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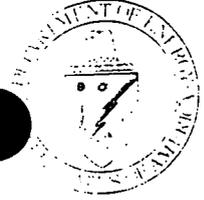
G-000-104 .143

**PERMIT TO OPERATE FOR FMPC SILO NO. 3**

10/19/90

DOE-65-91  
DOE-FN      OEPA  
6  
PTO

6488



**Department of Energy**

**FMPC Site Office**

P.O. Box 398705

Cincinnati, Ohio 45239-8705

(513) 738-6319

OCT 19 1990

DOE-65-91

Mr. M. Jay Kessel, Jr.  
Southwestern Ohio Air Pollution  
Control Agency  
1632 Central Parkway  
Cincinnati, OH 45210

Dear Mr. Kessel:

**PERMIT TO OPERATE FOR FMPC SILO NO. 3**

Enclosed is a Permit to Operate (PTO) application for FMPC Silo #3 (ID #65-003). The PTO application was prepared since radon gas is emitted from the contents of the silo. Calculations showing an estimate of annual radon gas emissions are provided with the application. The PTO application and emission calculations were prepared in a similar manner as with Silo #1 (OEPA #T111) and Silo #2 (OEPA #T112). Also enclosed is a statement from our contractor concerning the accuracy of the data in the application.

A \$15.00 check to cover the application fee is included with this transmittal. If you have any questions or require additional information, please contact Behram Shroff at (513) 738-6003.

Sincerely,

Gerald W. Westerbeck  
FMPC Site Manager

DP-84:Shroff

Enclosures: As stated

cc w/encl.:

B. L. Queener, SE-31, ORO  
S. M. Beckman, WMCO

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

6488

U.S. DOE-Feed Materials Production Center  
 Facility Name

Behram Shroff  
 Person to Contact

7400 Willey Rd.  
 Facility Address

P.O. Box 398705  
 Mailing Address

Fernald      Hamilton      45030  
 City            County            Zip

Cincinnati    Ohio      45239-8705  
 City            State            Zip

Telephone      Area            Number

(513) 738-6003  
 Telephone

2819

(Application No., if this is a renewal application) 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:

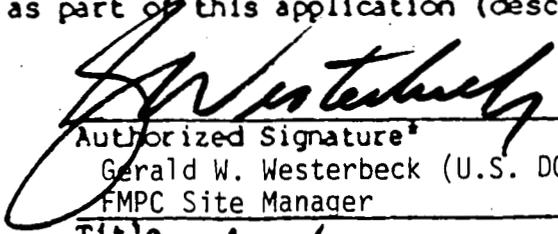
- |  |   |
|--|---|
| <input type="checkbox"/> Appendix A, Process   | <input type="checkbox"/> Appendix L, Solvent Metal Cleaning         |
| <input type="checkbox"/> Appendix B, Fuel-Burning Equipment                          | <input type="checkbox"/> Appendix M, Fugitive Dust Emission Sources |
| <input type="checkbox"/> Appendix C, Incinerator                                     |   |
| <input type="checkbox"/> Appendix D, Surface Coating or Printing Operation           | <u>Specify Appendix No.</u>   |
| <input checked="" type="checkbox"/> Appendix E, Storage Tank                         | <input type="checkbox"/> Appendix N, Rubber Tire Manufacturing      |
| <input type="checkbox"/> Appendix H, Gasoline Dispensing Facility                    | <input type="checkbox"/> Appendix O, Dry Cleaning Facility          |
| <input type="checkbox"/> Appendix J, Loading Rack at Bulk Gasoline Plant or Terminal | <input type="checkbox"/> Appendix P, Landfills                      |
| <input type="checkbox"/> Appendix K, Surface Coating Line or Printing Line           | <input type="checkbox"/> Other Appendix _____                       |
|  | <input type="checkbox"/> Compliance Time Schedule                   |

2. Description of Source (same as used on appendix): Silo #3 (Metal Oxide Silo)

3. Your identification for Source (same as used on appendix): F35-1 (65-003)

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):

- 1) Appendix E - Storage Tank
- 2) Data Sheet

  
 Authorized Signature\*  
 Gerald W. Westerbeck (U.S. DOE)  
 FMPC Site Manager  
 Title  
10/18/90  
 Date

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

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ource No. \_\_\_/\_\_\_  
lication No. \_\_\_/\_\_\_

