

GULF UNITED
NUCLEAR FUELS CORPORATION

For Div. of Compliance

GRASSLANDS ROAD
ELMSFORD, NEW YORK 10523
914.592.9000In reply refer to:
NISM-72-43

May 3, 1972

Director, Division of Materials Licensing
U. S. Atomic Energy Commission
Washington, D. C. 20545Attention: Mr. Donald A. Nussbaumer, Chief
Fuel Fabrication and Transportation BranchSubject: Waste Management Program, AEC License
No. SNM-33, Docket 70-36

Gentlemen:

Enclosed are seven copies of the description of Gulf United's Waste Management Program for Chemical Operations at Hematite, Missouri. I apologize for the delay in supplying this information but you are aware of the reasons for the delay.

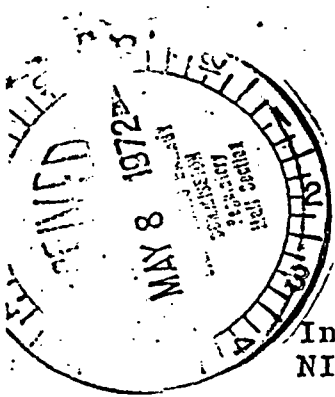
Much of the information was originally submitted on March 19, 1971 in connection with a license renewal action. However, a considerable number of changes in throughput and facility utilization have occurred since then. Thus certain future plans and modifications are indefinite or have been omitted from the tables but are described here.

1. ITEM PLANT. Operations in the Item Plant ceased in January, 1972 as indicated in my letter of March 22, 1972 (NISM 72-21). Therefore, no improvements in effluent control are planned.
2. RED ROOM. Future plans for improvements in effluent control for the Red Room, as shown in the tables are based on 1970 throughput and utilization factors. Current business plans indicate much reduced throughput and utilization thereby postponing indefinitely the need for implementing the plans for improvement, with the exception of the muffle box furnaces for pyrohydrolysis. Effluent concentrations from these furnaces will be reduced to 10 CFR 20 Appendix B Table II values by December 1972 as indicated in NISM-72-21.

G-71

NISM

1-1



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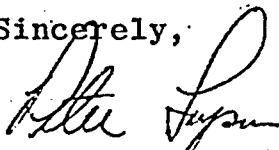
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GULF UNITED
NUCLEAR FUELS CORPORATION

3. LABORATORY. Future plans for improvement in effluent control for the laboratory were also based on 1970 throughput and utilization factors and analysis of materials from the Item Plant. Accordingly, these plans are indefinitely postponed, with reduced effluent concentrations achieved by reduced throughput and utilization.
4. GREEN ROOM. As indicated in my letter of March 30, 1972 (NISM-72-28), the Green Room would undergo significant alteration and modification in October, 1973. Air cleaning equipment is being designed, cannot now be included in the tables and is inapplicable to much of the existing processing equipment.

We recognize that the effluent control situation at Hematite is complex and possibly confusing. Please let me know if you require clarification or interpretation of any information in the report.

Sincerely,



Peter Loysen, Manager
Nuclear and Industrial Safety

PL/sm

SITE EVALUATION
Chemical Operations
SNM-33, Docket 70-36

Site and Location

The Chemical Operation is located on an approximate 150 acre site in a lightly populated area of east-central Missouri. The Operation is approximately three-quarters of a mile northeast of Hematite and is roughly on the borderline of the townships of Joachim, Central, Plattin and Valle. These townships are part of Jefferson County.

Land Use

Jefferson County is predominately rural with 50% of the land area classified as forrest, 39% productive farming such as grain and hay, and approximately 11% is classified urban, suburban, commercial and unused or undeveloped.

The land use pattern appears to be undergoing a major change. Jefferson County is part of a dynamic growing urban region, the St. Louis Standard Metropolitan Statistical Area (SMSA), and extensive development have resulted from its growth. This has resulted in growth of new buildings, subdivisions, scattered homesites, paved streets and roads, and public facilities. Connected with this growth has been an expansion of commercial establishments. However, agricultural land uses in the new growth areas are still predominant and represent numerous large and well-kept productive farms. There are approximately 60 manufacturing establishments in Jefferson County. They are located in the areas of high population densities, usually among residential and commercial areas. (1)

Population

Population figures for 1970 are summarized in the following table:

<u>Township</u>	<u>Population (# of People)</u>	<u>Area (Sq. Miles)</u>	<u>Population Density (No. of People/Sq. Mile)</u>
Joachim	21,938	74.05	296
Central	5,427	74.90	72
Plattin	4,487	105.70	42
Valle	9,975	93.90	106

For the total Jefferson County, the population density is 158 people per square mile based on a total population of 105,248 persons and an area of 666.6 square miles. (2, 3)

(1) The Quest for Tomorrow-Prologue for a Plan, Jefferson County Planning and Zoning Commission, June 1969

(2) General Population Statistics, Official 1970 Census Data, Bureau of Census, 1971

(3) Land Use, Jefferson County, Missouri, Hartland Bartholomew and Associates, November 1967

Meteorology

General meteorological characteristics of the Chemical Operation site should be similar to those of St. Louis, the nearest U.S. Weather Bureau recording station. St. Louis is located at the confluence of the nation's two major rivers and near the geographical center of the United States. Thus, with a somewhat modified continental climate, it is in the enviable position of being able to enjoy the vicissitude of a four season climate without the undue hardship of prolonged periods of extreme cold, extreme heat or high humidity. To the south is the warm, moist air of the Gulf of Mexico, and to the north in Canada is a favorable region of cold air masses. The alternate invasion of St. Louis by air masses from those sources, and the conflict along the frontal zones where they come together, produce a variety of weather conditions, none of which are likely to persist to the point of monotony.

Winters are brisk and stimulating, but seldom severe. Snow fall has averaged less than 20 inches per winter season since 1930. Maximum temperatures remain as cold as 32° or lower less than 20 to 25 days in most years. Summers are warm with maximum temperature of 90° or higher an average of 35 to 40 days per year. The normal average annual precipitation for the St. Louis area is a little over 35 inches. The three winter months are the driest, the spring months are normally the wettest and it is not unusual to have extended periods of 1 to 2 weeks or more without appreciable rainfall from the middle of the summer into the fall. (1)

Seasonally averaged data is summarized below:

<u>Season</u>	<u>Prevailing Wind Direction</u>	<u>Mean Speed (Miles/Hour)</u>	<u>Mean Temperature (°F)</u>	<u>Mean Precipitation (inch)</u>
Winter	NW	10.8	36.4	2.37
Spring	S	9.8	64.4	3.91
Summer	S	7.7	74.8	3.03
Fall	S	9.6	45.8	2.47

Hydrology

Stream Flow

Liquid effluents may be discharged to the Joachim Creek. The United States Department of the Interior, Geological Survey, maintains a flow gage on Route 21A Bridge crossing the Joachim Creek at Hematite.

Provisional data has been furnished by the Geological Survey and is summarized below:

<u>Season</u>	<u>Mean Flow (CFS)</u>	<u>Standard Deviation</u>	<u>No. of Observations</u>
Winter	169	331	12
Spring	330	773	13
Summer	12	8	15
Fall	16	15	16

(1) Local Climatological Data, St. Louis, Missouri, U.S. Department of Commerce, 1970

It should be noted that the standard deviations are quite large which is due in part to the small number of observations plus the fact that the data has not been adjusted. However, the Geological Survey feels this data is representative.

Ground-Water Reservoirs

Wells drilled into bedrock aquifers in the Joachim Creek Water shed encounter confined or artesian ground water. In general, ground water movement is easterly toward the Mississippi River. Yields of wells varies, depending on what rock units are penetrated. Wells finished in St. Peter Sandstone through Lower Gasconade Dolomite had yields of more than 100 gallons per minute while wells finished in Cambrian age sediments but open to Ordovician age sediments had yields up to as much as 500 gallons per minute. Wells drilled in any of these areas could expect to encounter water with acceptable solids (less than 500 parts per million) in or above the aquifer indicated. Ground water in the Joachim Creek Water shed becomes more saline in a down dip in a northeasterly direction. (1)

Geology

The underlying earth structures are composed of younger rock than that of the south western portion of the County. The 240-260 million year old Mississippian system of the far northeastern portion of the County gradually ages to the 440-470 million years old Cambrian system of the southwestern portion of the County. This difference in age partly explains the difference in topography. The older Cambrian system has been exposed to erosion for 200 million more years than the younger Mississippian system, resulting in a more rolling topography. The younger rock structure of the northeastern section has resulted in a more rugged topography.

