G-000-104.19

3832

PERMIT TO OPERATE APPLICATION FOR ANALYTICAL LABORATORY FACILITIES PERCHLORIC ACID HOODS VENTILATION CONTROL SYSTEM - FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

12/17/91

DOE-532-92
DOE-FN/SOAP
20
LETTER

[redacted]

Department of Energy
Fernald Environmental Management Project
P.O. Box 398705
Cincinnati, Ohio 45239-8705
(513) 738-6357

3832

DEC 17 1991

DOE-532-92

Ms. M. Meder
Environmental Scientist I
Southwestern Ohio Air Pollution
Control Agency
1632 Central Parkway
Cincinnati, Ohio 45210

Dear Ms. Meder:

PERMIT TO OPERATE APPLICATION FOR ANALYTICAL LABORATORY FACILITIES PERCHLORIC ACID HOODS VENTILATION CONTROL SYSTEM - FERNALD ENVIRONMENTAL MANAGEMENT PROJECT (FEMP)

Reference: Letter, DOE-1148-91, G. W. Westerbeck to H. Schwietering, Air Permit Actions," dated April 17,1991

Enclosed for your review and approval is an Ohio Environmental Protection Agency Permit to Operate application for new laboratory hoods and ventilation (vent) points. These facilities have been installed as part of the site analytical laboratory upgrade/renovation project. Emissions from all of the sources identified are ventilated through a distinct system which is identified as the "Perchloric Acid Hoods Ventilation Control System". A Permit to Install has not been prepared based on the exemption provided by OAC Rule 3745-31-03(A)(1)(f). The attached application has been expanded to include information deemed necessary for complete definition of the processes involved. Also enclosed is a check in the amount of $15.00 to cover the application fee.

In accordance with the above referenced letter, we will continue to provide laboratory support needed for monitoring and/or directing ongoing activities at the FEMP. To insure no interruption in essential services, start up will consist of a phased transfer of ongoing site laboratory services from old outdated facilities and equipment to the newly renovated installation. Part of the new expansion is the installation of new environment and ventilation control devices.

Recycled and Recyclable

If you have any questions or require additional information concerning this application, please contact Behram Shroff of my staff at (513) 738-6003.

Sincerely,

R. E. Tiller

R. E. Tiller
Manager

FO:Shroff

Enclosure: As stated

c w/encl.: M. Humphries, SE-31 ORO
P. B. Spotts, WEMCO

PERMIT TO OPERATE APPLICATION

ANALYTICAL LABORATORY FACILITIES PERCHLORIC ACID
HOODS VENTILATION CONTROL SYSTEM

FEMP ID# 15-003

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

3832

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

Mr. Behram Shroff
Person to Contact

7400 Willey Road
Facility Address

Post Office Box 398705
Mailing Address

Fernald Hamilton 45030
City County Zip

Cincinnati OH 45239-8705
City State Zip

(513) 738-6200
Telephone Area Number

(513) 738-6003
Telephone

(Application no., if this is a renewal application)

2819
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:

XXAppendix A, Process
__Appendix B, Fuel-Burning Equipment
__Appendix C, Incinerator
__Appendix D, Surface Coating or Printing Operation
__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): Analytical Laboratory Facilities Perchloric Acid Hoods Ventilation Control System

3. Your identification for Source (same as used on appendix): 15-003

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) General Description
2) Process Description
3) Appendix A - Process Data
4) Attachment I

R. E. Tiller
Authorized Signature
R. E. Tiller
Manager, Fernald Office
Title

12/10/91
Date

4 EPA-3161

PERMIT TO OPERATE
ANALYTICAL LABORATORY FACILITIES
MULTI-POINT VENTILATION CONTROL SYSTEM

GENERAL DESCRIPTION

The analytical laboratory facilities at the Fernald Environmental Management Project (FEMP) were constructed and first occupied in 1952 as part of supporting facilities for the production of high purity uranium metal. In 1989, renovation were initiated to provide quality control laboratories in support of the production facilities. The changes have been implemented in the existing Analytical Laboratory Building #15. The FEMP is a Government-owned facility for the production of uranium metal products for the U. S. Department of Energy (DOE). It is located at 7400 Willey Road near Fernald, Ohio and has the OEPA facility number of 1431110128.

In 1991 the U. S. Department of Energy announced a change of policy for the FEMP. Along with renaming of the facilities, new priorities were implemented emphasizing environmental clean up and site restoration. With the change in mission, changes have occurred in the composition of materials being processed through the laboratories. This application has been developed to demonstrate that all laboratory operations will be conducted in such a manner as to assure no adverse impact to the immediate and surrounding environments. In addition a NESHAPs determination was provided on January 18, 1991 by the USEPA. The determination was made that this renovation did not constitute a modification under NESHAPs based on no increase in emission rates. Contained herein are compliance demonstration in accordance with the requirements of OAC 3745-35-02 (C)(5).

