2974

G-000-104.27

APPLICATION FOR PERMIT TO INSTALL (AIR PERMIT) - SUMP SYSTEM - PLANT 8

03/09/92

WEMCO/SOAPCA
~~70~~ 119
APPLICATION

[redacted]

APPLICATION FOR PERMIT TO INSTALL (AIR PERMIT) - SUMP SYSTEM - PLANT 8

For All Permits to Install

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

Services of the Plant 8 Sump System

Wastewaters collected from numerous areas around the Fernald plant site will be collected and treated in three new 25,300 gallon tanks in a batch-type process. A lime slurry will be added to neutralize the wastewaters and precipitate dissolved metals. The slurry generated in this process will then be filtered over a precoated rotary vacuum filter. The filter cake will be collected in drums and will either be disposed of directly or transported to the Rotary Kiln for drying prior to disposal. Three existing tanks and one new tank will collect the filtrate. The filtrate will be analyzed and will either be recycled or pumped to holding tanks at the General Sump.

The generation of emissions may be broken down into two process operations:

(1) The Precoat Process and

(2) The Wastewater Treatment Process.

Precoat slurry to the two rotary vacuum filters will be supplied from an existing 3000 gallon slurry tank. Precoat in bags will be added to the tank through a new bag slitter/trash compactor unit. The Precoat system will generate emissions when dust, created from the opening and dumping of bags of precoat, becomes airborne. This dust shall be vented through a new 30 cfm dust collector, which is an integral part of the new bag slitter/trash compactor assembly.

In the Wastewater Treatment system, agitation of the filter feed tanks may entrain particulate matter in the vapor space above the liquid level of the vessel. Any entrained matter will be vented through a demister pad before exiting to the atmosphere. Any particulate collected in the demister assembly will be returned to the plant 8 floor sump.

The filter cake drumming station emissions will be vented to an existing HEPA dust collector (Equipment No. G43-27/29) before exiting to the atmosphere. This vent is monitored for radionuclide emissions. The monitoring system is equipped with an alarm and automatic process shutdown system.

Emissions from the lime slurry tank, the rotary vacuum filters, the filtrate receiver sump tank and the filtrate receiver tanks will be exhausted directly to the atmosphere.

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

The following materials shall be used or produced in the Precoat process:

Materials used -	Average	Maximum
Process water	484 lbs/hr	855 lbs/hr
Precoat (Diatomaceous Earth)	54 lbs/hr	95 lbs/hr
Materials produced -		
Precoat slurry	538 lbs/hr	950 lbs/hr

The following materials shall be used or produced in the Wastewater Treatment process:

Materials used -	Average	Maximum
Wastewater	20,825 lbs/hr	36,792 lbs/hr
Lime slurry (15%)	934 lbs/hr	1,650 lbs/hr
Precoat slurry	538 lbs/hr	950 lbs/hr
Materials produced -	Average	Maximum
Filter cake (50% water)	388 lbs/hr	685 lbs/hr
Treated wastewater	21,909 lbs/hr	38,707 lbs/hr

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

This application proposes the installation of new equipment along with modifications to some existing facilities.

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

Yes, an EPA preliminary staff determination recommended that the Director issue a Permit to Install for application number 14-1856, dated October 4, 1989, for the Plant 8 Sump System. In an effort to minimize waste generation and reduce construction costs and operating problems, several changes have been made to the original proposal. This modified application incorporates those proposed changes.

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

Yes, the proposed facility has been designed to operate in compliance with all applicable rules, and regulations of Ohio EPA and U.S. EPA.

For Air Pollution Sources

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

ACTUAL EMISSIONS		PARTICULATE		URANIUM	
SOURCE		LBS/HOUR	TONS/YEAR	LBS/HOUR	TONS/YEAR
Bag Slitter/ Trash Compactor	Max.	4.88E-02	1.07E-01	_____	_____
	Avg.	4.88E-02	1.53E-02		
Feed Tank T-08X-1800	Max.	1.44E-11	6.3E-11	1.44E-11	6.3E-11
	Avg.	2.89E-12	1.3E-11	2.89E-12	1.3E-11
Feed Tank T-08X-1900	Max.	1.44E-11	6.3E-11	1.44E-11	6.3E-11
	Avg.	2.89E-12	1.3E-11	2.89E-12	1.3E-11
Feed Tank T-08X-2000	Max.	1.44E-11	6.3E-11	1.44E-11	6.3E-11
	Avg.	2.89E-12	1.3E-11	2.89E-12	1.3E-11
Lime Slurry Tank T-08X-8000	Max.	1.20E-02	5.25E-02	_____	_____
	Avg.	2.40E-03	1.05E-02		
Vacuum Filter #1 Vacuum Pump	Max.	5.67E-03	2.49E-02	1.13E-04	4.97E-04
	Avg.	1.61E-03	4.82E-03	3.21E-05	9.64E-05
Vacuum Filter #1 Filter Hood	Max.	2.08E-03	9.11E-03	4.16E-05	1.82E-04
	Avg.	1.04E-03	3.12E-03	2.08E-05	6.25E-05
Drumming Station #1	Max.	1.04E-05	4.56E-05	5.21E-07	2.28E-06
	Avg.	5.20E-06	2.28E-05	2.60E-07	1.14E-06
Vacuum Filter #2 Vacuum Pump	Max.	5.67E-03	2.49E-02	1.13E-04	4.97E-04
	Avg.	1.61E-03	4.82E-03	3.21E-05	9.64E-05
Vacuum Filter #2 Filter Hood	Max.	2.08E-03	9.11E-03	4.16E-05	1.82E-04
	Avg.	1.04E-03	3.12E-03	2.08E-05	6.25E-05
Drumming Station #2	Max.	1.04E-05	4.56E-05	5.21E-07	2.28E-06
	Avg.	5.20E-06	2.28E-05	2.60E-07	1.14E-06
Filtrate Receiver Seal Tank T-08X-3100	Max.	3.49E-09	1.53E-08	3.49E-09	1.53E-08
	Avg.	7.00E-10	3.07E-09	7.00E-10	3.07E-09
Filtrate Receiver Tank 735-43-21A	Max.	5.02E-10	2.20E-09	5.02E-10	2.20E-09
	Avg.	1.00E-10	4.40E-10	1.00E-10	4.40E-10
Filtrate Receiver Tank 735-43-22A	Max.	4.34E-10	1.90E-09	4.34E-10	1.90E-09
	Avg.	8.69E-11	3.81E-10	8.69E-11	3.81E-10
Filtrate Receiver Tank 735-43-28A	Max.	4.34E-10	1.90E-09	4.34E-10	1.90E-09
	Avg.	8.69E-11	3.81E-10	8.69E-11	3.81E-10
Filtrate Receiver Tank 50K	Max.	3.22E-09	1.41E-08	3.22E-09	1.41E-08
	Avg.	6.45E-10	2.83E-09	6.45E-10	2.83E-09

7. **Are the proposed sources required to comply with the following federal requirements?**

   i. New Source Performance Standards (NSPS).----------No,
   ii. National Emission Standards for Hazardous Air Pollutants (NESHAPS).--Yes.
   iii. Prevention of Significant Deterioration (PSD).----------No.
   iv. Appendix "S" - Emission Offset Policy.----------No.

8. **Will the proposed sources employ best available technology?**

   Best available technology shall be used to control potential emissions from the Bag Slitter/Trash Compactor unit, the process feed tanks and the filter cake drumming stations. The Bag Slitter/Trash Compactor unit will use a bag filter with a 99.0 to 99.5 percent removal efficiency to minimize particulate emissions. Uranium, entrained in water droplets leaving the process feed tanks, shall be controlled with a high efficiency (99.0%) demister pad. The drumming stations from the new rotary vacuum filters will be vented through a cartridge filter and a HEPA dust collector with 99.5% and 99.97% particulate and uranium removal efficiencies. The remaining sources shall be vented directly to the atmosphere due to their low levels of potential emissions.

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

   No, this facility will not cause any significant degradation of air quality.

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

    No, this facility will not affect the attainment and maintenance of current air quality standards .

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

    A monitor to detect radionuclides and particulate will be installed in the exhaust stack of dust collector #G43-27/29. The monitor has two components, an isokinetic stack sampler and Geiger-Mueller counter. The monitor gives out an alarm and then the system is shut down when the rate of increase of the collection of radionuclides goes above a predetermined level.

    Differential pressures across dust collector #G43-27/29 will be monitored. Out of range pressure differentials will be alarmed.

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

    No.

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

An anticipated construction schedule is attached.

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

Dust collector on precoat system - $5,000
High efficiency Demister pad assembly - $20,000

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

The following table indicates which appendices for the Plant 8 Sump are included with this application:

DESCRIPTION	Appendix A	Appendix E-2
Precoat Process	Yes	No
Feed Tank T-08X-1800	Yes	Yes
Feed Tank T-08X-1900	Yes	Yes
Feed Tank T-08X-2000	Yes	Yes
Lime Slurry Tank T-08X-8000	Yes	Yes
Rotary Vacuum Filter L-08X-3000 and Drumming Station M-08X-3000	Yes	No
Rotary Vacuum Filter L-08X-4000 and Drumming Station M-08X-4000	Yes	No
Filtrate Receiver Seal Tank T-08X-3100	Yes	Yes
Filtrate Receiver Tank 50K	Yes	Yes
Filtrate Receiver Tank 735-43-21A	Yes	Yes
Filtrate Receiver Tank 735-43-22A	Yes	Yes
Filtrate Receiver Tank 735-43-28A	Yes	Yes

Also attached are the REPORTS ON COMPLIANCE for the unmonitored stacks with the potential to emit radionuclides.

OHIO ENVIRONMENTAL PROTECTION AGENCY

INSTALLATION SCHEDULE

TO ACCOMPANY APPLICATION FOR PERMIT TO INSTALL

THIS FORM CONSTITUTES PART OF THE APPLICATION OF:

FACILITY NAME: Fernald Environmental Management Project

ADDRESS: 7400 Willey Road, Fernald, Ohio 45030

FOR A PERMIT TO INSTALL THE FOLLOWING AIR CONTAMINANT SOURCE:

IDENTIFICATION: Plant 8 Sump - Wastewater Treatment Facility

DESCRIPTION: Wastewater treatment facility for various wastewaters generated on site.

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

		DATE
1.	EQUIPMENT ORDERED	12/1/92
2.	COMMENCE CONSTRUCTION	12/1/92
3.	STARTUP	2/1/94
4.	PERFORMANCE TESTING	2/1/94

*NOTE: These dates are tentative based on receiving an approved Air Permit to Install on or before 9/1/92.

Permit to Install Application

Appendix A

for

Plant 8 Sump - Precoat Process

FEMP ID #8-035

For Official Use Only

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

APPENDIX A, PROCESS

2974 A-1

PROCESS DATA

1. Name of process Plant 8 Sump - Precoat Process

2. End product of this process Precoat Slurry
3. Primary process equipment Mix tank, Bag Slitter/Trash Compactor

Your identification Tank 735-43-14A, Bag Slitter O-08X-9800 Year Installed 1955/1993

4. Manufacturer Not Available, To Be Determined (TBD) Make or Model N/A, TBD

5. Capacity of equipment (lbs./hr): Rated 3,750 Max. 4,500

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

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

OPERATING DATA

7. Normal operating schedule: 24 hrs./day, 7 days/wk., 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 3,750 Maximum 4,500

10. Annual production (indicate units) 314 Batches @ 15,000 lbs/batch
projected percent annual increase in production Zero

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

12. If batch, indicate Minutes per cycle 240 Minutes between cycles variable
13. Materials used in process:

List of Raw Materials	Principle Use	Amount (lbs./hr.)
Process Water	Slurry base	3,375
Diatomaceous Earth	Filter aid	375

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. See Attachment.

OEPA NO. 1431110128
FEMP ID NO. 8-035

CONTROL EQUIPMENT

Control Equipment Code:

(A)	Settling Chamber	(G)	Cyclonic Scrubber	(M)	Adsorber
(B)	Cyclone	(H)	Impingement Scrubber	(N)	Condenser
(C)	Multiple Cyclone	(I)	Orifice Scrubber	(O)	Afterburner - 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)	E - Fabric Filter	
(b) Manufacturer	To Be Determined	
(c) Model No.	To Be Determined	
(d) Year Installed	1993	
(e) Your Identification	O-08X-9800	
(f) Pollutant Controlled	Particulate	
(g) Controlled pollutant emission rate (if known)	9.76E-02 lbs/batch	
(h) Pressure Drop	unknown	
(i) Design efficiency	99.0% - 99.5%	
(j) Operating efficiency	99.0% - 99.5%	

STACK DATA

16. Your Stack Identification EP8-016

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

18. Type: [X] Round, top inside diameter dimension 10"
    [ ] Rectangular, top inside dimensions (L)_____ X (W)_____

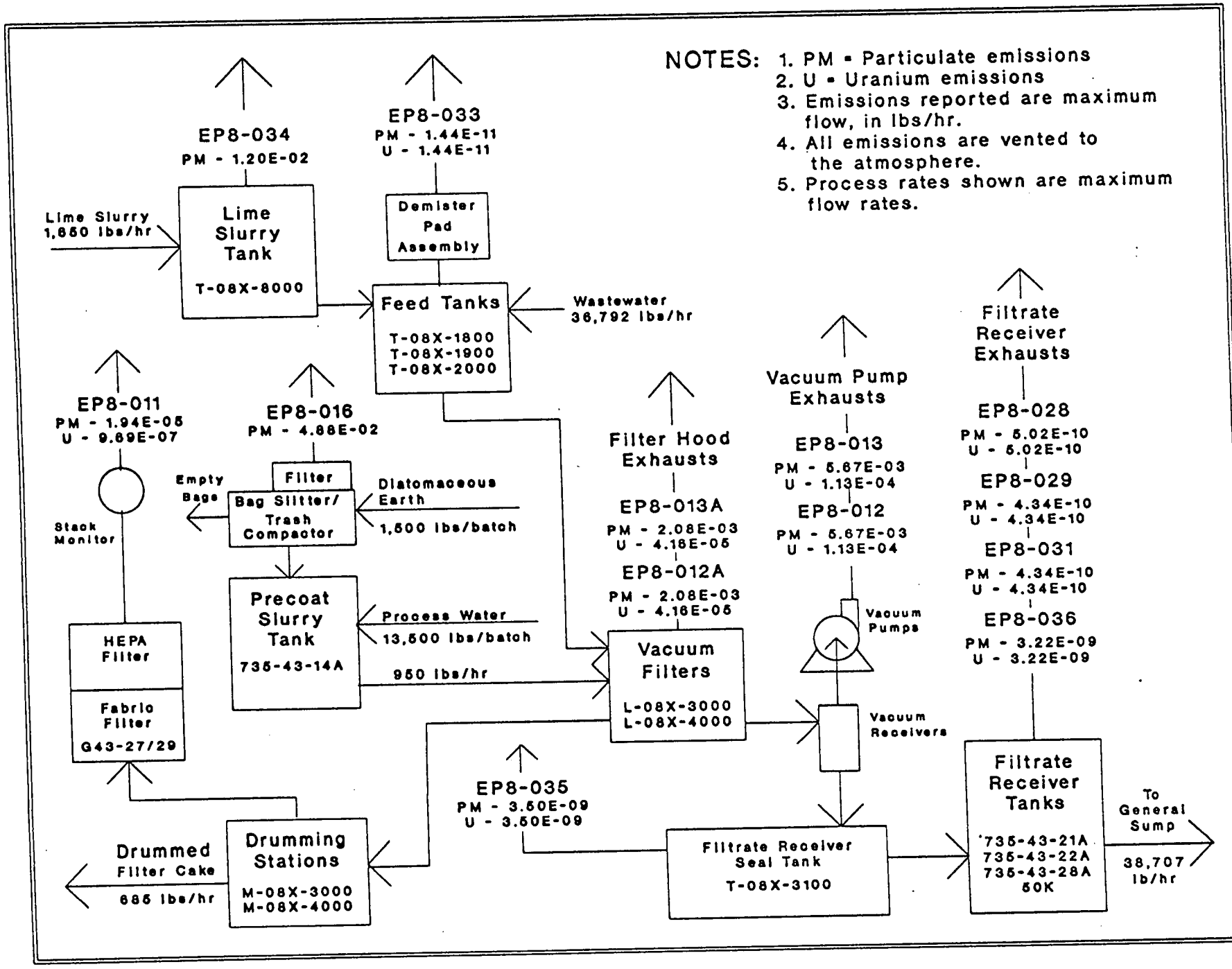
19. Height: Above roof 2.5 ft., above ground 38.5 ft.

20. Exit gas: Temp. Amb. °F, Volume 30 ACFM, Velocity 55 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 [ ] Material Balance
    Completed by Kip Klee, Date 12-09-91



PROCESS FLOW DIAGAM - Plant 8 Sump

EMISSION CALCULATIONS FOR PARTICULATES

SOURCE IDENTIFICATION

Source name and address: Plant 8 Sump - Precoat process

Calculations are based on AP-42, Appendix C.2

Process description: Charging of filter aid media.
AP-42 Section: Similar to charging paint pigments, Use 5.10, Paint.
Uncontrolled AP-42 emission factor: 20 lbs/ton

Batches/year: 314
Cycle time: 4 hours/batch

Materials used	lbs/batch/4 hrs
Process Water	13,500
Diatomaceous Earth	1,500

NOTE: Emissions occur only during the first two hours of the cycle.

For emission calculations, the amount of materials used is 1,500 lbs/batch.

Activity parameter: $\frac{314 \text{ batches}}{\text{year}} \cdot \frac{1500 \text{ lbs}}{\text{batch}} \cdot \frac{\text{ton}}{2000 \text{ lbs}} = 235.5 \text{ tons/year}$

Uncontrolled emissions: $\frac{235.5 \text{ tons}}{\text{year}} \cdot \frac{20 \text{ lbs}}{\text{ton}} \cdot \frac{\text{ton}}{2000 \text{ lbs}} = 2.355 \text{ tons/year}$

$\frac{2.355 \text{ tons}}{\text{year}} \cdot \frac{\text{year}}{314 \text{ batches}} \cdot \frac{\text{batch}}{2 \text{ hours}} \cdot \frac{2000 \text{ lbs}}{\text{ton}} = 7.50 \text{ lbs/hour}$

UNCONTROLLED SIZE EMISSIONS

Catagory name: Mechanically generated, Process Ores and Non-Metallic Minerals.
Catagory number: 4

	Particle size (microns)			
	≤ 2.5	≤ 6	≤ 10	All
Generic distribution, cumulative percent equal to or less than the size:	30	62	85	100
Cumulative mass ≤ particle size emissions (tons/year):	0.707	1.46	2.00	2.36

CONTROLLED SIZE EMISSIONS

Type of control device: Fabric filter

	Particle size (microns)			
	0 - 2.5	2.5 - 6	6 - 10	All
Collection efficiency (Table C.2-3):	99.0	99.5	99.5	99.5
Mass in size range before control (tons/year):	7.07E-01	7.54E-01	5.42E-01	3.53E-01
Mass in size range after control (tons/year):	7.07E-03	3.77E-03	2.71E-03	1.77E-03
Cumulative mass (tons/year):	7.07E-03	1.08E-02	1.35E-02	1.53E-02

ACTUAL EMISSION RATES

Annual actual emissions (from above) = 1.53E-02 tons/year.