The southwestern corner of the County near the Big River is primarily dolomite (magnesium limestone), with sandstone and chert (angular fragments of quartz) present in various quantities depending on the location. This dolomite and chert grades northeast toward St. Louis into dolomite with sandstone. A massive sandstone ridge runs across the County from Pacific southeast to Festus and Crystal City. This fine quality stone is used for glass manufacturing and building purposes. Limestone exists in the Kimmswick formation in a narrow strip across the northern part of the County and extends south along the Mississippi River. Some deposits of marble are also present in the County.

The topsoil is Tilsit Silt Loam beginning at the ridge just opposite the highway from the Operation on northward. The Operation itself is situated on fertile alluvial Union Silt Loam in the Joachim Creek bottomland. (2)

(1) Private communication with Donald Miller, Missouri Geological Survey and Water Resources Division, November 1971

(2) Economy and Population - Meramec, Rock and Joachim Townships, Jefferson County, Missouri, Hartland Bartholomew and Associates, March 1965

Seismology

The east central Missouri general area is relatively seismically active. The southeastern area of Missouri is quite active seismically and also contains a portion of the New Madrid Fault that caused the "great earthquakes" of 1811 and 1812. There were three quakes of Epicentral Intensity XII (M.M.) which took place on December 16, 1811 and January 23 and February 7, 1812, near New Madrid. During recent years, there have been two quakes recorded in the New Madrid area. In 1962 a quake measuring V (M.M.) was recorded and one with a magnitude of 4½ was recorded in 1963. (1)

(1) Eppley, R.A., Earthquake History of the United States, Part I, No. 41-1
Revised Edition, U.S. Department of Commerce, 1965

WASTE MANAGEMENT PROGRAM

CHEMICAL OPERATIONS

SNM-33, DOCKET 70-36

SOLID WASTE

Solid waste is generated, processed and disposed of in the quantities shown on the attached table. It is generated at all process steps and pieces of equipment throughout the Facility. Solid waste is collected as soon as it is generated and placed in bins or drums which are located strategically throughout the Facility. Processing consists of compacting or incineration; however, unprocessed drums may be released for disposal. Disposal refers to on-site burial and shipment for burial. It should be noted that on-site burial was stopped in November 1970 and off-site burial has been used exclusively since.

Through November 1970, 71,200 grams of uranium (approximately 4.81 curies) have had on-site burial. During 1970, 3,176 grams of uranium enriched to greater than 5% and containing 2,938 grams of U^{235} ; 28,466 grams of uranium enriched to 5% and containing 684 grams of U^{235} ; and 8,721 grams of depleted uranium containing 133 grams U^{235} (approximately 2.72 curies) all as solid waste were disposed of by shipment to burial.

Waste Management Program

Chemical Operation

SNM-33, Docket 70-36.

Solid Waste Generation, Reduction & Disposal ⁽¹⁾

<u>Category</u>	<u>Material Type</u>	<u>Material Description</u>	<u>Max. Wt. Per Container (lbs)</u>	<u>U²³⁵ Content Per Container (gms)</u>	<u>No. Containers Generated Per Week</u>	<u>No. Containers Reduced Per Week</u>		<u>No. Containers Disposed Per Week</u>
						<u>In</u>	<u>Out</u>	
Low Weight Low U ²³⁵	Combustibles	Paper, Rags, Gloves, etc.	200	Less than 5	20	20	5	5
High Weight Low U ²³⁵	Metals Ceramics	Contaminated Equipment	800	Less than 5	8	8	2	2
Low Weight High U ²³⁵	Combustibles	Paper, Rags Gloves, etc.	200	Less than 100	4	4	1	1
High Weight High U ²³⁵	Metals Ceramics	Acid Insolubles Equipment Insulation, etc.	800	Less than 100	5	0	0	5
Weekly Total No. of Containers					37	32	8	13
Weekly Total in Cubic Feet					272	236	59	96
Annual Total No. of Containers					1850	1600	400	650
Annual Total in Cubic Feet					13,600	11,800	2950	4800

NOTES: (1) Containers are 55-gallon drums

WASTE MANAGEMENT PROGRAM
Chemical Operation
SNM-33, Docket 70-36
Ventilation and Exhaust Air Cleaning Equipment

I. General

Ventilation and exhaust air cleaning equipment has been coded on the following forms to reduce repetitious information. The following guide lines and equipment descriptions apply to the coding used through out the forms.

II. Ventilation

1. Class A Ventilation

Fume Hoods: Minimum 100 ft./min face velocity.
Used for control of fumes where modest quantities of airborne uranium are generated. Typically these hoods might handle uranium primarily in solution form.

2. Class B Ventilation

Local Exhaust: Minimum 150 Ft./min spot velocity.
Spot ventilation used at locations such as sampling ports and product take-off parts where the need for air control is momentary or of low frequency and generation of airborne material is limited by equipment design.

3. Class C Ventilation

General Purpose Hoods: Minimum 150 ft./min face velocity.
Used for material transfer and similar operations where generation of airborne material is limited.

4. Class D. Ventilation

Restricted Access Hoods: Minimum 150 ft/min face velocity
Hoods designed for mixed use in which operations are performed that would require Class C ventilation but for which total containment is desirable during certain process steps involving active or potentially active generation of airborne contamination. Such hoods will frequently include gloveports, and will normally be closed during production operations.

5. Class E. Ventilation

Glove Boxes: Enclosed hood under negative pressure.
Operations where airborne material is actively generated, or where large quantities of material are handled such that Class C or D hoods would not be adequate will be contained in glove boxes. Airlock entry ports will be provided.

Fire prevention, the potential for generating explosive atmospheres, and the presence of pyrophoric materials is considered in ventilation design. Disaster control techniques such as air dilution, quenching or inert atmospheres and fire detection or automatic extinguishing systems are utilized as appropriate for such hazards.

III. Exhaust Air Cleaning

1. Type 1

Cyclone Collectors: Used to remove particulates from exhaust streams that are heavily loaded. This equipment is 70% to 90% efficient by the manufacturer.

2. Type 2

High Efficiency Particulate Air Filters: Used in the majority of cases for highest efficiency air cleaning, normally in conjunction with roughing filters to extend useful life and improve reliability. These filters have manufacturer's rated efficiencies of 99.97%.

3. Type 3

Wet Scrubbers: Used to clean heavily loaded air streams that are not suited, due to air quality or temperature, to other cleaning methods. This type of equipment is approximately 95% efficient as rated by the manufacturer.

4. Type 4

Dry Scrubbers: Used primarily for cleaning air streams containing corrosive agents that render wet scrubbing impractical. This equipment is approximately 95% efficient as rated by the manufacturer.

5. Type 5

Fabric Filters: Normally used in systems where material impinging on them can be returned to the process using reverse jet, pulsed air or other dislodging methods. These filters are approximately 90% to 95% efficient after some material builds-up has occurred. This rating was supplied by the manufacturer.

6. Type 6

Special Filters: Ceramic or metallic frit filters, usually an integral part of process equipment, may be used for special air cleaning requirements. This type filter is approximately 95% efficient as rated by the manufacturer.

IV. Utilization Factors

Emission values were obtained based on the following plant use factors for 1970.

