.

c. 0.06 $\frac{\text{lbs}}{\text{yr.}}$ (total uranium emissions from G5-262) x .04 (fraction attributed to new source 5-102).

= 0.0024 $\frac{\text{lbs}}{\text{hr}}$

3. Average/Maximum Particulate and Uranium emissions (lbs/hr)

a. Average/Maximum Particulate (lbs/hr) =
$(0.199 \text{ lbs/hr}) / \left(\frac{24 \text{ hrs}}{\text{days}} \times \frac{7 \text{ days}}{\text{week}} \times \frac{50 \text{ weeks}}{\text{yr}}\right)$

$= 2.37 \times 10^{-5}$ lbs/hr

b. Average/Maximum Uranium (lbs/hr) =
$(0.0024 \text{ lbs/yr}) / \left(\frac{24 \text{ hrs}}{\text{days}} \times \frac{7 \text{ days}}{\text{week}} \times \frac{50 \text{ weeks}}{\text{yr}}\right)$

$= 2.86 \times 10^{-7}$ lbs/hr

4. Average and Maximum Annual Particulate emissions (tons/yr)

a. Average Particulate Annual emissions (tons/yr) =
$(2.37 \times 10^{-5} \frac{\text{lbs}}{\text{hr}} \times \frac{24 \text{ hrs}}{\text{day}} \times \frac{7 \text{ days}}{\text{wk}} \times \frac{50 \text{ wks}}{\text{yr}}) \times \frac{1 \text{ ton}}{2000 \text{ lbs}}$

$= 9.95 \times 10^{-5}$ tons/yr

b. Maximum Particulate Annual Emissions (tons/yr) =
$(2.37 \times 10^{-5} \frac{\text{lbs}}{\text{hr}} \times \frac{24 \text{ hrs}}{\text{day}} \times \frac{7 \text{ days}}{\text{wk}} \times \frac{52 \text{ wks}}{\text{yr}}) \times \frac{1 \text{ ton}}{2000 \text{ lbs}}$

$= 1.04 \times 10^{-4}$ tons/yr

5. Average and Maximum Annual Uranium Emissions (tons/yr)

a. Average Uranium Annual Emissions (tons/yr) =
$(2.86 \times 10^{-7} \frac{\text{lbs}}{\text{hr}} \times \frac{24 \text{ hrs}}{\text{day}} \times \frac{7 \text{ days}}{\text{wk}} \times \frac{50 \text{ wks}}{\text{yr}}) \times \frac{1 \text{ ton}}{2000 \text{ lbs}}$

$= 1.20 \times 10^{-6}$ tons/yr

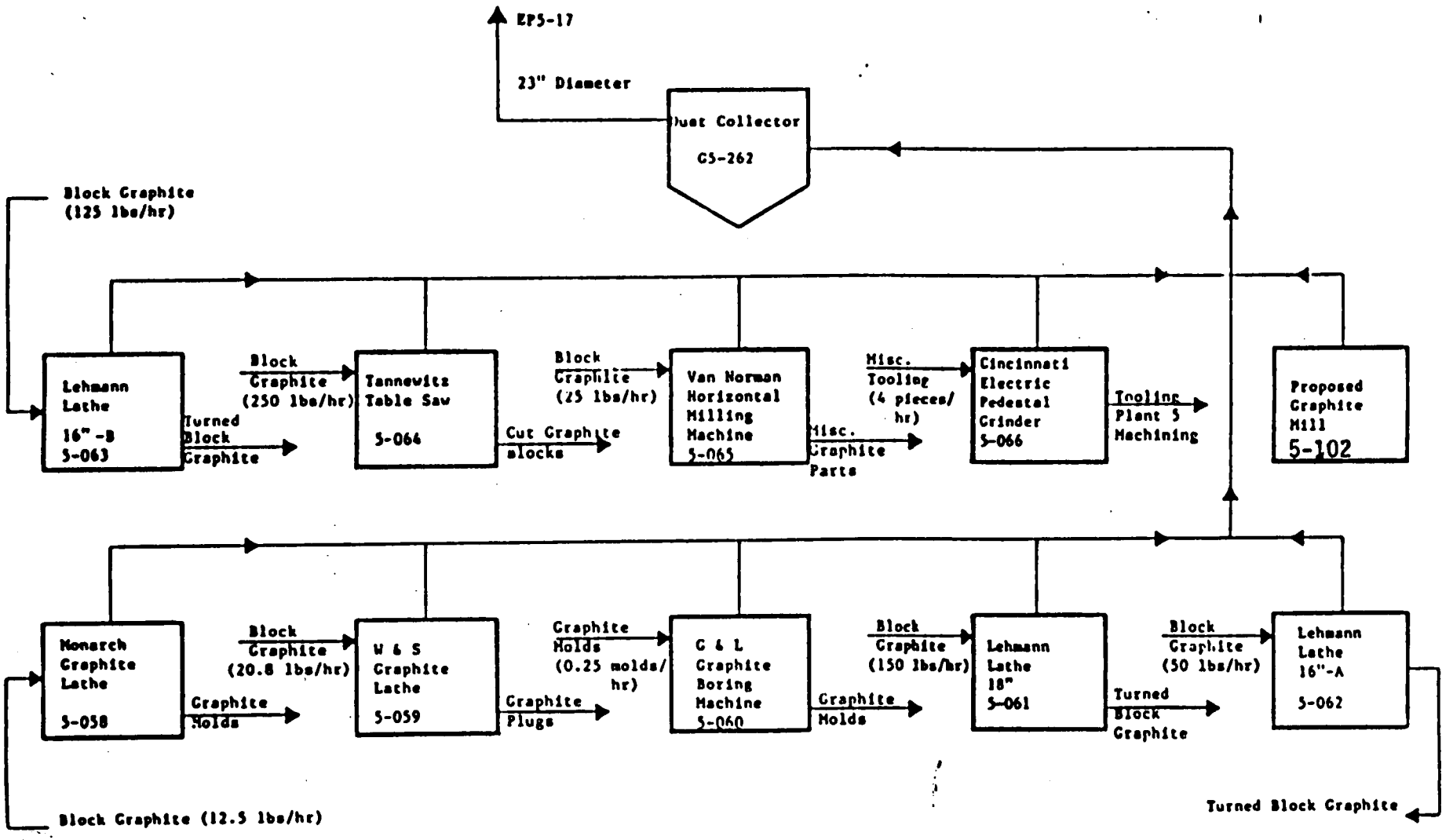
b. Maximum Uranium Annual emissions (ton/yr) =
$(2.86 \times 10^{-7} \frac{\text{lbs}}{\text{hr}} \times \frac{24 \text{ hrs}}{\text{day}} \times \frac{7 \text{ days}}{\text{week}} \times \frac{52 \text{ wks}}{\text{yr}}) \times \frac{1 \text{ ton}}{2000 \text{ lbs}}$

$= 1.25 \times 10^{-6}$ tons/yr

6. The emission rates for particulates and uranium are summarized as follows:

	Average (lbs/hr)	Maximum (lbs/hr)	Average (tons/yr)	Maximum (tons/yr
Particulates	2.37×10^{-5}	2.37×10^{-5}	9.95×10^{-5}	1.04×10^{-4}
Uranium	2.86×10^{-7}	2.86×10^{-7}	1.20×10^{-6}	1.25×10^{-6}

URANIUM (See attached emissions calculations)