Hourly actual emissions:

$$\frac{1.53E\text{-}02 \text{ tons}}{\text{year}} \left| \frac{\text{year}}{314 \text{ batches}} \right| \frac{\text{batch}}{2 \text{ hours}} \left| \frac{2000 \text{ lbs}}{\text{ton}} \right| = 4.88E\text{-}02 \text{ lbs/hour}$$

POTENTIAL EMISSIONS

Potential emissions are based on 8760 hours/year of operation and actual emission rates.

Maximum number of batches per year at a rate of 1 batch every 4 hours:

$$\frac{8760 \text{ hours}}{\text{year}} \left| \frac{\text{batch}}{4 \text{ hours}} \right| = 2190 \text{ batches/year}$$

Total actual emissions/year per batch:

$$\frac{1.53E\text{-}02 \text{ tons}}{\text{year}} \left| \frac{\text{year}}{314 \text{ batches}} \right| = 4.88E\text{-}05 \text{ tons/batch}$$

Annual potential emissions: $\frac{4.88E\text{-}05 \text{ tons}}{\text{batch}} \left| \frac{2190 \text{ batches}}{\text{year}} \right| = 1.07E\text{-}01 \text{ tons/year}$

Hourly potential emissions are equal to the actual hourly emission rates.

UNCONTROLLED POTENTIAL EMISSIONS

Uncontrolled potential emissions are based on 8760 hours/year of operation and uncontrolled emission rates.

Total uncontrolled emissions/year per batch:

$$\frac{2.355 \text{ tons}}{\text{year}} \left| \frac{\text{year}}{314 \text{ batches}} \right| = 7.5E\text{-}03 \text{ tons/batch}$$

Annual uncontrolled potential emissions:

$$\frac{7.5E\text{-}03 \text{ tons}}{\text{batch}} \left| \frac{2190 \text{ batches}}{\text{year}} \right| = 16.4 \text{ tons/year}$$

Hourly potential uncontrolled emissions:

$$\frac{7.5E\text{-}03 \text{ tons}}{\text{batch}} \left| \frac{2190 \text{ batches}}{\text{year}} \right| \frac{\text{year}}{8760 \text{ hours}} \left| \frac{2000 \text{ lbs}}{\text{ton}} \right| = 3.75 \text{ lbs/hour}$$

PM_{10} EMISSIONS

PM_{10} emissions are equal to the cumulative amount of emissions calculated under CONTROLLED SIZE EMISSIONS for the particle sizes less than or equal to 10 microns.

Annual PM_{10} emissions (from above): 1.35E-02 tons/year

Hourly PM_{10} emissions:

$$\frac{1.35E\text{-}02 \text{ tons}}{\text{year}} \left| \frac{\text{year}}{314 \text{ batches}} \right| \frac{\text{batch}}{2 \text{ hours}} \left| \frac{2000 \text{ lbs}}{\text{ton}} \right| = 4.31E\text{-}02 \text{ lbs/hour}$$

ALLOWABLE EMISSIONS (COMPLIANCE DETERMINATION)

Allowable emissions are calculated from rule 3745-17-11.

Process weight rate (P, in tons/hour) at maximum capacity:

$$P = \frac{1500 \text{ lbs}}{\text{batch}} \left| \frac{\text{batch}}{2 \text{ hours emitting time}} \right| \frac{\text{ton}}{2000 \text{ lbs}} = 0.375 \text{ tons/hour}$$

From Table I of rule 3745-17-11:

Allowable emissions (E, in lbs/hour)

= 4.10*(P)^0.67

= 4.10*(0.375)^0.67

= 2.13 lbs/hour

Since the uncontrolled mass rate of emissions is less than 10 lb/hour, Figure II does not apply.

EMISSIONS SUMMARY

ACTUAL EMISSIONS	4.88E-02 lbs/hour	1.53E-02 tons/year
POTENTIAL EMISSIONS	4.88E-02 lbs/hour	1.07E-01 tons/year
UNCONTROLLED POTENTIAL EMISSIONS	3.75 lbs/hour	16.4 tons/year
PM_{10} EMISSIONS	4.31E-02 lbs/hour	1.35E-02 tons/year
ALLOWABLE EMISSIONS (Compliance determination)	2.13 lbs/hour	_____

Permit to Install Application

Appendix A

for

Plant 8 Sump - Feed Tank T-08X-1800

FEMP ID #8-039

For Official Use Only

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

2974 A-1

APPENDIX A, PROCESS

PROCESS DATA

1. Name of process Plant 8 Sump - Wastewater Treatment

2. End product of this process Neutralized wastewaters
3. Primary process equipment 25,300 Gallon mix tank

Your identification T-08X-1800 (8-039) Year Installed 1993

4. Manufacturer To Be Determined (TBD) Make or Model TBD

5. Capacity of equipment (lbs./hr): Rated 21,759 Max. 38,442

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

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

OPERATING DATA

7. Normal operating schedule: 24 hrs./day, 7 days/wk., 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 21,759 Maximum 38,442

10. Annual production (indicate units) 7,628,000 Gallons
projected percent annual increase in production Zero

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

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

13. Materials used in process:

List of Raw Materials	Principle Use	Amount (lbs./hr.)
		Average/Maximum
Wastewater	Treated Media	20,825 / 36,792
Lime Slurry (15%)	pH Adjustment	934 / 1,650

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. SEE ATTACHED FLOW DIAGRAM

OEPA NO. 1431110128
FEMP ID NO. 8-039

CONTROL EQUIPMENT

Control Equipment Code:

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

15. Control Equipment Data:

Item	Primary Collector	Secondary Collector
(a) Type (See above Code)	Q-Demister Pad	
(b) Manufacturer	TBD	
(c) Model No.	TBD	
(d) Year Installed	1993	
(e) Your Identification	L-08X-6000	
(f) Pollutant Controlled	Uranium	
(g) Controlled pollutant emission rate (if known)	Max. 1.44E-11 lb/hr	
(h) Pressure Drop	unknown	
(i) Design efficiency	99.0 %	
(j) Operating efficiency	unknown	

STACK DATA

16. Your Stack Identification EP8-033

17. Are other sources vented to this stack? [X] Yes [ ] No
    If yes, identify sources Feed Tanks T-08X-1900 and T-08X-2000

18. Type: [X] Round, top inside diameter dimension 8"
    [ ] Rectangular, top inside dimensions (L)_____ X (W)_____

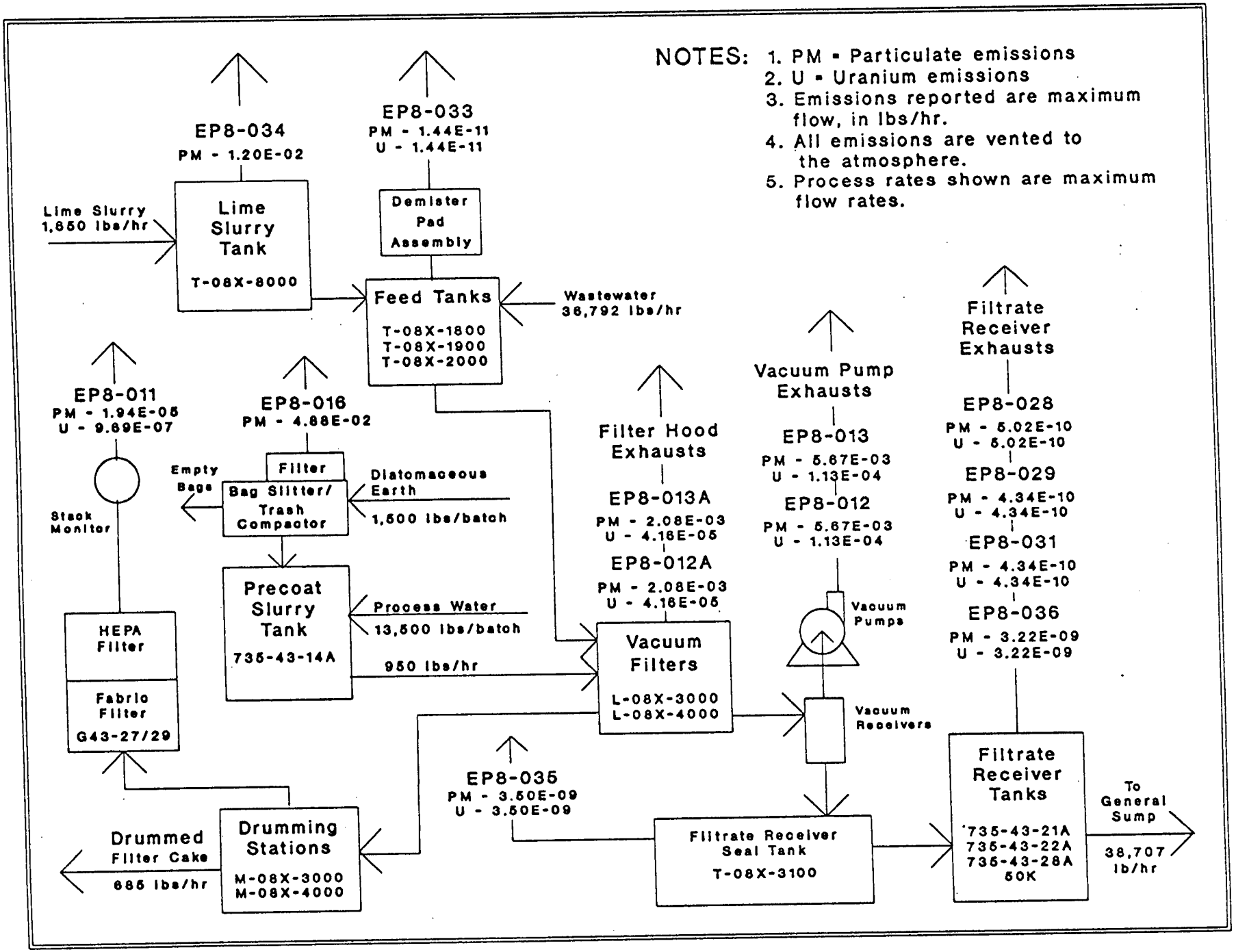
19. Height: Above roof 3 ft., above ground 52 ft.

20. Exit gas: Temp. Amb. °F, Volume 134 ACFM, Velocity 385 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 [ ] Material Balance
    Completed by Kip Klee, Date 12-10-91



PROCESS FLOW DIAGAM – Plant 8 Sump

Permit to Install Application

Appendix E-2

and Emission Calculations

for

Plant 8 Sump - Feed Tank T-08X-1800

FEMP ID #8-039

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

DOE - FEMP
(Facility Name)

APPENDIX E-2

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

1. Tank identification: Name or number Feed Tank T-08X-1800 Date Installed 1993 (month/year)

2. Tank capacity: 25,300 gallons

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

4. Tank dimensions: Diameter 14 ft. Height 22 ft. Length ----- Width -----

5. Tank shell material: [ ] Steel [ ] Aluminum [X] Other, specify 304 SS

6. Type of tank:
[ ] External floating roof tank
[ ] Internal floating roof tank
[X] Fixed roof tank
[ ] 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
N/A
[ ] Aluminum (specular) [ ] Light gray [ ] White
[ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

N/A 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 High Efficiency Demister Pad
Manufacturer To Be Determined (TBD) Make or model TBD
Date installed (month and year) 1993

b) Date tank was equipped with or vented to vapor control system (month & year) 1993

c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: Uranium - 99.0% Control
(Attach calculations and test data to support response, unless previously submitted)

DOE - FEMP
(Facility Name)
T-08X-1800 (8-039)
(tank identification)

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

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 Various plant wastewaters Trade Name Plant Wastewaters
Density: 8.3-10.0 lbs/gal or ---- ° API Producer WEMCO

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: 0.4642 psia at average storage temperature
0.4642 psia at maximum storage temperature

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

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

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

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

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

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

f) Indicate the year (or 12-month period) for item (g): 2-1-94 to 1-31-95

g) Annual throughput of material: 7,628,000 gallons.

Completed by Kip Klee Date 12-10-91

Westinghouse
1431110128

Uncontrolled uranium emissions for Feed Tank T-08X-1800

Fixed Roof Tank
Calculations based on AP-42, section 4.3

Breathing Loss
LB = 2.26*10^-2 * MV * (P/(PA-P))^0.68 * D^1.73 * H^0.51 * DT^0.5 * FP * C * KC

Working loss:
LW = 2.4*10^-5 * MV * P * V * N * KN * KC

where:

MV =	18	(lb/lbmol)	Molecular weight
PA =	14.7	psia	Avg. atmos. pressure
P =	0.4642	psia	liquid true vapor pressure
D =	14	ft	tank diameter
H =	11	ft	avg. vapor space height = 1/2 the tank height
DT =	20	degrees F	avg. diurnal temp change
FP =	1.35		paint factor
C =	0.7		Adjustment factor for small diameter tanks
KC =	1		product factor

V =	25300	gallons	tank volume
N =	301.5019		number of turnovers per year
KN =	0.24		turnover factor

LB = 54.739 lb/yr
LW = 367.122 lb/yr

LT = 421.862 lb/yr H20 vapor

Total Emissions: 421.8616 (lb H20 vapor/year)
x 6(10)^-6 lb U/1000 lb water
= 2.53E-06 lb U/year

Maximum Emissions: 2.53E-06 lb U/year x 5
= 1.27E-05 lb U/year

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

The parameters used to produce a "worst case" condition for the above calculations ar as follows:

(1) The only mechanism for uranium loss from the tank is by entrainment in the aeroso or mist generated during liquid storage and transfer, since uranium does not vaporize at storage conditions.

(2) The maximum concentration of uranium entrained in the aerosol would be equivelent to the amount of uranium entrained in the vapor as determined by laboratory tests conducte on Lab sample D-37, Lab #2-9846. The laboratory tests determined the maximum concentratio of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate is 6(10)^-6 gU/l of solution.

(3) Uranium emissions are based on the calculated amount of water vapor leaving the vessel.

CONTROLLED URANIUM FEED TANK EMISSIONS

A High Efficiency Demister Pad is used to control uranium emissions that may be present water droplets leaving the feed tank.

The efficiency of the demister is 99.0 percent.

Average annual uranium emissions:
= 2.53E-06 lb U/year

At 99.0% collection efficiency:
(Annual U emissions)(100-99.0)/100
= 2.53E-08 lb U/year
= 1.3E-11 tons U/year

Average hourly uranium emissions:
(Annual emissions/8760 hours per year)
= 2.89E-10 lbs U/hour

At 99.0% collection efficiency:
(Hourly U emissions)(100-99.0)/100
= 2.89E-12 lb U/hour

Maximum annual uranium emissions:
= 1.27E-05 lb U/year

At 99.0% collection efficiency:
(Annual U emissions)(100-99.0)/100
= 1.27E-07 lb U/year
= 6.3E-11 tons U/year

Maximum hourly uranium emissions:
(Annual emissions/8760 hours per year)
= 1.44E-09 lbs U/hour

At 99.0% collection efficiency:
(Hourly U emissions)(100-99.0)/100
= 1.44E-11 lb U/hour

Permit to Install Application

Appendix A

for

Plant 8 Sump - Feed Tank T-08X-1900

FEMP ID #8-040

For Official Use Only

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

APPENDIX A, PROCESS

PROCESS DATA

1. Name of process Plant 8 Sump - Wastewater Treatment

2. End product of this process Neutralized wastewaters
3. Primary process equipment 25,300 Gallon mix tank

Your identification T-08X-1900 (8-040) Year Installed 1993

4. Manufacturer To Be Determined (TBD) Make or Model TBD

5. Capacity of equipment (lbs./hr): Rated 21,759 Max. 38,442

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

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

OPERATING DATA

7. Normal operating schedule: 24 hrs./day, 7 days/wk., 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 21,759 Maximum 38,442

10. Annual production (indicate units) 7,628,000 Gallons
projected percent annual increase in production Zero

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

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

13. Materials used in process:

List of Raw Materials	Principle Use	Amount (lbs./hr.)
		Average/Maximum
Wastewater	Treated Media	20,825 / 36,792
Lime Slurry (15%)	pH Adjustment	934 / 1,650

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. SEE ATTACHED FLOW DIAGRAM

CONTROL EQUIPMENT

Control Equipment Code:

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

15. Control Equipment Data:

Item	Primary Collector	Secondary Collector
(a) Type (See above Code)	Q-Demister Pad	
(b) Manufacturer	TBD	
(c) Model No.	TBD	
(d) Year Installed	1993	
(e) Your Identification	L-08X-6000	
(f) Pollutant Controlled	Uranium	
(g) Controlled pollutant emission rate (if known)	Max. 1.44E-11 lb/hr	
(h) Pressure Drop	unknown	
(i) Design efficiency	99.0 %	
(j) Operating efficiency	unknown	

STACK DATA

16. Your Stack Identification EP8-033

17. Are other sources vented to this stack? [X] Yes [ ] No
    If yes, identify sources Feed Tanks T-08X-1800 and T-08X-2000

18. Type: [X] Round, top inside diameter dimension 8"
    [ ] Rectangular, top inside dimensions (L)_____ X (W)_____

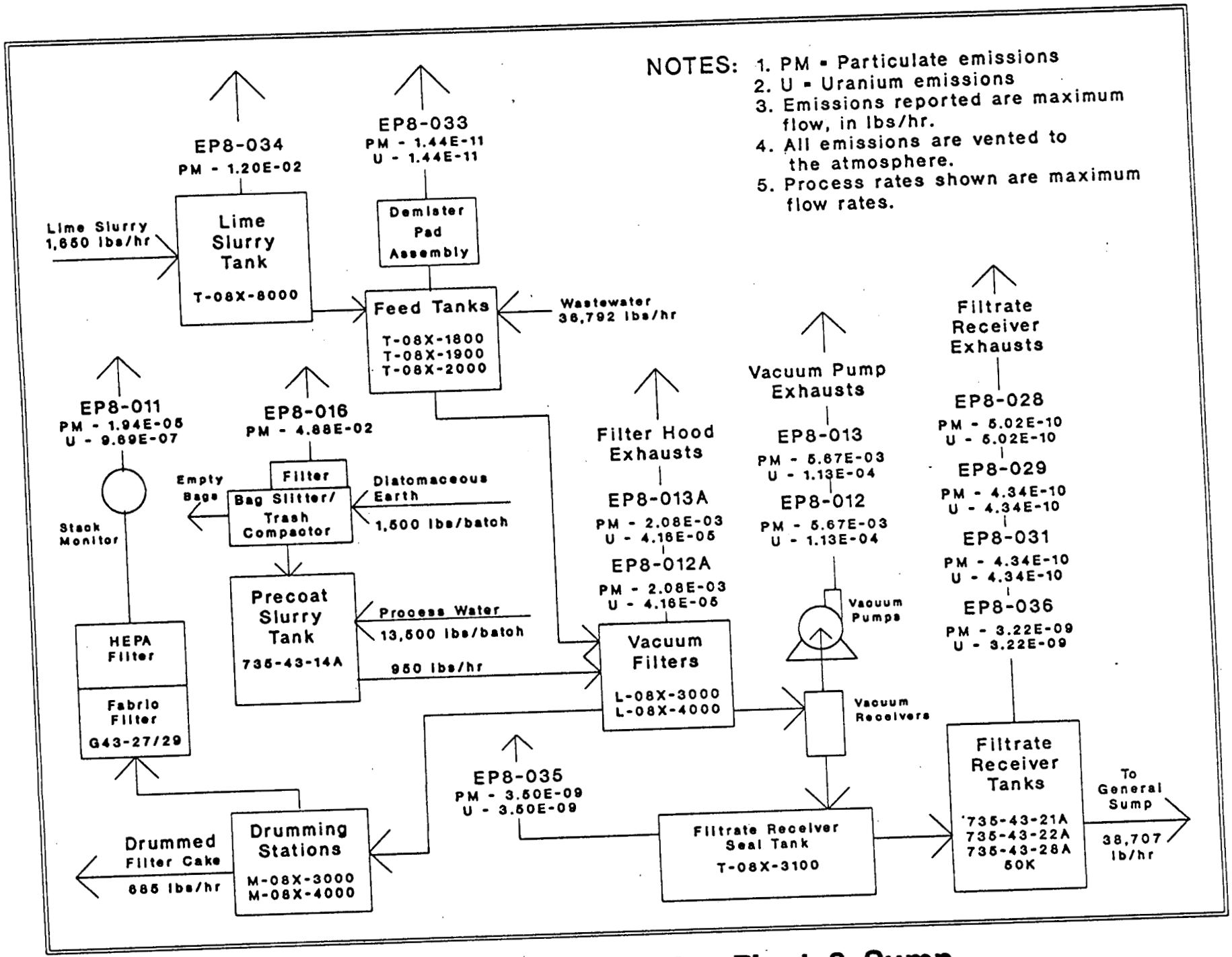
19. Height: Above roof 3 ft., above ground 52 ft.

