6432 G-000-104 .141

RENEWAL OF PERMITS TO OPERATE - TEN STORAGE TANKS - AT THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT (OEPA) NO. 1431110128 TO48, TO49, TO56, TO57, TO58, TO59, TO72, TO73, TO81, AND TO85

12/20/94

C:EC:94-0077
FERMCO HAMILTON COUNTY
~~30~~ 51
PTOS

Fernald Environmental

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

6432

December 20, 1994

U. S. Department of Energy
Fernald Environmental Management Project
Letter No. C:EC:94-0077

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

Dear Mr. Sturdevant:

**RENEWAL OF PERMITS TO OPERATE - TEN STORAGE TANKS - AT THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT (OEPA) NO. 1431110128 T048, T049, T056, T057, T058, T059, T072, T073, T081, AND T085**

Enclosed are the renewal applications for ten storage tanks at the FEMP for which the Permits to Operate are scheduled to expire.

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

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
File Record Storage Copy 108.6
RTS Files

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

6432

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

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 538705
Mailing Address

Fernald — City
Hamilton — County
45030 — Zip

Cincinnati — City
OH — State
45253-8705 — Zip

513/ 738-6502
Telephone — Area Number

513/ 738-6502
Telephone

#1431110128-T048
(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 F1-302

3. Your identification for Source (same as used on appendix): FEMP # 2-124

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

12/20/94
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. Page 1 EPA-3161

000002

FOR OFFICIAL USE ONLY

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

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T048
FEMP ID NO. 2-124

APPENDIX E-2

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

1. Tank identification: Name or number F1-302 (2-124) 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)

DOE - FEMP
(Facility Name)
F1-302 T048
(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: 0.4594 psia at average storage temperature
0.4594 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. Req/Tech Spec. III Date Dec 16, 1994

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 $6 \times 10^{-06}$ 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 — 12/16/94
EMISSIONS REPORT - DETAIL FORMAT — PAGE 1
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

| | |
|---|---|
| Identification No.: | T048 |
| 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 — 12/16/94
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 |

000003

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), CONT.

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: T048

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

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

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

6432

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

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 538705
Mailing Address

Fernald Hamilton 45030
City County Zip

Cincinnati OH 45253-8705
City State Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T049
(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): 2/3 Slag Leach MgF Storage Tank F1-303

3. Your identification for Source (same as used on appendix): FEMP # 2-125

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

12/20/94
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. Page 1 EPA-3161

000007

FOR OFFICIAL USE ONLY

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

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T049
FEMP ID NO. 2-125

APPENDIX E-2

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

1. Tank identification: Name or number F1-303 (2-125) 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)

000005

DOE - FEMP
(Facility Name)
F1-303 T049
(tank identification)

1. 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. |
|---|---|---|---|
| | | | |
| | | | |

2. 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: 0.4594 psia at average storage temperature
0.4594 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 [X] 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.

ompleted by Ervin Fisher, Jr. Reg/Tech Spec. III Date Dec , 1994

## 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 x $10^{-06}$ 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 — 12/16/94
EMISSIONS REPORT - DETAIL FORMAT — PAGE 1
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

*Identification*

| | |
|---|---|
| Identification No.: | T049 |
| 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 — 12/16/94
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 |

000010

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/16/94
PAGE 3

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 |

TANKS PROGRAM 2.0
EMISSIONS REPORT
DETAIL FORMAT
DETAIL CALCULATIONS (AP-42), CONT.

12/16/94
PAGE 4

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 |

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
INDIVIDUAL TANK EMISSION TOTALS

12/16/94
PAGE 5

Annual Emissions Report

| | Losses (lbs.): | | |
|---|---|---|---|
| Liquid Contents | 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: T049

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

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

6432

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

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

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 538705
Mailing Address

Fernald | Hamilton | 45030
City | County | Zip

Cincinnati | OH | 45253-8705
City | State | Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T056
(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 Process water Storage Tank F1-403

3. Your identification for Source (same as used on appendix): FEMP # 2-150

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

12/20/94
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. Page 1 EPA-3161

FOR OFFICIAL USE ONLY

6432

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

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T056
FEMP ID NO. 2-150

APPENDIX E-2

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

1. Tank identification: Name or number F1-403 (2-150) Date Installed 1952 (month/year)

2. Tank capacity: 5,800 gallons

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

4. Tank dimensions: Diameter 9' Height 12' 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: [X] Outdoors [ ] 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 [X] Other, specify S.S.

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)



000013

DOE - FEMP
(Facility Name)
F1-403 T056
(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 Process Wastewater <0.1 g/L U, 1-2 N $HNO_3$ Trade Name Raffinate
Density: 8.5 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: 0.4594 psia at average storage temperature
0.4594 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 [X] 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: 5,800 gallons.

Completed by Ervin Fisher, Jr. Req/Tech Spec. III Date Dec , 1994

# 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 $6 \times 10^{-06}$ 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 — 12/16/94
EMISSIONS REPORT - DETAIL FORMAT — PAGE 1
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

| | |
|---|---|
| Identification No.: | T056 |
| City: | Cincinnati |
| State: | OH |
| Company: | FERMCO |
| Type of Tank: | Vertical Fixed Roof |

Tank Dimensions

| | |
|---|---|
| Shell Height (ft): | 12 |
| Diameter (ft): | 9 |
| Liquid Height (ft): | 12 |
| Avg. Liquid Height (ft): | 12 |
| Volume (gallons): | 5711 |
| Turnovers: | 1 |
| Net Throughput (gal/yr): | 5711 |