METALS PRODUCTION PLANT - DUST COLLECTOR G5-262

ENCLOSURE 2

FMPC PLANT 6 SUMP AND WASTE TREATMENT SYSTEM

METHODOLOGY FOR CALCULATING THE DOSE TO THE MAXIMALLY EXPOSED MEMBERS OF THE PUBLIC FROM PLANT 6 SUMP IMROVEMENTS

No separate calculations for Plant 6 were made for the 1986 emissions, therefore, the emissions and committed dose equivalents for the entire FMPC site for 1986 are used in calculating the committed dose equivalents for Plant 6 equipment. The uranium site esmissions for FMPC for 1986 were as follows:

Uranium Emissions

U-234 - 9.10×10^{-3} Ci or 1.47 g
U-235 - 4.53×10^{-4} Ci or 212 g
U-238 - 9.72×10^{-3} Ci or 29200 g
Total U emissions - 1.93×10^{-2} Ci or 29412 g

Committed dose equivalents from the FMPC 1986 emissions which include uranium, fission products, radium, thorium, neptunium, and plutonium are:

Effective committed dose equivalent -- 1.18 mrem
Lung committed dose equivalent -- 7.38 mrem
Endosteal bone committed dose equivalent -- 7.14 mrem

Then the committed dose equivalents from the emissions from the Plant 6 Sump Improvements, which are estimated to result in a net increase of 0.063 pounds or 28.6 grams of uranium plus accompanying radionuclides per year, are:

Effective Committed Dose Equivalent

$$\frac{2.86 \times 10^{1} g \times 1.18 \text{ mrem}}{2.941 \times 10^{4} g} = 1.1 \times 10^{-3} \text{ mrem}$$

Lung Committed Dose Equivalent

$$\frac{2.86 \times 10^{1} g \times 7.38 \text{ mrem}}{2.941 \times 10^{4} g} = 7.2 \times 10^{-3} \text{ mrem}$$

Endosteal Bone Committed Dose Equivalent

$$\frac{2.86 \times 10^{1} g \times 7.14 \text{ mrem}}{2.941 \times 10^{4} g} = 6.9 \times 10^{-3} \text{ mrem}$$

Although these are not rigorous calculations, they are accurate enough to indicate the new tanks, which includes replacement tanks plus two additional tanks, will have a very minor effect on-site emissions and will not affect compliance with the site dose equiva-

lent standards. The numbers calculated above compare favorably with those using 1987 data. For example, in 1987 35.4 kg of uranium plus accompanying radionuclides were emitted with a calculated effective committed dose equivalent of 1.2 mrem. Then the effective committed dose equivalent for the Plant 6 Sump Improvements is:

$$\frac{2.86 \times 10^{1}\text{g from Plant 6} \quad \times \quad 1.2 \text{ mrem}}{3.54 \times 10^{4}\text{g from entire plant}} = 0.97 \times 10^{-3} \approx 1.0 \times 10^{-3} \text{ mrem}$$

which is comparable to the 1.1×10^{-3} mrem using 1986 data.

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Check Appropriate Box(es)

____ Air Discharge

____ Water Discharge to New Source Treatment Works

____ Solid Waste Disposal Facility

____ Hazardous Waste Disposal Facility

For Office Use Only

PTI Application No. _____

Date Received _____

Premise No. _____

OHIO ENVIRONMENTAL PROTECTION AGENCY
Application for Permit to Install

U. S. Department of Energy - Feed Materials Production Center
Applicant's Name

P. O. Box 398705
Mailing Address

Cincinnati,	Hamilton	Ohio	45239	
City	County	State	Zip Code	Telephone Number

Barbara Wojtowicz, Environmental Protection Division, Oak Ridge, TN. (615) 576-1181
Person to contact (Name and Title and Telephone Number)

FMPC is located near Fernald, Ohio at 7400 Willey Road
Location of Proposed Facility (State the location as completely and precisely as possible)*

Fernald, Ohio	Hamilton	45030
City or Township	County	Zip Code

2819
Standard Industrial Classification Code

Directions: A Permit to Install is required for new or modified source of pollution under the provisions of OAC Rule 3745-31. An application cannot be considered complete unless all applicable questions are answered and the required information has been submitted. This application must be signed in accordance with OAC Rule 3745-31-04(B) or it cannot be accepted.

Applicants for permits involving air emissions or wastewater treatment facilities will be required to pay a permit to install fee as shown in Section 3745.11(B) and (C) of the Ohio Revised Code. This fee is payable fifteen days after the date of final issuance of the permit.

Name of new or modified source or facility: Plant 6 sump and waste water treatment system

Product of new or modified source/facility: Reclaimed uranium and treated wastewater

Will the proposed source/facility involve any of the following: Check all that apply.

A. _X_ Air Discharge
B. ____ Wastewater Treatment Works
C. ____ Solid Waste Disposal Facility
D. ____ Hazardous Waste Disposal Facility

*Example: "The source will be constructed on a 20 Acre plot to be located on Franklin Township Road No. 17, approximately 1¼ miles north of the intersection of State Route 99 and Franklin Township Road No. 17."

6203

Under OAC 3745-31-04, These signatures shall constitute personal affirmation that all statements or assertions of fact made in the application are true and complete, comply fully with applicable state requirements, and shall subject the signatory to liability under applicable state laws forbidding false or misleading statements.

Mary E. Stone 11/22/88
Authorized Signature (for facility) Date

for James A. Reafsnyder (DOE)
Site Manager
Title

U. S. Department of Energy
P. O. Box 398705
Cincinnati, Ohio 45239-8705
Address

For Wastewater Treatment Plants:

Signature of General Contractor or Agent Performing installation, if selected. Date

Company

Address

000019

The following information must be submitted on a separate piece of paper and attached to this application.

FOR ALL PERMITS TO INSTALL

1. Describe the product or service to be produced by the applicant along with a description of the proposed source/facility.

2. List the name and quantity of all materials and chemicals (solid, liquid, or gaseous) that will be used or produced by the source/facility.

3. State the reason for the application. Is this a new installation, modification to an existing source/facility, reconstruction of an existing source/facility, or startup of a source/facility that has been permanently shutdown for _____ years? (State number of years)

4. Has a previous Ohio EPA application or plan submission been filed for this source/facility? If so, state the date and type of the application previously submitted.

5. Will the proposed source/facility comply with all rules, laws, and regulations of Ohio EPA and U.S. EPA?

FOR AIR POLLUTION SOURCES

6. State the amount of each air contaminant (actual emissions) from each source in pounds per hour and tons per year at maximum and average conditions.

7. Are the proposed sources required to comply with the following federal requirements?
   i. New Source Performance Standards (NSPS)
   ii. National Emission Standards for Hazardous Air Pollutants (NESHAPS)
   iii. Prevention of Significant Deterioration (PSD)
   iv. Appendix "S" - Emission Offset Policy

8. Will the proposed sources employ best available technology?

9. Will the proposed sources cause the significant degradation of air quality?

10. Will the proposed sources interfere with the attainment and maintenance of the ambient air quality standards?

11. Describe any source monitoring, emission monitoring, or control equipment monitoring devices to be installed by the applicant.

12. Will the proposed sources involve the use of asbestos, benzene, beryllium, mercury, or vinyl chloride?

13. Complete and attach an anticipated construction schedule for each proposed source. (See attached).

14. Please include the estimated cost of any air pollution control equipment to be installed on the proposed sources.

15. An appendix for each air contaminant source must accompany this application. From the following description of the appendices, determine which should accompany your application.

FOR ALL PERMITS TO INSTALL

1. Describe the product or service to be produced by the applicant along with a description of the proposed source/facility.

   The Feed Materials Production Center (FMPC) is a federal facility which produces highly pure uranium metal. The facility is owned and operated by the U. S. Department of Energy (DOE).

   The FMPC is divided into a series of buildings or plants each of which perform a specific chemical or metallurgical process. Wastewaters from these individual plants are first collected and treated at plant sump systems prior to discharge to a plantwide general sump treatment system.