20. Exit gas: Temp. Amb. °F, Volume 134 ACFM, Velocity 385 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 [ ] Material Balance
    Completed by Kip Klee, Date 12-10-91



PROCESS FLOW DIAGAM - Plant 8 Sump

Permit to Install Application

Appendix E-2

and Emission Calculations

for

Plant 8 Sump - Feed Tank T-08X-1900

FEMP ID #8-040

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

DOE - FEMP
(Facility Name)

APPENDIX E-2

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

1. Tank identification: Name or number Feed Tank T-08X-1900 Date Installed 1993 (month/year)

2. Tank capacity: 25,300 gallons

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

4. Tank dimensions: Diameter 14 ft. Height 22 ft. Length ----- Width -----

5. Tank shell material: [ ] Steel [ ] Aluminum [X] Other, specify 304 SS

6. Type of tank:
[ ] External floating roof tank
[ ] Internal floating roof tank
[X] Fixed roof tank
[ ] 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
N/A

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

N/A 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 High Efficiency Demister Pad
Manufacturer To Be Determined (TBD) Make or model TBD
Date installed (month and year) 1993

b) Date tank was equipped with or vented to vapor control system (month & year) 1993

c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: Uranium - 99.0% Control
(Attach calculations and test data to support response, unless previously submitted)

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

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 Various plant wastewaters Trade Name Plant Wastewaters
Density: 8.3-10.0 lbs/gal or ---- ° API Producer WEMCO

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: 0.4642 psia at average storage temperature
0.4642 psia at maximum storage temperature

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

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

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

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

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

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

f) Indicate the year (or 12-month period) for item (g): 2-1-94 to 1-31-95

g) Annual throughput of material: 7,628,000 gallons.

Completed by Kip Klee Date 12-10-91

Westinghouse
1431110128

Uncontrolled uranium emissions for Feed Tank T-08X-1900

Fixed Roof Tank
Calculations based on AP-42, section 4.3

Breathing Loss
LB = 2.26*10^-2 • MV • (P/(PA-P))^0.68 • D^1.73 • H^0.51 • DT^0.5 • FP • C • KC

Working loss:
LW = 2.4*10^-5 • MV * P • V • N • KN * KC

where:

MV =	18	(lb/lbmol)	Molecular weight
PA =	14.7	psia	Avg. atmos. pressure
P =	0.4642	psia	liquid true vapor pressure
D =	14	ft	tank diameter
H =	11	ft	avg. vapor space height = 1/2 the tank height
DT =	20	degrees F	avg. diurnal temp change
FP =	1.35		paint factor
C =	0.7		Adjustment factor for small diameter tanks
KC =	1		product factor

V =	25300	gallons	tank volume
N =	301.5019		number of turnovers per year
KN =	0.24		turnover factor

LB = 54.739 lb/yr
LW = 367.122 lb/yr

LT = 421.862 lb/yr H2O vapor

Total Emissions: 421.8616 (lb H2O vapor/year)
x 6(10)^-6 lb U/1000 lb water
= 2.53E-06 lb U/year

Maximum Emissions: 2.53E-06 lb U/year x 5
= 1.27E-05 lb U/year

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

The parameters used to produce a "worst case" condition for the above calculations ar as follows:

(1) The only mechanism for uranium loss from the tank is by entrainment in the aeroso or mist generated during liquid storage and transfer, since uranium does not vaporize at storage conditions.

(2) The maximum concentration of uranium entrained in the aerosol would be equivelent to the amount of uranium entrained in the vapor as determined by laboratory tests conducte on Lab sample D-37, Lab #2-9846. The laboratory tests determined the maximum concentratio of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate is 6(10)^-6 gU/l of solution.

(3) Uranium emissions are based on the calculated amount of water vapor leaving the vessel.

CONTROLLED URANIUM FEED TANK EMISSIONS

A High Efficiency Demister Pad is used to control uranium emissions that may be present water droplets leaving the feed tank.

The efficiency of the demister is 99.0 percent.

Average annual uranium emissions:
= 2.53E-06 lb U/year

At 99.0% collection efficiency:
(Annual U emissions)(100-99.0)/100
= 2.53E-08 lb U/year
= 1.3E-11 tons U/year

Average hourly uranium emissions:
(Annual emissions/8760 hours per year)
= 2.89E-10 lbs U/hour

At 99.0% collection efficiency:
(Hourly U emissions)(100-99.0)/100
= 2.89E-12 lb U/hour

Maximum annual uranium emissions:
= 1.27E-05 lb U/year

At 99.0% collection efficiency:
(Annual U emissions)(100-99.0)/100
= 1.27E-07 lb U/year
= 6.3E-11 tons U/year

Maximum hourly uranium emissions:
(Annual emissions/8760 hours per year)
= 1.44E-09 lbs U/hour

At 99.0% collection efficiency:
(Hourly U emissions)(100-99.0)/100
= 1.44E-11 lb U/hour

Permit to Install Application

Appendix A

for

Plant 8 Sump - Feed Tank T-08X-2000

FEMP ID #8-041

For Official Use Only

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

APPENDIX A, PROCESS

PROCESS DATA

1. Name of process Plant 8 Sump - Wastewater Treatment

2. End product of this process Neutralized wastewaters
3. Primary process equipment 25,300 Gallon mix tank

Your identification T-08X-2000 (8-041) Year Installed 1993

4. Manufacturer To Be Determined (TBD) Make or Model TBD

5. Capacity of equipment (lbs./hr): Rated 21,759 Max. 38,442

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

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

OPERATING DATA

7. Normal operating schedule: 24 hrs./day, 7 days/wk., 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 21,759 Maximum 38,442

10. Annual production (indicate units) 7,628,000 Gallons
projected percent annual increase in production Zero

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

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

13. Materials used in process:

List of Raw Materials	Principle Use	Amount (lbs./hr.)
		Average/Maximum
Wastewater	Treated Media	20,825 / 36,792
Lime Slurry (15%)	pH Adjustment	934 / 1,650

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. SEE ATTACHED FLOW DIAGRAM

OEPA NO. 1431110128
FEMP ID NO. 8-041

CONTROL EQUIPMENT

Control Equipment Code:

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

15. Control Equipment Data:

Item	Primary Collector	Secondary Collector
(a) Type (See above Code)	Q-Demister Pad	
(b) Manufacturer	TBD	
(c) Model No.	TBD	
(d) Year Installed	1993	
(e) Your Identification	L-08X-6000	
(f) Pollutant Controlled	Uranium	
(g) Controlled pollutant emission rate (if known)	Max. 1.44E-11 lb/hr	
(h) Pressure Drop	unknown	
(i) Design efficiency	99.0 %	
(j) Operating efficiency	unknown	

STACK DATA

16. Your Stack Identification EP8-033

17. Are other sources vented to this stack? [X] Yes [ ] No
If yes, identify sources Feed Tanks T-08X-1800 and T-08X-1900

18. Type: [X] Round, top inside diameter dimension 8"
[ ] Rectangular, top inside dimensions (L)_____ X (W)_____

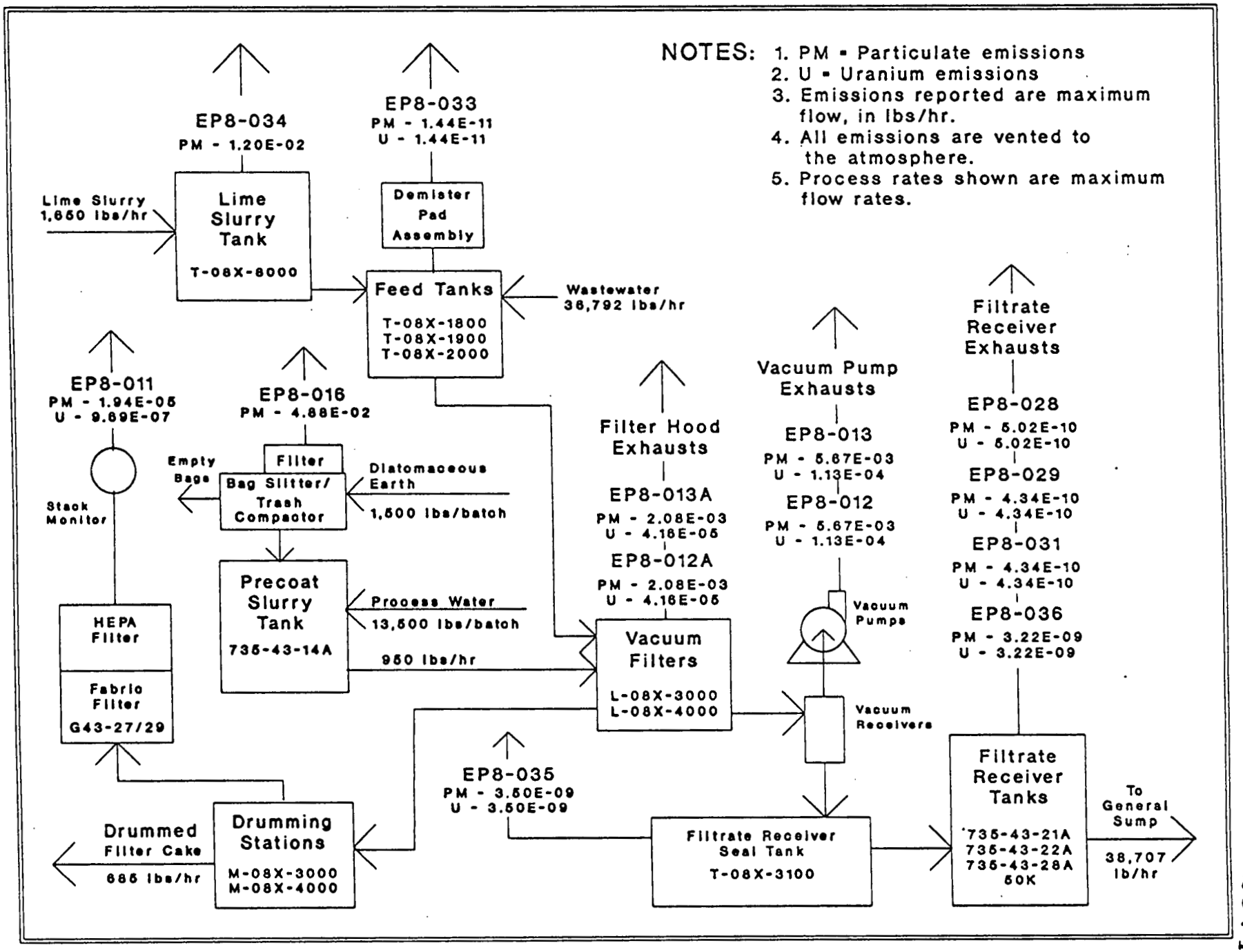
19. Height: Above roof 3 ft., above ground 52 ft.

20. Exit gas: Temp. Amb. °F, Volume 134 ACFM, Velocity 385 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 [ ] Material Balance
Completed by Kip Klee, Date 12-10-91



PROCESS FLOW DIAGAM - Plant 8 Sump

Permit to Install Application

Appendix E-2

and Emission Calculations

for

Plant 8 Sump - Feed Tank T-08X-2000

FEMP ID #8-041

2974

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

DOE - FEMP
(Facility Name)

APPENDIX E-2

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

1. Tank identification: Name or number Feed Tank T-08X-2000 Date Installed 1993 (month/year)

2. Tank capacity: 25,300 gallons

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

4. Tank dimensions: Diameter 14 ft. Height 22 ft. Length ----- Width -----

5. Tank shell material: [ ] Steel [ ] Aluminum [X] Other, specify 304 SS

6. Type of tank:
[ ] External floating roof tank
[ ] Internal floating roof tank
[X] Fixed roof tank
[ ] 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
N/A
[ ] Aluminum (specular) [ ] Light gray [ ] White
[ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

N/A 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 High Efficiency Demister Pad
Manufacturer To Be Determined (TBD) Make or model TBD
Date installed (month and year) 1993

b) Date tank was equipped with or vented to vapor control system (month & year) 1993

c) Specify the rate of emission or percent control (by weight) for any pollutants being controlled: Uranium - 99.0% Control
(Attach calculations and test data to support response, unless previously submitted)

DOE - FEMP 2074
(Facility Name)
T-08X-2000 (8-041)
(tank identification)

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

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 Various plant wastewaters Trade Name Plant Wastewaters
Density: 8.3-10.0 lbs/gal or ---- ° API Producer WEMCO

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: 0.4642 psia at average storage temperature
0.4642 psia at maximum storage temperature

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

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

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

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

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

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

f) Indicate the year (or 12-month period) for item (g): 2-1-94 to 1-31-95

g) Annual throughput of material: 7,628,000 gallons.

Completed by Kip Klee Date 12-10-91

Westinghouse
1431110128

Uncontrolled uranium emissions for Feed Tank T-08X-2000

Fixed Roof Tank
Calculations based on AP-42, section 4.3

Breathing Loss
LB = 2.26*10^-2 * MV • (P/(PA-P))^0.68 * D^1.73 • H^0.51 • DT^0.5 * FP • C • KC

Working loss:
LW = 2.4*10^-5 • MV • P * V • N • KN • KC

where:

MV =	18	(lb/lbmol)	Molecular weight
PA =	14.7	psia	Avg. atmos. pressure
P =	0.4642	psia	liquid true vapor pressure
D =	14	ft	tank diameter
H =	11	ft	avg. vapor space height = 1/2 the tank height
DT =	20	degrees F	avg. diurnal temp change
FP =	1.35		paint factor
C =	0.7		Adjustment factor for small diameter tanks
KC =	1		product factor

V =	25300	gallons	tank volume
N =	301.5019		number of turnovers per year
KN =	0.24		turnover factor

LB = 54.739 lb/yr
LW = 367.122 lb/yr

LT = 421.862 lb/yr H20 vapor

Total Emissions: 421.8616 (lb H20 vapor/year)
x 6(10)^-6 lb U/1000 lb water

= 2.53E-06 lb U/year

Maximum Emissions: 2.53E-06 lb U/year x 5

= 1.27E-05 lb U/year

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

The parameters used to produce a "worst case" condition for the above calculations ar as follows:

(1) The only mechanism for uranium loss from the tank is by entrainment in the aeroso or mist generated during liquid storage and transfer, since uranium does not vaporize at storage conditions.

(2) The maximum concentration of uranium entrained in the aerosol would be equivelent to the amount of uranium entrained in the vapor as determined by laboratory tests conducte on Lab sample D-37, Lab #2-9846. The laboratory tests determined the maximum concentratio of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate is 6(10)^-6 gU/l of solution.

(3) Uranium emissions are based on the calculated amount of water vapor leaving the vessel.

CONTROLLED URANIUM FEED TANK EMISSIONS

A High Efficiency Demister Pad is used to control uranium emissions that may be present water droplets leaving the feed tank.

The efficiency of the demister is 99.0 percent.