Included in the renovation is the implementation of Best Available Technology (BAT) for control of emissions from the various sources which produce air contaminants. These sources are laboratory scale operations where quantitative/qualitative analyses are performed. Usually, only small quantities of product are involved, (10 grams or less). Historically the laboratory was involved in analysis of samples containing high concentrations of uranium or other radionuclide bearing materials. With the re-emphasis from a production facility to environmental remediation and clean up, processing of highly concentrated materials are greatly reduced.

For each point ventilated, a process description, hood ID number, ventilation air flow rate and the materials processed have been compiled in Table "A" (see Appendix A). In addition to the table, calculations have been prepared to determine average and maximum emissions expected. Where available, historical information and/or known operational data is used. Normally this information is provided as part of the Permit to Install submittal; however, based on the exemption identified in the OAC rule 3745-31-03 item (A)(1)(f), no PTI has been prepared. Therefore, the information listed in OAC 3745-35-02-B6 deemed necessary by the Agency and normally submitted with the PTI, has been provided as part of the PTO application. This preparation is in conformance with the requirements of OAC 3745-31-05.

PROCESS DESCRIPTION FEMP ID# 15-003 (PERCHLORIC ACID HOODS VENTILATION CONTROL SYSTEM)

The perchloric acid hoods ventilation control system consists of 12 separate systems, each of which services a single fume hood. Each system contains a hood, duct run, internal hood and stack wash down system, exhaust fan and stack. Emission points are identified as EP15-004 through EP15-015 and are serviced by exhaust fans numbered EF-4 through EF-15 respectively. Discharge ducting is a vertical arrangement to an exhaust fan mounted on the laboratory building roof. Information relative to each stack is provided in table form. This table contains the following: stack heights, diameters, flow rates and velocities and is appended to this application as TABLE "B" in Appendix A.

The fans exhausting the individual systems vary and are dependent on the size of hoods being ventilated (4, 5 and 6 foot long hoods are used). Hoods shall be variable air volume type, without bypass, with the exhaust volume adjustable by raising and lowering the hood's sash. An independent variable air volume hood mounted controller shall adjust the exhaust air control valve to compensate for sash position in order to maintain a constant face velocity of 150 FPM. Due to the variable sash position, flow rates through the hood will vary accordingly.

Materials processed in the hoods will contain small to trace concentrations of the following analytes: metals, uranium, thorium and other radionuclides. Routine samples processed have a concentration of 100 ppm or less of these constituents. Samples with concentrations greater than this value will be cut to be within the limit prior to processing. Reagents used will be concentrated perchloric, nitric and hydrofluoric acids. The following is a list of sources from which samples may be obtained: residues from drumming stations, sump liquors and sump cakes, stack sampler filters, dust collector residues, greases, solvents, contaminated oils, scrap salts, concrete, soils, paint chips, waste water, various mixed wastes and other environmental media. Materials containing VOC's will be pretreated to drive off volatile organics prior to processing in the perchloric hoods. A typical solution for analysis is prepared by digesting a 2 gram fraction of solids containing the analyte in 5 ml of $HClO_4$ and 5 ml of HNO_3. For a liquid sample, 5 ml of solution containing the analyte is used. These samples are then reduced to dryness by heating inside the hoods. Maximum rate of processing of samples will be 20 per hour per hood. As a worst case assumption, emission rates are estimated based on the maximum number possible of typical samples processed in one hour.

In this application, the determination of emission estimates is based on the number of samples processed on a per hood basis and the volume of materials driven off in the digestion/drying process. This will be accomplished using a material balance method to determine particulate emission rate from each stack. For radionuclides, the emissions estimate will be based on a concentration factor of the analyte contained in the sample. An effective dose equivalent (EDE) calculation is provided. This calculation is provided to demonstrate the collective impact of emissions on a potential off site receptor.

APPENDIX A

ANALYTICAL LABORATORY FACILITIES PERCHLORIC ACID HOODS VENTILATION CONTROL SYSTEM

CONTENTS

PROCESS DATA SHEETS

PROCESS FLOW DIAGRAM

TABLE "A"

TABLE "B"

For Official Use Only

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

APPENDIX A, PROCESS

PROCESS DATA

1. Name of process Analytical Laboratory Facilities Perchloric Acid Hoods Ventilation Control System FMPC ID #15-003
2. End product of this process Analytical and Technology Demonstation Services
3. Primary process equipment Analytical Equipment and Laboratory Facilities

   Your identification See TABLE "A" Year Installed 1991

4. Manufacturer N/A Make or Model N/A

5. Capacity of equipment (lbs./hr): Rated N/A Max. N/A
6. Method of exhaust ventilation: [X] Stack [ ] Window fan [ ] Roof vent
   [ ] Other, describe____