   The existing Plant 6 sump operation will be replaced. The system will be comprised of three wastewater receiving tanks (spent coolant receiving tank, ingot pickling hold tank, and acid water hold tank) and two parallel waste treatment systems. Each water treatment system will include the following equipment in series: oil treatment tank, oil coalescer, precipitation tank, filter press and filtrate hold tank. Additional equipment includes a waste oil receiving tank, a nitric acid storage tank and a sodium hydroxide storage tank.

   In accordance with the provisions of the Ohio Administrative Code this permit to install application covers following proposed sources:

Appendix E-2 - Storage Tanks	Source No.
Ingot Pickling Tank	6-050
Acid Water Tank	6-051

Appendix A - Process	Source No.
Oil Treatment Tank System I	6-046
Oil Treatment Tank System II	6-048
Precipitation Tank System I	6-047
Precipitation Tank System II	6-049

2. List the name and quantity of all materials and chemicals (solid, liquid, or gaseous) that will be used or produced by the source/facility.

Process inputs -	Spent coolant wastewater	28536 gal/day
	Acidic wastewaters	20188 gal/day
	Nitric acid (HNO_3)	250 gal/day
	Sodium hydroxide (NaOH)	5200 gal/day
	Flocculant (.2% Polymer)	300 gal/day
Process outputs -	Filter cake (precipitated uranium salts)	Varies
	Waste Oils	350 gal/day
	Treated wastewaters	50000 gal/day

FOR ALL PERMITS TO INSTALL - CONTINUED

3. State the reason for the application. Is this a new installation, modification to an existing source/facility, reconstruction of an existing source/facility, or startup of a source/facility that has been permanently shutdown for _____ years? (State number of years)

   This is an installation of replacement equipment for the Plant 6 sump project.

4. Has a previous Ohio EPA application or plan submission been filed for this source/facility? If so, state the date and type of the application previously submitted.

   Four tanks associated with the existing Plant 6 sump operation have received either a notice of registration or a permit to operate from OEPA. The registration and permits were all issued December 6, 1985 and are as follows:

Fresh Acid Tank	WMCO	#6-042	
	Ohio EPA	#T-092	(Notice of Registration)
Spent Acid Tank	WMCO	#6-043	
	Ohio EPA	#T-093	(Permit to Operate - 1431110128T093)
Spent Acid Tank	WMCO	#6-044	
	Ohio EPA	#T-094	(Permit to Operate - 1431110128T094)
Decant Tank	WMCO	#6-045	
	Ohio EPA	#T-095	(Permit to Operate - 1431110128T095)

   A wastewater PTI for the Plant 6 Sump System was issued July 27, 1987 (OEPA Application #05-2405).

5. Will the proposed source/facility comply with all the rules, laws, and regulations of the Ohio EPA and U.S. EPA?

   The proposed facility has been designed to comply with all applicable rules, regulations and laws of Ohio EPA and U.S. EPA.

FOR AIR POLLUTION SOURCES

6. State the amount of each air contaminant (actual emissions) from each source in pounds per hour and tons per year at maximum and average conditions.

Source	Air Contaminant	Total Emissions			
		Average		Maximum	
		lb/hr	ton/y	lb/hr	ton/y
Acid Waste Hold Tank (6-050)	$HNO_3(NO_x)$	0.006	0.026	0.006	0.026
Acid Waste Hold Tank (6-051)	$HNO_3(NO_x)$	0.006	0.026	0.006	0.026
Oil Treat Tank System 1 (6-046)	$HNO_3(NO_x)$	3.75×10^{-3}	0.0125	0.0375	0.0585
Oil Treat Tank System 2 (6-048)	$HNO_3(NO_x)$	3.75×10^{-3}	0.0125	0.0375	0.0585
Precipitation Tank System 1 (6-047)	$HNO_3(NO_x)$	3.75×10^{-3}	0.0125	0.0375	0.0585
Precipitation Tank System 2 (6-049)	$HNO_3(NO_x)$	3.75×10^{-3}	0.0125	0.0375	0.0585
TOTAL	HNO_3 (NO_x)	0.027	0.102	0.027	0.286

Source	Air Contaminant	Total Emissions			
		Average		Maximum	
		lb/hr	ton/y	lb/hr	ton/y
Acid Waste Hold Tank (6-050)	Uranyl Nitrate	2.955×10^{-8}	1.295×10^{-7}	2.955×10^{-8}	1.295×10^{-7}
Acid Waste Hold Tank (6-051)	Uranyl Nitrate	2.955×10^{-8}	1.295×10^{-7}	2.955×10^{-8}	1.295×10^{-7}
Oil Treat Tank System (6-046)	Uranyl Nitrate	1.77×10^{-6}	7.75×10^{-6}	1.77×10^{-6}	7.75×10^{-6}

FOR AIR POLLUTION SOURCES - CONTINUED

Source	Air Contaminant	Total Emissions Average lb/hr	Average ton/y	Maximum lb/hr	Maximum ton/y
Oil Treat Tank System (6-048)	Uranyl Nitrate	1.77×10^{-6}	7.75×10^{-6}	1.77×10^{-6}	7.75×10^{-6}
Precipitation Tank, System 1 (6-047)	Uranyl Nitrate	1.77×10^{-6}	7.75×10^{-6}	1.77×10^{-6}	7.75×10^{-6}
Precipitation Tank, System 2 (6-049)	Uranyl Nitrate	1.77×10^{-6}	7.75×10^{-6}	1.77×10^{-6}	7.75×10^{-6}
TOTAL	Uranyl Nitrate	7.14×10^{-6}	3.13×10^{-5}	7.19×10^{-7}	3.13×10^{-5}

7. Are the proposed sources required to comply with the following federal requirements?
   i. New Source Performance Standards (NSPS) - No
   ii. National Emission Standards for Hazardous Air Pollutants (NESHAP) - Yes
   iii. Prevention of Significant Deterioration (PSD) - No
   iv. Appendix "S" - Emission Offset Policy - No

Proposed sources 6-046 through 6-051 will process solutions containing low concentrations of uranyl nitrate. Although uranyl nitrate will be present in solution as hexahydrate yellowish crystals (and consequently no vapor pressure), some emissions from the sources could occur if aerosols are released during the process operations. (Aerosols generated during mixing could entrain the uranyl nitrate solids).

Calculations shown in Attachment B show projected uranium emissions in the form of uranyl nitrate from the new Plant 6 sump operations to be 0.063 pounds per year. The emissions estimates were based on sampling the present Plant 6 sump operations which should be similar to the new installation. The uranium emissions from the new Plant 6 sump installation represent less than .1% of the total uranium emissions for the FMPC site recorded in 1986 and 1987. Therefore, emissions for the new installation are minimal and would not represent a significant off-site dose contribution.

FOR AIR POLLUTION SOURCES - CONTINUED

8. Will the proposed sources employ best available technology?

   The proposed sources will not employ air pollution control equipment since air emissions are minimal. Best available technology for the Source No. 6-050 and 6-051 is vertical cylindrical tanks with splash fill.

9. Will the proposed sources cause the significant degradation of air quality?

   This facility will not cause significant degradation of air quality since the total maximum HNO_3 (NO_x) emissions are 0.287 tons per year.

10. Will the proposed sources interfere with the attainment and maintenance of the ambient air quality standards?

    The proposed sources will not interfere with the attainment and maintenance of the ambient air quality standards.

11. Describe any source monitoring, emission monitoring, or control equipment monitoring devices to be installed by the applicant.

    There will be no automatic or continuous monitoring devices in regard to air emissions installed as part of the facility.

12. Will the proposed sources involve the use of asbestos, benzene, beryllium, mercury, or vinyl chloride?

    No.