Average annual uranium emissions:
= 2.53E-06 lb U/year

At 99.0% collection efficiency:
(Annual U emissions)(100-99.0)/100
= 2.53E-08 lb U/year
= 1.3E-11 tons U/year

Average hourly uranium emissions:
(Annual emissions/8760 hours per year)
= 2.89E-10 lbs U/hour

At 99.0% collection efficiency:
(Hourly U emissions)(100-99.0)/100
= 2.89E-12 lb U/hour

Maximum annual uranium emissions:
= 1.27E-05 lb U/year

At 99.0% collection efficiency:
(Annual U emissions)(100-99.0)/100
= 1.27E-07 lb U/year
= 6.3E-11 tons U/year

Maximum hourly uranium emissions:
(Annual emissions/8760 hours per year)
= 1.44E-09 lbs U/hour

At 99.0% collection efficiency:
(Hourly U emissions)(100-99.0)/100
= 1.44E-11 lb U/hour

Permit to Install Application

Appendix A

for

Plant 8 Sump - Lime Slurry Tank T-08X-8000

FEMP ID #8-038

For Official Use Only

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

APPENDIX A, PROCESS

PROCESS DATA

1. Name of process Plant 8 Sump - Lime Slurry Tank T-08X-8000

2. End product of this process Lime Slurry (15 %)
3. Primary process equipment Lime Slurry Tank

Your identification T-08X-8000 (8-038) Year Installed 1993

4. Manufacturer To Be Determined (TBD) Make or Model TBD

5. Capacity of equipment (lbs./hr): Rated 934 Max. 1,650

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

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

OPERATING DATA

7. Normal operating schedule: 24 hrs./day, 7 days/wk., 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 934 Maximum 1,650

10. Annual production (indicate units) 935,400 Gallons
projected percent annual increase in production Zero

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

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

13. Materials used in process:

List of Raw Materials	Principle Use	Amount (lbs./hr.)
		Average/Maximum
Lime Slurry (15 %)	pH Adjustment	934 / 1,650

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. SEE ATTACHED FLOW DIAGRAM

CONTROL EQUIPMENT

Control Equipment Code:

(A)	Settling Chamber	(G)	Cyclonic Scrubber	(M)	Adsorber
(B)	Cyclone	(H)	Impingement Scrubber	(N)	Condenser
(C)	Multiple Cyclone	(I)	Orifice Scrubber	(O)	Afterburner - 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	
(b) Manufacturer		
(c) Model No.		
(d) Year Installed		
(e) Your Identification		
(f) Pollutant Controlled		
(g) Controlled pollutant emission rate (if known)		
(h) Pressure Drop		
(i) Design efficiency		
(j) Operating efficiency		

STACK DATA

16. Your Stack Identification EP8-034

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

18. Type: [X] Round, top inside diameter dimension 3"
    [ ] Rectangular, top inside dimensions (L)_____ X (W)_____

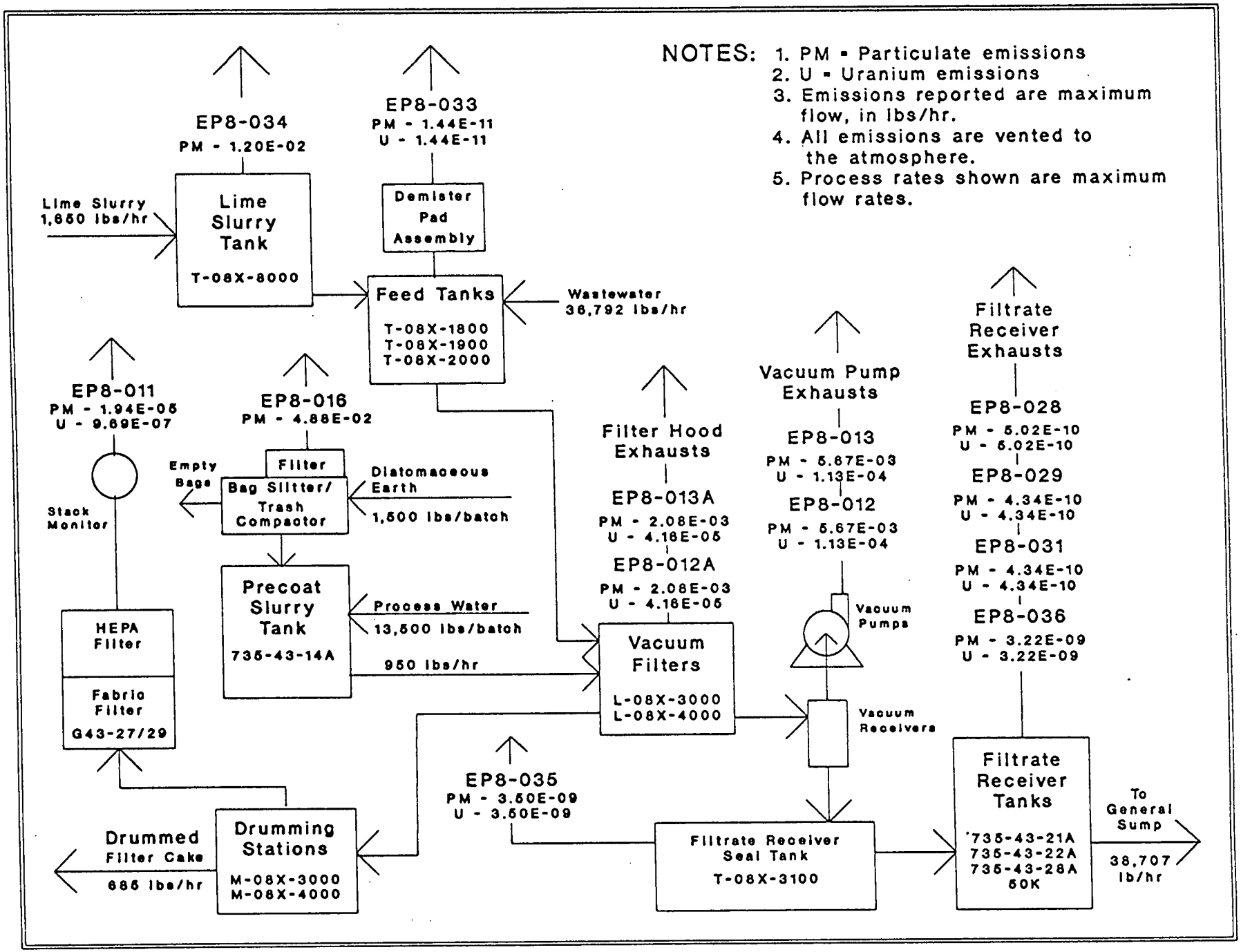
19. Height: Above roof N/A ft., above ground 23 ft.

20. Exit gas: Temp. Amb. °F, Volume 2 ACFM, Velocity 50 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 [ ] Material Balance
    Completed by Kip Klee, Date 12-10-91



PROCESS FLOW DIAGAM - Plant 8 Sump

Permit to Install Application

Appendix E-2

and Emission Calculations

for

Plant 8 Sump - Lime Slurry Tank T-08X-8000

FEMP ID #8-038

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

DOE - FEMP
(Facility Name)

APPENDIX E-2

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

1. Tank identification: Name or number Lime Slurry Tk. T-08X-8000 Date Installed 1993 (month/year)

2. Tank capacity: 12,900 gallons

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

4. Tank dimensions: Diameter 10 ft. Height 22 ft. Length ----- Width -----

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

6. Type of tank:
[ ] External floating roof tank
[ ] Internal floating roof tank
[X] Fixed roof tank
[ ] 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
N/A
[ ] Aluminum (specular) [ ] Light gray [ ] White
[ ] Aluminum (diffuse) [ ] Medium gray [ ] Other, specify _____

N/A 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.
N/A
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)
T-08X-8000 (8-038)
(tank identification)

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

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 15% Lime Slurry Trade Name Lime Slurry
Density: 9.12 lbs/gal or ---- ° API Producer WEMCO

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: 0.4642 psia at average storage temperature
0.4642 psia at maximum storage temperature

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

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

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

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

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

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

f) Indicate the year (or 12-month period) for item (g): 2-1-94 to 1-31-95

g) Annual throughput of material: 935,400 gallons.

Completed by Kip Klee Date 12-10-91

EMISSION CALCULATIONS

PARTICULATE EMISSIONS FROM TANK T-08X-8000

---

1. ASSUMPTIONS

A. Particulate emissions from tank T-08X-8000 consist of Calcium Hydroxide particles entrained in the water vapor leaving the tank.

B. The concentration of Calcium Hydroxide in the water vapor is equal to the concentration of Calcium Hydroxide in the solution.

C. Water vapor losses may be calculated from the working and breathing loss equations used to determine storage tank emissions.

D. All particulate losses are considered to be PM10 losses.

---

2. TOTAL WEIGHT LOSS FROM THE LIME SLURRY TANK

The equations used are:

Breathing Loss

LB = 2.26*10^-2 * MV • (P/(PA-P))^0.68 • D^1.73 * H^0.51 • DT^0.5 • FP • C • KC

Working loss:

LW = 2.4*10^-5 • MV • P • V • N • KN • KC

where:

MV =	18 (lb/lbmol)	Molecular weight
PA =	14.7 psia	Avg. atmos. pressure
P =	0.4594 psia	liquid true vapor pressure
D =	10 ft	tank diameter
H =	11 ft	avg. vapor space height = 1/2 the tank height
DT =	20 degrees F	avg. diurnal temp change
FP =	1	paint factor
C =	0.7	Adjustment factor for small diameter tanks
KC =	1	product factor

V =	12900 gallons	tank volume
N =	72.51162	number of turnovers per year
KN =	0.52	turnover factor

Water vapor loss =	22.49	Breathing losses
+	96.53	Working losses

	119.02	lb/yr water vapor total

Total weight loss/yr = 119.02 /0.85
= 140.03 lbs/yr total weight loss

---

3. ACTUAL EMISSIONS

Particulate loss =	140.03	lbs/yr total weight loss
	- 119.02	lb/yr water vapor total

=	21.00	lbs/yr of particulate
21 /8760 hrs/yr =	2.40E-03	lbs/hr of particulate
21 /2000 lbs/ton =	1.05E-02	tons/yr of particulate

---

4. POTENTIAL EMISSIONS

The above calculations determine the actual emissions for 8760 operating hours per year.

The potential emissions from this tank, by agency policy, are five times the actual emissions. Therefore:

Actual emissions x 5 = Potential emissions.

21.00 lbs/yr x 5 =	105	lbs/yr of particulate
2.40E-03 lbs/hr x 5 =	1.20E-02	lbs/hr of particulate
1.05E-02 tons/yr x 5 =	5.25E-02	tons/yr of particulate

---

5. UNCONTROLLED POTENTIAL EMISSIONS

Since no control equipment is used, the uncontrolled potential emissions will equal the potential emissions.

---

6. PM10 EMISSIONS

All particulate emissions are assumed to be PM10 emissions, therefore, the PM10 emissions will equal the actual emissions.

---

7. ALLOWABLE EMISSIONS

Allowable emissions are calculated from rule 3745-17-11.

Process weight rate (P, in tons/hour) at maximum capacity:
P = (from Appendix A) = 0.825 tons/hour

Allowable emissions (E, in lbs/hour): From Table I of rule 3745-17-11.

If 0 <= P <= 0.05, then E = 0.551

If 0.05 <= P <= 30, then E = 4.10 (P)^0.67

If P > 30, then E = 5.0(P)^0.11 - 40

Allowable emissions = 3.6 lbs/hour of particulate

Permit to Install Application

Appendix A

for

Plant 8 Sump - Wastewater Treatment

Rotary Vacuum Filter L-08X-3000
Rotary Vacuum Filter L-08X-4000
Filtrate Receiver Seal Tank T-08X-3100
Drumming Station M-08X-3000
Drumming Station M-08X-4000

FEMP ID #8-042

For Official Use Only

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

2974

APPENDIX A, PROCESS

A-1

PROCESS DATA

1. Name of process Plant 8 Sump - Wastewater Treatment

2. End product of this process Neutralized/Filtered Wastewater and Filter Cake
3. Primary process equipment See page A-1A

Your identification See A-1A Year Installed See page A-1A

4. Manufacturer To Be Determined (TBD) Make or Model TBD

5. Capacity of equipment (lbs./hr): Rated See page A-1A Max. See page A-1A

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

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

OPERATING DATA

7. Normal operating schedule: 24 hrs./day, 7 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 See page A-1A Maximum See page A-1A

10. Annual production (indicate units) See page A-1A
projected percent annual increase in production Zero

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

12. If batch, indicate Minutes per cycle 7,200 Minutes between cycles 2,880

13. Materials used in process:

List of Raw Materials	Principle Use	Amount (lbs./hr.)
		Average/Maximum
Neutralized Wastewater	Treated Media	21,759 / 38,442
Precoat Slurry	Filter Aid	538 / 950

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. SEE ATTACHED FLOW DIAGRAM.

APPENDIX A, PROCESS

ANSWERS TO QUESTIONS 3,5,9 and 10

3. PRIMARY PROCESS EQUIPMENT

	IDENTIFICATION	YEAR INSTALLED
Rotary Vacuum Filter	L-08X-3000	1993
Rotary Vacuum Filter	L-08X-4000	1993
Filtrate Receiver Seal Tank	T-08X-3100	1993
Rotary Vacuum Filter Drumming Station	M-08X-3000	1993
Rotary Vacuum Filter Drumming Station	M-08X-4000	1993

5. CAPACITY OF EQUIPMENT (lbs./hr.)

	RATED	MAXIMUM
Combined capacity for the L-08X-3000 and L-08X-4000 Rotary Vacuum Filters	22,297	39,392
Filtrate Receiver Seal Tank	21,909	38,707
Combined capacity for the M-08X-3000 and M-08X-4000 Rotary Vacuum Filter Drumming Stations	388	685

9. HOURLY PRODUCTION RATES (lbs).

	AVERAGE	MAXIMUM
Neutralized/Filtered Wastewater	21,909	38,707
Filter Cake	388	685

10. ANNUAL PRODUCTION.

Neutralized/Filtered Wastewater	23,040,000 Gallons/year
Filter Cake	3,397,000 Pounds/year

CONTROL EQUIPMENT

A-2A
OEPA NO. 1431110128
FEMP ID NO. L=08X-3000

Control Equipment Code:

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

15. Control Equipment Data:

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

STACK DATA

16. Your Stack Identification EP8-013 (Exhaust from Vacuum Pump)

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

18. Type: [X] Round, top inside diameter dimension 4"
[ ] Rectangular, top inside dimensions (L)_____ X (W)_____

19. Height: Above roof 3 ft., above ground 48 ft.

20. Exit gas: Temp. Amb. °F, Volume 750 ACFM, Velocity 8,594 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 [ ] Material Balance
Completed by Kip Klee, Date 12-12-91

A-2B

OEPA NO. 1431110128

FEMP ID NO. L=08X-3000

CONTROL EQUIPMENT

Control Equipment Code:

(A)	Settling Chamber	(G)	Cyclonic Scrubber	(M)	Adsorber
(B)	Cyclone	(H)	Impingement Scrubber	(N)	Condenser
(C)	Multiple Cyclone	(I)	Orifice Scrubber	(O)	Afterburner - 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	
(b) Manufacturer		
(c) Model No.		
(d) Year Installed		
(e) Your Identification		
(f) Pollutant Controlled		
(g) Controlled pollutant emission rate (if known)		
(h) Pressure Drop		
(i) Design efficiency		
(j) Operating efficiency		

STACK DATA

16. Your Stack Identification EP8-013A (Exhaust from Filter hood)

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

18. Type: [X] Round, top inside diameter dimension 8"
    [ ] Rectangular, top inside dimensions (L)_____ X (W)_____

19. Height: Above roof 3 ft., above ground 48 ft.

20. Exit gas: Temp. Amb. °F, Volume 750 ACFM, Velocity 2,149 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 [ ] Material Balance
    Completed by Kip Klee , Date 12-12-91

OEPA NO. 1431110128
FEMP ID NO. L=08X-4000

CONTROL EQUIPMENT

Control Equipment Code:

(A)	Settling Chamber	(G)	Cyclonic Scrubber	(M)	Adsorber
(B)	Cyclone	(H)	Impingement Scrubber	(N)	Condenser
(C)	Multiple Cyclone	(I)	Orifice Scrubber	(O)	Afterburner - 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	
(b) Manufacturer		
(c) Model No.		
(d) Year Installed		
(e) Your Identification		
(f) Pollutant Controlled		
(g) Controlled pollutant emission rate (if known)		
(h) Pressure Drop		
(i) Design efficiency		
(j) Operating efficiency		

STACK DATA

16. Your Stack Identification EP8-012 (Exhaust from Vacuum Pump)

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

18. Type: [X] Round, top inside diameter dimension 4"
    [ ] Rectangular, top inside dimensions (L)_____ X (W)_____

19. Height: Above roof 3 ft., above ground 48 ft.

20. Exit gas: Temp. Amb. °F, Volume 750 ACFM, Velocity 8,594 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 [ ] Material Balance
    Completed by Kip Klee, Date 12-12-91

CONTROL EQUIPMENT

A-2D
OEPA NO. 1431110128
FEMP ID NO. L=08X-4000

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	
(b) Manufacturer		
(c) Model No.		
(d) Year Installed		
(e) Your Identification		
(f) Pollutant Controlled		
(g) Controlled pollutant emission rate (if known)		
(h) Pressure Drop		
(i) Design efficiency		
(j) Operating efficiency		

STACK DATA

16. Your Stack Identification EP8-012A (Exhaust from Filter hood)

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

18. Type: [X] Round, top inside diameter dimension 8"
    [ ] Rectangular, top inside dimensions (L)_____ X (W)_____

19. Height: Above roof 3 ft., above ground 48 ft.

20. Exit gas: Temp. Amb. °F, Volume 750 ACFM, Velocity 2,149 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 [ ] Material Balance
    Completed by Kip Klee, Date 12-12-91

A-2E

OEPA NO. 1431110128

FEMP ID NO. T=08X-3100

CONTROL EQUIPMENT

Control Equipment Code:

(A)	Settling Chamber	(G)	Cyclonic Scrubber	(M)	Adsorber
(B)	Cyclone	(H)	Impingement Scrubber	(N)	Condenser
(C)	Multiple Cyclone	(I)	Orifice Scrubber	(O)	Afterburner - 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	
(b) Manufacturer		
(c) Model No.		
(d) Year Installed		
(e) Your Identification		
(f) Pollutant Controlled		
(g) Controlled pollutant emission rate (if known)		
(h) Pressure Drop		
(i) Design efficiency		
(j) Operating efficiency		

STACK DATA

16. Your Stack Identification EP8-035 (Exhaust from Filtrate Receiver Seal Tank)

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

18. Type: [ ] Round, top inside diameter dimension_____
    [X] Rectangular, top inside dimensions (L) 9 ft. X (W) 6 ft.

19. Height: Above roof N/A ft., above ground 0 ft.

20. Exit gas: Temp. Amb. °F, Volume Unknown ACFM, Velocity Unknown 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 [ ] Material Balance
    Completed by Kip Klee, Date 12-12-91

A-2F

OEPA NO. 1431110128
FEMP ID NO. M-08X-3000
M-08X-4000

CONTROL EQUIPMENT

Control Equipment Code:

(A)	Settling Chamber	(G)	Cyclonic Scrubber	(M)	Adsorber
(B)	Cyclone	(H)	Impingement Scrubber	(N)	Condenser
(C)	Multiple Cyclone	(I)	Orifice Scrubber	(O)	Afterburner - 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)	Q - Cartridge Filter	Q - HEPA Filter
(b) Manufacturer	United Air Specialists	Flanders
(c) Model No.	FJH-12-3	E6-3x2-GG-F
(d) Year Installed	1991	1991
(e) Your Identification	G43-27/29	G43-27/29
(f) Pollutant Controlled	Particulate/Uranium	Particulate/Uranium
(g) Controlled pollutant emission rate (if known)	Part.= 8.49E-02 tons/yr Uran.= 4.25E-03 tons/yr	Part.= 8.49E-5 tons/yr Uran.= 4.25E-6 tons/yr
(h) Pressure Drop	4" w.c.	4" w.c.
(i) Design efficiency	99.5% @ 1.0 micron	99.97% @ 0.3 microns
(j) Operating efficiency	99.0% @ 1.0 micron	99.9% @ 0.3 microns

STACK DATA

16. Your Stack Identification EP8-011 (Exhaust from Drumming Stations)

17. Are other sources vented to this stack? [X] Yes [ ] No
    If yes, identify sources Equipment Nos. 08-A040A-PMP, 08-A040A-DFS, 08-A129-DDS, 08-A127-RXS, 08-F380-DFS, 08-F340-DFS, M-08C-1000, M-08C-4000, M-08C-4500