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): | 5.00 |
| 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 — 12/16/94
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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sump Water | All | 58.85 | 50.52 | 67.18 | 54.50 | 0.4300 | 0.4300 | 0.4300 | 18.000 | | | 18.00 | Option 1 |

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/16/94
PAGE 3

Annual Emission Calculations

| | |
|---|---|
| Standing Losses (lb): | 3.1934 |
| Vapor Space Volume (cu ft): | 101.47 |
| Vapor Density (lb/cu ft): | 0.0014 |
| Vapor Space Expansion Factor: | 0.064241 |
| Vented Vapor Saturation Factor: | 0.964926 |
| **Tank Vapor Space Volume** | |
| Vapor Space Volume (cu ft): | 101.47 |
| Tank Diameter (ft): | 9 |
| Vapor Space Outage (ft): | 1.59 |
| Tank Shell Height (ft): | 12 |
| Average Liquid Height (ft): | 12 |
| Roof Outage (ft): | 1.59 |
| **Roof Outage (Dome Roof)** | |
| Roof Outage (ft): | 1.59 |
| Dome Radius (ft): | 5 |
| Shell Radius (ft): | 5 |
| **Vapor Density** | |
| Vapor Density (lb/cu ft): | 0.0014 |
| Vapor Molecular Weight (lb/lb-mole): | 18.000000 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| 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: | 0.064241 |
| Daily Vapor Temperature Range (deg.R): | 33.31 |
| Daily Vapor Pressure Range (psia): | 0.000000 |
| Breather Vent Press. Setting Range(psia): | 0.00 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia): | 0.430000 |
| 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 |

TANKS PROGRAM 2.0
EMISSIONS REPORT
DETAIL FORMAT

12/16/94
PAGE 4

DETAIL CALCULATIONS (AP-42)

| | |
|---|---|
| **Annual Emission Calculations** | |
| **Vented Vapor Saturation Factor** | |
| Vented Vapor Saturation Factor: | 0.964926 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Space Outage (ft): | 1.59 |
| Withdrawal Losses (lb): | 1.0525 |
| Vapor Molecular Weight (lb/lb-mole): | 18.000000 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Annual Net Throughput (gal/yr): | 5711 |
| Turnover Factor: | 1.0000 |
| Maximum Liquid Volume (cuft): | 763 |
| Maximum Liquid Height (ft): | 12 |
| Tank Diameter (ft): | 9 |
| Working Loss Product Factor: | 1.00 |
| Total Losses (lb): | 4.25 |

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
INDIVIDUAL TANK EMISSION TOTALS

12/16/94
PAGE 5

Annual Emissions Report

| Liquid Contents | Losses (lbs.): Standing | Withdrawal | Total |
|---|---|---|---|
| Sump Water | 3.19 | 1.05 | 4.25 |
| Total: | 3.19 | 1.05 | 4.25 |

URANIUM EMISSIONS

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

Annual Emissions: $\frac{4.25 \text{ lb UNH}}{1000 \text{ lb UNH}} \times 6 \times 10^{-06} \text{ lb U} = 2.55 \text{ E-8 lb U/year}$

T056

Maximum Emissions: 2.55 E-8 lb U/year x 5 = 1.28 E-7 lb U/year

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

6432

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

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 538705
Mailing Address

Fernald | Hamilton | 45030
City | County | Zip

Cincinnati | OH | 45253-8705
City | State | Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T057
(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 Process water Storage Tank F1-401

3. Your identification for Source (same as used on appendix): FEMP # 2-148

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

12/20/94
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. Page 1 EPA-3161

000017

FOR OFFICIAL USE ONLY

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

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T057
FEMP ID NO. 2-148

APPENDIX E-2

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

1. Tank identification: Name or number F1-401 (2-148) Date Installed 1952 (month/year)

2. Tank capacity: 5,800 gallons

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

4. Tank dimensions: Diameter 9' Height 12' 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: [X] Outdoors [ ] 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 [X] Other, specify S.S.

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 bein controlled: _____
(Attach calculations and test data to support response, unless previously submitted)



000018

DOE - FEMP
(Facility Name)
F1-401 T057
(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 Process Wastewater <0.1 g/L U, 1-2 N $HNO_3$ Trade Name Raffinate
Density: 8.5 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: 0.4594 psia at average storage temperature
0.4594 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 [X] 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: 5,800 gallons.

Completed by Ervin Fisher, Jr. Req/Tech Spec. III Date Dec , 1994

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 $6 \times 10^{-06}$ 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 — 12/16/94
EMISSIONS REPORT - DETAIL FORMAT — PAGE 1
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

| | |
|---|---|
| Identification No.: | T057 |
| City: | Cincinnati |
| State: | OH |
| Company: | FERMCO |
| Type of Tank: | Vertical Fixed Roof |

Tank Dimensions

| | |
|---|---|
| Shell Height (ft): | 12 |
| Diameter (ft): | 9 |
| Liquid Height (ft): | 12 |
| Avg. Liquid Height (ft): | 12 |
| Volume (gallons): | 5711 |
| Turnovers: | 1 |
| Net Throughput (gal/yr): | 5711 |

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): | 5.00 |
| 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 — 12/16/94
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 Pressur Calculations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sump Water | All | 58.85 | 50.52 | 67.18 | 54.50 | 0.4300 | 0.4300 | 0.4300 | 18.000 | -- | -- | 18.00 | Option 1 |