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

OPERATING DATA

7. Normal operating schedule: 24 hrs./day, 5 days/wk., 52 wks./year.

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

9. Hourly production rates (lbs.): Average N/A Maximum N/A

10. Annual production (indicate units) N/A
    projected percent annual increase in production N/A

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

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

13. Materials used in process:

List of Raw Materials	Principle Use	Amount (lbs./hr.)
SEE PROCESS DESCRIPTION	QUANTITATIVE/QUALITATIVE	LABORATORY SCALE
	ANALYSES	

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

CONTROL EQUIPMENT

A-2

OEPA NO. 1431110128 ____
FEMP ID NO. 15-003

Control Equipment Code:

(A)	Settling Chamber	(G)	Cyclonic Scrubber	(M)	Adsorber
(B)	Cyclone	(H)	Impingement Scrubber	(N)	Condenser
(C)	Multiple Cyclone	(I)	Orifice Scrubber	(O)	Afterburner - Catalytic
(D)	Electrostatic Precipitator	(J)	Venturi Scrubber	(P)	Afterburner - Thermal
(E)	Fabric Filter	(K)	Plate or Tray Tower	(Q)	Other, Describe_____
(F)	Spray Chamber	(L)	Packing Tower		_____

15. Control Equipment Data:

Item	Primary Collector	Secondary Collector
(a) Type (See above Code)	None	None
(b) Manufacturer	N/A	N/A
(c) Model No.	N/A	N/A
(d) Year Installed	N/A	N/A
(e) Your Identification	N/A	N/A
(f) Pollutant Controlled	N/A	N/A
(g) Controlled pollutant emission rate (if known)	N/A	N/A
(h) Pressure Drop	N/A	N/A
(i) Design efficiency	N/A	N/A
(j) Operating efficiency	N/A	N/A

STACK DATA

16. Your Stack Identification EP15-004 THRU EP15-015 (** See TABLE "B")

17. Are other sources vented to this stack? [ ] Yes [X] No
    If yes, identify sources_____

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

19. Height: Above roof ** ft., above ground ** ft.

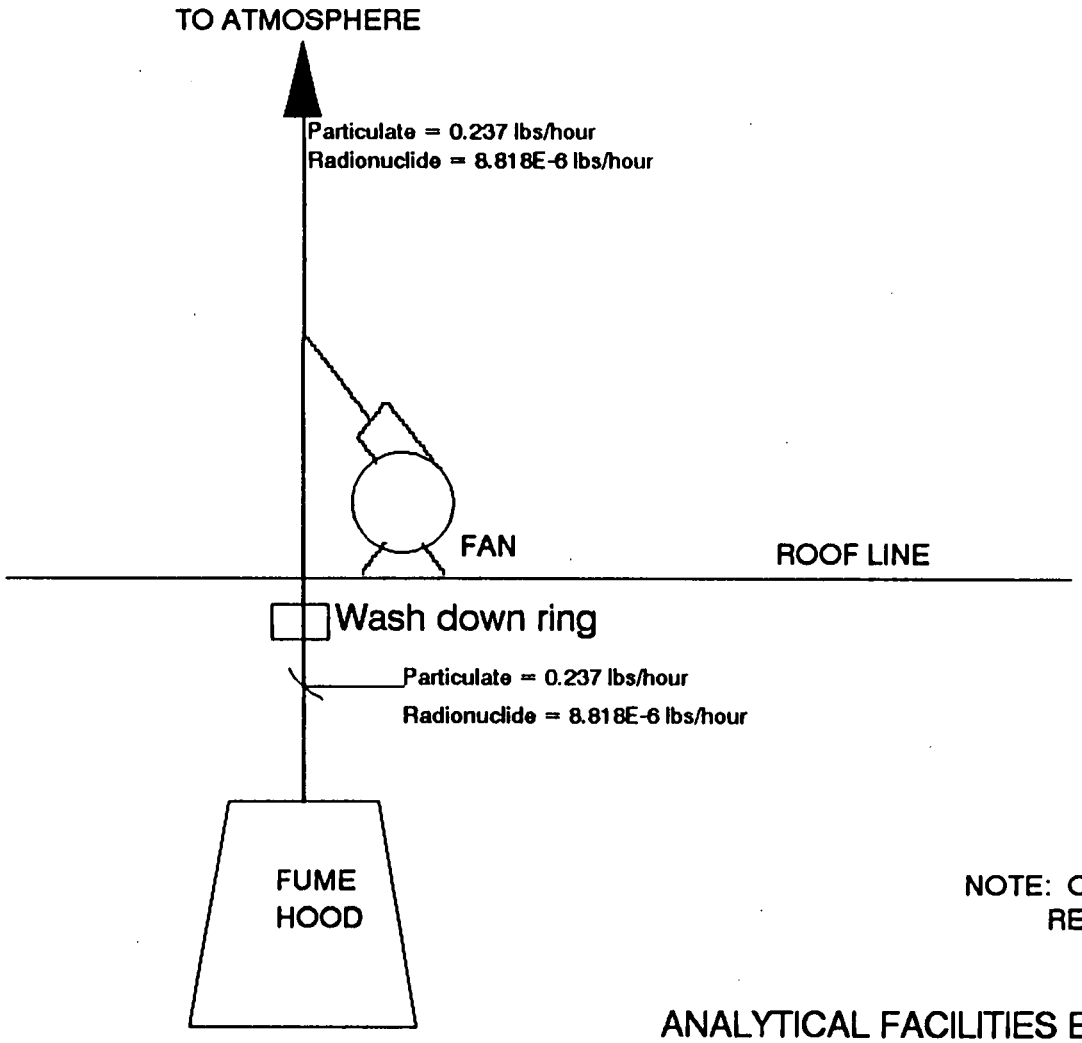
20. Exit gas: Temp. Ambient °F, Volume ** ACFM, Velocity ** ft./min.