18. Type: [X] Round, top inside diameter dimension 26"
    [ ] Rectangular, top inside dimensions (L)_____ X (W)_____

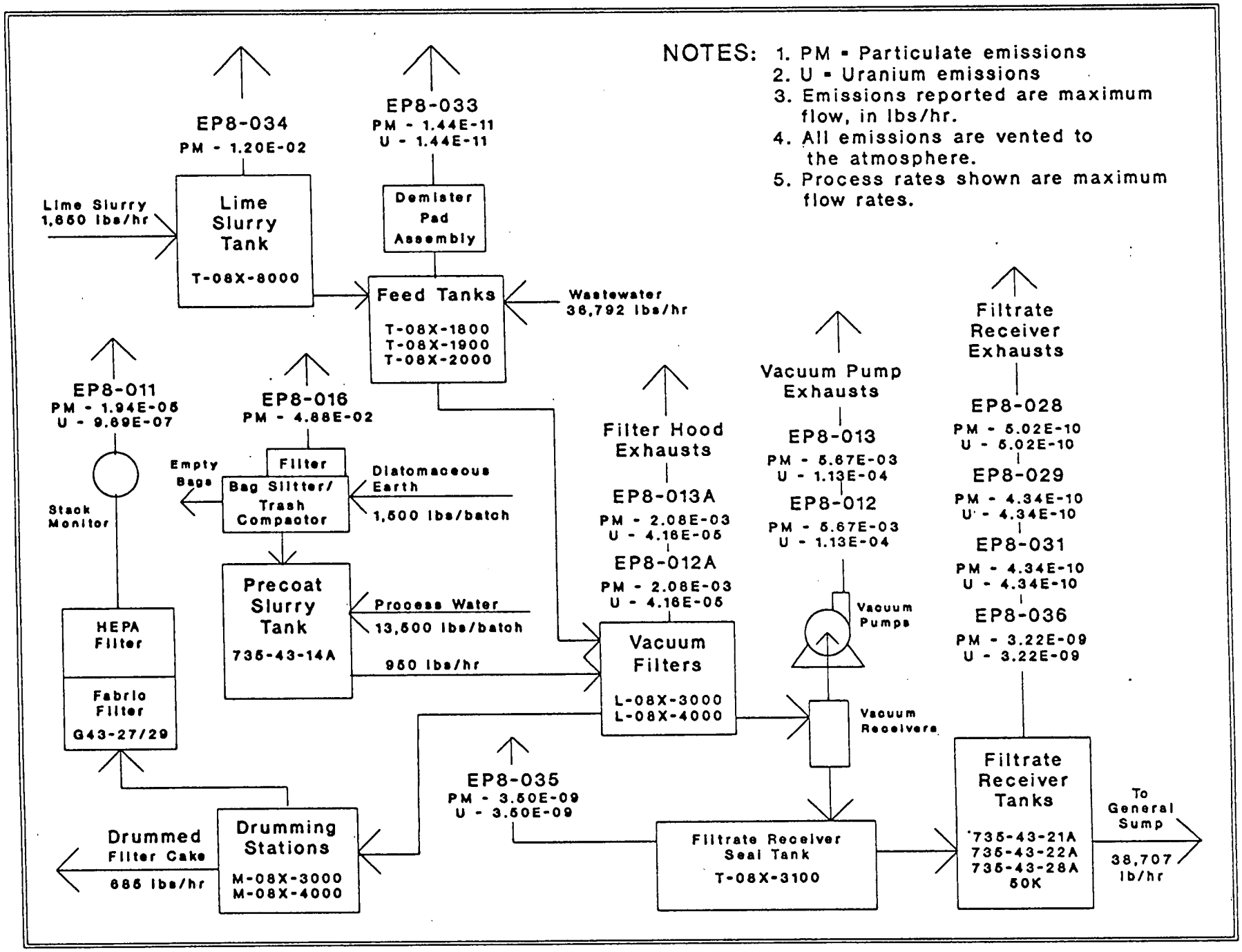
19. Height: Above roof 10 ft., above ground unkn ft.

20. Exit gas: Temp. Amb. °F, Volume 13,960 ACFM, Velocity 3,783 ft./min.

21. Continuous monitoring equipment: [X] Yes [ ] No
    If yes, indicate : Type Geiger-Mueller Tube , Manufacturer Ludlum

    Make or Model 177-62, Pollutant(s) monitored Uranium

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 [ ] Material Balance
    Completed by Kip Klee , Date 12-12-91



PROCESS FLOW DIAGAM - Plant 8 Sump

Permit to Install Application

Emission Calculations

for

Plant 8 Sump - Wastewater Treatment

Rotary Vacuum Filter L-08X-3000
Rotary Vacuum Filter L-08X-4000
Drumming Station M-08X-3000
Drumming Station M-08X-4000

FEMP ID #8-042

EMISSION CALCULATIONS
FOR THE L-08X-3000 AND L-08X-4000
ROTARY VACUUM FILTERS
VACUUM PUMPS

---

1. ASSUMPTIONS and TEST DATA

A. Water vapor emissions from the vacuum pumps are similar to those from an R-C blower.

B. Test data from the R-C Blower indicates that the water vapor content of exhaust emitted through the stack equals 0.02% of the water flow through the vacuum system.

C. The Concentration of uranium in the water vapor equals that in the filtrate.

D. The maximum uranium concentration observed in the filtrate for a similar operation is 1.2E-04 lbs U/gal.

E. The flow rate through the vacuum filters shall average 2677 gallons/hour with a maximum of 4729 gallons/hour.

F. Average operating hours are 6000 hours per year with a maximum of 8760 hours per year.

G. Particulate emissions (resulting from entrainment in water droplets) are back-calculated from uranium emissions data assuming the percentage of uranium in a particulate form is 2%. This assumption is based on upon Plant 8 Rotary Kiln and Primary Calciner observations and the uranium content of the feed material.

2. VOLUMETRIC FLOW RATES AND VELOCITIES

A. For each vacuum pump exhaust:

From design specifications: Q = 750 ACFM at STP = 750 SCFM

Vent diameter = 4 inches, Area = 0.0873 ft^2.

Velocity = Q/A = 750/0.0873 = 8594 ft/min.

NOTE: The emissions are calculated for both exhausts combined.

3. ACTUAL EMISSIONS

A. Actual uranium emissions:

$$\frac{2677\ \text{gal}}{\text{hr}} \left| \frac{0.02}{100} \right| = 0.535\ \frac{\text{gal}}{\text{hr}}\ \text{of water vapor}$$

$$\frac{0.535\ \text{gal}}{\text{hr}} \left| \frac{1.2\text{E-}04\ \text{lbs U}}{\text{gal}} \right| = 6.42\text{E-}05\ \frac{\text{lbs U}}{\text{hour}}$$

$$\frac{6.42\text{E-}05\ \text{lbs U}}{\text{hour}} \left| \frac{6000\ \text{hrs}}{\text{year}} \right| = 3.85\text{E-}01\ \frac{\text{lbs U}}{\text{year}}$$

$$\frac{3.85\text{E-}01\ \text{lbs U}}{\text{year}} \left| \frac{\text{ton}}{2000\ \text{lbs}} \right| = 1.93\text{E-}04\ \frac{\text{tons U}}{\text{year}}$$

B. Actual particulate emissions:

$$\frac{6.42\text{E-}05\ \text{lbs U}}{\text{hour}} \left| \frac{100}{2} \right| = 3.21\text{E-}03\ \frac{\text{lbs particulate}}{\text{hour}}$$

$$\frac{3.21\text{E-}03\ \text{lbs P}}{\text{hour}} \left| \frac{6000\ \text{hrs}}{\text{year}} \right| = 19.3\ \frac{\text{lbs particulate}}{\text{year}}$$

$$\frac{19.3\ \text{lbs P}}{\text{year}} \left| \frac{\text{ton}}{2000\ \text{lbs}} \right| = 9.64\text{E-}3\ \frac{\text{tons particulate}}{\text{year}}$$

4. POTENTIAL EMISSIONS

A. Potential uranium emissions:

$$\frac{4729\ \text{gal}}{\text{hr}} \left| \frac{0.02}{100} \right| = 0.946\ \frac{\text{gal}}{\text{hr}}\ \text{of water vapor}$$

$$\frac{0.946\ \text{gal}}{\text{hr}} \left| \frac{1.2\text{E-}04\ \text{lbs U}}{\text{gal}} \right| = 1.13\text{E-}04\ \frac{\text{lbs U}}{\text{hour}}$$

$$\frac{1.14\text{E-}04\ \text{lbs U}}{\text{hour}} \left| \frac{8760\ \text{hrs}}{\text{year}} \right| = 9.94\text{E-}01\ \frac{\text{lbs U}}{\text{year}}$$

$$\frac{9.94\text{E-}01\ \text{lbs U}}{\text{year}} \left| \frac{\text{ton}}{2000\ \text{lbs}} \right| = 4.97\text{E-}04\ \frac{\text{tons U}}{\text{year}}$$

B. Potential particulate emissions:

$$\frac{1.13\text{E-}04\ \text{lbs U}}{\text{hour}} \left| \frac{100}{2} \right| = 5.67\text{E-}03\ \frac{\text{lbs particulate}}{\text{hour}}$$

$$\frac{5.67\text{E-}03\ \text{lbs P}}{\text{hour}} \left| \frac{8760\ \text{hrs}}{\text{year}} \right| = 49.7\ \frac{\text{lbs particulate}}{\text{year}}$$

$$\frac{49.7\ \text{lbs P}}{\text{year}} \left| \frac{\text{ton}}{2000\ \text{lbs}} \right| = 2.49\text{E-}02\ \frac{\text{tons particulate}}{\text{year}}$$

5. UNCONTROLLED POTENTIAL EMISSIONS

Uncontrolled Potential emissions are calculated based on 8760 hours per year of operation and uncontrolled emission rates at the maximum design capacity of the source, or any production limitation listed in the PTI or PTO.

Since no control equipment is used on the the vacuum pumps or filter hood exhausts, the uncontrolled potential emissions will equal the potential emissions.

6. PM_{10} EMISSIONS

For these sources, assume all particulate emissions are PM_{10} emissions.

7. ALLOWABLE EMISSIONS

A. Process weight rate (P) in tons/hr:

The process weight rate is the same for both the vacuum pump and filter hood sources.

$$\frac{39392 \text{ lbs}}{\text{hour}} \left| \frac{\text{ton}}{2000 \text{ lbs}} \right| = 19.7 \frac{\text{tons}}{\text{hour}}$$

B. From Table I of the Ohio Administrative Code 3745-17-11:

Allowable emissions (E) in lbs/hr:

$$E = 4.10(P)^{0.67}$$
$$E = 4.10(19.7)^{0.67}$$

$$E = 30.2 \text{ lbs/hour}$$

EMISSION CALCULATIONS
FOR THE L-08X-3000 AND L-08X-4000
ROTARY VACUUM FILTERS
HOOD EXHAUSTS

---

1. ASSUMPTIONS and TEST DATA

A. The air in the vicinity of the filters is assumed to have a maximum alpha activity of $1.0E^{-11}$ microcuries/cm^3 and is indicative of the air being exhausted through the filter hood. This activity is based on air sample results obtained in the area of vacuum filter operations of a similar nature. This activity is considered to be representative of the emissions that would occur at both average and maximum process feed rates.

B. All of the alpha activity is attributed to natural uranium with a specific activity coefficient of 0.676 microcuries/gram.

C. Particulate emissions (resulting from entrainment in water droplets) are back-calculated from uranium emissions data assuming the percentage of uranium in a particulate form is 2%. This assumption is based on upon Plant 8 Rotary Kiln and Primary Calciner observations and the uranium content of the feed material.

2. VOLUMETRIC FLOW RATES AND VELOCITIES

A. For each filter hood exhaust:

From design specifications: Q = 750 ACFM at STP = 750 SCFM

Vent diameter = 8 INCHES, Area = 0.349 ft^2.

Velocity = Q/A = 750/0.349 = 2149 ft/min.

NOTE: The emissions are calculated for both exhausts combined.

3. URANIUM CONCENTRATION IN VENT EXHAUST:

$$\frac{1.0E\text{-}11 \text{ microcuries}}{cm^3} \left| \frac{\text{gram}}{0.676 \text{ microcuries}} \right| = 1.48E\text{-}11 \ \frac{\text{grams}}{cm^3}$$

$$\frac{1.48E\text{-}11 \text{ g}}{cm^3} \left| \frac{10^6 \ cm^3}{m^3} \right| \frac{m^3}{35.314 \ ft^3} \left| \frac{Kg}{1000 \text{ g}} \right| \frac{2.205 \text{ lb}}{Kg} \Bigg| = 9.24E\text{-}10 \ \frac{\text{lbs U}}{ft^3}$$

4. ACTUAL EMISSIONS

A. Actual uranium emissions:

$$\frac{750\ ft^3}{min} \left| \frac{60\ min}{hour} \right| \frac{9.24E\text{-}10\ lbs\ U}{ft^3} \Bigg| = 4.16E\text{-}05\ \frac{lbs\ U}{hour}$$

$$\frac{4.16E\text{-}05\ lbs\ U}{hour} \left| \frac{6000\ hours}{year} \right| = 2.49E\text{-}01\ \frac{lbs\ U}{year}$$

$$\frac{2.49E\text{-}01\ lbs\ U}{year} \left| \frac{ton}{2000\ lbs} \right| = 1.25E\text{-}04\ \frac{tons\ U}{year}$$

B. Actual particulate emissions:

$$\frac{4.16E\text{-}05\ lbs\ U}{hour} \left| \frac{100}{2} \right| = 2.08E\text{-}03\ \frac{lbs\ particulate}{hour}$$

$$\frac{2.08E\text{-}03\ lbs\ P}{hour} \left| \frac{6000\ hrs}{year} \right| = 12.5\ \frac{lbs\ particulate}{year}$$

$$\frac{12.5\ lbs\ P}{year} \left| \frac{ton}{2000\ lbs} \right| = 6.24E\text{-}03\ \frac{tons\ particulate}{year}$$

5. POTENTIAL EMISSIONS

A. Potential uranium emissions:

$$\frac{4.16E\text{-}05\ lbs\ U}{hour} \left| \frac{8760\ hours}{year} \right| = 3.64E\text{-}01\ \frac{lbs\ U}{year}$$

$$\frac{3.64E\text{-}01\ lbs\ U}{year} \left| \frac{ton}{2000\ lbs} \right| = 1.82E\text{-}04\ \frac{tons\ U}{year}$$

B. Potential particulate emissions:

$$\frac{4.16E\text{-}05\ lbs\ U}{hour} \left| \frac{100}{2} \right| = 2.08E\text{-}03\ \frac{lbs\ particulate}{hour}$$

$$\frac{2.08E\text{-}03\ lbs\ P}{hour} \left| \frac{8760\ hrs}{year} \right| = 18.2\ \frac{lbs\ particulate}{year}$$

$$\frac{18.2\ lbs\ P}{year} \left| \frac{ton}{2000\ lbs} \right| = 9.11E\text{-}03\ \frac{tons\ particulate}{year}$$

6. UNCONTROLLED POTENTIAL EMISSIONS

Uncontrolled Potential emissions are calculated based on 8760 hours per year of operation and uncontrolled emission rates at the maximum design capacity of the source, or any production limitation listed in the PTI or PTO.

Since no control equipment is used on the the vacuum pumps or filter hood exhausts, the uncontrolled potential emissions will equal the potential emissions.

7. PM_{10} EMISSIONS

For these sources, assume all particulate emissions are PM_{10} emissions.

8. ALLOWABLE EMISSIONS

A. Process weight rate (P) in tons/hr:

The process weight rate is the same for both the vacuum pump and filter hood sources.

$$\frac{39392 \text{ lbs}}{\text{hour}} \left| \frac{\text{ton}}{2000 \text{ lbs}} \right| = 19.7 \frac{\text{tons}}{\text{hour}}$$

B. From Table I of the Ohio Administrative Code 3745-17-11:

Allowable emissions (E) in lbs/hr:

$$E = 4.10(P)^{0.67}$$
$$E = 4.10(19.7)^{0.67}$$

$$E = 30.2 \text{ lbs/hour}$$

EMISSION CALCULATIONS
FOR THE M-08X-3000 AND M-08X-4000
ROTARY VACUUM FILTER
DRUMMING OPERATIONS

SOURCE IDENTIFICATION
Source name and address: Plant 8 sump - Filter Cake Drumming Operations

Process description: Drumming of filter cake from rotary vacuum filters
AP-42 Section: For 50% wet cake, assume losses are equal to 0.1% of throughput.
Uncontrolled AP-42 emission factor: 2 lbs/ton

ASSUMPTIONS:

A. Filter cake production is 9306 pounds per day average, 16,440 pounds per day maximum.

B. The filter cake contains 50 percent solids.

C. Particulate losses from the drumming operation will amount to approximately 0.1% of the total throughput.

D. The maximum uranium concentration in the particulate is 5 percent.

E. The efficiency of the primary collector is 95 percent.

F. The efficiency of the secondary collector is 99.9 percent.

G. The emissions calculated are the total emissions for both drumming stations.

For emissions calculations, the process weight rate is 9306 lbs/day average

Activity parameter:	(lbs/day)(days/year)/(2000 lbs/ton) =	1698 tons/year of process feed
Uncontrolled emissions:	(tons/yr)(emission factor)/(2000 lbs/ton)=	1.70 tons/year of particulate
	(tons/yr)(2000 lbs/ton)/(d/yr)/(24hrs/d) =	0.39 lbs/hour of particulate

---

UNCONTROLLED SIZE EMISSIONS
Catagory name: Mechanically generated, Process Ores and Non-metallic Minerals.
Catagory number: 4

	Particle size (um)			
	< 2.5	< 6	< 10	All
Generic distribution, Cumulative percent equal to or less than the size:	30	62	85	100
Cumulative mass < particle size emissions (tons/year total particulate):	5.10E-01	1.05E+00	1.44E+00	1.70E+00
Cumulative mass < particle size emissions (tons/year total uranium):	2.55E-02	5.26E-02	7.22E-02	8.49E-02

CONTROLLED SIZE EMISSIONS FROM PRIMARY COLLECTOR
Type of control device: Cartridge filter

	Particle size (um)			
	0-2.5	2.5-6	6-10	>10
Collection efficiency (Assumed):	95.0	95.0	95.0	95.0
Mass in size range before control (tons/year of particulate):	0.51	0.54	0.39	0.25
Mass in size range after control (tons/year of particulate):	2.55E-02	2.72E-02	1.95E-02	1.27E-02
Cumulative mass (tons/year of particulate):	2.55E-02	5.26E-02	7.22E-02	8.49E-02
Cumulative mass (tons/year of uranium):	1.27E-03	2.63E-03	3.61E-03	4.25E-03

CONTROLLED SIZE EMISSIONS FROM SECONDARY COLLECTOR
Type of control device: HEPA filter

	Particle size (um)			
	0-2.5	2.5-6	6-10	>10
Collection efficiency (Assumed):	99.90	99.90	99.90	99.90
Mass in size range before control (tons/year of particulate):	2.55E-02	2.72E-02	1.95E-02	1.27E-02
Mass in size range after control (tons/year of particulate):	2.55E-05	2.72E-05	1.95E-05	1.27E-05
Cumulative mass (tons/year of particulate):	2.55E-05	5.26E-05	7.22E-05	8.49E-05
Cumulative mass (tons/year of uranium):	1.27E-06	2.63E-06	3.61E-06	4.25E-06

ACTUAL EMISSION RATES

Annual emissions (from above) = 8.49E-05 tons/year of particulate

Hourly actual emissions: (tons/yr)(2000 lbs/ton)/(d/yr)/(24hrs/d) = 1.94E-05 lbs/hour of particulate

Uranium emissions: (lbs/hr of particulate)(5/100) = 9.69E-07 lbs/hour of uranium

POTENTIAL EMISSIONS

Potential emissions are based on 8760 hours/year of operation and actual emission rates.