000020

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/16/94
PAGE 3

Annual Emission Calculations

| | |
|---|---|
| Standing Losses (lb): | 3.1934 |
| Vapor Space Volume (cu ft): | 101.47 |
| Vapor Density (lb/cu ft): | 0.0014 |
| Vapor Space Expansion Factor: | 0.064241 |
| Vented Vapor Saturation Factor: | 0.964926 |
| **Tank Vapor Space Volume** | |
| Vapor Space Volume (cu ft): | 101.47 |
| Tank Diameter (ft): | 9 |
| Vapor Space Outage (ft): | 1.59 |
| Tank Shell Height (ft): | 12 |
| Average Liquid Height (ft): | 12 |
| Roof Outage (ft): | 1.59 |
| **Roof Outage (Dome Roof)** | |
| Roof Outage (ft): | 1.59 |
| Dome Radius (ft): | 5 |
| Shell Radius (ft): | 5 |
| **Vapor Density** | |
| Vapor Density (lb/cu ft): | 0.0014 |
| Vapor Molecular Weight (lb/lb-mole): | 18.000000 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| 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: | 0.064241 |
| Daily Vapor Temperature Range (deg.R): | 33.31 |
| Daily Vapor Pressure Range (psia): | 0.000000 |
| Breather Vent Press. Setting Range(psia): | 0.00 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia): | 0.430000 |
| 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 |

TANKS PROGRAM 2.0
EMISSIONS REPORT
DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/16/94
PAGE 4

Annual Emission Calculations

| | |
|---|---|
| **Vented Vapor Saturation Factor** | |
| Vented Vapor Saturation Factor: | 0.964926 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Space Outage (ft): | 1.59 |
| Withdrawal Losses (lb): | 1.0525 |
| Vapor Molecular Weight (lb/lb-mole): | 18.000000 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Annual Net Throughput (gal/yr): | 5711 |
| Turnover Factor: | 1.0000 |
| Maximum Liquid Volume (cuft): | 763 |
| Maximum Liquid Height (ft): | 12 |
| Tank Diameter (ft): | 9 |
| Working Loss Product Factor: | 1.00 |
| Total Losses (lb): | 4.25 |

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
INDIVIDUAL TANK EMISSION TOTALS

12/16/94
PAGE 5

Annual Emissions Report

| Liquid Contents | Losses (lbs.): Standing | Withdrawal | Total |
|---|---|---|---|
| Sump Water | 3.19 | 1.05 | 4.25 |
| Total: | 3.19 | 1.05 | 4.25 |

URANIUM EMISSIONS

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

Annual Emissions: T057

$$\frac{4.25 \text{ lb UNH}}{1000 \text{ lb UNH}} \times 6 \times 10^{-06} \text{ lb U} = 2.55 \text{ E-8 lb U/year}$$

Maximum Emissions: 2.55 E-8 lb U/year x 5 = 1.28 E-7 lb U/year

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

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

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 538705
Mailing Address

Fernald | Hamilton | 45030
City | County | Zip

Cincinnati | OH | 45253-8705
City | State | Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T058
(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 Process water Storage Tank F1-402

3. Your identification for Source (same as used on appendix): FEMP # 2-149

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

12/20/94
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. Page 1

EPA-3161

FOR OFFICIAL USE ONLY

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

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T058
FEMP ID NO. 2-149

APPENDIX E-2

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

1. Tank identification: Name or number F1-402 (2-149) Date Installed 1952 (month/year)

2. Tank capacity: 5,800 gallons

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

4. Tank dimensions: Diameter 9' Height 12' 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: [X] Outdoors [ ] 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 [X] Other, specify S.S.

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)

000023

DOE - FEMP
(Facility Name)
F1-402 T058
(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 Process Wastewater <0.1 g/L U, 1-2 N HNO, Trade Name Raffinate
Density: 8.5 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: 0.4594 psia at average storage temperature
0.4594 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 [X] 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: 5,800 gallons.

Completed by Ervin Fisher, Jr. Req/Tech Spec. III Date Dec , 1994

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 $6 \times 10^{-06}$ 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 — 12/16/94
EMISSIONS REPORT - DETAIL FORMAT — PAGE 1
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

| | |
|---|---|
| Identification No.: | T058 |
| City: | Cincinnati |
| State: | OH |
| Company: | FERMCO |
| Type of Tank: | Vertical Fixed Roof |

Tank Dimensions

| | |
|---|---|
| Shell Height (ft): | 12 |
| Diameter (ft): | 9 |
| Liquid Height (ft): | 12 |
| Avg. Liquid Height (ft): | 12 |
| Volume (gallons): | 5711 |
| Turnovers: | 1 |
| Net Throughput (gal/yr): | 5711 |

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): | 5.00 |
| 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 — 12/16/94
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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sump Water | All | 58.85 | 50.52 | 67.18 | 54.50 | 0.4300 | 0.4300 | 0.4300 | 18.000 | | | 18.00 | Option 1 |

000025

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/16/94
PAGE 3

Annual Emission Calculations

| | |
|---|---|
| Standing Losses (lb): | 3.1934 |
| Vapor Space Volume (cu ft): | 101.47 |
| Vapor Density (lb/cu ft): | 0.0014 |
| Vapor Space Expansion Factor: | 0.064241 |
| Vented Vapor Saturation Factor: | 0.964926 |
| **Tank Vapor Space Volume** | |
| Vapor Space Volume (cu ft): | 101.47 |
| Tank Diameter (ft): | 9 |
| Vapor Space Outage (ft): | 1.59 |
| Tank Shell Height (ft): | 12 |
| Average Liquid Height (ft): | 12 |
| Roof Outage (ft): | 1.59 |
| **Roof Outage (Dome Roof)** | |
| Roof Outage (ft): | 1.59 |
| Dome Radius (ft): | 5 |
| Shell Radius (ft): | 5 |
| **Vapor Density** | |
| Vapor Density (lb/cu ft): | 0.0014 |
| Vapor Molecular Weight (lb/lb-mole): | 18.000000 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| 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: | 0.064241 |
| Daily Vapor Temperature Range (deg.R): | 33.31 |
| Daily Vapor Pressure Range (psia): | 0.000000 |
| Breather Vent Press. Setting Range(psia): | 0.00 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia): | 0.430000 |
| 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 |