13. Complete and attach an anticipated construction schedule for each proposed source. (See attached).

    See Attached Installation Schedule.

14. Please include the estimated cost of any air pollution control equipment to be installed on the proposed sources.

    N/A.

15. An appendix for each air contaminant source must accompany this application. From the following description of the appendices, determine which should accompany your application.

    See attached Appendix A and appendices E-2 for the process storage tanks and treatment tanks.

OHIO ENVIRONMENTAL PROTECTION AGENCY

INSTALLATION SCHEDULE

TO ACCOMPANY APPLICATION FOR PERMIT TO INSTALL

THIS FORM CONSTITUTES PART OF THE APPLICATION OF:

FACILITY NAME: Feed Materials Production Center - U.S. Dept. of Energy

ADDRESS: 7400 Willey Road, Fernald, Ohio 45030

FOR A PERMIT TO INSTALL THE FOLLOWING AIR CONTAMINANT SOURCE:

IDENTIFICATION: Plant 6 sump and wastewater treatment system

DESCRIPTION: Neutralization of and precipitation of solids in acidic wastewaters; separation of waste oils from wastewater stream.

THE INSTALLATION OF THE ABOVE AIR CONTAMINANT SOURCE IS PLANNED TO FOLLOW THE TIME SCHEDULE DESCRIBED BELOW:

	DATE
1. EQUIPMENT ORDERED - - - - - - - - - - - -	April, 1987
2. COMMENCE CONSTRUCTION - - - - - - - - - -	March, 1988
3. STARTUP - - - - - - - - - - - - - - - - -	September 1, 1988
4. PERFORMANCE TESTING - - - - - - - - - - -	September 1, 1988

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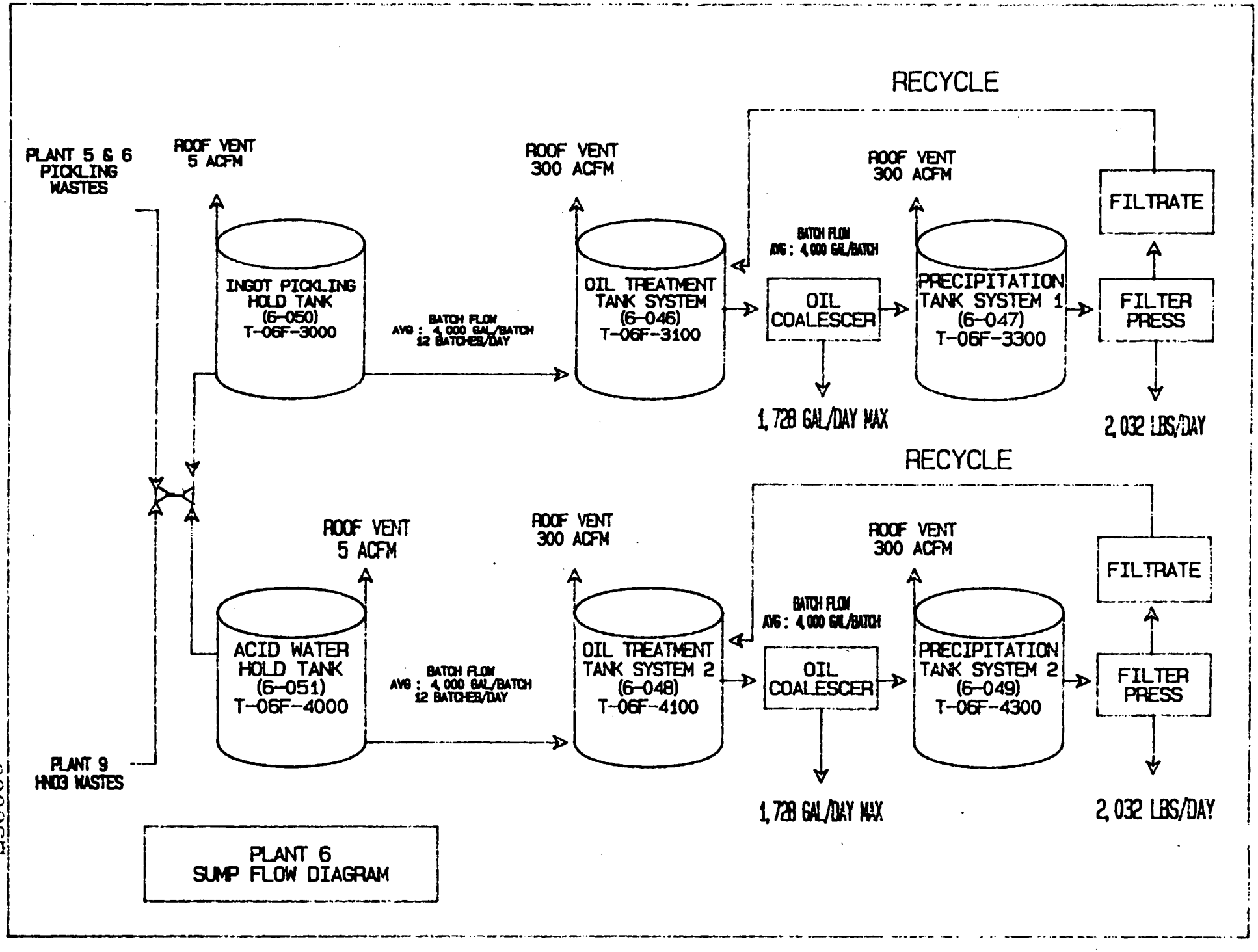
EPA 3150
6/8/82


RECYCLE
PLANT 5 & 6 PICKLING WASTES
ROOF VENT 5 ACFM
INGOT PICKLING HOLD TANK (6-050) T-06F-3000
BATCH FLOW AVG : 4,000 GAL/BATCH 12 BATCHES/DAY
ROOF VENT 300 ACFM
OIL TREATMENT TANK SYSTEM (6-046) T-06F-3100
BATCH FLOW AVG : 4,000 GAL/BATCH
OIL COALESCER
1,728 GAL/DAY MAX
ROOF VENT 300 ACFM
PRECIPITATION TANK SYSTEM 1 (6-047) T-06F-3300
FILTRATE
FILTER PRESS
2,032 LBS/DAY
RECYCLE
PLANT 9 HNO3 WASTES
ROOF VENT 5 ACFM
ACID WATER HOLD TANK (6-051) T-06F-4000
BATCH FLOW AVG : 4,000 GAL/BATCH 12 BATCHES/DAY
ROOF VENT 300 ACFM
OIL TREATMENT TANK SYSTEM 2 (6-048) T-06F-4100
BATCH FLOW AVG : 4,000 GAL/BATCH
OIL COALESCER
1,728 GAL/DAY MAX
ROOF VENT 300 ACFM
PRECIPITATION TANK SYSTEM 2 (6-049) T-06F-4300
FILTRATE
FILTER PRESS
2,032 LBS/DAY
PLANT 6 SUMP FLOW DIAGRAM

420000

Emise No. __/__/__/____
ource No. __/____
plication No. __/____

APPENDIX A, PROCESS

A-1

PROCESS DATA

6203 - -

Name of process Plant 6 Sump - Oil Treatment Tank - System 1

End product of this process Treated Wastewater, Waste Oil

Primary process equipment Oil Treatment Tank - System 1

Your identification (6-046) Tank T-06F-3100 Year Installed 1987

Manufacturer Custom Fabricated Make or model N/A

Capacity of equipment (lbs./hr): Rated 12000 lbs/hr Max. 12000 lbs/hr

Method of exhaust ventilation: [X] Stack [ ] Window fan [X] Roof vent
[ ] Other, describe

Are there multiple exhausts? [ ] Yes [X] No

OPERATING DATA

Normal operating schedule: 24 hrs./day, 7 days/wk., 50 wks./year.