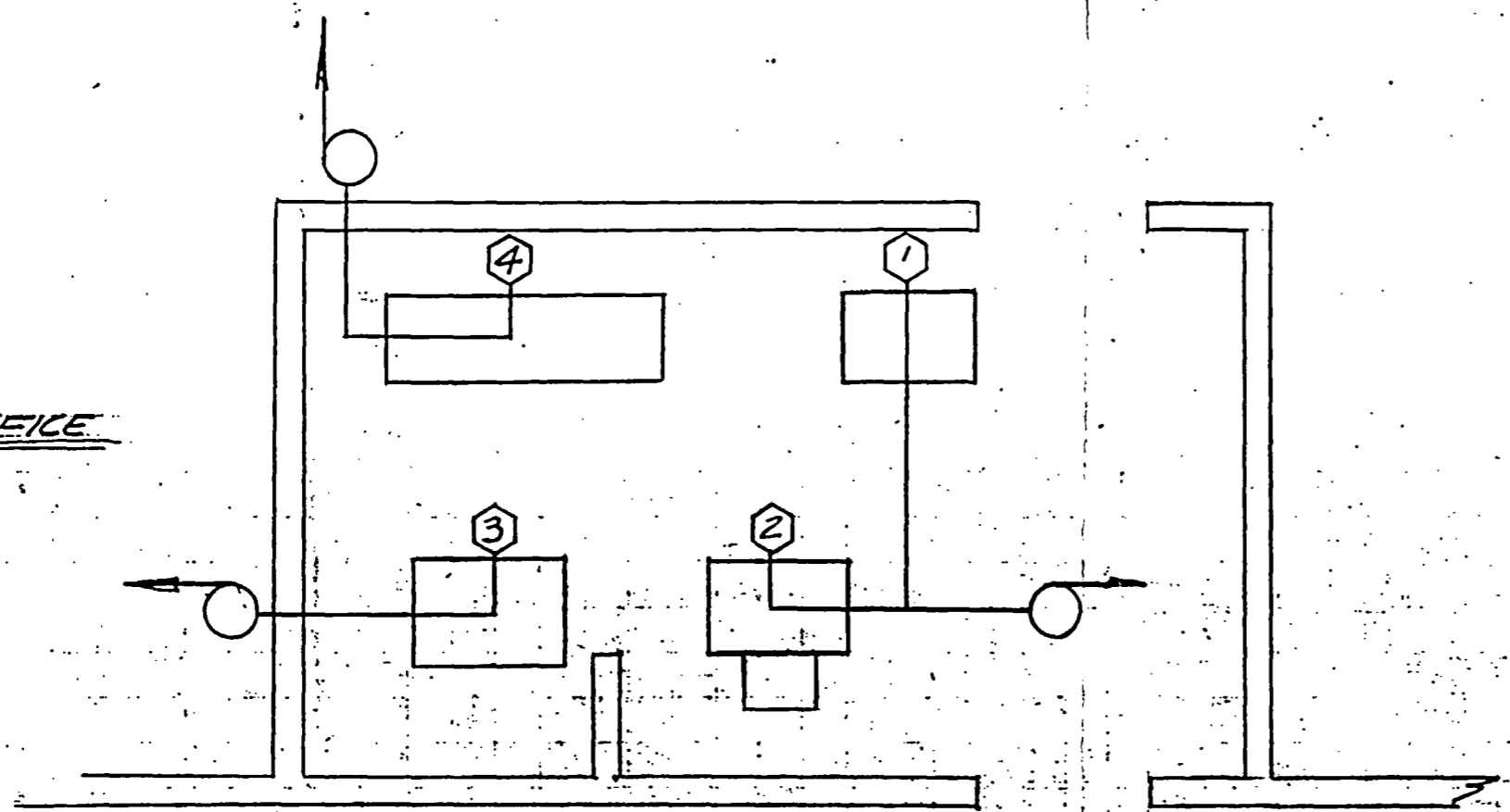
<u>Plant Area</u>	<u>Use Factor (days per year)</u>
Oxide Plant	300
Pellet Plant	320
Red Room	240
Green Room	260
Item Plant	290
Laboratory	330

Notes to Air Effluent System
SNM-33
Docket 70-36

Note A - Average effluent concentrations will be reduced to levels as far below the values specified in 10 CFR Part 20 as is practicable but in no case will they exceed 4.0×10^{-12} $\mu\text{c}/\text{cc}$. Where no specific modifications are indicated to achieve the reduction, improvements in filter servicing procedures are implied.

Note B- The emission value given is based on the maximum average effluent concentration of 4.0×10^{-12} $\mu\text{c}/\text{cc}$ for the purpose of indicating the maximum emission. The actual emission may be significantly less depending on the actual concentration.

OFFICE

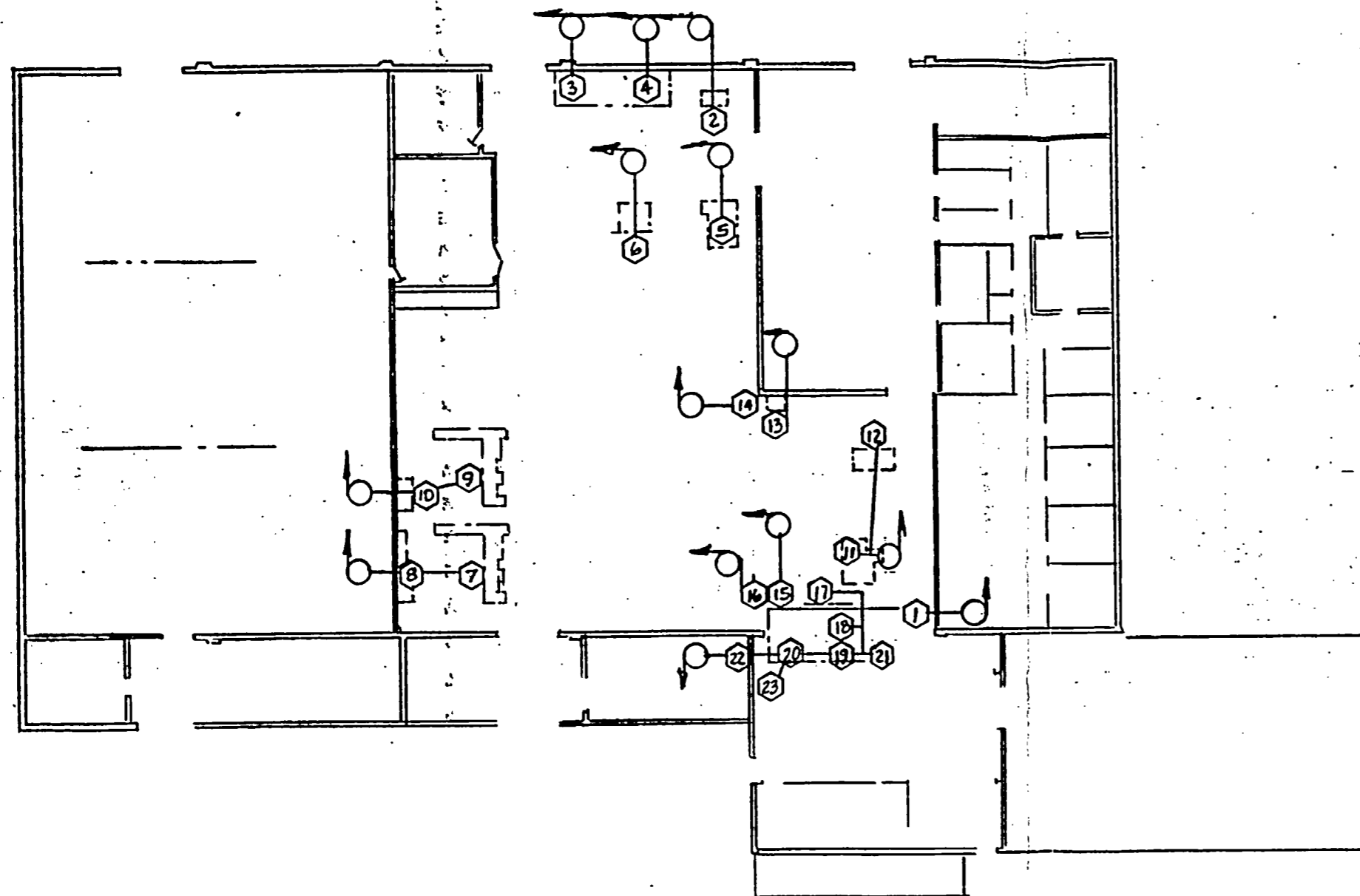


REF.
ITEM PLANT

LEGEND

- 1. SUBSTRATE OXIDATION
REDUCTION
- 2. UTILITY HOOD
- 3. BLENDING & WEIGHING
C2-3
- 4. GREEN BLEND HOOD
C2-4 (1E)