TANKS PROGRAM 2.0
EMISSIONS REPORT
DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/16/94
PAGE 4

Annual Emission Calculations

| | |
|---|---|
| **Vented Vapor Saturation Factor** | |
| Vented Vapor Saturation Factor: | 0.964926 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Space Outage (ft): | 1.59 |
| Withdrawal Losses (lb): | 1.0525 |
| Vapor Molecular Weight (lb/lb-mole): | 18.000000 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Annual Net Throughput (gal/yr): | 5711 |
| Turnover Factor: | 1.0000 |
| Maximum Liquid Volume (cuft): | 763 |
| Maximum Liquid Height (ft): | 12 |
| Tank Diameter (ft): | 9 |
| Working Loss Product Factor: | 1.00 |
| Total Losses (lb): | 4.25 |

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
INDIVIDUAL TANK EMISSION TOTALS

12/16/94
PAGE 5

Annual Emissions Report

| Liquid Contents | Losses (lbs.): Standing | Withdrawal | Total |
|---|---|---|---|
| Sump Water | 3.19 | 1.05 | 4.25 |
| Total: | 3.19 | 1.05 | 4.25 |

URANIUM EMISSIONS

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

Annual Emissions: T058

$$\frac{4.25 \text{ lb UNH}}{1000 \text{ lb UNH}} \times 6 \times 10^{-06} \text{ lb U} = 2.55 \text{ E-8 lb U/year}$$

Maximum Emissions: 2.55 E-8 lb U/year x 5 = 1.28 E-7 lb U/year

6432

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

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

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 538705
Mailing Address

Fernald Hamilton 45030
City County Zip

Cincinnati OH 45253-8705
City State Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T059
(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 Process water Storage Tank F1-400

3. Your identification for Source (same as used on appendix): FEMP # 2-147

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

12/20/94
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. Page 1 EPA-3161

000027

FOR OFFICIAL USE ONLY

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

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T05
FEMP ID NO. 2-14

APPENDIX E-2

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

1. Tank identification: Name or number F1-400 (2-147) Date Installed 1952 (month/year

2. Tank capacity: 5,800 gallons

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

4. Tank dimensions: Diameter 9' Height 12' 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: [X] Outdoors [ ] 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 [X] Other, specify S.S.

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 bein controlled: _____
(Attach calculations and test data to support response, unless previously submitted)

DOE - FEMP
(Facility Name)
F1-400 T059
(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 Process Wastewater <0.1 g/L U, 1-2 N $HNO_3$ Trade Name Raffinate
Density: 8.5 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: 0.4594 psia at average storage temperature
0.4594 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 [X] 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: 5,800 gallons.

Completed by Ervin Fisher, Jr. Req/Tech Spec. III Date Dec , 1994

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 $6 \times 10^{-06}$ 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 — 12/16/94
EMISSIONS REPORT - DETAIL FORMAT — PAGE 1
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

| | |
|---|---|
| Identification No.: | T059 |
| City: | Cincinnati |
| State: | OH |
| Company: | FERMCO |
| Type of Tank: | Vertical Fixed Roof |

Tank Dimensions

| | |
|---|---|
| Shell Height (ft): | 12 |
| Diameter (ft): | 9 |
| Liquid Height (ft): | 12 |
| Avg. Liquid Height (ft): | 12 |
| Volume (gallons): | 5711 |
| Turnovers: | 1 |
| Net Throughput (gal/yr): | 5711 |

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): | 5.00 |
| 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 — 12/16/94
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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sump Water | All | 58.85 | 50.52 | 67.18 | 54.50 | 0.4300 | 0.4300 | 0.4300 | 18.000 | | | 18.00 | Option 1 |

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/16/94
PAGE 3

Annual Emission Calculations

| | |
|---|---|
| Standing Losses (lb): | 3.1934 |
| Vapor Space Volume (cu ft): | 101.47 |
| Vapor Density (lb/cu ft): | 0.0014 |
| Vapor Space Expansion Factor: | 0.064241 |
| Vented Vapor Saturation Factor: | 0.964926 |
| **Tank Vapor Space Volume** | |
| Vapor Space Volume (cu ft): | 101.47 |
| Tank Diameter (ft): | 9 |
| Vapor Space Outage (ft): | 1.59 |
| Tank Shell Height (ft): | 12 |
| Average Liquid Height (ft): | 12 |
| Roof Outage (ft): | 1.59 |
| **Roof Outage (Dome Roof)** | |
| Roof Outage (ft): | 1.59 |
| Dome Radius (ft): | 5 |
| Shell Radius (ft): | 5 |
| **Vapor Density** | |
| Vapor Density (lb/cu ft): | 0.0014 |
| Vapor Molecular Weight (lb/lb-mole): | 18.000000 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| 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: | 0.064241 |
| Daily Vapor Temperature Range (deg.R): | 33.31 |
| Daily Vapor Pressure Range (psia): | 0.000000 |
| Breather Vent Press. Setting Range(psia): | 0.00 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia): | 0.430000 |
| 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 |

TANKS PROGRAM 2.0
EMISSIONS REPORT
DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/16/94
PAGE 4