21. Continuous monitoring equipment: [ ] Yes [X] No
    If yes, indicate : Type _____, Manufacturer _____
    Make or Model _____, Pollutant(s) monitored _____

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

Completed by Robert Young, Date 11/27/91

R.G.
10/9/91



NOTE: ONE SYSTEM SHOWN 12 SYSTEMS
REQUIRED SEE TABLES "A" & "B"

ANALYTICAL FACILITIES BUILDING # 15
PERCHLORIC ACID HOODS VENTILATION CONTROL SYSTEM

FLOW DIAGRAM

TABLE "A"
FEMP SOURCE ID# 15-003
EMISSION POINT ID# EP15-004 THROUGH EP15-015

GROUPS	PROCESS	HOOD ID NO'S	HOOD CFM	FAN ID	MATERIALS PROCESSED
Analytical Laboratories	Process Materials Control	FH - 169D	0-1500	EF-4	s. & l. digestions of samples U, Th, trace metals & radionuclides
Analytical Laboratories	Process Materials Control	FH - 169E	0-1500	EF-5	same as above
Analytical Laboratories	Materials Control	FH - 168D	0-1500	EF-6	same as above
Analytical Laboratories	Materials Control	FH - 168C	0-1500	EF-7	same as above
Technology Demonstration	Research Technology	FH - 156A	0-1900	EF-8	same as above
Miscellaneous	Metals	FH - 157C	0-1500	EF-9	same as above
Miscellaneous	Samples	FH - 162C	0-1500	EF-10	same as above
Miscellaneous	Powder & Sample Prep.	FH - 193C	0-1500	EF-11	same as above
Analytical Laboratories	Radiometric (Isotopic)	FH - 209D	0-1900	EF-12	same as above
Analytical Laboratories	Radiometric (Isotopic)	FH - 213B	0-1500	EF-13	same as above
Analytical Laboratories	Radiometric (Isotopic)	FH - 206B	0-1900	EF-14	same as above
Miscellaneous	Greensalt/ Sump Cake	FH - 165C	0-1000	EF-15	same as above

FH - Fume Hood, s. - solid, l. - liquid

TABLE "B"

FAN #	EMISSION POINT	HEIGHT ABOVE GRADE (FEET)	HEIGHT ABOVE ROOF (FEET)	DIAMETER (INCHES)	MAXIMUM FLOW RATE (CFM)	VELOCITY (ft/min)
EF-6	EP15-006	38.25	7	16	1500	1074
EF-7	EP15-007	38.25	7	16	1500	1074
EF-8	EP15-008	39.42	7	18	1900	1075
EF-4	EP15-004	42.50	30	16	1500	1074
EF-5	EP15-005	40.50	28	16	1500	1074
EF-9	EP15-009	37.50	25	16	1500	1074
EF-10	EP15-010	19.50	7	16	1500	1074
EF-11	EP15-011	37.25	7	16	1500	1074
EF-12	EP15-012	38.42	7	18	1900	1075
EF-13	EP15-013	37.25	7	16	1500	1074
EF-14	EP15-014	38.42	7	18	1900	1075
EF-15	EP15-015	36.17	25	10	1000	1833

ATTACHMENT I

ANALYTICAL LABORATORY FACILITIES PERCHLORIC ACID HOODS VENTILATION CONTROL SYSTEM AIR EMISSIONS CALCULATIONS FEMP SOURCE #15-003

TABLE OF CONTENT

A. Assumptions

B. Particulate Loading Rates (Uncontrolled)

C. Radionuclide Loading Rates (Uncontrolled)

D. Compliance Determination (Particulate)

E. Best Available Technology Determination (Particulate)

F. Effective Dose Equivalent Calculations
   Table A Radionuclide Values
   Table B Radionuclide Conversions

A. ASSUMPTIONS

1. Assume maximum work schedule of 24 hours per day, 7 days per week and 52 weeks per year, (8760 hr/yr) and an average work schedule of 24 hours per day, 5 days per week and 50 weeks per year, (6000 hr/yr).