Annual potential emissions: (lbs/hr)(8760 hours/year)/(2000lbs/ton) = 8.49E-05 tons/year of particulate

Uranium emissions: (tons/yr of particulate)(5/100) = 4.25E-06 tons/year of uranium

Hourly potential emissions are equal to the actual hourly emission rates.

UNCONTROLLED POTENTIAL EMISSIONS

Uncontrolled potential emissions are based on 8760 hours/year of operation and uncontrolled emission rates.

Particulate emissions (from above): =	1.70E+00 tons/year of particulate
(tons/yr of particulate)(2000 lbs/ton)/(8760 hrs/yr) =	3.88E-01 lbs/hour of particulate
Uranium emissions (from above): =	8.49E-02 tons/year of uranium
(tons/yr of uranium)(2000 lbs/ton)/(8760 hrs/yr) =	1.94E-02 lbs/hour of uranium

---

PM10 EMISSIONS

PM10 emissions are equal to the cumulative amount of emissions calculated under CONTROLLED SIZE EMISSIONS for the particle sizes less than or equal to 10 microns.

Annual PM10 emissions (from above):	7.22E-05 tons/year of particulate
Hourly PM10 emissions: (tns/yr)(2000lbs/tn)/(8760 hrs/yr) =	1.65E-05 lbs/hour of particulate

---

ALLOWABLE EMISSIONS (Compliance determination)

Allowable emissions are calculated form rule 3745-17-11.

Process weight rate (P) at maximum capacity:
P = (lbs/day)(ton/2000 lbs)/(24 hrs/day) = 0.194 tons/hour

Allowable emissions: From Table I of rule 3745-17-11.

If 0 <= P <= 0.05, then E = 0.551

If 0.05 <= P <= 30, then E = 4.10(P)^0.67

If P> 30, then E = 55.0(P)^0.11 - 40

Allowable emissions = 1.37 lbs/hour of particulate

EMISSION SUMMARY
FOR THE L-08X-3000 AND L-08X-4000
ROTARY VACUUM FILTERS
AND THE M-08X-3000 AND M-08X-4000
DRUMMING STATIONS

EMISSION SUMMARY	Vacuum pumps		Filter Hoods		Drumming Stations	
	Uranium	Particulate	Uranium	Particulate	Uranium	Particulate
Actual Emissions	6.42E-05 lb/hr 1.93E-04 tons/yr	3.21E-03 lb/hr 9.64E-03 tons/yr	4.16E-05 lb/hr 1.25E-04 tons/yr	2.08E-03 lb/hr 6.24E-03 tons/yr	9.69E-07 lb/hr 4.25E-06 tons/yr	1.94E-05 lb/hr 8.49E-05 tons/yr
Potential Emissions	1.13E-04 lb/hr 4.97E-04 tons/yr	5.67E-03 lb/hr 2.49E-02 tons/yr	4.16E-05 lb/hr 1.82E-04 tons/yr	2.08E-03 lb/hr 9.11E-03 tons/yr	9.69E-07 lb/hr - 4.25E-06 tons/yr	1.94E-05 lb/hr - 8.49E-05 tons/yr
Uncontrolled Potential Emissions	1.13E-04 lb/hr 4.97E-04 tons/yr	5.67E-03 lb/hr 2.49E-02 tons/yr	4.16E-05 lb/hr 1.82E-04 tons/yr	2.08E-03 lb/hr 9.11E-03 tons/yr	1.94E-02 lb/hr 8.49E-02 tons/yr	3.88E-01 lb/hr 1.70E+00 tons/yr
PM_{10} Emissions	------	5.67E-03 lb/hr 2.49E-02 tons/yr	------	2.08E-03 lb/hr 9.11E-03 tons/yr	------	1.65E-05 lb/hr 7.22E-05 tons/yr
Allowable Emissions	------	30.2 lb/hr	------	30.2 lb/hr	------	1.37 lb/hr

Permit to Install Application

Appendix E-2 and

Emission Calculations

for

Plant 8 Sump - Wastewater Treatment

Filtrate Receiver Seal Tank T-08X-3100

FEMP ID #8-042

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

DOE - FEMP
(Facility Name)

APPENDIX E-2

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

1. Tank identification: Name or number Filtrate Receiver Seal Tank T-08X-3100 Date Installed 1993 (mon/yr)

2. Tank capacity: 2,425 gallons

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

4. Tank dimensions: Diameter _____ Height 6 ft. Length 9 ft. Width 6 ft.

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

6. Type of tank:
[ ] External floating roof tank
[ ] Internal floating roof tank
[ ] Fixed roof tank
[ ] Vertical cylindrical tank
[ ] Horizontal cylindrical tank
[ ] Pressure tank
[X] Other, specify Rectangular, open top tank (Sump)

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

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

9. 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 Black

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.
N/A

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)
T-08X-3100 (8-042)
(tank identification)

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

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 Filtrate from Vacuum Filters Trade Name Filtrate
Density: 8.34 lbs/gal or ---- ° API Producer WEMCO

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: 0.4642 psia at average storage temperature
0.4642 psia at maximum storage temperature

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

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

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

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

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

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

f) Indicate the year (or 12-month period) for item (g): 2-1-94 to 1-31-95

g) Annual throughput of material: 23,040,000 gallons.

Completed by Kip Klee Date 12-11-91

Westinghouse
1431110128

Uranium emissions for Filtrate Receiver Seal Tank T-08X-3100

Fixed Roof Tank
Calculations based on AP-42, section 4.3

Breathing Loss
LB = 2.26*10^-2 * MV • (P/(PA-P))^0.68 • D^1.73 • H^0.51 • DT^0.5 • FP • C • KC

Working loss:
LW = 2.4*10^-5 • MV • P • V • N * KN • KC

where:

MV =	18	(lb/lbmol)	Molecular weight
PA =	14.7	psia	Avg. atmos. pressure
P =	0.4642	psia	liquid true vapor pressure
D =	8.3	ft	• tank diameter
H =	3	ft	avg. vapor space height = 1/2 the tank height
DT =	20	degrees F	avg. diurnal temp change
FP =	1		paint factor
C =	0.47		• Adjustment factor for small diameter tanks
KC =	1		product factor

V =	2425	gallons	tank volume
N =	9501.0		number of turnovers per year
KN =	0.22		turnover factor

LB = 5.681 lb/yr
LW = 1016.469 lb/yr

LT = 1022.149 lb/yr of Water vapor

Total Emissions: 1022.149 (lb H20 vapor/year
x 6(10)^-6 lb U/1000 lb water
= 6.13E-06 lb U/year

Maximum Emissions: 6.13E-06 lb U/year x 5
= 3.07E-05 lb U/year

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 parameters used to produce a "worst case" condition for the above calculations are as follows:

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

(2) The maximum concentration of uranium entrained in the aerosol would be equivelent to the amount of uranium entrained in the vapor as determined by laboratory tests conducted on Lab sample D-37, Lab #2-9846. The laboratory tests determined the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate is 6(10)^-6 gU/l of solution.

(3) Uranium emissions are based on the calculated amount of water vapor leaving the vessel.

(4) Since this tank is of a rectangular design, the values used for variables marked with an asterisk, are those of a vertical, cylindrical vessel that would produce an equivalent amount of surface area as the rectangular vessel.

Permit to Install Application

Appendix A

for

Plant 8 Sump - Filtrate Receiver Tank 50K

FEMP ID #8-043

For Official Use Only
Premise No. / / /
Source No. /
Application No. /

APPENDIX A, PROCESS

2974

A-1

PROCESS DATA

1. Name of process Plant 8 Sump - Wastewater Treatment

2. End product of this process Neutralized and Filtered Wastewaters
3. Primary process equipment 50,000 Gallon Holding Tank

Your identification T-50K Year Installed 1993

4. Manufacturer To Be Determined (TBD) Make or Model TBD

5. Capacity of equipment (lbs./hr): Rated 15,310 Max. 27,033

6. Method of exhaust ventilation: [ ] Stack [ ] Window fan [ ] Roof vent
[X] Other, describe Open Top Tank

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

OPERATING DATA

7. Normal operating schedule: 24 hrs./day, 7 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 15,310 Maximum 27,033

10. Annual production (indicate units) 16,100,000 Gallons
projected percent annual increase in production Zero

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

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

13. Materials used in process:

List of Raw Materials	Principle Use	Amount (lbs./hr.)
		Average/Maximum
Filtered Wastewater	Work In Progress	15,310 / 27,033

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. SEE ATTACHED FLOW DIAGRAM

CONTROL EQUIPMENT

Control Equipment Code:

(A)	Settling Chamber	(G)	Cyclonic Scrubber	(M)	Adsorber
(B)	Cyclone	(H)	Impingement Scrubber	(N)	Condenser
(C)	Multiple Cyclone	(I)	Orifice Scrubber	(O)	Afterburner - 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	
(b) Manufacturer		
(c) Model No.		
(d) Year Installed		
(e) Your Identification		
(f) Pollutant Controlled		
(g) Controlled pollutant emission rate (if known)		
(h) Pressure Drop		
(i) Design efficiency		
(j) Operating efficiency		

STACK DATA

16. Your Stack Identification EP8-036

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

18. Type: [X] Round, top inside diameter dimension 20' (Open top Tank)
    [ ] Rectangular, top inside dimensions (L)_____ X (W)_____

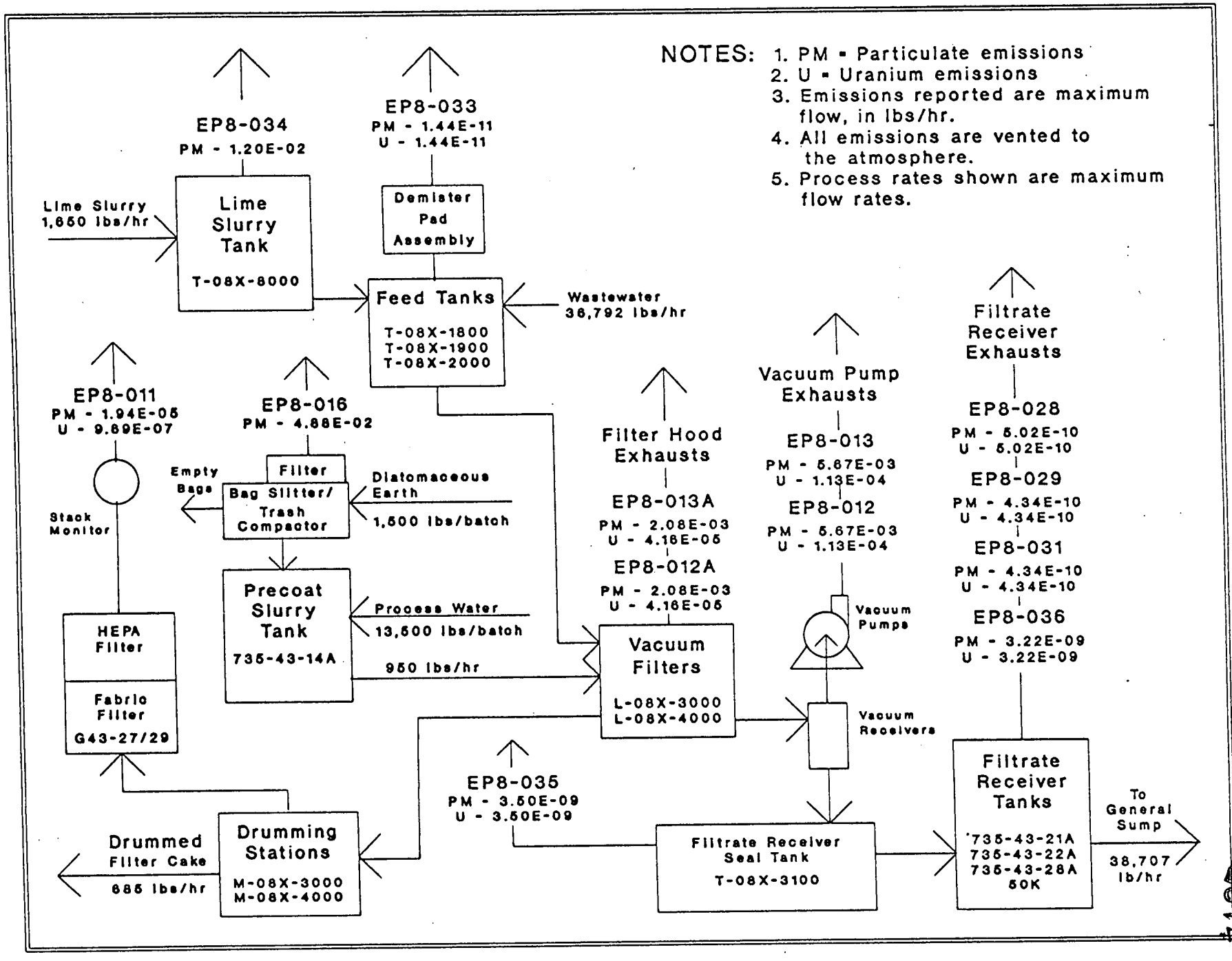
19. Height: Above roof N/A ft., above ground 25 ft.

20. Exit gas: Temp. Amb. °F, Volume 15,612 ACFM, Velocity 50 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 [ ] Material Balance
    Completed by Kip Klee, Date 12-16-91



PROCESS FLOW DIAGAM - Plant 8 Sump

Permit to Install Application

Appendix E-2

and Emission Calculations

for

Plant 8 Sump - Filtrate Receiver Tank 50K

FEMP ID #8-043

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

DOE - FEMP
(Facility Name)

APPENDIX E-2

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

1. Tank identification: Name or number Filtrate Receiver Tank 50K Date Installed 1993 (month/year)

2. Tank capacity: 51,700 gallons

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

4. Tank dimensions: Diameter 20 ft. Height 24 ft. Length ----- Width -----

5. Tank shell material: [ ] Steel [ ] Aluminum [X] Other, specify 304 SS

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

7. Location of tank: [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 304 SS

N/A 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.

N/A

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 2974
(Facility Name)
50K (8-043)
(tank identification)

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

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 Filtrate from Vacuum Filters Trade Name Filtrate
Density: 8.33 lbs/gal or ---- ° API Producer WEMCO

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: 0.4642 psia at average storage temperature
0.4642 psia at maximum storage temperature

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

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

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

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

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

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

f) Indicate the year (or 12-month period) for item (g): 2-1-94 to 1-31-95

g) Annual throughput of material: 16,100,000 gallons.

Completed by Kip Klee Date 12-16-91

Westinghouse
1431110128

Uranium emissions for Filtrate Receiver Tank 50K

Fixed Roof Tank
Calculations based on AP-42, section 4.3

Breathing Loss
LB = 2.26*10^-2 * MV * (P/(PA-P))^0.68 * D^1.73 * H^0.51 * DT^0.5 * FP * C * KC

Working loss:
LW = 2.4*10^-5 * MV * P * V * N * KN * KC

where:

MV =	18	(lb/lbmol)	Molecular weight
PA =	14.7	psia	Avg. atmos. pressure
P =	0.4642	psia	liquid true vapor pressure
D =	20	ft	tank diameter
H =	12	ft	avg. vapor space height = 1/2 the tank height
DT =	20	degrees F	avg. diurnal temp change
FP =	1.35		paint factor
C =	0.89		Adjustment factor for small diameter tanks
KC =	1		product factor

V =	51700	gallons	tank volume
N =	311.4		number of turnovers per year
KN =	0.25		turnover factor

LB = 134.848 lb/yr
LW = 807.151 lb/yr

LT = 941.999 lb/yr of Water vapor

Total Emissions: 941.9987 (lb H20 vapor/year
x 6(10)^-6 lb U/1000 lb water
= 5.65E-06 lb U/year

Maximum Emissions: 5.65E-06 lb U/year x 5
= 2.83E-05 lb U/year

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 parameters used to produce a "worst case" condition for the above calculations are as follows:

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

(2) The maximum concentration of uranium entrained in the aerosol would be equivelent to the amount of uranium entrained in the vapor as determined by laboratory tests conducted on Lab sample D-37, Lab #2-9846. The laboratory tests determined the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate is 6(10)^-6 gU/l of solution.

(3) Uranium emissions are based on the calculated amount of water vapor leaving the vessel.