Annual Emission Calculations

| | |
|---|---|
| **Vented Vapor Saturation Factor** | |
| Vented Vapor Saturation Factor: | 0.964926 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Space Outage (ft): | 1.59 |
| Withdrawal Losses (lb): | 1.0525 |
| Vapor Molecular Weight (lb/lb-mole): | 18.000000 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Annual Net Throughput (gal/yr): | 5711 |
| Turnover Factor: | 1.0000 |
| Maximum Liquid Volume (cuft): | 763 |
| Maximum Liquid Height (ft): | 12 |
| Tank Diameter (ft): | 9 |
| Working Loss Product Factor: | 1.00 |
| Total Losses (lb): | 4.25 |

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
INDIVIDUAL TANK EMISSION TOTALS

12/16/94
PAGE 5

Annual Emissions Report

| Liquid Contents | Losses (lbs.): Standing | Withdrawal | Total |
|---|---|---|---|
| Sump Water | 3.19 | 1.05 | 4.25 |
| Total: | 3.19 | 1.05 | 4.25 |

URANIUM EMISSIONS

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

Annual Emissions: T059

$$\frac{4.25 \text{ lb UNH}}{1000 \text{ lb UNH}} \times 6 \times 10^{-06} \text{ lb U} = 2.55 \text{ E-8 lb U/year}$$

Maximum Emissions: 2.55 E-8 lb U/year x 5 = 1.28 E-7 lb U/year

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

6432

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

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 538705
Mailing Address

Fernald Hamilton 45030
City County Zip

Cincinnati OH 45253-8705
City State Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T072
(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 UNH Storage Tank F3E-225

3. Your identification for Source (same as used on appendix): FEMP # 2-100

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 Calculation

Authorized Signature*
Terence D. Hagen
Director Environmental Compliance
Title

12/20/94
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

000032

FOR OFFICIAL USE ONLY

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

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T07
FEMP ID NO. 2-10

APPENDIX E-2

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

1. Tank identification: Name or number F3E-225 (2-100) Date Installed 1952 (month/year

2. Tank capacity: 70,000 gallons

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

4. Tank dimensions: Diameter 22' Height 24' 6" 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: [X] Outdoors [ ] 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 [X] Other, specify Jacketed w/Galv. Steel coverin

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 bein controlled: _____
(Attach calculations and test data to support response, unless previously submitted)



000033

DOE - FEMP
(Facility Name)
F3E-225 T072
(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 Uranyl Nitrate (UNH) 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: 0.4594 psia at average storage temperature
0.4594 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 [X] 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: 70,000 gallons.

Completed by Ervin Fisher, Jr. Req/Tech Spec. III Date Dec , 1994

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 $6 \times 10^{-06}$ 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 — 12/16/94
EMISSIONS REPORT - DETAIL FORMAT — PAGE 1
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

| | |
|---|---|
| Identification No.: | T072 |
| City: | Cincinnati |
| State: | OH |
| Company: | FERMCO |
| Type of Tank: | Vertical Fixed Roof |

Tank Dimensions

| | |
|---|---|
| Shell Height (ft): | 25 |
| Diameter (ft): | 22 |
| Liquid Height (ft): | 25 |
| Avg. Liquid Height (ft): | 25 |
| Volume (gallons): | 70000 |
| Turnovers: | 1 |
| Net Throughput (gal/yr): | 70000 |

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): | 11.00 |
| 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 — 12/16/94
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 |

000035

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/16/94
PAGE 3

Annual Emission Calculations

| | |
|---|---|
| Standing Losses (lb): | 194.6267 |
| Vapor Space Volume (cu ft): | 2787.64 |
| Vapor Density (lb/cu ft): | 0.0028 |
| Vapor Space Expansion Factor: | 0.074684 |
| Vented Vapor Saturation Factor: | 0.912080 |
| **Tank Vapor Space Volume** | |
| Vapor Space Volume (cu ft): | 2787.64 |
| Tank Diameter (ft): | 22 |
| Vapor Space Outage (ft): | 7.33 |
| Tank Shell Height (ft): | 25 |
| Average Liquid Height (ft): | 25 |
| Roof Outage (ft): | 7.33 |
| **Roof Outage (Dome Roof)** | |
| Roof Outage (ft): | 7.33 |
| Dome Radius (ft): | 11 |
| Shell Radius (ft): | 11 |
| **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 |

TANKS PROGRAM 2.0
EMISSIONS REPORT
DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/16/94
PAGE 4

Annual Emission Calculations

| | |
|---|---|
| **Vented Vapor Saturation Factor** | |
| Vented Vapor Saturation Factor: | 0.912080 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.248015 |
| Vapor Space Outage (ft): | 7.33 |
| Withdrawal Losses (lb): | 26.0416 |
| Vapor Molecular Weight (lb/lb-mole): | 63.000000 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.248015 |
| Annual Net Throughput (gal/yr): | 70000 |
| Turnover Factor: | 1.0000 |
| Maximum Liquid Volume (cuft): | 9503 |
| Maximum Liquid Height (ft): | 25 |
| Tank Diameter (ft): | 22 |
| Working Loss Product Factor: | 1.00 |
| Total Losses (lb): | 220.67 |

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
INDIVIDUAL TANK EMISSION TOTALS

12/16/94
PAGE 5

Annual Emissions Report

| Liquid Contents | Losses (lbs.): Standing | Withdrawal | Total |
|---|---|---|---|
| Uranyl Nitrate | 194.63 | 26.04 | 220.67 |
| Total: | 194.63 | 26.04 | 220.67 |