LICENSE: SNM-33
DOCKET: 70-36
GULF UNITED NUCLEAR FUELS CORP.
HEMITITE MISSOURI
CHEM. OPS. RECYCLE ROOM AIR STREAMS
DATE: 3-24-71



LEGEND:

1. ZNS BLENDERS
2. UTILITY HOOD
3. AGGLOMERATION OR TRANSFER HOOD
4. AGGLOMERATION OR TRANSFER HOOD DRYER
5. DENISION PRESS HOOD
- 6 LANDIS GRINDER
7. GRINDER #1
- 8 COOLANT CLEANING HOOD #1
- 9 GRINDER #2
10. COOLANT CLEANING HOOD #2
11. PRESS #1 EXHAUST
12. PRESS #2 EXHAUST
13. PRESS FINES COLLECTOR
14. PRESS FINES COLLECTOR HOOD
15. CENTRAL VACUUM SYSTEM (PRESS FINES)
16. CENTRAL VACUUM SYSTEM COLLECTION HOOD
17. ZNS HOOD (NON-U)
18. P-K BLENDER PARTS CLEAN-HP HOOD
19. AGGLOMERATION HOOD #1
20. AGGLOMERATION HOOD #2
21. GRANULATOR HOOD
22. HO₂ DRYER EXHAUST

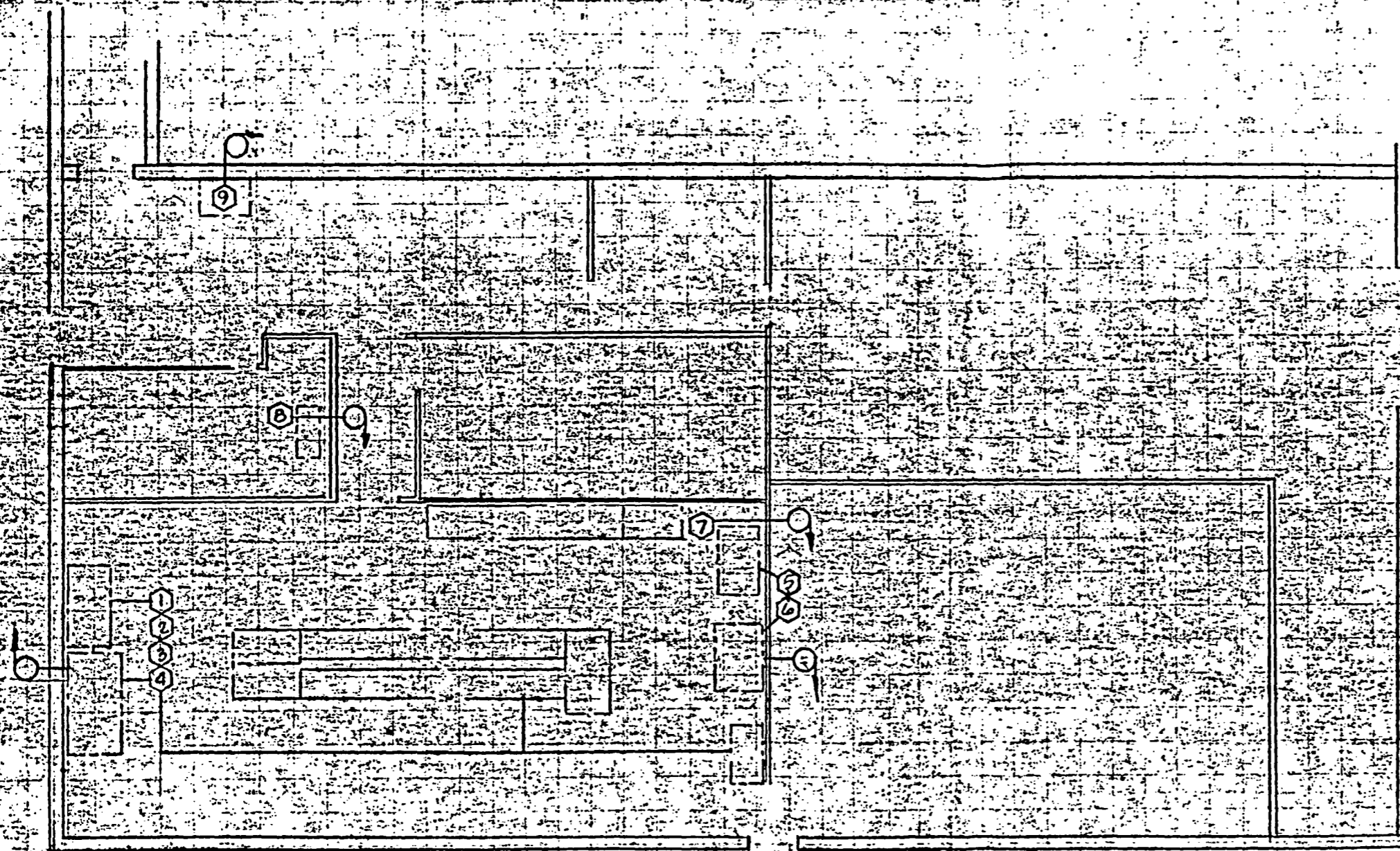
LICENSE: SNM 53
DOCKET 70-56
GULF UNITED NUCLEAR FUELS CORP.
HEMATITE MISSOURI
TITLE-CHEM. DEPT. PELLET AIR STREAMS PLANT
DATE- 3-22-71