2. Assume particulate load is composed of mists, acid fumes and/or dust particles; water vapors are not included.

3. Assume maximum radionuclide concentration is 100 ppm, sole source is 2 gram sample.

4. Assumed maximum number of samples processed is 20 per hood in one hour.

5. As worst case use 2 gram sample dissolved in 5 ml HNO_3 and 5 ml $HCLO_4$; Assume entire sample is exhausted from the hood.

B. PARTICULATE LOADING RATES (Uncontrolled)

5 grams HNO_3 @ 70% = 3.5 grams HNO_3 + 1.5 grams H_2O.
decomposition of 3.5 grams HNO_3 yields 2.11 grams NO_x gas.*

5 grams $HClO_4$ @ 70% = 3.5 grams $HClO_4$ + 1.5 grams H_2O.
decomposition of 3.5 grams $HClO_4$ yields 1.27 grams HCl gas.*

Assume uncontrolled particulate is composed of all materials excluding water vapors.
2 grams sample + 2.11 grams NO_x + 1.27 grams HCl = 5.38 grams of sample.

Samples are processed at a rate of 20 per hour per hood.
(5.38 grams/sample)(20 sample/hour) = 107.6 grams/hour
or (107.6 grams/hour)(lbs/453.59) = 0.237 lbs/hour/hood.

<u>Average Rate:</u>

0.237 lbs/hr X 6000 hr/yr = 1423.3 lbs/yr/hood
or
1423.3 lbs/yr X tons/2000 lbs = 0.712 tons/yr/hood.

<u>Maximum Rate:</u>

0.237 lbs/hr X 8760 hr/yr = 2078.0 lbs/yr/hood
or
2078.0 lbs/hr X tons/2000 lbs = 1.039 tons/yr/hood.

* - Remaining fraction of decomposition is a mixture of water and/or oxygen.

C. RADIONUCLIDE LOADING RATES (Uncontrolled)

2 grams/sample X lbs/453.59 grams X 20 samples/hour X 100/1000000 = 8.818E-6 lbs/hr/hood.

Average Rate:

8.818E-6 lbs/hr X 6000 hr/yr = 0.053 lbs/yr/hood
or
0.053 lbs/yr X tons/2000 lbs = 2.646E-5 tons/yr/hood.

Maximum Rate:

8.818E-6 lbs/hr X 8760 hr/yr = 0.077 lbs/yr/hood
or
0.077 lbs/yr X tons/2000 lbs = 3.863E-5 tons/yr/hood.

D. COMPLIANCE DETERMINATION (PARTICULATE)

Allowable rate of particulate emissions based on process weight rate at maximum capacity, Table I, OAC 3745-17-11:

From OAC 3745-17-11 the allowable rate of particulate emissions
$E = 4.10P^{0.67}$
where: P is the process weight rate at maximum capacity in tons per hour.

then: P = (0.237 lbs/hr)/(2000 lbs/ton) = 0.000119 ton/hr.
and: $E = 4.10(0.000119)^{0.67} = 0.009598$ lbs/hr.

Comparison of calculated (E) with values found in the above referenced table, where P is between zero and 0.05, a value of E = 0.551 lbs/hr can be used.

The calculated rate of 0.237 lbs/hr when compared to the above E value of 0.551 lbs/hr indicates that compliance with OAC rule 3745-17-11 will be achieved. See Table X below:

NOTE: The compliance demonstration as prepared reflects emissions from one perchloric acid hood system only. There is a total of 12 such systems. From the Ohio EPA, Office of Pollution Control, Division of Engineering, Engineering Guide #11: for compliance demonstration, the summation of estimated emissions can be compared with the summation of the allowable limiting values as specified by OAC 3745-17-11. This is made possible by the assumption that the twelve systems are identical.

TABLE X

	Allowable Rate Per Table I, OAC 3745-17-11	Determined Rate (maximum)
Particulate	0.551 lbs/hr	0.237 lbs/hr
Particulate	Best Available Technology OAC rule 3745-31-05(A)(3)	None required

E. BEST AVAILABLE TECHNOLOGY DETERMINATION (Particulate)

Based on the maximum calculated annual uncontrolled emissions rate of 2078 lbs/yr for particulate and 0.077 lbs for radionuclides exhausted in the rated flow of the one fume hood system, it is proposed that installation of additional controls would not be cost effective. To achieve an added reduction in emissions, installation of high energy scrubbers would be required.