## URANIUM EMISSIONS

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

Annual Emissions: T072

$$\frac{220.67 \text{ lb UNH}}{1000 \text{ lb UNH}} \times 6 \times 10^{-06} \text{ lb U} = 1.32 \text{ E-6 lb U/year}$$

Maximum Emissions: 1.32 E-6 lb U/year x 5 = 6.62 E-6 lb U/year

6432

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

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

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 538705
Mailing Address

Fernald Hamilton 45030
City County Zip

Cincinnati OH 45253-8705
City State Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T073
(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 Process water Storage Tank F1-308

3. Your identification for Source (same as used on appendix): FEMP # 2-126

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
12/20/94
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. Page 1 EPA-3161

000037

FOR OFFICIAL USE ONLY

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

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T07
FEMP ID NO. 2-12

APPENDIX E-2

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

1. Tank identification: Name or number F1-308 (2-126) Date Installed 1952 (month/year

2. Tank capacity: 2,250 gallons

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

4. Tank dimensions: Diameter 6' 6" Height 9' 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 bein controlled: _____
(Attach calculations and test data to support response, unless previously submitted)

000038

DOE - FEMP
(Facility Name)
F1-308 T073
(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 Process Wastewater <50g/L Uranium; <3 Normal $HNO_3$ Trade Name Filtrate from Slag Leach
Density: 8.5 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: 0.4594 psia at average storage temperature
0.4594 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 [X] 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: 2,250 gallons.

Completed by Ervin Fisher, Jr. Req/Tech Spec. III Date Dec , 1994

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 x $10^{-06}$ 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 — 12/16/94
EMISSIONS REPORT - DETAIL FORMAT — PAGE 1
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

| | |
|---|---|
| Identification No.: | T073 |
| City: | Cincinnati |
| State: | OH |
| Company: | FERMCO |
| Type of Tank: | Vertical Fixed Roof |

Tank Dimensions

| | |
|---|---|
| Shell Height (ft): | 9 |
| Diameter (ft): | 7 |
| Liquid Height (ft): | 8 |
| Avg. Liquid Height (ft): | 8 |
| Volume (gallons): | 2250 |
| Turnovers: | 1 |
| Net Throughput (gal/yr): | 2250 |

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 — 12/16/94
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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sump Water | All | 58.85 | 50.52 | 67.18 | 54.50 | 0.4300 | 0.4300 | 0.4300 | 18.000 | | | 18.00 | Option 1 |

000040

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/16/94
PAGE 3

Annual Emission Calculations

| | |
|---|---|
| Standing Losses (lb): | 2.5742 |
| Vapor Space Volume (cu ft): | 82.79 |
| Vapor Density (lb/cu ft): | 0.0014 |
| Vapor Space Expansion Factor: | 0.064241 |
| Vented Vapor Saturation Factor: | 0.953263 |
| **Tank Vapor Space Volume** | |
| Vapor Space Volume (cu ft): | 82.79 |
| Tank Diameter (ft): | 7 |
| Vapor Space Outage (ft): | 2.15 |
| Tank Shell Height (ft): | 9 |
| Average Liquid Height (ft): | 8 |
| Roof Outage (ft): | 1.15 |
| **Roof Outage (Dome Roof)** | |
| Roof Outage (ft): | 1.15 |
| Dome Radius (ft): | 4 |
| Shell Radius (ft): | 4 |
| **Vapor Density** | |
| Vapor Density (lb/cu ft): | 0.0014 |
| Vapor Molecular Weight (lb/lb-mole): | 18.000000 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| 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: | 0.064241 |
| Daily Vapor Temperature Range (deg.R): | 33.31 |
| Daily Vapor Pressure Range (psia): | 0.000000 |
| Breather Vent Press. Setting Range(psia): | 0.00 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia): | 0.430000 |
| 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 |

TANKS PROGRAM 2.0
EMISSIONS REPORT
DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/16/94
PAGE 4

Annual Emission Calculations

| | |
|---|---|
| **Vented Vapor Saturation Factor** | |
| Vented Vapor Saturation Factor: | 0.953263 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Space Outage (ft): | 2.15 |
| Withdrawal Losses (lb): | 0.4146 |
| Vapor Molecular Weight (lb/lb-mole): | 18.000000 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Annual Net Throughput (gal/yr): | 2250 |
| Turnover Factor: | 1.0000 |
| Maximum Liquid Volume (cuft): | 308 |
| Maximum Liquid Height (ft): | 8 |
| Tank Diameter (ft): | 7 |
| Working Loss Product Factor: | 1.00 |
| Total Losses (lb): | 2.99 |

TANKS PROGRAM 2.0
12/16/94
EMISSIONS REPORT - DETAIL FORMAT
PAGE 5
INDIVIDUAL TANK EMISSION TOTALS

Annual Emissions Report

| Liquid Contents | Losses (lbs.): Standing | Withdrawal | Total |
|---|---|---|---|
| Sump Water | 2.57 | 0.41 | 2.99 |
| Total: | 2.57 | 0.41 | 2.99 |

URANIUM EMISSIONS

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

Annual Emissions: $\frac{2.99 \text{ lb UNH}}{1000 \text{ lb UNH}} \times 6 \times 10^{-06} \text{ lb U} = 1.79 \text{ E-8 lb U/year}$

T073

Maximum Emissions: 1.79 E-8 lb U/year x 5 = 8.97 E-8 lb U/year

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

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

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 538705
Mailing Address

Fernald | Hamilton | 45030
City | County | Zip

Cincinnati | OH | 45253-8705
City | State | Zip

513/ 738-6502
Telephone Area Number

513/ 738-6502
Telephone

#1431110128-T081
(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 Process water Storage Tank F1-317
3. Your identification for Source (same as used on appendix): FEMP # 2-146