Percent annual production (finished units) by season:
Winter 25 Spring 25 Summer 25 Fall 25

Hourly production rates (lbs.): Average 12000 Maximum 12000

Annual production (indicate units) 10,000,000 gal
Projected percent annual increase in production 10

Type of operation: [ ] Continuous [X] Batch

If batch, indicate Minutes per cycle 330 Minutes between cycles Varies

Materials used in process:

List of Raw Materials	Principal Use	Amount (lbs./hr.)
Spent Coolant Water	Wastewater	14300 gal/day
(1.24% Water Soluble Coolant)		
Acidic Wastewater	Wastewater	10100 gal/day
Nitric Acid (62%)	pH Control	As Needed <200 gal/day

A PROCESS FLOW DIAGRAM MUST BE INCLUDED WITH THIS APPENDIX. Show entry and exit points of all raw materials, intermediate products, by-products and finished products, Label all materials including airborne contaminants and other waste materials. Label the process equipment and control equipment.

See Attachment

000028

CONTROL EQUIPMENT

Control Equipment Code:

(A) Settling chamber	(G) Cyclonic scrubber	(M) Adsorber
(B) Cyclone	(H) Impingement scrubber	(N) Condenser
(C) Multiple cyclone	(I) Orifice scrubber	(O) Afterburner - catalyti
(D) Electrostatic precipitator	(J) Venturi scrubber	(P) Afterburner - thermal
(E) Fabric filter	(K) Plate or tray tower	(Q) Other, describe_____
(F) Spray chamber	(L) Packed tower	_____

15. Control Equipment data:

Item	Primary Collector	Secondary Collector
(a) Type (See above code)	N/A	
(b) Manufacturer		
(c) Model No.		
(d) Year installed		
(e) Your identification		
(f) Pollutant Controlled	(see Attachments A & B)	
(g) Controlled pollutant emission rate (if known)		
(h) Pressure drop		
(i) Design efficiency		
(j) Operating efficiency		

STACK DATA

16. Your stack identification VE-1046-PA-12" EP6-9

17. Are other sources vented to this stack? [X] Yes [ ] No
    If yes, identify sources Precipitation Tank - System 1 (6-047) T-06F-3300

18. Type: [XX] Round, top inside diameter dimension 12"
    [ ] Rectangular, top inside dimensions (L)_____ x (W)_____

19. Height: Above roof 7 ft., above ground 58 ft.

20. Exit gas: Temp. amb-180 °F, Volume 1200 ACFM, Velocity 1530 ft./min.

21. Continuous monitoring equipment: [ ] Yes [X] No
    If yes, indicate: Type_____, Manufacturer_____
    Make or Model_____, Pollutant(s) monitored_____

22. Emission data: Emissions from this source have been determined and such data is included with this appendix: [X] Yes [ ] No
    If yes, check method: [ ] Stack Test [ ] Emission factor [X] Material balance

Completed by D. J. Carr/Jacobs Engineering, Date 4/11/86

Premise No. __/__/__/____
Source No. __/____
Application No. __/____

APPENDIX A, PROCESS

PROCESS DATA

6203 - -

- Name of process Plant 6 Sump - Precipitation Tank - System 1
- End product of this process Treated Wastewater
- Primary process equipment Precipitation Tank -System 1 (T-06F-3300)

Your identification (6-047) T-06F-3300 Year Installed 1987

- Manufacturer Custom Fabricated Make or model N/A

Capacity of equipment (lbs./hr): Rated 12000 Max. 12000

Method of exhaust ventilation: ☐ Stack ☐ Window fan ☒ Roof vent
☐ Other, describe

Are there multiple exhausts? ☐ Yes ☒ No

OPERATING DATA

Normal operating schedule: 24 hrs./day, 7 days/wk., 50 wks./year.

Percent annual production (finished units) by season:
Winter 25 Spring 25 Summer 25 Fall 25

Hourly production rates (lbs.): Average 12000 Maximum 12000

Annual production (indicate units) 10,000,000 gallons
Projected percent annual increase in production 10

Type of operation: ☐ Continuous ☒ Batch

If batch, indicate Minutes per cycle 330 Minutes between cycles Varies

Materials used in process:

List of Raw Materials	Principal Use	Amount (lbs./hr.)
Acidic Wastewater	Wastewater	10100 gal/day
Spent Coolant Water	Wastewater	14300 gal/day
Sodium Hydroxide (50%)	pH Control	As Needed 200 gal/day
Flocculant (0.2% polymer)	Coagulant	<200 gal/day

A PROCESS FLOW DIAGRAM MUST BE INCLUDED WITH THIS APPENDIX. Show entry and exit points of all raw materials, intermediate products, by-products and finished products, Label all materials including airborne contaminants and other waste materials. Label the process equipment and control equipment.

See Attachment

CONTROL EQUIPMENT

Control Equipment Code:

(A)	Settling chamber	(G)	Cyclonic scrubber	(M)	Adsorber
(B)	Cyclone	(H)	Impingement scrubber	(N)	Condenser
(C)	Multiple cyclone	(I)	Orifice scrubber	(O)	Afterburner - cataly
(D)	Electrostatic precipitator	(J)	Venturi scrubber	(P)	Afterburner - therma
(E)	Fabric filter	(K)	Plate or tray tower	(Q)	Other, describe____
(F)	Spray chamber	(L)	Packed tower		

15. Control Equipment data:

Item	Primary Collector	Secondary Collector
(a) Type (See above code)	N/A	
(b) Manufacturer		
(c) Model No.		
(d) Year installed		
(e) Your identification		
(f) Pollutant Controlled	(see Attachment A & B)	
(g) Controlled pollutant emission rate (if known)		
(h) Pressure drop		
(i) Design efficiency		
(j) Operating efficiency		

STACK DATA

16. Your stack identification VE-1046-PA-12" EP6-9

17. Are other sources vented to this stack? [X] Yes [ ] No
    If yes, identify sources Oil Treatment Tank - System 1 - (6-046) T-06F-3100

18. Type: [X] Round, top inside diameter dimension 12"
    [ ] Rectangular, top inside dimensions (L)_____ x (W)_____

19. Height: Above roof 7 ft., above ground 58 ft.

20. Exit gas: Temp. amb-180 °F, Volume 1200 ACFM, Velocity 1530 ft./min.

21. Continuous monitoring equipment: [ ] Yes [X] No
    If yes, indicate: Type_____, Manufacturer_____
    Make or Model_____, Pollutant(s) monitored_____

22. Emission data: Emissions from this source have been determined and such data is included with this appendix: [X] Yes [ ] No
    If yes, check method: [ ] Stack Test [ ] Emission factor [X] Material balanc

Completed by D. J. Carr/Jacobs Engineering, Date 4/11/86

Premise No. __/__/__/____
Source No. __/____
Application No. __/____

APPENDIX A, PROCESS

PROCESS DATA

6203

1. Name of process Plant 6 Sump - Oil Treatment Tank - System 2

2. End product of this process Treated Wastewater

3. Primary process equipment Oil Treatment Tank - System 2 (T-06F-4100)

Your identification (6-048) T-06F-4100 Year Installed 1987

4. Manufacturer Custom Fabricated Make or model N/A

5. Capacity of equipment (lbs./hr): Rated 12000 Max. 12000

6. Method of exhaust ventilation: ☐ Stack ☐ Window fan ☒ Roof vent
☐ Other, describe

Are there multiple exhausts? ☐ Yes ☒ No

OPERATING DATA

. Normal operating schedule: 24 hrs./day, 7 days/wk., 50 wks./year.