Permit to Install Application

Appendix A

for

Plant 8 Sump - Filtrate Receiver Tank 735-43-21A

FEMP ID #8-024

For Official Use Only

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

APPENDIX A, PROCESS

PROCESS DATA

1. Name of process Plant 8 Sump - Wastewater Treatment

2. End product of this process Neutralized and Filtered Wastewaters
3. Primary process equipment 8,225 Gallon Holding Tank

Your identification 735-43-21A Year Installed 1955

4. Manufacturer Unknown Make or Model Unknown

5. Capacity of equipment (lbs./hr): Rated 2,434 Max. 4,301

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

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

OPERATING DATA

7. Normal operating schedule: 24 hrs./day, 7 days/wk., 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 2,434 Maximum 4,301

10. Annual production (indicate units) 2,560,000 Gallons
projected percent annual increase in production Zero

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

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

13. Materials used in process:

List of Raw Materials	Principle Use	Amount (lbs./hr.)
		Average/Maximum
Filtered Wastewater	Work In Progress	2,434 / 4,301

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. SEE ATTACHED FLOW DIAGRAM

CONTROL EQUIPMENT

A-2
OEPA NO. 1431110128
FEMP ID NO. 8-024

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	
(b) Manufacturer		
(c) Model No.		
(d) Year Installed		
(e) Your Identification		
(f) Pollutant Controlled		
(g) Controlled pollutant emission rate (if known)		
(h) Pressure Drop		
(i) Design efficiency		
(j) Operating efficiency		

STACK DATA

16. Your Stack Identification EP8-028

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

18. Type: [X] Round, top inside diameter dimension 20"
    [ ] Rectangular, top inside dimensions (L)_____ X (W)_____

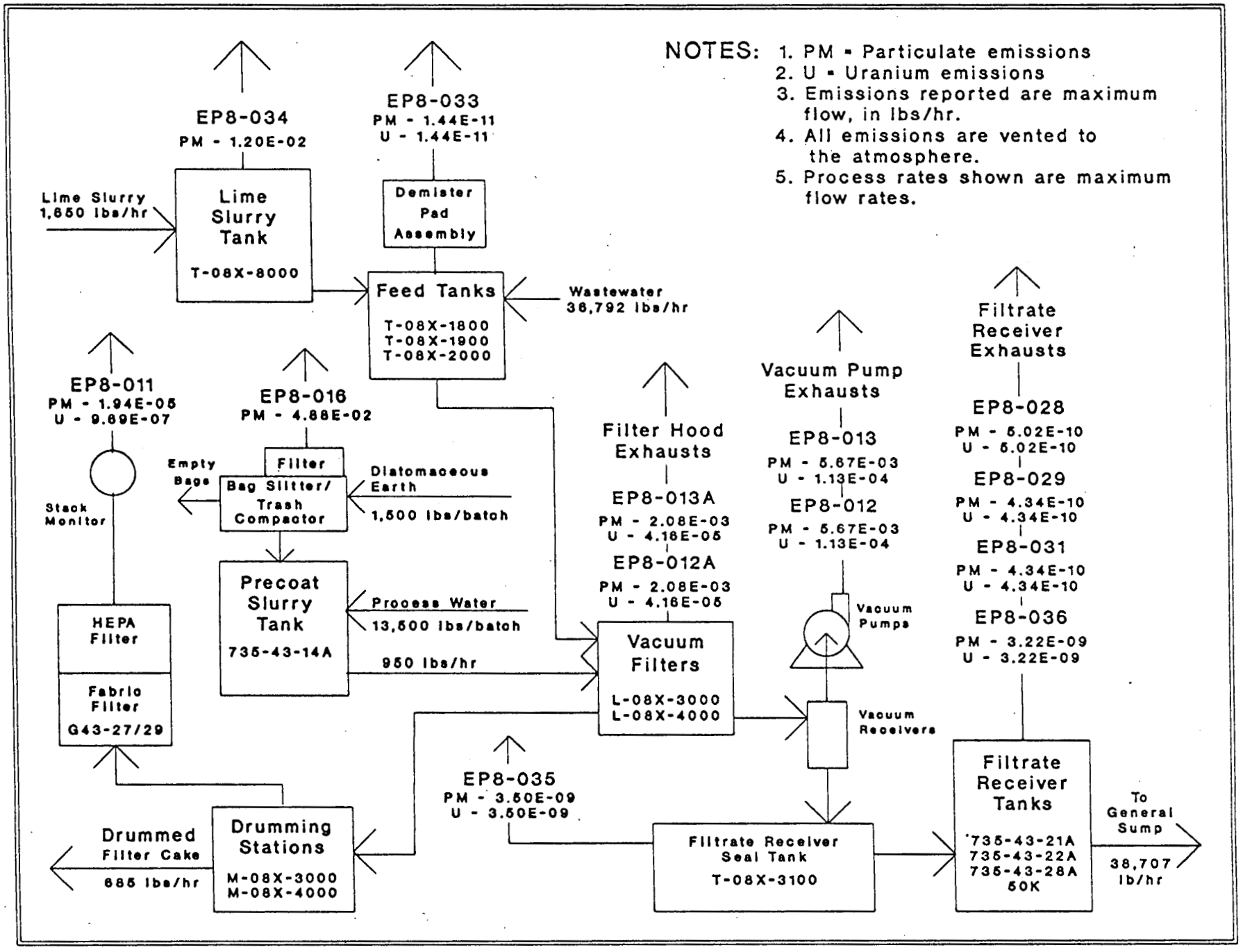
19. Height: Above roof N/A ft., above ground 15 ft.

20. Exit gas: Temp. Amb. °F, Volume 108 ACFM, Velocity 50 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 [ ] Material Balance
    Completed by Kip Klee, Date 12-16-91



PROCESS FLOW DIAGAM - Plant 8 Sump

Permit to Install Application

Appendix E-2

and Emission Calculations

for

Plant 8 Sump - Filtrate Receiver Tank 735-43-21A

FEMP ID #8-024

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

DOE - FEMP
(Facility Name)

APPENDIX E-2

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

1. Tank identification: Name or number Filtrate Receiver Tank 735-43-21A Date Installed 1955 (month/year)

2. Tank capacity: 8,225 gallons

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

4. Tank dimensions: Diameter 10 ft. Height 14 ft. Length ----- Width -----

5. Tank shell material: [ ] Steel [ ] Aluminum [X] Other, specify 304 SS

6. Type of tank:
[ ] External floating roof tank
[ ] Internal floating roof tank
[X] Fixed roof tank
[ ] 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 304 SS

N/A 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.

N/A

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)

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

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 Filtrate from Vacuum Filters Trade Name Filtrate
Density: 8.33 lbs/gal or ---- ° API Producer WEMCO

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: 0.4642 psia at average storage temperature
0.4642 psia at maximum storage temperature

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

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

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

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

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

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

f) Indicate the year (or 12-month period) for item (g): 2-1-94 to 1-31-95

g) Annual throughput of material: 2,560,000 gallons.

Completed by Kip Klee Date 12-16-91

Westinghouse
1431110128

Uranium emissions for Filtrate Receiver Tank 735-43-21A

Fixed Roof Tank
Calculations based on AP-42, section 4.3

Breathing Loss
LB = 2.26*10^-2 * MV * (P/(PA-P))^0.68 * D^1.73 * H^0.51 * DT^0.5 * FP * C * KC

Working loss:
LW = 2.4*10^-5 * MV * P * V * N * KN * KC

where:

MV =	18 (lb/lbmol)	Molecular weight
PA =	14.7 psia	Avg. atmos. pressure
P =	0.4642 psia	liquid true vapor pressure
D =	10 ft	tank diameter
H =	7 ft	avg. vapor space height = 1/2 the tank height
DT =	20 degrees F	avg. diurnal temp change
FP =	1.35	paint factor
C =	0.53	Adjustment factor for small diameter tanks
KC =	1	product factor

V =	8225 gallons	tank volume
N =	311.2	number of turnovers per year
KN =	0.25	turnover factor

LB = 18.389 lb/yr
LW = 128.342 lb/yr

LT = 146.731 lb/yr of Water vapor

Total Emissions: 146.7313 (lb H2O vapor/year
x 6(10)^-6 lb U/1000 lb water
= 8.80E-07 lb U/year

Maximum Emissions: 8.80E-07 lb U/year x 5
= 4.40E-06 lb U/year

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 parameters used to produce a "worst case" condition for the above calculations are as follows:

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

(2) The maximum concentration of uranium entrained in the aerosol would be equivelent to the amount of uranium entrained in the vapor as determined by laboratory tests conducted on Lab sample D-37, Lab #2-9846. The laboratory tests determined the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate is 6(10)^-6 gU/l of solution.

(3) Uranium emissions are based on the calculated amount of water vapor leaving the vessel.

Permit to Install Application

Appendix A

for

Plant 8 Sump - Filtrate Receiver Tank 735-43-22A

FEMP ID #8-025

For Official Use Only

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

2974

APPENDIX A, PROCESS

A-1

PROCESS DATA

1. Name of process Plant 8 Sump - Wastewater Treatment

2. End product of this process Neutralized and Filtered Wastewaters
3. Primary process equipment 7,050 Gallon Holding Tank

Your identification 735-43-22A Year Installed 1955

4. Manufacturer Unknown Make or Model Unknown

5. Capacity of equipment (lbs./hr): Rated 2,083 Max. 3,686

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

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

OPERATING DATA

7. Normal operating schedule: 24 hrs./day, 7 days/wk., 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 2,083 Maximum 3,686

10. Annual production (indicate units) 2,190,000 Gallons
projected percent annual increase in production Zero

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

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

13. Materials used in process:

List of Raw Materials	Principle Use	Amount (lbs./hr.)
		Average/Maximum
Filtered Wastewater	Work In Progress	2,083 / 3,686

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. SEE ATTACHED FLOW DIAGRAM

OEPA NO. 1431110128
FEMP ID NO. 8-025

CONTROL EQUIPMENT

Control Equipment Code:

(A)	Settling Chamber	(G)	Cyclonic Scrubber	(M)	Adsorber
(B)	Cyclone	(H)	Impingement Scrubber	(N)	Condenser
(C)	Multiple Cyclone	(I)	Orifice Scrubber	(O)	Afterburner - 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	
(b) Manufacturer		
(c) Model No.		
(d) Year Installed		
(e) Your Identification		
(f) Pollutant Controlled		
(g) Controlled pollutant emission rate (if known)		
(h) Pressure Drop		
(i) Design efficiency		
(j) Operating efficiency		

STACK DATA

16. Your Stack Identification EP8-029

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

18. Type: [X] Round, top inside diameter dimension 20"
    [ ] Rectangular, top inside dimensions (L)_____ X (W)_____

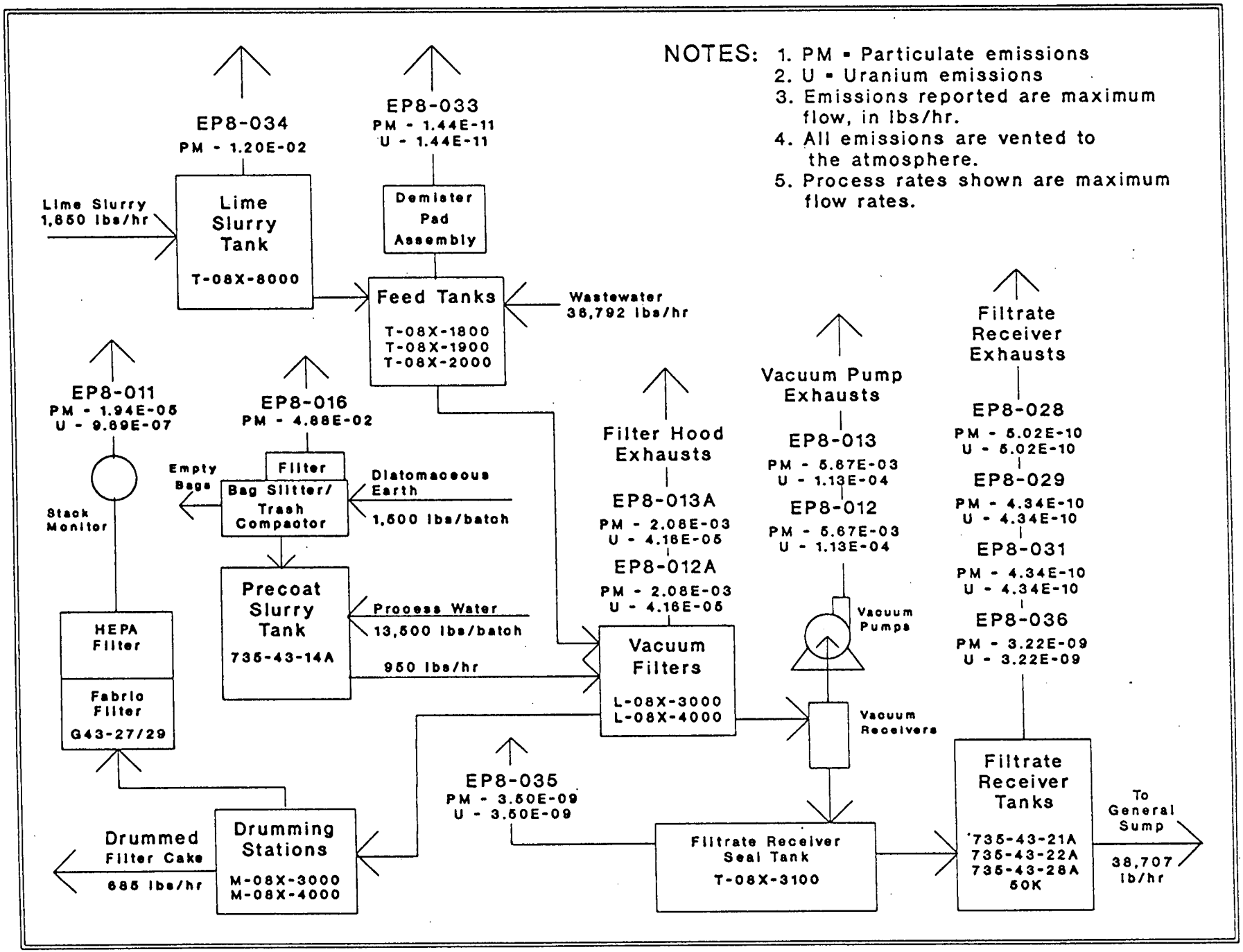
19. Height: Above roof N/A ft., above ground 13 ft.

20. Exit gas: Temp. Amb. °F, Volume 108 ACFM, Velocity 50 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 [ ] Material Balance
    Completed by Kip Klee, Date 12-16-91



PROCESS FLOW DIAGAM - Plant 8 Sump

Permit to Install Application

Appendix E-2

and Emission Calculations

for

Plant 8 Sump - Filtrate Receiver Tank 735-43-22A

FEMP ID #8-025

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

DOE - FEMP
(Facility Name)

APPENDIX E-2

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

1. Tank identification: Name or number Filtrate Receiver Tank 735-43-22A Date Installed 1955 (month/year)

2. Tank capacity: 7,050 gallons

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

4. Tank dimensions: Diameter 10 ft. Height 12 ft. Length ----- Width -----

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

6. Type of tank:
[ ] External floating roof tank
[ ] Internal floating roof tank
[X] Fixed roof tank
[ ] 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 Black

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.

N/A

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)
735-43-22A (8-025)
(tank identification)

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

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 Filtrate from Vacuum Filters Trade Name Filtrate
Density: 8.33 lbs/gal or ---- ° API Producer WEMCO

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: 0.4642 psia at average storage temperature
0.4642 psia at maximum storage temperature

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

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

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

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

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

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

f) Indicate the year (or 12-month period) for item (g): 2-1-94 to 1-31-95

g) Annual throughput of material: 2,190,000 gallons.

Completed by Kip Klee Date 12-16-91

Westinghouse
1431110128

Uranium emissions for Filtrate Receiver Tank 735-43-22A

Fixed Roof Tank
Calculations based on AP-42, section 4.3

Breathing Loss
LB = 2.26*10^-2 • MV • (P/(PA-P))^0.68 • D^1.73 • H^0.51 • DT^0.5 • FP • C • KC

Working loss:
LW = 2.4*10^-5 • MV • P • V • N • KN * KC

where:

MV =	18	(lb/lbmol)	Molecular weight
PA =	14.7	psia	Avg. atmos. pressure
P =	0.4642	psia	liquid true vapor pressure
D =	10	ft	tank diameter
H =	6	ft	avg. vapor space height = 1/2 the tank height
DT =	20	degrees F	avg. diurnal temp change
FP =	1.35		paint factor
C =	0.53		Adjustment factor for small diameter tanks
KC =	1		product factor

V =	7050	gallons	tank volume
N =	310.6		number of turnovers per year
KN =	0.25		turnover factor

LB = 16.999 lb/yr
LW = 109.793 lb/yr

LT = 126.792 lb/yr of Water vapor

Total Emissions: 126.7915 (lb H2O vapor/year
x 6(10)^-6 lb U/1000 lb water
= 7.61E-07 lb U/year

Maximum Emissions: 7.61E-07 lb U/year x 5
= 3.80E-06 lb U/year

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 parameters used to produce a "worst case" condition for the above calculations are as follows:

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

(2) The maximum concentration of uranium entrained in the aerosol would be equivelent to the amount of uranium entrained in the vapor as determined by laboratory tests conducted on Lab sample D-37, Lab #2-9846. The laboratory tests determined the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate is 6(10)^-6 gU/l of solution.

(3) Uranium emissions are based on the calculated amount of water vapor leaving the vessel.

Permit to Install Application

Appendix A

for

Plant 8 Sump - Filtrate Receiver Tank 735-43-28A

FEMP ID #8-027

For Official Use Only

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

APPENDIX A, PROCESS

PROCESS DATA

1. Name of process Plant 8 Sump - Wastewater Treatment

2. End product of this process Neutralized and Filtered Wastewaters
3. Primary process equipment 7,050 Gallon Holding Tank

   Your identification 735-43-28A Year Installed 1955

4. Manufacturer Unknown Make or Model Unknown

5. Capacity of equipment (lbs./hr): Rated 2,083 Max. 3,686

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

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

OPERATING DATA

7. Normal operating schedule: 24 hrs./day, 7 days/wk., 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 2,083 Maximum 3,686

10. Annual production (indicate units) 2,190,000 Gallons
    projected percent annual increase in production Zero

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

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

13. Materials used in process:

List of Raw Materials	Principle Use	Amount (lbs./hr.)
		Average/Maximum
Filtered Wastewater	Work In Progress	2,083 / 3,686

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. SEE ATTACHED FLOW DIAGRAM

A-2
OEPA NO. 1431110128
FEMP ID NO. 8-027

CONTROL EQUIPMENT

Control Equipment Code:

(A)	Settling Chamber	(G)	Cyclonic Scrubber	(M)	Adsorber
(B)	Cyclone	(H)	Impingement Scrubber	(N)	Condenser
(C)	Multiple Cyclone	(I)	Orifice Scrubber	(O)	Afterburner - 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	
(b) Manufacturer		
(c) Model No.		
(d) Year Installed		
(e) Your Identification		
(f) Pollutant Controlled		
(g) Controlled pollutant emission rate (if known)		
(h) Pressure Drop		
(i) Design efficiency		
(j) Operating efficiency		

STACK DATA

16. Your Stack Identification EP8-031

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

18. Type: [X] Round, top inside diameter dimension 20"
    [ ] Rectangular, top inside dimensions (L)_____ X (W)_____

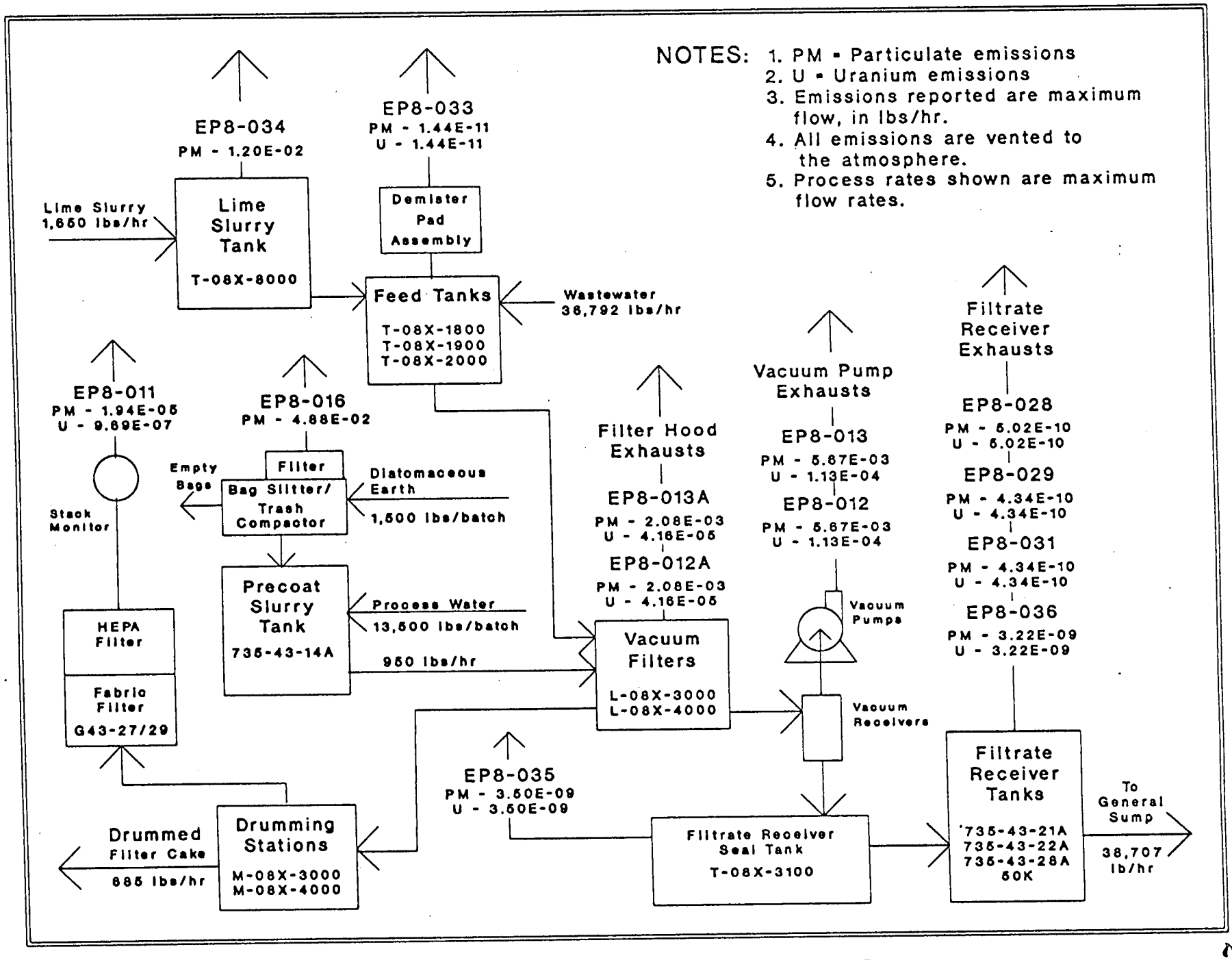
19. Height: Above roof N/A ft., above ground 13 ft.