Air Effluent System for License: SNM-33

Docket 70-36

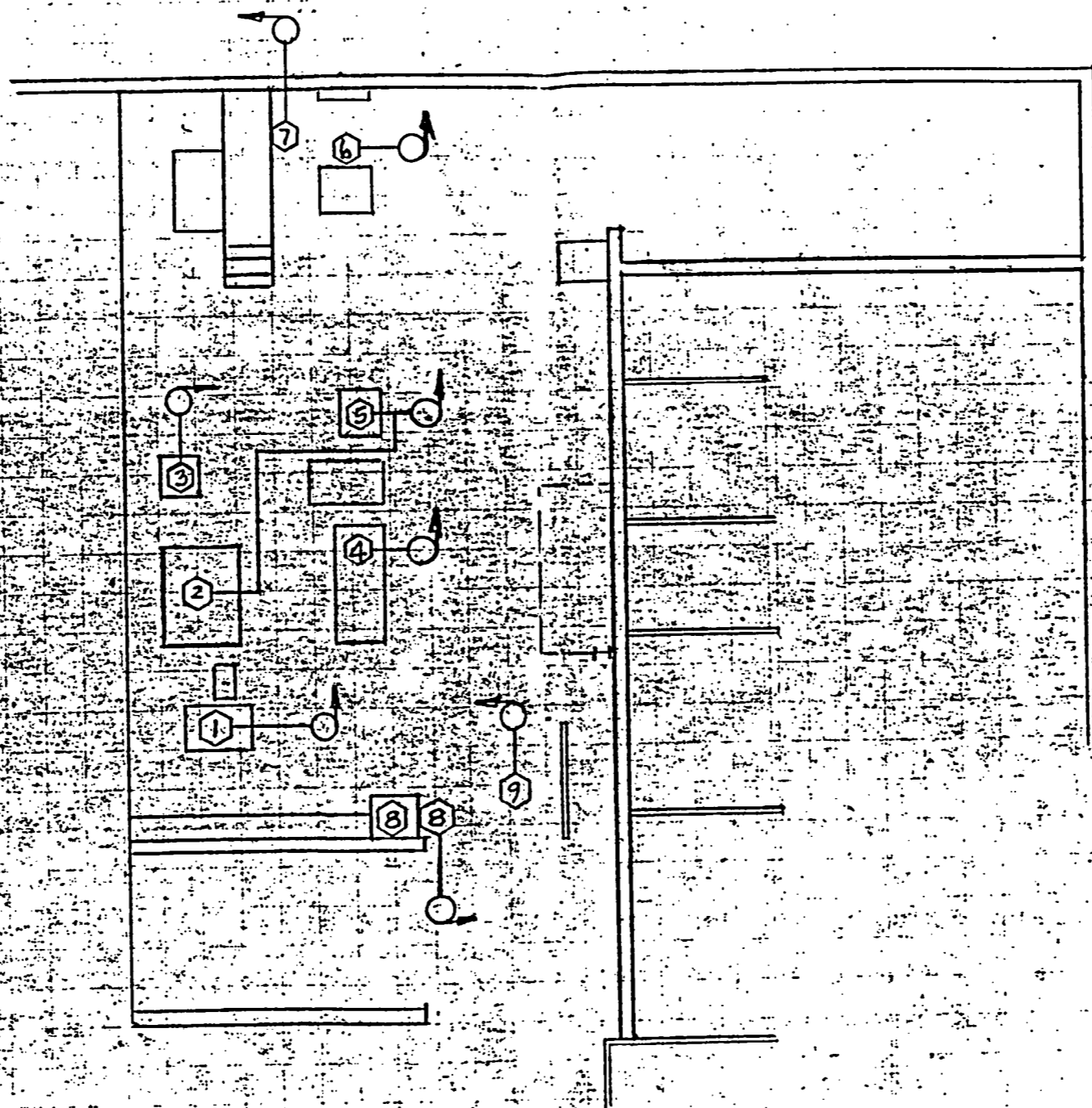
Area or Location Co-Pellet Plant

PRESENT											FUTURE											
ITEM NO.	AIR INTAKE SOURCE AND OPERATION OR FUNCTION	VENT CLASS	AIR CL. TYPE	PRELIM. CLEANING	FINAL CLEANING	AIR FLOW, cfm	BLOWER	CONC. $\mu\text{Ci/cc} \times 10^{-12}$	EMISSION $\mu\text{Ci/yr}$	AIR SAMPLE POINT	VENT CLASS	AIR CL. TYPE	PRELIM. CLEANING	FINAL CLEANING	AIR FLOW, cfm	BLOWER	CONC. $\mu\text{Ci/cc} \times 10^{-12}$	EMISSION $\mu\text{Ci/yr}$	AIR SAMPLE POINT	COMPLETION PERIOD	NOTE	
1	ZNS blenders. Negative pressure transfer system.	None	2 & 5	Felt filter	Felt filter	50	Single system	Est. Avg. 0.5 Est. Max. 1.0	0.64	At stack discharge							1.0	0.64	At stack discharge			
2	Utility hood. General purpose.	C	2	None	Hepa filter																	
3	Agglomeration or transfer hood. Agglomeration of UO ₂ & general purpose.	D	2	None	Hepa filter	1760	Common system	Not sampled not currently in use	1.0									<1.0				
4	Agglomeration or transfer hood dryer. Dry UO ₂ .	B	None	None	None																	
5	Denison press hood. Dust pick-up for platen & shuttle box.	C	2	None	Hepa filter	525	Single system	Not sampled not currently in use	1.0			Same						<1.0				
6	Landis grinder. Exhaust over grinder.	B	2	None	Hepa filter	600	Single system	Not sampled not currently in use	1.0									<1.0				
7	Grinder #1. Exhaust over grinder.	D	2	Felt filter	Hepa filter	650	Common system	Avg. 0.4 Max. 1.3	3.3									0.4	3.3			
8	Coolant cleaning hood #1. Hydroclone and filter.	C	2	None	Hepa filter																	
9	Grinder #2. Exhaust over grinder.	D	2	Felt filter	Hepa filter	650	Common system	Avg. 1.7 Max. 4.8	14									1.7	14			
10	Coolant cleaning hood #2. Hydroclone and filter.	C	2	None	Hepa filter																	
11	Press #1. Dust pick-up for platen & shuttle box.	B	2	Felt filter	Hepa filter	440	Common system	Avg. 1.0 Max. 1.4	5.6									1.0	5.6			
12	Press #2. Dust pick-up for platen & shuttle box.	B	2	Felt filter	Hepa filter																	
13	Press fines collector. Negative pressure.	None	2&5	Felt filter	Felt filter	60	Low vol. high vac. system	Est. Avg. 0.4 Max. 0.7	0.54									0.7	0.54			



- LEGEND
- 1. FINISHED ITEM
 - 2. SUBSTRATE ITEM
 - 3. RO-TAP HOOD
 - 4. CONTROL LAB HOOD
 - 5. U.B. N₂ HOOD
 - 6. ATOMIC ABSORPTION PREPARATION HOOD
 - 7. CONTROL LAB HOOD
 - 8. ATOMIC ABSORPTION UNIT
 - 9. TRASH COMPACTOR

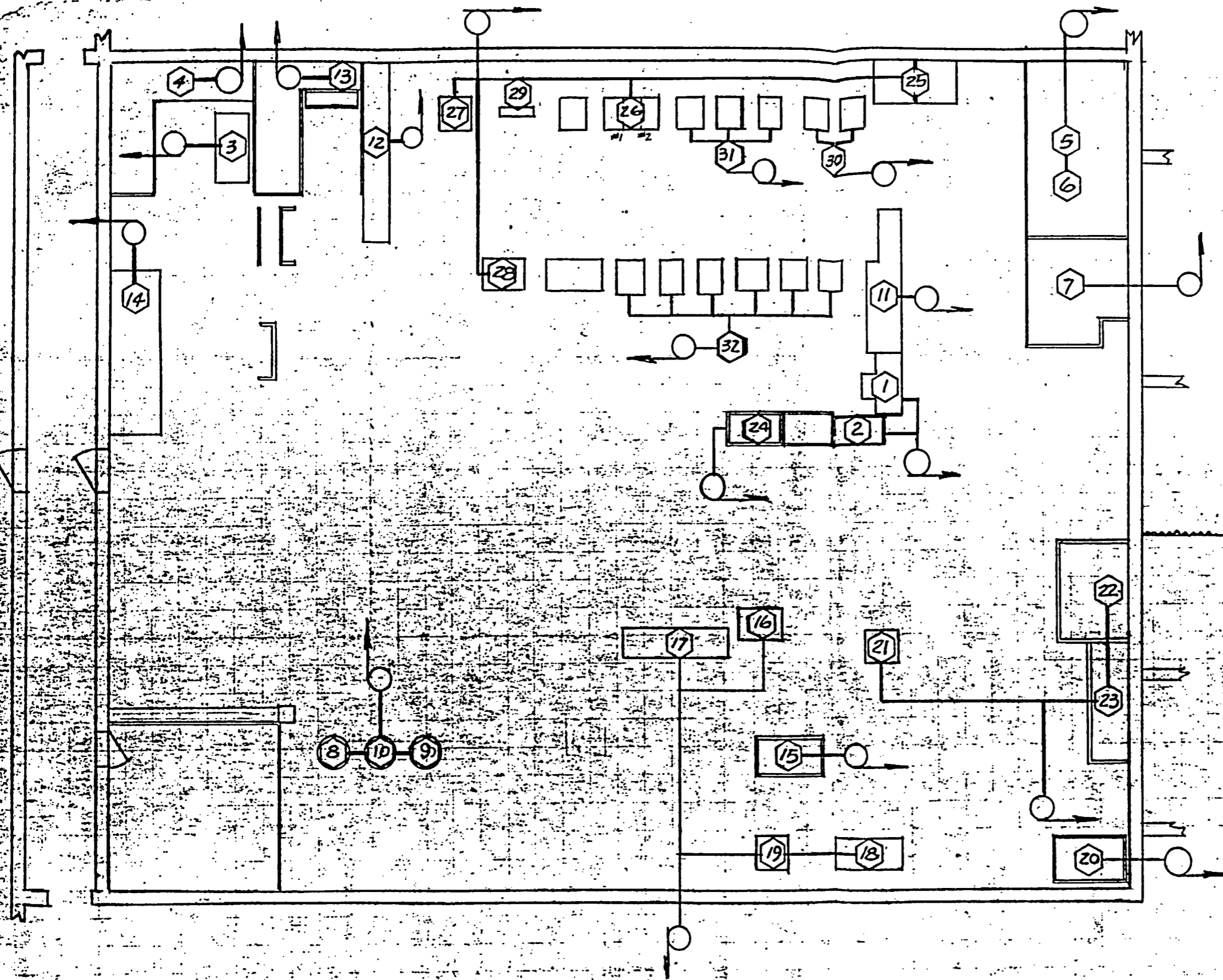
LICENSE:	SNM-85
DOCKET:	70-36
GULF UNITED NUCLEAR FUELS CORP.	
HEMATITE:	Missouri
TITLE: CHEM. OPS. LABORATORY AIR STREAM	
DATE: 3-22-71	