. Percent annual production (finished units) by season:
Winter 25 Spring 25 Summer 25 Fall 25

. Hourly production rates (lbs.): Average 12000 Maximum 12000

. Annual production (indicate units) 10,000,000 gallons
Projected percent annual increase in production 10

. Type of operation: ☐ Continuous ☒ Batch

. If batch, indicate Minutes per cycle 330 Minutes between cycles Varies

. Materials used in process:

List of Raw Materials	Principal Use	Amount (lbs./hr.)
Spent Coolant Water	Wastewater	14300 gal/day
(1.24% Water Soluble Coolant)		
Acidic Wastewater	Wastewater	10100 gal/day
Nitric Acid (60%)	pH Control	As req'd. <200 gal/day

A PROCESS FLOW DIAGRAM MUST BE INCLUDED WITH THIS APPENDIX. Show entry and exit points of all raw materials, intermediate products, by-products and finished products. Label all materials including airborne contaminants and other waste materials. Label the process equipment and control equipment.

See Attachment

CONTROL EQUIPMENT

Control Equipment Code:

(A)	Settling chamber	(G)	Cyclonic scrubber	(M)	Adsorber
(B)	Cyclone	(H)	Impingement scrubber	(N)	Condenser
(C)	Multiple cyclone	(I)	Orifice scrubber	(O)	Afterburner - cataly
(D)	Electrostatic precipitator	(J)	Venturi scrubber	(P)	Afterburner - therma
(E)	Fabric filter	(K)	Plate or tray tower	(Q)	Other, describe____
(F)	Spray chamber	(L)	Packed tower		

15. Control Equipment data:

Item	Primary Collector	Secondary Collector
(a) Type (See above code)	N/A	
(b) Manufacturer		
(c) Model No.		
(d) Year installed		
(e) Your identification		
(f) Pollutant Controlled	(See Attachment A & B)	
(g) Controlled pollutant emission rate (if known)		
(h) Pressure drop		
(i) Design efficiency		
(j) Operating efficiency		

STACK DATA

16. Your stack identification VE-1090-PA-12" (EP6-10) (Vent)

17. Are other sources vented to this stack? [X] Yes [ ] No
If yes, identify sources Precipitation Tank (System #2) T-06F-4300 (6-049)

18. Type: [X] Round, top inside diameter dimension 12"
[ ] Rectangular, top inside dimensions (L)_____ x (W)_____

19. Height: Above roof 7 ft., above ground 58 ft.

20. Exit gas: Temp. amb-180 °F, Volume 1200 ACFM, Velocity 1530 ft./min.

21. Continuous monitoring equipment: [ ] Yes [X] No
If yes, indicate: Type_____, Manufacturer_____
Make or Model_____, Pollutant(s) monitored_____

22. Emission data: Emissions from this source have been determined and such data is included with this appendix: [X] Yes [ ] No
If yes, check method: [ ] Stack Test [ ] Emission factor [X] Material balance

Completed by D. J. Carr/Jacobs Engineering, Date 4/11/86

Premise No. __/__/__/____
Source No. __/____
Application No. __/____

APPENDIX A, PROCESS

PROCESS DATA

A-

6203

1. Name of process Plant 6 Sump - Precipitation Tank - System 2

2. End product of this process Treated Wastewater

3. Primary process equipment Precipitation Tank - System 2

Your identification (6-049) T-06F-4300 Year Installed 1987

4. Manufacturer Custom Fabricated Make or model N/A

5. Capacity of equipment (lbs./hr): Rated 12000 Max. 12000

6. Method of exhaust ventilation: ☐ Stack ☐ Window fan ☒ Roof vent
☐ Other, describe

Are there multiple exhausts? ☐ Yes ☒ No

OPERATING DATA

7. Normal operating schedule: 24 hrs./day, 7 days/wk., 50 wks./year.

8. Percent annual production (finished units) by season:
Winter 25 Spring 25 Summer 25 Fall 25

9. Hourly production rates (lbs.): Average 12000 Maximum 12000

10. Annual production (indicate units) 10,000,000 gallons
Projected percent annual increase in production 10

11. Type of operation: ☐ Continuous ☐ Batch

If batch, indicate Minutes per cycle 330 Minutes between cycles Varies

Materials used in process:

List of Raw Materials	Principal Use	Amount (lbs./hr.)
Acidic Wastewater	Wastewater	10100 gal/day
Spent Coolant Water	Wastewater	14300 gal/day
Sodium Hydroxide (50%)	pH Control	As needed 200 gal/day
Flocculant (0.2% polymer)	Coagulant	< 200 gal/day

A PROCESS FLOW DIAGRAM MUST BE INCLUDED WITH THIS APPENDIX. Show entry and exit points of all raw materials, intermediate products, by-products and finished products, Label all materials including airborne contaminants and other waste materials. Label the process equipment and control equipment.

See Attachment

CONTROL EQUIPMENT

Control Equipment Code:

(A)	Settling chamber	(G)	Cyclonic scrubber	(M)	Adsorber
(B)	Cyclone	(H)	Impingement scrubber	(N)	Condenser
(C)	Multiple cyclone	(I)	Orifice scrubber	(O)	Afterburner - catalyt
(D)	Electrostatic precipitator	(J)	Venturi scrubber	(P)	Afterburner - thermal
(E)	Fabric filter	(K)	Plate or tray tower	(Q)	Other, describe_____
(F)	Spray chamber	(L)	Packed tower		_____

15. Control Equipment data:

Item	Primary Collector	Secondary Collector
(a) Type (See above code)	N/A	
(b) Manufacturer		
(c) Model No.		
(d) Year installed		
(e) Your identification		
(f) Pollutant Controlled	(See Attachment A & B)	
(g) Controlled pollutant emission rate (if known)		
(h) Pressure drop		
(i) Design efficiency		
(j) Operating efficiency		

STACK DATA

16. Your stack identification VE-1090-PA-12" (EP-10)

17. Are other sources vented to this stack? [X] Yes [ ] No
    If yes, identify sources Precipitation Tank (System 2) (T-06F-4300) (6-048)

18. Type: [XX] Round, top inside diameter dimension 12"
    [ ] Rectangular, top inside dimensions (L)_____ x (W)_____

19. Height: Above roof 7 ft., above ground 58 ft.

20. Exit gas: Temp. amb-180 °F, Volume 1200 ACFM, Velocity 1530 ft./min.

21. Continuous monitoring equipment: [ ] Yes [XX] No
    If yes, indicate: Type_____, Manufacturer_____
    Make or Model_____, Pollutant(s) monitored_____

22. Emission data: Emissions from this source have been determined and such data is included with this appendix: [X] Yes [ ] No
    If yes, check method: [ ] Stack Test [ ] Emission factor [X] Material balance

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FOR OFFICIAL USE ONLY

6203

Premise No.___/___/___/____
Source No.___/____
Application No.____/____

DOE - FMPC
(Facility Name)

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number Ingot pickling hold tank 6-050 Date Installed 1988 (month/year)

2. Tank capacity: 10,000 gallons

3. Tank shape: [X] Cylindrical [ ] Rectangular
[ ] Spherical [ ] Other, specify _____

4. Tank dimensions: Diameter 12 ft Height 13.5 ft Length _____ Width _____

5. Tank shell material: [X] Steel [ ] Aluminum [ ] Other, specify _____

6. Type of tank: [ ] External floating roof tank
[ ] Internal floating roof tank
[ ] Fixed roof tank
[X] Vertical cylindrical tank
[ ] Horizontal cylindrical tank
[ ] Pressure tank
[ ] Other, specify _____

7. Location of tank: [ ] Outdoors [X] Indoors [ ] Underground

8. Type of filling: [X] Splash [ ] Submerged [ ] Other, specify _____

9. If this tank is located outdoors and above ground, provide the paint color of the tank.

[ ] Aluminum (specular) [ ] Light gray [ ] White
[ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

Condition of paint: [ ] Good [ ] Poor

10. If this tank is equipped with or vented to a vapor control system, complete (a) through (c) of this item.

a) Type of vapor control system _____
Manufacturer _____ Make or model _____
Date installed (month and year) _____

b) Date tank was equipped with or vented to vapor control system (month & year)_____

c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: _____
(Attach calculations and test data to support response, unless previously submitted.)