F. EFFECTIVE DOSE EQUIVALENT CALCULATIONS

40 CFR Part 61
National Emission Standards
for Hazardous Air Pollutants

REPORT ON COMPLIANCE WITH

THE CLEAN AIR ACT LIMITS FOR RADIONUCLIDE EMISSIONS

FROM THE COMPLY CODE, VERSION 1.4

ANALYTICAL LABORATORY FACILITIES PERCHLORIC ACID HOODS VENTILATION CONTROL SYSTEM

Prepared by:

Westinghouse Environmental Management Co. of OH
Fernald Environmental Management Project (FEMP)
P. O. Box 398704, Cincinnati, Ohio 45239

Robert Gorog, Senior Engineer
(513) 738-6707

Prepared for:

U.S. Department of Energy
Fernald Environmental Management Project
Fernald, Ohio 45030

REPORT ON COMPLIANCE WITH THE CLEAN AIR ACT LIMITS FOR RADIONUCLIDE EMISSIONS

SCREENING LEVEL 2

DATA ENTERED:

RELEASE RATES FOR STACK EP15-006

Nuclide		Release Rate (curies/YEAR)
U-234	Y	1.194E-05
U-235	Y	5.340E-07
U-236	Y	1.110E-06
U-238	Y	1.159E-05
PU-239	W	1.500E-08
PU-238	W	3.000E-09
NP-237	W	1.000E-09
TH-234	Y	5.378E-05
TH-232	W	5.200E-08
TH-230	W	7.150E-07
TH-228	Y	7.400E-08
RA-228	W	8.000E-09
RA-226	W	4.700E-08
CS-137	D	3.940E-07
RU-106	Y	6.800E-08
TC-99	W	1.686E-06
SR-90	Y	5.200E-08

RELEASE RATES FOR STACK EP15-007

Nuclide		Release Rate (curies/YEAR)
U-234	Y	1.194E-05
U-235	Y	5.340E-07
U-236	Y	1.110E-06
U-238	Y	1.159E-05
PU-239	W	1.500E-08
PU-238	W	3.000E-09
NP-237	W	1.000E-09
TH-234	Y	5.378E-05
TH-232	W	5.200E-08
TH-230	W	7.150E-07
TH-228	Y	7.400E-08
RA-228	W	8.000E-09
RA-226	W	4.700E-08
CS-137	D	3.940E-07
RU-106	Y	6.800E-08
TC-99	W	1.686E-06
SR-90	Y	5.200E-08

RELEASE RATES FOR STACK EP15-008

Nuclide		Release Rate (curies/YEAR)
U-234	Y	1.194E-05
U-235	Y	5.340E-07
U-236	Y	1.110E-06
U-238	Y	1.159E-05
PU-239	W	1.500E-08
PU-238	W	3.000E-09
NP-237	W	1.000E-09
TH-234	Y	5.378E-05
TH-232	W	5.200E-08
TH-230	W	7.150E-07
TH-228	Y	7.400E-08
RA-228	W	8.000E-09
RA-226	W	4.700E-08
CS-137	D	3.940E-07
RU-106	Y	6.800E-08
TC-99	W	1.686E-06
SR-90	Y	5.200E-08

RELEASE RATES FOR STACK EP15-004

Nuclide		Release Rate (curies/YEAR)
U-234	Y	1.194E-05
U-235	Y	5.340E-07
U-236	Y	1.110E-06
U-238	Y	1.159E-05
PU-239	W	1.500E-08
PU-238	W	3.000E-09
NP-237	W	1.000E-09
TH-234	Y	5.378E-05
TH-232	W	5.200E-08
TH-230	W	7.150E-07
TH-228	Y	7.400E-08
RA-228	W	8.000E-09
RA-226	W	4.700E-08
CS-137	D	3.940E-07
RU-106	Y	6.800E-08
TC-99	W	1.686E-06
SR-90	Y	5.200E-08

RELEASE RATES FOR STACK EP15-005

Nuclide		Release Rate (curies/YEAR)
U-234	Y	1.194E-05
U-235	Y	5.340E-07
U-236	Y	1.110E-06
U-238	Y	1.159E-05
PU-239	W	1.500E-08
PU-238	W	3.000E-09
NP-237	W	1.000E-09
TH-234	Y	5.378E-05
TH-232	W	5.200E-08
TH-230	W	7.150E-07
TH-228	Y	7.400E-08
RA-228	W	8.000E-09
RA-226	W	4.700E-08
CS-137	D	3.940E-07
RU-106	Y	6.800E-08
TC-99	W	1.686E-06
SR-90	Y	5.200E-08

RELEASE RATES FOR STACK EP15-009

Nuclide		Release Rate (curies/YEAR)
U-234	Y	1.194E-05
U-235	Y	5.340E-07
U-236	Y	1.110E-06
U-238	Y	1.159E-05
PU-239	W	1.500E-08
PU-238	W	3.000E-09
NP-237	W	1.000E-09
TH-234	Y	5.378E-05
TH-232	W	5.200E-08
TH-230	W	7.150E-07
TH-228	Y	7.400E-08
RA-228	W	8.000E-09
RA-226	W	4.700E-08
CS-137	D	3.940E-07
RU-106	Y	6.800E-08
TC-99	W	1.686E-06
SR-90	Y	5.200E-08