LEGEND

- 1. INCINERATOR
- 2. CONSOLIDATION HOOD
- 3. DRYER
- 4. EVAPORATION HOOD
- 5. DRYER
- 6. MILLING HOOD
- 7. SRECO SCREENING HOOD
- 8. CONTAMINATED VACUUM SYSTEM COLLECTOR
- 9. CONTAMINATED VAC. SYSTEM COLLECTION HOOD

LICENSE: SNM-33
 DOCKET: 70-36
 GULF UNITED NUCLEAR
 FUELS CORP.
 HEMATITE MISSOURI
 TITLE: CHEM. OPS. SCRAP
 RECYCLE AREA
 AIR STREAMS
 DATE: 3-22-71



LEGEND

1. CARBONATE MAKE-UP HOOD
2. MIXER-SETTLER PUMPING STA.
3. UTILITY GLOVE BOX
4. SULFATE HOOD
5. PRECIPITATION & FILTRATION HOOD
6. UTILITY HOOD
7. MIXER-SETTLER HOOD
8. VERTICAL TUBE FURNACE #1
9. VERTICAL TUBE FURNACE #2
10. VERTICAL TUBE COOLER
11. BALL MILL GLOVE BOX
12. PACKAGING UO₂
13. HAND DUNKER #1
14. HAND DUNKER #2
15. PICKLING HOOD
16. MAGNETITE DRYER
17. BOMB SHELL UNLOADING HOOD
18. BOMB MAKE-UP HOOD
19. BOMB REDUCTION FURNACE
20. CYLINDER WASH HOOD
21. MILLING GLOVE BOX
22. U₂F₆ CONVERSION HOOD #1
23. U₂F₆ CONVERSION HOOD #2
24. UTILITY HOOD
25. DRYERS 1, 2, 3 & 4
26. MUFFLER BOX COOLER #1 & 2
27. MILLING HOOD (PRODUCTION)
28. MILLING HOOD (UTILITY)
29. LID PLENUM
30. MUFFLE BOX FURNACES #1 & 2
31. MUFFLE BOX FURNACES #3, 4 & 5
32. MUFFLE BOX FURNACES #6, 7, 8, 9, 10 & 11

LICENSE: SNM-33
DOCKET: 70-36
GULF UNITED NUCLEAR FUELS CORP.
HEMATITE MISSOURI
CHEM. OPS. RED ROOM - AIR STREAMS
DATE 3-22-71