EPA-3851
04/12/84

000036

11. Complete the table below for any pressure or vacuum relief vent valve.

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to a vapor control, identify the vapor control.
Atmospheric vent to stack on roof			

12. Operational Data (Complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets, if necessary.)

a) Material Acidic waste waters Trade Name HNO_3, Uranyl Nitrate
Density: 9.0 lbs/gal or _____ °API Producer _____

b) Temperature of stored material: Average Amb °F and Maximum 140 °F
(If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii or iii of this item. If vapor pressure is not known, write "unknown"):

i) Actual vapor pressure: <0.01 psia at average storage temperature for HNO_3
_____ psia at maximum storage temperature

ii) Reid vapor pressure: Average _____ psi and minimum-maximum _____ - _____ psi

iii) If material stored is a gas or liquified gas, provide the pressure at which it is stored: _____ psi gage at _____ °F

d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? [ ] Yes [ ] No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? [ ] Yes [X] No
If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): Maximum anticipated throughput

g) Annual throughput of material: 1.77×10^6 - 3.53×10^6 gallons.

Completed by D. J. Carr/Jacobs Engineering Date 4/11/86

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6203

Premise No.___/___/___/____
Source No.___/____
Application No.____/____

DOE - FMPC
(Facility Name)

APPENDIX E-2

INORGANIC MATERIAL STORAGE TANK OR STORAGE TANK WITH CAPACITY LESS THAN 40,000 GALLONS

1. Tank identification: Name or number Acid Water Hold Tank 6-051 Date Installed 1988 (month/year)

2. Tank capacity: 10,000 gallons

3. Tank shape: [x] Cylindrical [ ] Rectangular
[ ] Spherical [ ] Other, specify _____

4. Tank dimensions: Diameter 12 ft Height 13.5 ft Length _____ Width _____

5. Tank shell material: [x] Steel [ ] Aluminum [ ] Other, specify _____

6. Type of tank:
[ ] External floating roof tank
[ ] Internal floating roof tank
[ ] Fixed roof tank
[x] Vertical cylindrical tank
[ ] Horizontal cylindrical tank
[ ] Pressure tank
[ ] Other, specify _____

7. Location of tank: [ ] Outdoors [x] Indoors [ ] Underground

8. Type of filling: [x] Splash [ ] Submerged [ ] Other, specify _____

9. If this tank is located outdoors and above ground, provide the paint color of the tank.

[ ] Aluminum (specular) [ ] Light gray [ ] White
[ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

Condition of paint: [ ] Good [ ] Poor

10. If this tank is equipped with or vented to a vapor control system, complete (a) through (c) of this item.

a) Type of vapor control system _____
Manufacturer _____ Make or model _____
Date installed (month and year) _____

b) Date tank was equipped with or vented to vapor control system (month & year)_____

c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: _____
(Attach calculations and test data to support response, unless previously submitted.

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11. Complete the table below for any pressure or vacuum relief vent valve.

Type of Vent Valve	Pressure Setting	Vacuum Setting	If pressure relief is discharged to a vapor control, identify the vapor control.
Atmospheric vent through stack on roof			

12. Operational Data (Complete (a) through (g) of this item for all materials stored or to be stored. Attach additional sheets, if necessary.)

a) Material Acidic waste waters Trade Name HNO_3 ,Uranyl Nitrate
Density: 9.0 lbs/gal or _____ °API Producer _____

b) Temperature of stored material: Average AMB °F and Maximum 140 °F
(If temperature is approximately outdoor ambient temperature, write "AMB".)

c) Vapor pressure of stored material (Complete i, ii or iii of this item. If vapor pressure is not known, write "unknown"):

i) Actual vapor pressure: < 0.01 psia at average storage temperature for HNO_3
_____ psia at maximum storage temperature

ii) Reid vapor pressure: Average _____ psi and minimum-maximum _____ - _____ psi

iii) If material stored is a gas or liquified gas, provide the pressure at which it is stored: _____ psi gage at _____ °F

d) Type of liquid organic material (If the material is an organic liquid other than a gasoline, fuel oil, kerosene, crude oil, lubricant or other petroleum liquid, answer the question below.)

Is it a photochemically reactive material? [ ] Yes [ ] No

e) Type of waste material (If the material is a waste, answer the question below.)

Is it a hazardous waste? [ ] Yes [X] No
If yes, identify type (EPA hazardous waste number) _____

f) Indicate the year (or 12-month period) for item (g): Maximum anticipate throughput

g) Annual throughput of material: 1.77×10^6 - 3.53×10^6 gallons.

Completed by D. J. Carr/Jacobs Engineering Date 4/11/86

Attachment A

CALCULATION OF HNO_3 (NO_x) Emissions from Plant 6 Sump

Calculations of emission of HNO_3 from the Plant 6 sump follow. It should be stressed that these calculations are conservative for the following reasons. It is likely that the concentration of HNO_3 in the process would be less than the assumed 22% in 1 below. The maximum concentration of HNO_3 in solution would probably be about 4.7% (about 1 Molar, pH = 0). Because HNO_3 is an electrolyte, the emission of HNO_3 from the sump system would be expected to be less than the results calculated in 1c (for batch processing) by at least a factor of 4. Therefore these calculations for 1 and 2 below represent maximum emissions.

MAXIMUM EMISSIONS

1) Calculations for HNO_3 Emissions from Plant 6 Sump during Batch Processing

a) Assume the HNO_3 concentration is 22% (3.5 Molar), then the partial pressure of HNO_3 over the solution at 82°C (180°F) and at equilibrium is about 1.0 Mm Hg (1.9×10^{-2} psia). (Perry and Chilton, Chemical Engineers' Handbook, 1973)

b) The partial pressure of HNO_3 above the solution at equilibrium is equal to the mole-fraction (of HNO_3 in the gas phase) times the total pressure (atmospheric) of all components in the gas phase.

$$\text{The mole-fraction of } HNO_3 = \frac{1.0 \text{ Mm Hg partial pressure of } HNO_3}{760 \text{ Mm Hg Total pressure}}$$

$$= 1{,}315 \times 10^{-6} \text{ (1,315 ppm)}$$

$$\text{or } 3{,}290 \text{ mg/m}^3 \text{ } HNO_3$$

- 3,290 mg/m^3 is equivalent to 93 mg/cubic foot
- The maximum volume of exhaust from the sump system is 1200 ACFM

(600 ACFM/tank). (Size of the exhaust fan for the oil treat and precipitation tank combined).

c) - Assume the air space just above the surface (e.g., about 1 cm above the surface) of the liquid is saturated with HNO_3 at the equilibrium vapor concentration of 0 mg/m^3. To determine a flux of HNO_3 vapor movement from the saturated zone just above the liquid to the zone with fresh air (no HNO_3) use Ficks first Law:

$$N_a = -(D)\frac{dc}{dx}$$

Where C = Concentration gradient;

X = Distance along gradient;

D = Diffusivity of HNO_3 in air;

N_a = The flux of vapor per unit surface area.