RELEASE RATES FOR STACK EP15-010

Nuclide		Release Rate (curies/YEAR)
U-234	Y	1.194E-05
U-235	Y	5.340E-07
U-236	Y	1.110E-06
U-238	Y	1.159E-05
PU-239	W	1.500E-08
PU-238	W	3.000E-09
NP-237	W	1.000E-09
TH-234	Y	5.378E-05
TH-232	W	5.200E-08
TH-230	W	7.150E-07
TH-228	Y	7.400E-08
RA-228	W	8.000E-09
RA-226	W	4.700E-08
CS-137	D	3.940E-07
RU-106	Y	6.800E-08
TC-99	W	1.686E-06
SR-90	Y	5.200E-08

RELEASE RATES FOR STACK EP15-011

Nuclide		Release Rate (curies/YEAR)
U-234	Y	1.194E-05
U-235	Y	5.340E-07
U-236	Y	1.110E-06
U-238	Y	1.159E-05
PU-239	W	1.500E-08
PU-238	W	3.000E-09
NP-237	W	1.000E-09
TH-234	Y	5.378E-05
TH-232	W	5.200E-08
TH-230	W	7.150E-07
TH-228	Y	7.400E-08
RA-228	W	8.000E-09
RA-226	W	4.700E-08
CS-137	D	3.940E-07
RU-106	Y	6.800E-08
TC-99	W	1.686E-06
SR-90	Y	5.200E-08

RELEASE RATES FOR STACK EP15-012

Nuclide		Release Rate (curies/YEAR)
U-234	Y	1.194E-05
U-235	Y	5.340E-07
U-236	Y	1.110E-06
U-238	Y	1.159E-05
PU-239	W	1.500E-08
PU-238	W	3.000E-09
NP-237	W	1.000E-09
TH-234	Y	5.378E-05
TH-232	W	5.200E-08
TH-230	W	7.150E-07
TH-228	Y	7.400E-08
RA-228	W	8.000E-09
RA-226	W	4.700E-08
CS-137	D	3.940E-07
RU-106	Y	6.800E-08
TC-99	W	1.686E-06
SR-90	Y	5.200E-08

RELEASE RATES FOR STACK EP15-013

Nuclide		Release Rate (curies/YEAR)
U-234	Y	1.194E-05
U-235	Y	5.340E-07
U-236	Y	1.110E-06
U-238	Y	1.159E-05
PU-239	W	1.500E-08
PU-238	W	3.000E-09
NP-237	W	1.000E-09
TH-234	Y	5.378E-05
TH-232	W	5.200E-08
TH-230	W	7.150E-07
TH-228	Y	7.400E-08
RA-228	W	8.000E-09
RA-226	W	4.700E-08
CS-137	D	3.940E-07
RU-106	Y	6.800E-08
TC-99	W	1.686E-06
SR-90	Y	5.200E-08

RELEASE RATES FOR STACK EP15-014

Nuclide		Release Rate (curies/YEAR)
U-234	Y	1.194E-05
U-235	Y	5.340E-07
U-236	Y	1.110E-06
U-238	Y	1.159E-05
PU-239	W	1.500E-08
PU-238	W	3.000E-09
NP-237	W	1.000E-09
TH-234	Y	5.378E-05
TH-232	W	5.200E-08
TH-230	W	7.150E-07
TH-228	Y	7.400E-08
RA-228	W	8.000E-09
RA-226	W	4.700E-08
CS-137	D	3.940E-07
RU-106	Y	6.800E-08
TC-99	W	1.686E-06
SR-90	Y	5.200E-08

RELEASE RATES FOR STACK EP15-015 *

Nuclide		Release Rate (curies/YEAR)
U-234	Y	1.194E-05
U-235	Y	5.340E-07
U-236	Y	1.110E-06
U-238	Y	1.159E-05
PU-239	W	1.500E-08
PU-238	W	3.000E-09
NP-237	W	1.000E-09
TH-234	Y	5.378E-05
TH-232	W	5.200E-08
TH-230	W	7.150E-07
TH-228	Y	7.400E-08
RA-228	W	8.000E-09
RA-226	W	4.700E-08
CS-137	D	3.940E-07
RU-106	Y	6.800E-08
TC-99	W	1.686E-06
SR-90	Y	5.200E-08

* - Assumed same release rate as other stacks.

SITE DATA FOR STACK EP15-006

Release height 11 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 930 meters.

Building width 79 meters.

SITE DATA FOR STACK EP15-007

Release height 11 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 930 meters.

Building width 79 meters.

SITE DATA FOR STACK EP15-008

Release height 12 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 930 meters.

Building width 79 meters.

SITE DATA FOR STACK EP15-004

Release height 13 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 930 meters.

Building width 79 meters.

SITE DATA FOR STACK EP15-005

Release height 12 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 930 meters.

Building width 79 meters.

SITE DATA FOR STACK EP15-009

Release height 11 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 930 meters.

Building width 79 meters.

SITE DATA FOR STACK EP15-010

Release height 6 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 930 meters.

Building width 79 meters.