DOE-FMPC  
\_\_\_\_\_  
(Facility Name)

APPENDIX E-2

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

Tank identification: Name or number Silo #3 F35-1 Date Installed Mid-1952  
65-003 (month/year)

Tank capacity: 156,350 ft<sup>3</sup> gallons

Tank shape:  Cylindrical  Rectangular  
 Spherical  Other, specify \_\_\_\_\_

Tank dimensions: Diameter 80' Height 36' Length \_\_\_\_\_ Width \_\_\_\_\_  
\*To the top of the dome is 36 ft. The sidewall is 27 ft. high

Tank shell material:  Steel  Aluminum  Other, specify Reinforced concrete

Type of tank:  External floating roof tank  
 Internal floating roof tank  
 Fixed roof tank  
 Vertical cylindrical tank  
 Horizontal cylindrical tank  
 Pressure tank  
 Other, specify \_\_\_\_\_

Location of tank:  Outdoors  Indoors  Underground

Type of filling:  Splash  Submerged  Other, specify \_\_\_\_\_

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

Aluminum (specular)  Light gray  White  
 Aluminum (diffuse)  Medium gray  Other, specify X  
The silo has a gunite layer covering the outside of the sidewall. The dome has no protective  
Condition of paint:  Good  Poor layer.

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 N/A  
Manufacturer \_\_\_\_\_ Make or model \_\_\_\_\_  
Date installed (month and year) \_\_\_\_\_

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

c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: Radon Gas (see attached calculations) 0.9 Ci/yr  
(Attach calculations and test data to support response, unless previously submitted.)

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.
N/A			

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

a) Material Metal Oxides-Calcined Residues Trade Name N/A  
Density:      lbs/gal or      °API Producer N/A  
(Specific Gravity 2.08-2.75)

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

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

i) Actual vapor pressure: None psia at average storage temperature  
None psia at maximum storage temperature  
The stored material is a solid, Radon has no vapor pressure

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

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

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

Is it a photochemically reactive material? [ ] Yes [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) N/A

f) Indicate the year (or 12-month period) for item (g): See Note

g) Annual throughput of material: N/A; see Note gallons.

Note: Material was last placed in tank in late 1950 s

Completed by T. J. Walsh Date 8/13/90

Emissions Calculations For Silo #3

## I. Assumptions

1. To date a number of studies and investigations have been undertaken on Silos #1, #2, and #3. Some of the data used in calculating the attached radon-222 emissions were obtained from these studies. Since these studies are in draft or preliminary form, the numbers contained in this attachment may change somewhat as additional information becomes available.
2. Silo #3 head space is approximately 7000 ft<sup>3</sup>. This is based on visual observation of the level of material in Silo #3 during a sampling project.
3. Silo #3 is not pressurized and is subject to diurnal temperature changes of approximately 12 degrees C per day.
4. By using a ratio technique, the concentration of radon-222 in the head space of Silo #3 can be estimated. The ratio technique assumes the radon-222 content of the head space in Silo #2 is proportional to the radium-226 content of the material stored in Silo #2. Therefore, the radium-226 content of Silo #3 can be used to determine the radon-222 concentration of Silo #3's headspace.
5. The radon-222 concentration in Silo #2 is  $3.0 \times 10^7$  pCi/l.<sup>1</sup>
6. The radium-226 content of Silo #2 is estimated to be 2300 curies. This assumed that the radium-226 content of Silos #1 and #2 totaled 4600 curies with an equal amount of radium in Silo #1 and #2.<sup>2</sup>
7. The radium content of Silo #3 is estimated to be 23 curies.<sup>3</sup>
8. The Ideal Gas Law can be used to calculate the change in volume of gas in the headspace for Silo #3 due to diurnal temperature changes.
9. The average yearly temperature at the FMPC is 54 degrees F or 12.2 degrees C (285.5 degrees K).