GULF UNITED NUCLEAR FUELS CORPORATION

Air Effluent System for License: SNM-33

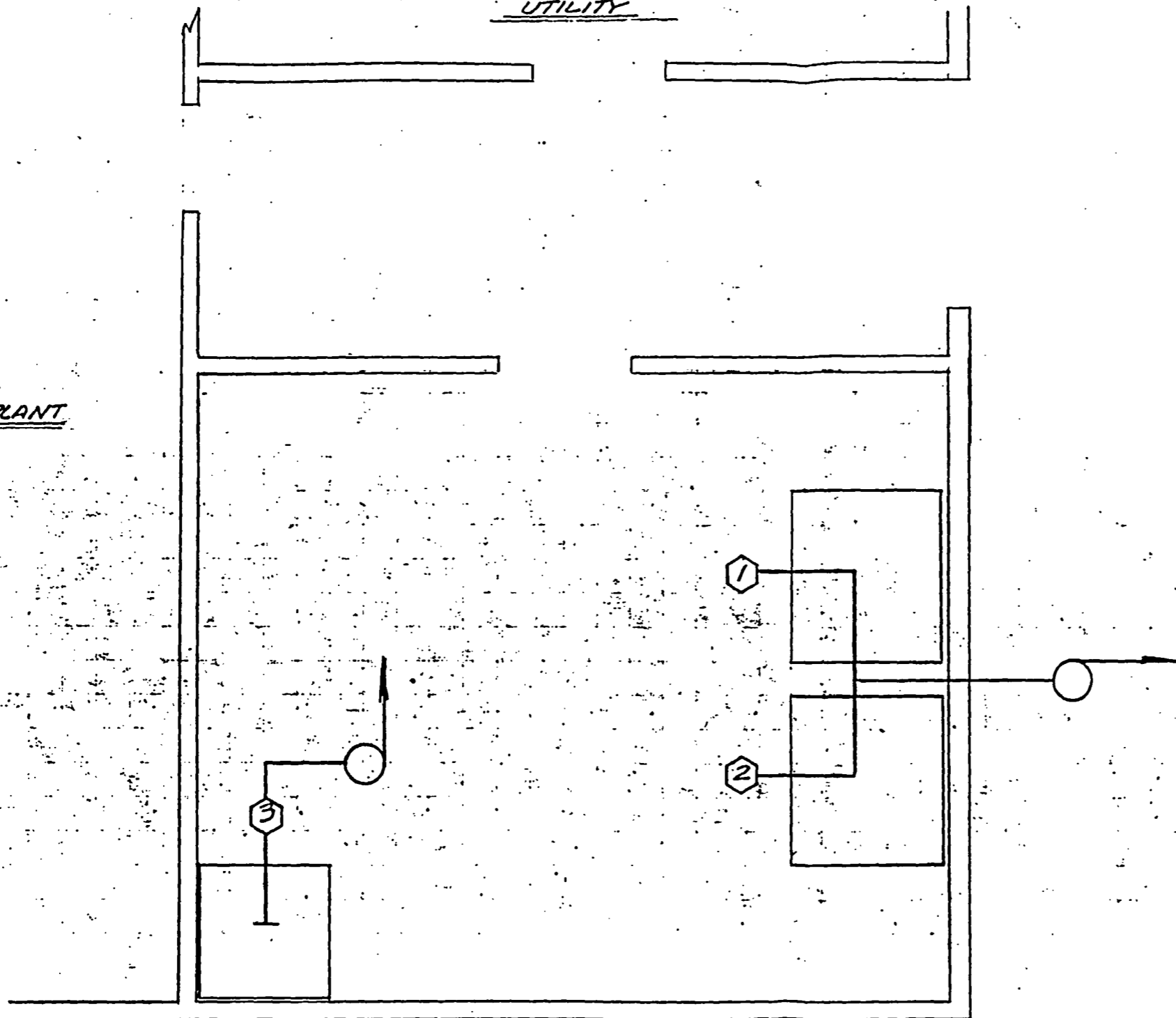
Docket 70-36

Area or Location Co-Red Room

ITEM NO.	AIR INTAKE SOURCE AND OPERATION OR FUNCTION	PRESENT									FUTURE										
		VENT CLASS	AIR CL. TYPE	PRELIM. CLEANING	FINAL CLEANING	AIR FLOW. cfm	BLOWER	CONC. $\mu\text{C}/\text{cc} \times 10^{-12}$	EMISSION $\mu\text{C}/\text{yr}$	AIR SAMPLE POINT	VENT CLASS	AIR CL. TYPE	PRELIM. CLEANING	FINAL CLEANING	AIR FLOW. cfm	BLOWER	CONC. $\mu\text{C}/\text{cc} \times 10^{-12}$	EMISSION $\mu\text{C}/\text{yr}$	AIR SAMPLE POINT	COMPLETION PERIOD	NOTE
1	Carbonate make-up hood. Prepare feed and work-up carbonate for feed soln., used in mixer settler.	C	2	None	Hepa filter	1200	Common system	Avg. 3.1 Max. 6.2 (est)	37	At stack discharge	C	3	None	New scrubber	3800	Note C	Note A	150 Note B	At stack discharge		
2	Mixer-settler pumping station. Filtering & pumping feed soln., to overhead tanks.																				
3	Utility Glove box 240-2-32. Unload ADU from filtering funnels.	E	2	None	Hepa filter	45	Single system	Avg. 5.2 Max. 10	2.3		C	3	None	New scrubber	3800	Note C	Note A	150 Note B			
4	Sulfate hood 240-2-25. Wash U-metal, prepare feed solution.	C	None	None	None	1500	Single system	Avg. 23 Max. 46	340		C	3	None	New scrubber	3800	Note C	Note A	150 Note B			
5	Precipitation & filtration hood 240-2-29. Precipitate and filter ADU.	C	None	None	None	2300	Common system	Avg. 3.1 Max. 6.2	70		C	3	None	New scrubber	3800	Note C	Note A	150 Note B			
6	Utility hood 240-2-29. Dissolution of scrap.	C	None	Felt filter	None	2300	Common system	Avg. 3.1 Max. 6.2	70		C	3	None	New scrubber	3800	Note C	Note A	150 Note B			
7	Mixer-settler hood 240-2-30. Mixer-settler extraction.	E	2	None	Hepa filter	151	Single system	Avg. 0.7 Max. 1.4	1.0		C	3	None	New scrubber	3800	Note C	Note A	150 Note B			
8	Vertical tube furnace #1. Drying UF4.	A	None	None	None	580	Common system	Avg. 3.7 Max. 5.0	21		A	3	None	New scrubber	580	Note C	Note A	23 Note B			
9	Vertical tube furnace #2. Drying UF4.																				
10	Vertical tube cooler. Cooling vertical tubes.																				
11	Ball mill glove box 240-2-28. Ball mill ash and other solids in preparation for dissolution.	E	2	None	Hepa filter	135	Single system	Avg. 1.4 Max. 2.5	1.9		C	3	None	New scrubber	3800	Note C	Note A	150 Note B			

REF:
UTILITY

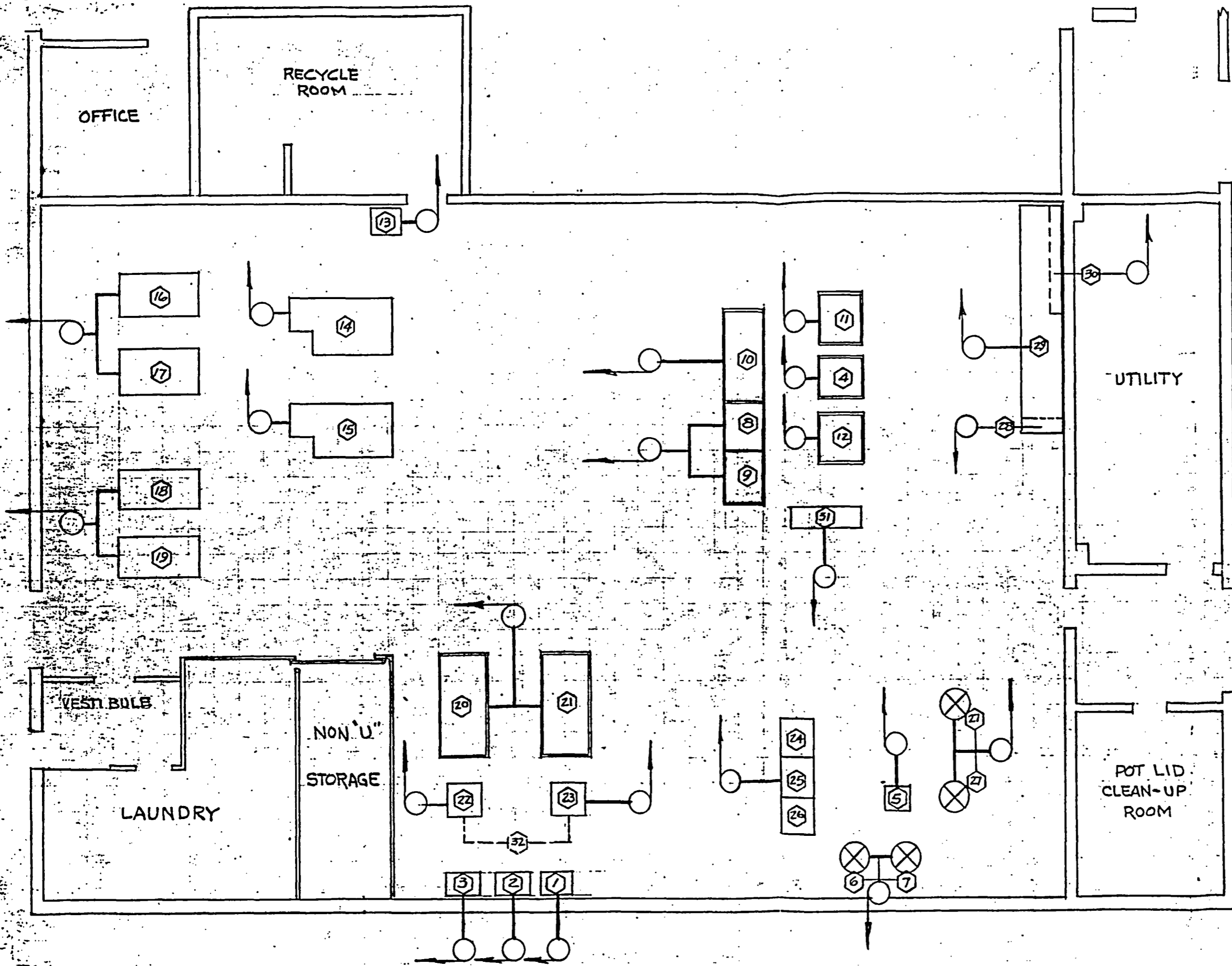
REF:
ITEM PLANT



LEGEND

- 1. TRAP CLEAN-OUT HOOD
- 2. POT-LID CLEAN-UP HOOD
- 3. POT-LID RESIDUE
BOIL-DOWN HOOD

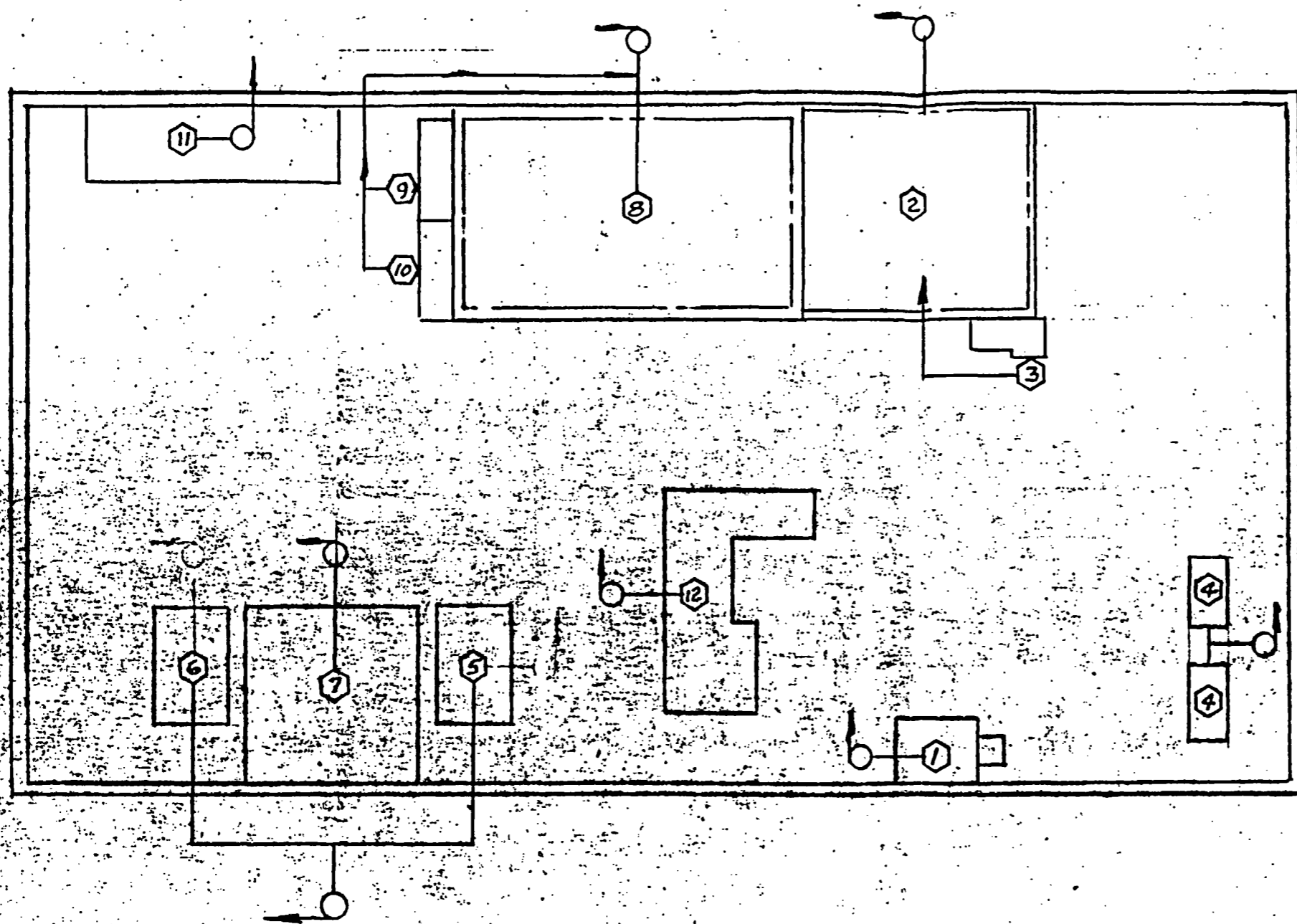
LICENSE: SNM-33
DOCKET: 70-36
GULF UNITED NUCLEAR FUELS CORP HEMITITE MISSOURI
CHEM. OPS. POT CLEAN-UP ROOM AIR STREAMS
DATE 3-24-71