SITE DATA FOR STACK EP15-011

Release height 11 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 930 meters.

Building width 79 meters.

SITE DATA FOR STACK EP15-012

Release height 11 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 930 meters.

Building width 79 meters.

SITE DATA FOR STACK EP15-013

Release height 11 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 930 meters.

Building width 79 meters.

SITE DATA FOR STACK EP15-014

Release height 11 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 930 meters.

Building width 79 meters.

SITE DATA FOR STACK EP15-015

Release height 11 meters.

Building height 9 meters.

The source and receptor are not on the same building.

Distance from the source to the receptor is 930 meters.

Building width 79 meters.

Default mean wind speed used (2.0 m/sec).

NOTES:

Input parameters outside the "normal" range:

Receptor is unusually FAR.

RESULTS:

Effective dose equivalent: 9.5E-02 mrem/yr.

*** Comply at level 2.

This facility is in COMPLIANCE.

It may or may not be EXEMPT from reporting to the EPA.

You may contact your regional EPA office for more information.

********** END OF COMPLIANCE REPORT **********

NOTES:

Per 40 CFR 61.93.a, Subpart H, "DOE facilities for which the maximally exposed individual lives within 3 kilometers of all sources of emissions in the facility, may use EPA's COMPLY model and associated procedures for determining dose for purpose of compliance". The above determined effective dose equivalent (EDE) is 0.095 mrem/yr which is less than 1% of the 10 mrem/yr standard specified in Subpart H. Therefore, these release points are NOT subject to the emission measurement requirement as identified in paragraph b of 40 CFR 61.93. It should be noted that the above analysis assumes that all 12 hoods operated 24 hours per day, 365 days per year analyzing samples at the maximum radionuclide concentration. The emission estimate also assume that the entire sample is emitted to the atmosphere from the hood. Based on these worst case assumption, the calculated dose value remain below the stated standards. The actual dose, during normal operations will be significantly lower.

Source information relating to the radionuclide data used is appended as TABLES A and B.

TABLE A RADIONUCLIDE VALUES*

Radionuclides	Quantity (Ci/Kg U)	Solubility
U-234	3.42E-04	Y
U-235	1.53E-05	Y
U-236	3.18E-05	Y
U-238	3.32E-04	Y
Pu-239+240	4.39E-07	Y
Pu-238	9.06E-08	Y
Np-237	2.90E-07	Y
Th-234	1.54E-03	Y
Pa-234m	6.79E-04	Y
Th-232	1.49E-06	Y
Th-230	2.05E-05	Y
Th-228	2.14E-06	Y
Ra-228	2.43E-07	Y
Ra-226	1.36E-06	Y
Cs-137	1.13E-05	D
Ru-106	1.96E-06	W
Tc-99	4.83E-05	Y
Sr-90	1.49E-06	D
Ba-137m	1.13E-05	Y

*Extract from Application for determination of a modification under 40 CFR 61, National Emission Standards for Hazardous Air Pollutants (NESHAP), Analytical Facility Upgrade. Application Submitted for USEPA approval November 27, 1990, See Appendix B Table 3.

TABLE B RADIONUCLIDE CONVERSIONS

FOR STACK NUMBERS EP15-004 THROUGH EP15-015

From Air Emissions Calculations Estimated Annual Stack Discharge Rates, Summary Table, Maximum Radionuclide Discharge Rate = 0.077 lbs U/yr or 0.077 lbs U/yr x kg/2.205 lbs. = 0.0349 kg U/yr

Radionuclides	Quantity Ci/Kg U)	Rate Kg U/yr	Release Rate Ci/yr
U-234	3.42E-04	0.0349	1.194E-5
U-235	1.53E-05	0.0349	5.340E-7
U-236	3.18E-05	0.0349	1.110E-6
U-238	3.32E-04	0.0349	1.159E-5
Pu-239+240	4.39E-07	0.0349	1.500E-8
Pu-238	9.06E-08	0.0349	3.000E-9
Np-237	2.90E-07	0.0349	1.000E-9
Th-234	1.54E-03	0.0349	5.378E-5
Th-232	1.49E-06	0.0349	5.200E-8
Th-230	2.05E-05	0.0349	7.150E-7
Th-228	2.14E-06	0.0349	7.400E-8
Ra-228	2.43E-07	0.0349	8.000E-9
Ra-226	1.36E-06	0.0349	4.700E-8
Cs-137	1.13E-05	0.0349	3.940E-7
Ru-106	1.96E-06	0.0349	6.800E-8
Tc-99	4.83E-05	0.0349	1.686E-6
Sr-90	1.49E-06	0.0349	5.200E-8

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INVOICE DATE	REFERENCE/INVOICE NO.	AMOUNT OF INVOICE	DEDUCTION	AMOUNT
12/04/91	103877 / 911204	15.00		15.00
PTO Application Fee for Analytical Laboratories Bldg #15, FEMP ID #15-003				

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