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

12/20/94
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. Page 1 EPA-3161

FOR OFFICIAL USE ONLY

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

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 TO
FEMP ID NO. 2-1

APPENDIX E-2

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

1. Tank identification: Name or number F1-317 (2-146) Date Installed 1952 (month/yea

2. Tank capacity: 8,225 gallons

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

4. Tank dimensions: Diameter 10' Height 14' 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: [X] Outdoors [ ] 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) [X] Medium gray [X] Other, specify Insulated

Condition of paint: [X] 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 bein controlled: _____
(Attach calculations and test data to support response, unless previously submitted)

000043

DOE - FEMP
(Facility Name)
F1-317 T081
(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 b stored. Attach additional sheets if necessary.)

a) Material Process Wastewater <50g/L Uranium; <3 Normal $HNO_3$ Trade Name Filtrate from Slag Leach
Density: 8.5 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 pressur is not known, write "unknown"):

i.) Actual vapor pressure: 0.4594 psia at average storage temperature
0.4594 psia at maximum storage temperature

ii.) Reid vapor pressure: Average UKN psi and minimum-maximum UNK - UNK ps

iii.) If material stored is a gas or liquified gas, provide the pressure at which i 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, answe the question below.) Not an organic material

Is it a photochemically reactive material? [ ] Yes [X] 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: 8,225 gallons.

Completed by Ervin Fisher, Jr. Req/Tech Spec. III Date Dec , 1994

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 $6 \times 10^{-06}$ 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 — 12/16/94
EMISSIONS REPORT - DETAIL FORMAT — PAGE 1

TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

| | |
|---|---|
| Identification No.: | T081 |
| City: | Cincinnati |
| State: | OH |
| Company: | FERMCO |
| Type of Tank: | Vertical Fixed Roof |

Tank Dimensions

| | |
|---|---|
| Shell Height (ft): | 14 |
| Diameter (ft): | 10 |
| Liquid Height (ft): | 14 |
| Avg. Liquid Height (ft): | 14 |
| Volume (gallons): | 7800 |
| Turnovers: | 1 |
| Net Throughput (gal/yr): | 7800 |

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): | 5.00 |
| 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 — 12/16/94
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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sump Water | All | 58.85 | 50.52 | 67.18 | 54.50 | 0.4300 | 0.4300 | 0.4300 | 18.000 | | | 18.00 | Option 1 |

000045

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/16/94
PAGE 3

Annual Emission Calculations

| | |
|---|---|
| Standing Losses (lb): | 7.9361 |
| Vapor Space Volume (cu ft): | 261.80 |
| Vapor Density (lb/cu ft): | 0.0014 |
| Vapor Space Expansion Factor: | 0.064241 |
| Vented Vapor Saturation Factor: | 0.929397 |
| **Tank Vapor Space Volume** | |
| Vapor Space Volume (cu ft): | 261.80 |
| Tank Diameter (ft): | 10 |
| Vapor Space Outage (ft): | 3.33 |
| Tank Shell Height (ft): | 14 |
| Average Liquid Height (ft): | 14 |
| Roof Outage (ft): | 3.33 |
| **Roof Outage (Dome Roof)** | |
| Roof Outage (ft): | 3.33 |
| Dome Radius (ft): | 5 |
| Shell Radius (ft): | 5 |
| **Vapor Density** | |
| Vapor Density (lb/cu ft): | 0.0014 |
| Vapor Molecular Weight (lb/lb-mole): | 18.000000 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| 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: | 0.064241 |
| Daily Vapor Temperature Range (deg.R): | 33.31 |
| Daily Vapor Pressure Range (psia): | 0.000000 |
| Breather Vent Press. Setting Range(psia): | 0.00 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia): | 0.430000 |
| 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 |

TANKS PROGRAM 2.0
EMISSIONS REPORT
DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/16/94
PAGE 4

Annual Emission Calculations

| | |
|---|---|
| **Vented Vapor Saturation Factor** | |
| Vented Vapor Saturation Factor: | 0.929397 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Space Outage (ft): | 3.33 |
| Withdrawal Losses (lb): | 1.4374 |
| Vapor Molecular Weight (lb/lb-mole): | 18.000000 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Annual Net Throughput (gal/yr): | 7800 |
| Turnover Factor: | 1.0000 |
| Maximum Liquid Volume (cuft): | 1100 |
| Maximum Liquid Height (ft): | 14 |
| Tank Diameter (ft): | 10 |
| Working Loss Product Factor: | 1.00 |
| Total Losses (lb): | 9.37 |

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
INDIVIDUAL TANK EMISSION TOTALS

12/16/94
PAGE 5

Annual Emissions Report

| Liquid Contents | Losses (lbs.): Standing | Withdrawal | Total |
|---|---|---|---|
| Sump Water | 7.94 | 1.44 | 9.37 |
| Total: | 7.94 | 1.44 | 9.37 |

URANIUM EMISSIONS

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

Annual Emissions: $\frac{9.37 \text{ lb UNH}}{1000 \text{ lb UNH}} \times 6 \times 10^{-06} \text{ lb U} = 5.62 \text{ E-8 lb U/year}$

T081

Maximum Emissions: 5.62 E-8 lb U/year x 5 = 2.81 E-7 lb U/year

6432

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

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

Mr. Stephen M. Beckman
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 538705
Mailing Address

