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G-000-104 .156

RENEWAL OF PERMIT TO OPERATE - SLAG LEACH STORAGE TANK - AT THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT (OEPA) NO. 1431110128 TO47

02/16/95

C:EC:95-0030
FERMCO HAMILTON COUNTY
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PTO

Fernald Environmental

6606

FERMCO
Restoration Management Corporation P.O. Box 398704 Cincinnati, Ohio 45239-8704 (513) 738-6200

February 16, 1995

U. S. Department of Energy
Fernald Environmental Management Project
Letter No. C:EC:95-0030

Mr. Peter Sturdevant
Compliance Specialist
Air Quality Management Division
Hamilton County Department
of Environmental Services
1632 Central Parkway
Cincinnati, Ohio 45210

Dear Mr. Sturdevant:

RENEWAL OF PERMIT TO OPERATE - SLAG LEACH STORAGE TANK - AT THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT (OEPA) NO. 1431110128 T047

Enclosed is the renewal application for the Slag Leach Storage Tank at the FEMP for which the Permit to Operate is scheduled to expire.

Please contact Ervin Fisher of my staff at (513) 738-6053 if you have any questions about this application.

Sincerely,

Terence D. Hagen, Director
Environmental Compliance

TDH:EF:mhv
Attachments

cc: S. M. Beckman, FERMCO/MS65-2 - w/o attachments
D. W. Kirby, FERMCO/MS62 - w/o attachments
L. E. Parsons, DOE Contract Specialist/MS45
W. J. Quaider, DOE-FN/MS45
P. B. Spotts, FERMCO/MS65-2 - w/o attachments
AR Coordinator/MS78
File Record Storage Copy 108.6
RTS Files

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OHIO ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR A PERMIT TO OPERATE AN AIR CONTAMINANT SOURCE

6606

D.O.E.-Fernald Environmental Management Project
Facility Name

7400 Willey Road
Facility Address

Fernald Hamilton 45030
City County Zip

513/ 738-6502
Telephone Area Number

Mr. Stephen M. Beckman
Person to Contact

Post Office Box 538705
Mailing Address

Cincinnati OH 45253-8705
City State Zip

513/ 738-6502
Telephone

#1431110128-T047
(Application no., if this is a renewal application)

4953
Std. Ind. Class. Code

1. Complete and attach any of the following appendices most appropriate to the air contaminant source. In addition, a compliance time schedule form is to be attached when applicable. Check as appropriate the following:

___Appendix A, Process
___Appendix B, Fuel-Burning Equipment
___Appendix C, Incinerator
___Appendix D, Surface Coating or Printing Operation
_X_Appendix E, Storage Tank
___Appendix H, Gasoline Dispensing Facility
___Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal
___Appendix K, Surface Coating Line or Printing Line
___Appendix L, Solvent Metal Cleaning
___ Appendix M, Fugitive Dust Emission Sources
Specify Appendix No.
___Appendix N, Rubber Tire Manufacturing
___Appendix O, Dry Cleaning Facility
___Appendix P, Landfills
___Other Appendix
___Compliance Time Schedule

2. Description of Source (same as used on appendix): Plant 2/3 Slag Leach MgF Storage Tank F1-301

3. Your identification for Source (same as used on appendix): FEMP # 2-123

I, being the individual specified in Rule 3745-35-02(B) of the Ohio Administrative Code, hereby apply for a Permit to Operate the air contaminant source(s) described herein. As required, the following additional documents are submitted as part of this application (describe all attachments):

Appendix E-2
Emission Calculations

Authorized Signature
Terence D. Hagen
Director Environmental Compliance
Title

2/16/95
Date

*Pursuant to OAC Rule 3745-35-02(B) (Permit to Operate).

Operation of an air contaminant source without an effective permit to operate is prohibited to 3704.05 Ohio Revised Code.

EPA-3161

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FOR OFFICIAL USE ONLY

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

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T047
FEMP ID NO. 2-123

APPENDIX E-2

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

1. Tank identification: Name or number F1-301 (2-123) Date Installed 1952 (month/year)

2. Tank capacity: 3,200 gallons

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

4. Tank dimensions: Diameter 7' 6" Height 10' Length _____ Width _____

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

6. Type of tank:
[ ] External floating roof tank
[ ] Internal floating roof tank
[X] 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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DOE - FEMP
(Facility Name)
F1-301 T047
(tank identification)

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.

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 Slag Leach-Magnesium Fluoride Trade Name N/A
Density: 8.5-12 lbs/gal or _____ ° API Producer N/A

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

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

i.) Actual vapor pressure: 0.2480 psia at average storage temperature
0.3331 psia at maximum storage temperature

ii.) Reid vapor pressure: Average UKN psi and minimum-maximum UNK - UNK 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.) Not an organic material

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): 1995 est

g) Annual throughput of material: 3,200 gallons.

Completed by Ervin Fisher, Jr. Reg/Tech Spec. III Date Feb 14, 1995

STORAGE TANK EMISSION REPORT

The calculations for uranium emissions are based on known data where possible and where data for parameters is unknown or incomplete, conservative values producing a "worst case" condition for emissions are used.