## II. Calculations

1.  $(V1/T1) = (V2/T2)$

$$(7000 \text{ ft}^3/285.5 \text{ degrees K}) = (V2/297.5 \text{ degrees K})$$

$$V2 = 7294 \text{ ft}^3$$

$$V2 - V1 = 7294 \text{ ft}^3 - 7000 \text{ ft}^3 = 294 \text{ ft}^3$$

2.  $\frac{(\text{Ra-226 content Silo \#3})}{(\text{Ra-226 content Silo \#2})} = \frac{(\text{Rn-222 content Silo \#3})}{(\text{Rn-222 content Silo \#2})}$

$$\frac{(23 \text{ Curies})}{(2300 \text{ Curies})} = \frac{(\text{Rn-222 content Silo \#3})}{(3.0 \times 10^7 \text{ pCi/l})}$$

$$\text{Rn-222 content of headspace Silo \#3} = 3.0 \times 10^5 \text{ pCi/l}$$

3. Radon release rate from diurnal temperature change:

$$(3.0 \times 10^5 \text{ pCi/l}) \times (1 \times 10^{-12} \text{ Ci/pCi}) \times (294 \text{ ft}^3/\text{day}) \times (28.3 \text{ l/ft}^3) = 2.5 \times 10^{-3} \text{ Ci/day}$$

4.  $(2.5 \times 10^{-3} \text{ Ci/day}) \times (365 \text{ days/yr}) = 0.9 \text{ Ci/yr}$

## III. References

1. Walker, S., 1989, "Radon Emission Calculations For The K-65 Silos Since The Dome Foaming," Permit To Operate Application (FMPC ID# 65-002), dated March 16, 1989.
2. University of Cincinnati, College of Engineering, Draft "A Probabilistic Risk Assessment For The K-65 Storage Silos At The FMPC," p. 1-2, dated August 9, 1990.
3. Advanced Sciences Incorporated (ASI)/International Technology Corporation, 1990, Draft "Remedial Investigation Report For Operable Unit 4, Volume 1 of 2, Feed Material Production Center, Fernald, Ohio," p. 1-41, prepared by Advanced Sciences, Inc./IT Corporation for the Department of Energy, Oak Ridge Operations Office, July 1990, FMPC-0460-3.



6488

Westinghouse  
Materials Company  
of Ohio

PO Box 398704  
Cincinnati, Ohio 45239-8704

(513) 738 6200

WMCO:EC:90-363

September 28, 1990

Mr. Gerald W. Westerbeck  
FMPC Site Manager  
U.S. Department of Energy  
P.O. Box 398705  
Cincinnati, Ohio 45239-8705

Dear Mr. Westerbeck:

**PERMIT TO OPERATE FOR FMPC SILO NO. 3 (FMPC ID #65-003)**

- Reference: 1) Letter, Raymond J. Hansen, DOE/FMPC to Mr. M. B. Boswell, WMCO, "Air Emissions Actions", DOE-897-90 dated April 13, 1990.
- 2) Letter, W. H. Britton, WMCO to Mr. G. W. Westerbeck, DOE/FMPC, "Permit To Operate Determination For FMPC Silo No. 3", WMCO:P:90-263 dated June 15, 1990.

Attached is a Permit To Operate (PTO) application for Silo #3 (FMPC ID# 65-003) which should be transmitted to the Southwestern Ohio Air Pollution Control Agency (SWOAPCA). The PTO application was prepared in response to Reference 1 since radon gas is emitted from the contents of Silo #3 and is technically considered an air emission source by definition in the Ohio Administrative Code (OAC). The PTO application and emission calculations were prepared in a similar manner as the Silo #1 and #2 applications.

The WMCO personnel responsible for preparing this application have reviewed it for completeness and accuracy. To the best of my knowledge, the application, in its current form, is true, complete and accurate.

Enclosed is a draft letter for transmittal of the application to SWOAPCA. A check in the amount of \$15 to cover the application fee is available from Environmental Compliance. Please contact Environmental Compliance (x6679) when you require the check.

Very truly yours,

Ellery D. Savage, Manager  
Environmental Compliance

TJW

Attachment



0488

LWA-545-90

MEMORANDUM

DATE: October 8, 1990  
TO: Behram Shroff, DOE  
FROM: Mitch Newman, LWA  
SUBJECT: PERMIT TO OPERATE FOR SILO #3

Reference: Letter E. D. Savage, WMCO to Mr. G. W. Westerbeck  
DOE/FMPC, WMCO:EC:90-363, dated September 28, 1990

After completion of review of the PTO for Silo #3, it has been found technically acceptable, as is, for transmittal to Southwestern Ohio Air Pollution Control Agency.

*interior*  
to d-3450  
(2342)

Date Rec'd OCT 09 1990  
Log E-41  
File \_\_\_\_\_  
Library \_\_\_\_\_

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