Fernald — City
Hamilton — County
45030 — Zip

Cincinnati — City
OH — State
45253-8705 — Zip

513/ 738-6502
Telephone — Area Number

513/ 738-6502
Telephone

#1431110128-T085
(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 Process water Storage Tank F3-408
3. Your identification for Source (same as used on appendix): FEMP # 2-156

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

12/20/94
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. Page 1

EPA-3161

000047

FOR OFFICIAL USE ONLY

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

DOE - FEMP
(Facility Name)
OEPA NO 1431110128 T085
FEMP ID NO. 2-156

APPENDIX E-2

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

1. Tank identification: Name or number F3E-408 (2-156) Date Installed 1952 (month/year)

2. Tank capacity: 25,000 gallons

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

4. Tank dimensions: Diameter 17' Height 15' 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: [X] 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 bein controlled: _____
(Attach calculations and test data to support response, unless previously submitted)

000048

6432

DOE - FEMP
(Facility Name)
F3E-408 T085
(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 b stored. Attach additional sheets if necessary.)

a) Material Slopwater, Rainwater, Sumpwater and Process Wastewater <5g/L Uranium; <1 Normal $HNO_3$ Trade Name N/A
Density: 8.3 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 pressur is not known, write "unknown"):

i.) Actual vapor pressure: 0.4594 psia at average storage temperature
0.4594 psia at maximum storage temperature

ii.) Reid vapor pressure: Average UKN psi and minimum-maximum UNK - UNK ps

iii.) If material stored is a gas or liquified gas, provide the pressure at which i 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, answe the question below.) Not an organic material

Is it a photochemically reactive material? [ ] Yes [X] 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: 25,000 gallons.

Completed by Ervin Fisher, Jr. Req/Tech Spec. III Date Dec , 1994



000019

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 $6 \times 10^{-06}$ 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 — 12/16/94
EMISSIONS REPORT - DETAIL FORMAT — PAGE 1
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

| | |
|---|---|
| Identification No.: | T085 |
| City: | Cincinnati |
| State: | OH |
| Company: | FERMCO |
| Type of Tank: | Vertical Fixed Roof |

Tank Dimensions

| | |
|---|---|
| Shell Height (ft): | 15 |
| Diameter (ft): | 17 |
| Liquid Height (ft): | 15 |
| Avg. Liquid Height (ft): | 15 |
| Volume (gallons): | 25000 |
| Turnovers: | 1 |
| Net Throughput (gal/yr): | 25000 |

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): | 9.00 |
| 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 — 12/16/94
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 Pressur Calculations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sump Water | All | 58.85 | 50.52 | 67.18 | 54.50 | 0.4300 | 0.4300 | 0.4300 | 18.000 | | | 18.00 | Option 1 |

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/16/94
PAGE 3

Annual Emission Calculations

| | |
|---|---|
| Standing Losses (lb): | 24.1863 |
| Vapor Space Volume (cu ft): | 801.19 |
| Vapor Density (lb/cu ft): | 0.0014 |
| Vapor Space Expansion Factor: | 0.064241 |
| Vented Vapor Saturation Factor: | 0.925546 |
| **Tank Vapor Space Volume** | |
| Vapor Space Volume (cu ft): | 801.19 |
| Tank Diameter (ft): | 17 |
| Vapor Space Outage (ft): | 3.53 |
| Tank Shell Height (ft): | 15 |
| Average Liquid Height (ft): | 15 |
| Roof Outage (ft): | 3.53 |
| **Roof Outage (Dome Roof)** | |
| Roof Outage (ft): | 3.53 |
| Dome Radius (ft): | 9 |
| Shell Radius (ft): | 9 |
| **Vapor Density** | |
| Vapor Density (lb/cu ft): | 0.0014 |
| Vapor Molecular Weight (lb/lb-mole): | 18.000000 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| 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: | 0.064241 |
| Daily Vapor Temperature Range (deg.R): | 33.31 |
| Daily Vapor Pressure Range (psia): | 0.000000 |
| Breather Vent Press. Setting Range(psia): | 0.00 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia): | 0.430000 |
| 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 |

TANKS PROGRAM 2.0
EMISSIONS REPORT
DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

12/16/94
PAGE 4

Annual Emission Calculations

| | |
|---|---|
| **Vented Vapor Saturation Factor** | |
| Vented Vapor Saturation Factor: | 0.925546 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Vapor Space Outage (ft): | 3.53 |
| Withdrawal Losses (lb): | 4.6071 |
| Vapor Molecular Weight (lb/lb-mole): | 18.000000 |
| Vapor Pressure at Daily Average Liquid Surface Temperature (psia): | 0.430000 |
| Annual Net Throughput (gal/yr): | 25000 |
| Turnover Factor: | 1.0000 |
| Maximum Liquid Volume (cuft): | 3405 |
| Maximum Liquid Height (ft): | 15 |
| Tank Diameter (ft): | 17 |
| Working Loss Product Factor: | 1.00 |
| Total Losses (lb): | 28.79 |

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
INDIVIDUAL TANK EMISSION TOTALS

12/16/94
PAGE 5

Annual Emissions Report

| Liquid Contents | Losses (lbs.): Standing | Withdrawal | Total |
|---|---|---|---|
| Sump Water | 24.19 | 4.61 | 28.79 |
| Total: | 24.19 | 4.61 | 28.79 |

URANIUM EMISSIONS

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

Annual Emissions: T085

$$\frac{28.79 \text{ lb UNH}}{1000 \text{ lb UNH}} \times 6 \times 10^{-06} \text{ lb U} = 1.73 \text{ E-7 lb U/year}$$

Maximum Emissions: 1.73 E-7 lb U/year x 5 = 8.64 E-7 lb U/year