The conditions used to determine uranium emissions from the tank are as follows:

(1) At typical tank pressures and temperatures, the vapor pressure of the Uranyl Nitrate solution is equal to that of water.

(2) Since uranium does not vaporize at storage conditions the only mechanism for uranium loss from the tank is by entrainment in the aerosol or mist generated during liquid storage and transfer.

(3) Uranium emissions are determined by multiplying the amount of water lost from the tank by entrainment in the aerosol or mist generated during liquid storage and transfer by an emission factor determined from laboratory tests conducted on Lab sample D-37, Lab #2-9846.

(4) The emission factor has been determined to be 6×10^{-06} gU/l of solution; the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate as determined by the laboratory tests.

(5) Vapor losses from the tank are calculated using the TANKS software program, version 2.0.

(6) Maximum emissions are five times the calculated annual emissions.

TANKS PROGRAM 2.0 — 02/14/95
EMISSIONS REPORT - DETAIL FORMAT — PAGE 1
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

Identification No.:	T047
City:	Cincinnati
State:	OH
Company:	FERMCO
Type of Tank:	Vertical Fixed Roof

Tank Dimensions

Shell Height (ft):	10
Diameter (ft):	8
Liquid Height (ft):	9
Avg. Liquid Height (ft):	9
Volume (gallons):	3200
Turnovers:	1
Net Throughput (gal/yr):	3200

Paint Characteristics

Shell Color/Shade:	Aluminum/Diffuse
Shell Condition:	Good
Roof Color/Shade:	Aluminum/Diffuse
Roof Condition:	Good

Roof Characteristics

Type:	Dome
Height (ft):	0.00
Radius (ft) (Dome Roof):	4.00
Slope (ft/ft) (Cone Roof):	0.0000

Breather Vent Settings

Vacuum Setting (psig):	0.00
Pressure Setting (psig):	0.00

Meteorological Data Used in Emission Calculations: Dayton, Ohio

TANKS PROGRAM 2.0 — 02/14/95
EMISSIONS REPORT - DETAIL FORMAT — PAGE 2
LIQUID CONTENTS OF STORAGE TANK

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Uranyl Nitrate	All	58.85	50.52	67.18	54.50	0.2480	0.1822	0.3331	63.000			63.00	Option 1

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Annual Emission Calculations

Standing Losses (lb):	13.4596
Vapor Space Volume (cu ft):	184.31
Vapor Density (lb/cu ft):	0.0028
Vapor Space Expansion Factor:	0.074684
Vented Vapor Saturation Factor:	0.954019
Tank Vapor Space Volume	
Vapor Space Volume (cu ft):	184.31
Tank Diameter (ft):	8
Vapor Space Outage (ft):	3.67
Tank Shell Height (ft):	10
Average Liquid Height (ft):	9
Roof Outage (ft):	2.67
Roof Outage (Dome Roof)	
Roof Outage (ft):	2.67
Dome Radius (ft):	4
Shell Radius (ft):	4
Vapor Density	
Vapor Density (lb/cu ft):	0.0028
Vapor Molecular Weight (lb/lb-mole):	63.000000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.248015
Daily Avg. Liquid Surface Temp.(deg. R):	518.52
Daily Average Ambient Temp. (deg. R):	511.57
Ideal Gas Constant R (psia cuft /(lb-mole-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	514.17
Tank Paint Solar Absorptance (Shell):	0.60
Tank Paint Solar Absorptance (Roof):	0.60
Daily Total Solar Insolation Factor (Btu/sqft^Gday):	1160.00
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.074684
Daily Vapor Temperature Range (deg.R):	33.31
Daily Vapor Pressure Range (psia):	0.150928
Breather Vent Press. Setting Range(psia):	0.00
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.248015
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.182208
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.333136
Daily Avg. Liquid Surface Temp. (deg R):	518.52
Daily Min. Liquid Surface Temp. (deg R):	510.19
Daily Max. Liquid Surface Temp. (deg R):	526.85
Daily Ambient Temp. Range (deg.R):	19.20

DETAIL CALCULATIONS (AP-42)

Annual Emission Calculations	
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.954019
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.248015
Vapor Space Outage (ft):	3.67
Withdrawal Losses (lb):	1.1905
Vapor Molecular Weight (lb/lb-mole):	63.000000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.248015
Annual Net Throughput (gal/yr):	3200
Turnover Factor:	1.0000
Maximum Liquid Volume (cuft):	452
Maximum Liquid Height (ft):	9
Tank Diameter (ft):	8
Working Loss Product Factor:	1.00
Total Losses (lb):	14.65

Annual Emissions Report

Liquid Contents	Losses (lbs.): Standing	Withdrawal	Total
Uranyl Nitrate	13.46	1.19	14.65
Total:	13.46	1.19	14.65

URANIUM EMISSIONS

These calculations are based on conservative estimates, the actual emissions are expected to be less than those indicated.

Annual Emissions: T047

$$\frac{14.65 \text{ lb UNH}}{1000 \text{ lb UNH}} \times 6 \times 10^{-06} \text{ lb U} = 8.79 \text{ E-8 lb U/year}$$

Maximum Emissions: 8.79 E-8 lb U/year x 5 = 4.40 E-7 lb U/year