(See Bird, Stewart and Lightfoot (1960). Transport Phenomena)

- For the oil treat and precipitation tanks the surface area of the liquid is 5.9 m^2 (59,000 cm^2). A conservative assumption (maximum emissions) for the distance between the saturated zone above the liquid and fresh air is 1.0 cm (the distance between the top of the liquid in a full tank and the top of the tank is about 45-60 cm). The diffusivity for HNO_3 in air is on the order of 0.1 cm^2/second (Bird, Stewart and Lightfoot (1960) Transport Phenomena).

- The amount of HNO_3 vapor transferred out of the saturated zone, into the "fresh" air of an oil treat tank is:

$$HNO_3 \text{ flux} = \frac{(59{,}000 cm^2)(0.1\ cm^2/s)(3{,}290-0)mg/m3(1m^3/10^6 cm^3)}{(1.0\ cm)}$$

$$= 19 \text{ mg/s}$$

$$= 68 \text{ gram/hr}$$

$$= 0.15 \text{ lb/hr}$$

It is assumed that all vapor transferred from the saturated zone to air will be vented to atmosphere.

- A maximum of 5 batches of 22% HNO_3 wastewater would be processed in one day through the oil treat tanks. Emissions from the process are from these oil treat tanks (for 1 hour) and from the precipitation tanks during the first 1/2 hour.

- Maximum emissions from these 5 batches (22% HNO_3) would be:

$$\text{Maximum} = \frac{(5 \text{ batches})}{\text{day}} (1.5 \text{ hr}) (0.15 \text{ lb/hr}) = 1.12 \text{ lb/day}$$

or 410 lb/year

- In addition to the above 5 batches, 7 additional batches of 4.7% HNO_3 could be processed per day. The equilibrium vapor pressure of these batches would be less than 0.10 Mm Hg or 1/10th of that for 22% HNO_3.

- Using the same assumptions as for the 22% HNO_3 case, except for a partial vapor pressure of 0.10 Mm Hg, emissions from these batches would be:

$$\frac{0.15 \text{ lb/hr}}{10} = 0.015 \text{ lb/hr}$$

- The emissions of HNO_3 from the oil treat tanks for 7 batches of 4.7% HNO_3 would be:

(0.015 lb/hr) (7) (1.5hr) = 0.157 lb/day

or 57.5 lb/year

- The maximum emissions for 12 batches per day could be:

410 lb/yr + 58 lb/yr = 468 lb/yr HNO_3

2) Calculations for maximum HNO_3 Emissions from Ingot Pickling and Acid Water Hold Tanks

a) Assume HNO_3 concentration of 22% as in 1.a. above and a maximum temperature of 60°c (140°F).

b) The equilibrium vapor pressure for 22% HNO_3 at 60°C (140°F) is about 0.1 Mm Hg (1.9×10^{-4} psia) The equilibrium vapor concentration is:

$\frac{0.1}{760}$ = 131 ppm (325 mg/m^3 HNO_3).

c) - Estimate exhaust volume of 5 ACFM for each tank

- 325 mg/m^3 HNO_3 is equivalent to 9 mg/ft^3

- Emissions from both acid waste and hold tanks:

(2) X (5 ACFM) X (9 mg/ft^3) = 90 mg/minute
= 2×10^{-4} lb/minute
= 0.012 lb/hr
= 105 lb/year

AVERAGE ANNUAL EMISSIONS

3) Average (typical) emissions of HNO_3 from the batch operations.

- 12 batches of 4.7% HNO_3 waste water per day

$$\frac{(18 \text{ hrs})}{\text{day}} (0.015 \text{ lb/hr}) = 0.27 \text{ lb/day } HNO_3 \text{ emitted}$$
$$= 99 \text{ lb/yr}$$

4) Average emissions from the HNO_3 waste water hold tanks.

- Same conditions as for maximum since the calculations assume exhaust ventalation operates continuously for the entire year.

  0.012 lb/hr HNO_3

  105 lb/yr

SUMMARY OF EMISSION POTENTIAL

5) Maximum Emissions

Batch operations + Acid Hold Tanks = Total

Annual = 468 lb/yr + 105 lb/yr = 573 lb/yr

= 0.286 ton/yr

Hourly = 0.15 lb/hr = 0.162 lb/hr

6) Average Emissions

Annual = 99 lb/yr + 105 lb/yr = 204 lb/yr

= 0.102 ton/yr

Hourly = 0.015 lb/hr + 0.012 lb/hr = 0.027 lb/hr

Attachment B

CALCULATION OF URANIUM EMISSIONS FROM THE PLANT 6 SUMP

ASSUMPTIONS

1) The maximum volume of exhaust from the sump system oil treatment and precipitation tanks is 1200 ACFM.

2) Sample results obtained in January 1988 at the present Plant 6 Sump area are indicative of the concentrations expected with the installation of the oil treatment, precipitation, acid waste and hold tanks.

3) All reported alpha activity on the sample is attributed to U_{238}. The sample result used in the emission calculation is based on the average value of three air samples collected over 4 days.

4) The exhaust volume from the acid waste and hold tanks is 5 ACFM.

CALCULATIONS

Specific activity (SA) of U_{238} = $\frac{A_{RA} \times T_{RA}}{Ai \times Ti}$*

A_{RA} = 226 g/mole
T_{RA} = 1600 YRS
Ai = 238 g/mole
Ti = 4.51×10^9 YRS

*Herman Cember, Introduction To Health Physics, pg. 78, Second Edition, Pergamon Press, 1983.

$$SA = \frac{226 \times 1600 \text{ YRS}}{238 \times 4.51 \times 10^9 \text{ YRS}}$$

$$= 3.4 \times 10^{-7} \frac{Ci}{g}$$

Averaged Total Activity of Measured Samples = $5.37 \times 10^{-13} \frac{uCi}{cc}$

$$\frac{\text{Total Activity}}{SA} = \frac{5.37 \times 10^{-13} \frac{uCi}{cc}}{3.4 \times 10^{-7} \frac{Ci}{g} \times 10^6 \frac{uCi}{Ci}} = 1.58 \times 10^{-12} \frac{g}{cc}$$

Exhaust volume of 1200 ACFM from oil treatment and precipitation tanks

$$\text{Emission Rate} = 1200 \frac{ft^3}{min} \times 1.58 \times 10^{-12} \frac{g}{cc} \times \frac{1\ cc}{3.531 \times 10^{-5}\ ft^3} \times 2.2 \frac{lbs}{kg} \times 1 \frac{kg}{1000g}$$

$$= 1.18 \times 10^{-7} \frac{lbs}{min}$$

$$\text{Emissions per year} = 1.18 \times 10^{-7} \frac{lbs}{min} \times 60 \frac{min}{hr} \times 24 \frac{hrs}{day} \times 365 \frac{day}{yr}$$

$$= 6.2 \times 10^{-2} \frac{lbs}{yr}$$

Exhaust volume of 5 ACFM from each acid waste and hold tanks

$$\text{Emission Rate} = 10 \frac{ft^3}{min} \times 1.58 \times 10^{-12} \frac{g}{cc} \times \frac{1\ cc}{3.531 \times 10^{-5}\ ft^3} \times 2.2 \frac{lbs}{kg} \times 1 \frac{kg}{1000g}$$

$$= 9.85 \times 10^{-10} \frac{lbs}{min}$$

$$\text{Emissions Per Year} = 9.85 \times 10^{-10} \frac{lbs}{min} \times 60 \frac{min}{hr} \times 24 \frac{hrs}{day} \times 365 \frac{days}{yr}$$

$$= 5.18 \times 10^{-4} \frac{lbs}{yr}$$

$$\text{Net increase} = 6.2 \times 10^{-2} \frac{lbs}{yr} + 5.18 \times 10^{-4} \frac{lbs}{yr}$$

$$= .063 \frac{lbs}{yr}$$