20. Exit gas: Temp. Amb. °F, Volume 108 ACFM, Velocity 50 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 [ ] Material Balance
    Completed by Kip Klee, Date 12-16-91



PROCESS FLOW DIAGAM - Plant 8 Sump

Permit to Install Application

Appendix E-2

and Emission Calculations

for

Plant 8 Sump - Filtrate Receiver Tank 735-43-28A

FEMP ID #8-027

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

DOE - FEMP
(Facility Name)

APPENDIX E-2

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

1. Tank identification: Name or number Filtrate Receiver Tank 735-43-28A Date Installed 1955 (month/year)

2. Tank capacity: 7,050 gallons

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

4. Tank dimensions: Diameter 10 ft. Height 12 ft. Length ----- Width -----

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

6. Type of tank:
[ ] External floating roof tank
[ ] Internal floating roof tank
[X] Fixed roof tank
[ ] 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 Black

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.

N/A

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)

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

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 Filtrate from Vacuum Filters Trade Name Filtrate
Density: 8.33 lbs/gal or ---- ° API Producer WEMCO

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: 0.4642 psia at average storage temperature
0.4642 psia at maximum storage temperature

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

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

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

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

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

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

f) Indicate the year (or 12-month period) for item (g): 2-1-94 to 1-31-95

g) Annual throughput of material: 2,190,000 gallons.

Completed by Kip Klee Date 12-16-91

Westinghouse
1431110128

Uranium emissions for Filtrate Receiver Tank 735-43-28A

Fixed Roof Tank
Calculations based on AP-42, section 4.3

Breathing Loss
LB = 2.26*10^-2 * MV * (P/(PA-P))^0.68 * D^1.73 * H^0.51 * DT^0.5 * FP * C * KC

Working loss:
LW = 2.4*10^-5 * MV * P * V * N * KN * KC

where:

MV =	18	(lb/lbmol)	Molecular weight
PA =	14.7	psia	Avg. atmos. pressure
P =	0.4642	psia	liquid true vapor pressure
D =	10	ft	tank diameter
H =	6	ft	avg. vapor space height = 1/2 the tank height
DT =	20	degrees F	avg. diurnal temp change
FP =	1.35		paint factor
C =	0.53		Adjustment factor for small diameter tanks
KC =	1		product factor

V =	7050	gallons	tank volume
N =	310.6		number of turnovers per year
KN =	0.25		turnover factor

LB =	16.999	lb/yr	Total Emissions: 126.7915 (lb H2O vapor/year
LW =	109.793	lb/yr	x 6(10)^-6 lb U/1000 lb water
	---		= 7.61E-07 lb U/year
LT =	126.792	lb/yr of Water vapor	Maximum Emissions: 7.61E-07 lb U/year x 5
			= 3.80E-06 lb U/year

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 parameters used to produce a "worst case" condition for the above calculations are as follows:

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

(2) The maximum concentration of uranium entrained in the aerosol would be equivelent to the amount of uranium entrained in the vapor as determined by laboratory tests conducted on Lab sample D-37, Lab #2-9846. The laboratory tests determined the maximum concentration of uranium entrained in the vapor from a boiling solution of 9% uranyl nitrate is 6(10)^-6 gU/l of solution.

(3) Uranium emissions are based on the calculated amount of water vapor leaving the vessel.

Permit to Install Application

Results of COMPLY runs to determine

Stack Monitoring Requirements

for the following stacks:

EP8-011	EP8-029
EP8-012	EP8-031
EP8-012A	EP8-033
EP8-013	EP8-035
EP8-013A	EP8-036
EP8-028	

Per NESHAPS Subpart H, Stack Monitoring is required when the calculated Effective Dose Equivalent (EDE) from the stack (before controls) is $\geq$ 0.1 mrem/year.

1/6/92

EVALUATION FOR STACK EP8-011

SCREENING LEVEL 4

DATA ENTERED:

Nuclide		Release Rate (curies/YEAR)
U-234	Y	2.630E-02
U-235	Y	1.180E-03
U-236	Y	2.450E-03
U-238	Y	2.560E-02
PU-239	W	1.930E-03
PU-238	W	3.310E-05
NP-237	W	5.780E-05
TH-234	Y	2.620E-02
TH-232	W	8.470E-04
TH-230	W	2.770E-02
TH-228	Y	8.470E-04
RA-228	W	2.310E-03
RA-226	W	3.160E-05
CS-137	D	3.850E-04
RU-106	Y	2.000E-05
TC-99	W	3.000E-03
SR-90	Y	9.240E-05

Release height 16 meters.
Building height 15 meters.
The source and receptor are not on the same building.
Building width 80 meters.
Building length 80 meters.

STACK DISTANCES, FILE: H:\COMP\PLT8STK

DIR	Distance (meters)
N	1200.0
NNE	1270.0
NE	1700.0
ENE	2370.0
E	1150.0
ESE	1210.0
SE	1400.0
SSE	1250.0
S	1330.0
SSW	1150.0
SW	1080.0
WSW	970.0
W	2270.0
WNW	1260.0
NW	1550.0
NNW	1620.0

1/6/92

WINDROSE DATA, FILE: H:\COMP\WINDROSE.APT
Source of wind rose data: Cincinnati Metropolitan Airport
Dates of coverage: 1985 through 1989
Wind rose location: Cincinnati, Ohio
Distance to facility: 30 miles

Percent calm: 0.00

Wind FROM	Frequency	Speed (meters/s)
N	0.068	4.50
NNE	0.033	4.67
NE	0.040	4.29
ENE	0.047	4.17
E	0.065	3.58
ESE	0.036	2.92
SE	0.030	2.93
SSE	0.036	2.86
S	0.099	3.56
SSW	0.123	4.41
SW	0.111	5.09
WSW	0.072	5.47
W	0.090	5.88
WNW	0.060	6.37
NW	0.052	5.56
NNW	0.037	4.97

He produces his own VEGETABLES at home.
He produces his own MILK at home.
He produces his own MEAT at home.

NOTES:

The receptor exposed to the highest concentration is located 1200. meters from the source in the N sector.

He produces his own VEGETABLES at his home.
He produces his own MEAT at his home.
He produces his own MILK at his home.

RESULTS:

Effective dose equivalent: 4.8 mrem/yr.

Since the calculated EDE is >0.1 mrem/yr, stack monitoring is required.

NOTE: Installation of a stack monitor is included in the project scope.

1/ 6/92

EVALUATION OF STACKS EP8-012

SCREENING LEVEL 2

DATA ENTERED:

Nuclide		Release Rate (curies/YEAR)
U-234	Y	2.990E-05
U-235	Y	1.340E-06
U-236	Y	2.780E-06
U-238	Y	2.910E-05
PU-239	W	2.190E-06
PU-238	W	3.760E-08
NP-237	W	6.560E-08
TH-234	Y	2.980E-05
TH-232	W	9.630E-07
TH-230	W	3.150E-05
TH-228	Y	9.630E-07
RA-228	W	2.630E-06
RA-226	W	3.590E-08
CS-137	D	4.380E-07
RU-106	Y	2.280E-08
TC-99	W	3.410E-06
SR-90	Y	1.050E-07

Release height 16 meters.
Building height 15 meters.
The source and receptor are not on the same building.
Distance from the source to the receptor is 1100 meters.
Building width 80 meters.
Default mean wind speed used (2.0 m/sec).

RESULTS:

Effective dose equivalent: 3.4E-02 mrem/yr.

Since the calculated EDE is <0.1 mrem/yr, no stack monitoring is required.

1/ 6/92

EVALUATION OF STACKS EP8-012A

SCREENING LEVEL 2

DATA ENTERED:

Nuclide		Release Rate (curies/YEAR)
U-234	Y	1.940E-05
U-235	Y	8.670E-07
U-236	Y	1.800E-06
U-238	Y	1.880E-05
PU-239	W	1.420E-06
PU-238	W	2.440E-08
NP-237	W	4.250E-08
TH-234	Y	1.930E-05
TH-232	W	6.240E-07
TH-230	W	2.040E-05
TH-228	Y	6.240E-07
RA-228	W	1.700E-06
RA-226	W	2.320E-08
CS-137	D	2.830E-07
RU-106	Y	1.470E-08
TC-99	W	2.210E-06
SR-90	Y	6.800E-08

Release height 16 meters.
Building height 15 meters.
The source and receptor are not on the same building.
Distance from the source to the receptor is 1100 meters.
Building width 80 meters.
Default mean wind speed used (2.0 m/sec).

RESULTS:

Effective dose equivalent: 2.2E-02 mrem/yr.

Since the calculated EDE is <0.1 mrem/yr, no stack monitoring is required.

1/ 6/92

EVALUATION OF STACKS EP8-013

SCREENING LEVEL 2

DATA ENTERED:

Nuclide		Release Rate (curies/YEAR)
U-234	Y	2.990E-05
U-235	Y	1.340E-06
U-236	Y	2.780E-06
U-238	Y	2.910E-05
PU-239	W	2.190E-06
PU-238	W	3.760E-08
NP-237	W	6.560E-08
TH-234	Y	2.980E-05
TH-232	W	9.630E-07
TH-230	W	3.150E-05
TH-228	Y	9.630E-07
RA-228	W	2.630E-06
RA-226	W	3.590E-08
CS-137	D	4.380E-07
RU-106	Y	2.280E-08
TC-99	W	3.410E-06
SR-90	Y	1.050E-07

Release height 16 meters.
Building height 15 meters.
The source and receptor are not on the same building.
Distance from the source to the receptor is 1100 meters.
Building width 80 meters.
Default mean wind speed used (2.0 m/sec).

RESULTS:

Effective dose equivalent: 3.4E-02 mrem/yr.

Since the calculated EDE is <0.1 mrem/yr, no stack monitoring is required.

1/ 6/92

EVALUATION OF STACKS EP8-013A

SCREENING LEVEL 2

DATA ENTERED:

Nuclide		Release Rate (curies/YEAR)
U-234	Y	1.940E-05
U-235	Y	8.670E-07
U-236	Y	1.800E-06
U-238	Y	1.880E-05
PU-239	W	1.420E-06
PU-238	W	2.440E-08
NP-237	W	4.250E-08
TH-234	Y	1.930E-05
TH-232	W	6.240E-07
TH-230	W	2.040E-05
TH-228	Y	6.240E-07
RA-228	W	1.700E-06
RA-226	W	2.320E-08
CS-137	D	2.830E-07
RU-106	Y	1.470E-08
TC-99	W	2.210E-06
SR-90	Y	6.800E-08

Release height 16 meters.
Building height 15 meters.
The source and receptor are not on the same building.
Distance from the source to the receptor is 1100 meters.
Building width 80 meters.
Default mean wind speed used (2.0 m/sec).

RESULTS:

Effective dose equivalent: 2.2E-02 mrem/yr.

Since the calculated EDE is <0.1 mrem/yr, no stack monitoring is required.

1/ 6/92

EVALUATION FOR STACK EP8-028

SCREENING LEVEL 2

DATA ENTERED:

Nuclide		Release Rate (curies/YEAR)
U-234	Y	1.360E-10
U-235	Y	6.110E-12
U-236	Y	1.270E-11
U-238	Y	1.320E-10
PU-239	W	9.980E-12
PU-238	W	1.720E-13
NP-237	W	2.990E-13
TH-234	Y	1.360E-10
TH-232	W	4.390E-12
TH-230	W	1.440E-10
TH-228	Y	4.390E-12
RA-228	W	1.200E-11
RA-226	W	1.640E-13
CS-137	D	2.000E-12
RU-106	Y	1.040E-13
TC-99	W	1.560E-11
SR-90	Y	4.790E-13

Release height 5 meters.
Building height 5 meters.
The source and receptor are not on the same building.
Distance from the source to the receptor is 1100 meters.
Building width 3 meters.
Default mean wind speed used (2.0 m/sec).

RESULTS:

Effective dose equivalent: 1.7E-07 mrem/yr.

Since the calculated EDE is <0.1 mrem/yr, no stack monitoring is required.

1/ 6/92

EVALUATION FOR STACKS EP8-029

SCREENING LEVEL 2

DATA ENTERED:

Nuclide		Release Rate (curies/YEAR)
U-234	Y	1.180E-10
U-235	Y	5.290E-12
U-236	Y	1.100E-11
U-238	Y	1.150E-10
PU-239	W	8.640E-12
PU-238	W	1.490E-13
NP-237	W	2.590E-13
TH-234	Y	1.170E-10
TH-232	W	3.800E-12
TH-230	W	1.240E-10
TH-228	Y	3.800E-12
RA-228	W	1.040E-11
RA-226	W	1.420E-13
CS-137	D	1.730E-12
RU-106	Y	8.990E-14
TC-99	W	1.350E-11
SR-90	Y	4.150E-13

Release height 4 meters.
Building height 4 meters.
The source and receptor are not on the same building.
Distance from the source to the receptor is 1100 meters.
Building width 3 meters.
Default mean wind speed used (2.0 m/sec).

RESULTS:

Effective dose equivalent: 1.5E-07 mrem/yr.

Since the calculated EDE is <0.1 mrem/yr, no stack monitoring is required.

1/ 6/92

EVALUATION FOR STACKS EP8-031

SCREENING LEVEL 2

DATA ENTERED:

Nuclide		Release Rate (curies/YEAR)
U-234	Y	1.180E-10
U-235	Y	5.290E-12
U-236	Y	1.100E-11
U-238	Y	1.150E-10
PU-239	W	8.640E-12
PU-238	W	1.490E-13
NP-237	W	2.590E-13
TH-234	Y	1.170E-10
TH-232	W	3.800E-12
TH-230	W	1.240E-10
TH-228	Y	3.800E-12
RA-228	W	1.040E-11
RA-226	W	1.420E-13
CS-137	D	1.730E-12
RU-106	Y	8.990E-14
TC-99	W	1.350E-11
SR-90	Y	4.150E-13

Release height 4 meters.
Building height 4 meters.
The source and receptor are not on the same building.
Distance from the source to the receptor is 1100 meters.
Building width 3 meters.
Default mean wind speed used (2.0 m/sec).

RESULTS:

Effective dose equivalent: 1.5E-07 mrem/yr.

Since the calculated EDE is <0.1 mrem/yr, no stack monitoring is required.

1/ 6/92

EVALUATION FOR STACK EP8-033

SCREENING LEVEL 2

DATA ENTERED:

Nuclide		Release Rate (curies/YEAR)
U-234	Y	1.160E-09
U-235	Y	5.200E-11
U-236	Y	1.080E-10
U-238	Y	1.130E-09
PU-239	W	8.500E-11
PU-238	W	1.460E-12
NP-237	W	2.550E-12
TH-234	Y	1.160E-09
TH-232	W	3.740E-11
TH-230	W	1.220E-09
TH-228	Y	3.740E-11
RA-228	W	1.020E-10
RA-226	W	1.390E-12
CS-137	D	1.700E-11
RU-106	Y	8.840E-13
TC-99	W	1.330E-10
SR-90	Y	4.080E-12

Release height 16 meters.
Building height 15 meters.
The source and receptor are not on the same building.
Distance from the source to the receptor is 1100 meters.
Building width 80 meters.
Default mean wind speed used (2.0 m/sec).

RESULTS:

Effective dose equivalent: 1.3E-06 mrem/yr.

Since the calculated EDE is <0.1 mrem/yr, no stack monitoring is required.

EVALUATION OF STACK EP8-035

SCREENING LEVEL 2

DATA ENTERED:

Nuclide		Release Rate (curies/YEAR)
U-234	Y	9.520E-10
U-235	Y	4.260E-11
U-236	Y	8.850E-11
U-238	Y	9.240E-10
PU-239	W	6.960E-11
PU-238	W	1.200E-12
NP-237	W	2.090E-12
TH-234	Y	9.470E-10
TH-232	W	3.060E-11
TH-230	W	1.000E-09
TH-228	Y	3.060E-11
RA-228	W	8.350E-11
RA-226	W	1.140E-12
CS-137	D	1.390E-11
RU-106	Y	7.240E-13
TC-99	W	1.090E-10
SR-90	Y	3.340E-12

Release height 8 meters.
Building height 8 meters.
The source and receptor are not on the same building.
Distance from the source to the receptor is 1100 meters.
Building width 7 meters.
Default mean wind speed used (2.0 m/sec).

RESULTS:

Effective dose equivalent: 1.2E-06 mrem/yr.

Since the calculated EDE is <0.1 mrem/yr, no stack monitoring is required.

EVALUATION FOR STACK EP8-036

SCREENING LEVEL 2

DATA ENTERED:

Nuclide		Release Rate (curies/YEAR)
U-234	Y	8.780E-10
U-235	Y	3.930E-11
U-236	Y	8.160E-11
U-238	Y	8.520E-10
PU-239	W	6.420E-11
PU-238	W	1.100E-12
NP-237	W	1.930E-12
TH-234	Y	8.730E-10
TH-232	W	2.820E-11
TH-230	W	9.240E-10
TH-228	Y	2.820E-11
RA-228	W	7.700E-11
RA-226	W	1.050E-12
CS-137	D	1.280E-11
RU-106	Y	6.670E-13
TC-99	W	1.000E-10
SR-90	Y	3.080E-12

Release height 8 meters.
Building height 8 meters.
The source and receptor are not on the same building.
Distance from the source to the receptor is 1100 meters.
Building width 7 meters.
Default mean wind speed used (2.0 m/sec).

RESULTS:

Effective dose equivalent: 1.1E-06 mrem/yr.

Since the calculated EDE is <0.1 mrem/yr, no stack monitoring is required.