LEGEND

- 1. SAMPLE HOOD
- 2. LOT BLENDING
- 3. FIRED WEIGHING
- 4. PRODUCT COLLECTION HOOD
- 5. FLUID BED REACTOR FILTER CLEANING HOOD
- 6. FLUID BED CLEAN UP BOTTOM
- 7. FLUID BED CLEANUP TOP
- 8. FINISH SW SCREENING HOOD
- 9. FINISHED SCREENING HOOD
- 10. FILTERING HOOD (DECLADDING)
- 11. FINISHED WASH HOOD
- 12. FINISHED WASH HOOD
- 13. GREEN WEIGHING HOOD
- 14. SUBSTRATE PREPARATION (2-A)
- 15. SUBSTRATE PREPARATION (2-B)
- 16. BLENDING & DRYING HOOD (1-A)
- 17. BLENDING & DRYING HOOD (1-B)
- 18. BLENDING & DRYING HOOD (1-C)
- 19. BLENDING & DRYING HOOD (1-D)
- 20. FIRED SUBSTRATE (3-A)
- 21. FIRED SUBSTRATE (3-B)
- 22. SUBSTRATE WASHING HOOD (4-A)
- 23. SUBSTRATE WASHING HOOD (4-B)
- 24. FINISH BLENDING HOOD
- 25. FINISH BLENDING HOOD
- 26. FINISH BLENDING HOOD
- 27. FLUID BED EXHAUST
- 28. POT BURN OFF EXHAUST
- 29. POT HOOD
- 30. POT VIBRATOR EXHAUST
- 31. WEIGHING HOOD
- 32. VACUUM SOURCE

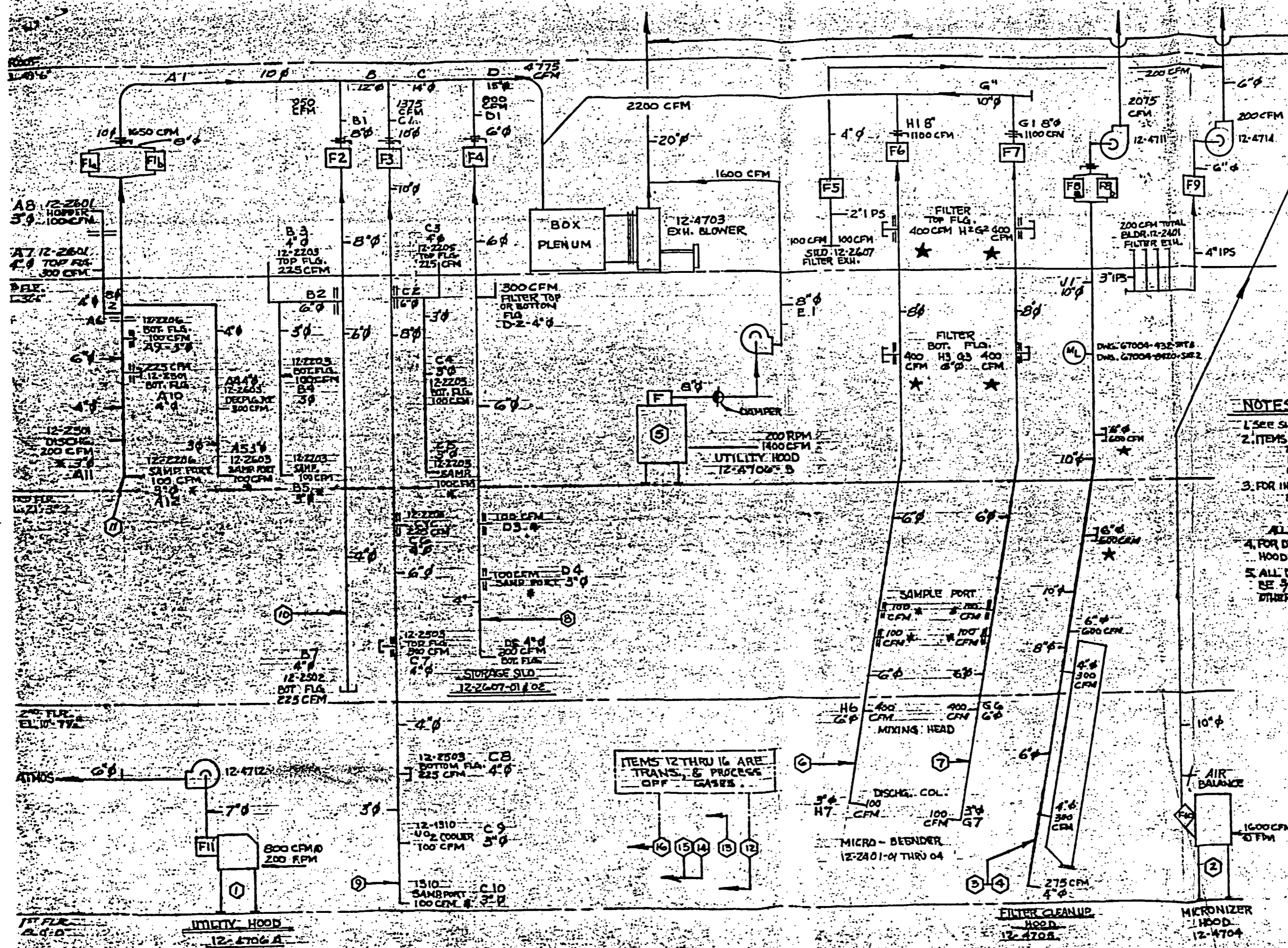
LICENSE: SNM-33
DOCKET: 70-36
GULF UNITED NUCLEAR FUELS CORP. HEMITTE, MISSOURI
CHEM OPS ITEM PLANT AIR STREAMS
DATE 3-24-71



LEGEND:

- 1. SAMPLE & WEIGH HOOD
- 2. DISSOLUTION HOOD
- 3. VIBRATORY FEED HOOD
- 4. FILTER HOLD TANKS
- 5. FURNACE
- 6. FURNACE
- 7. REACTOR BOX COOLER
- 8. PRECIPITATION HOOD
- 9. DRYER
- 10. DRYER
- 11. BLEND HOOD
- 12. UNLOADING & MILLING HOOD

LICENSE:	SNM - 33
DOCKET:	70-36
GULF UNITED NUCLEAR	
FUELS CORP.	
HEMATITE	MISSOURI
TITLE - CHEM. OPS.	GREEN ROOM
AIR STREAMS	
DATE:	3-22-71

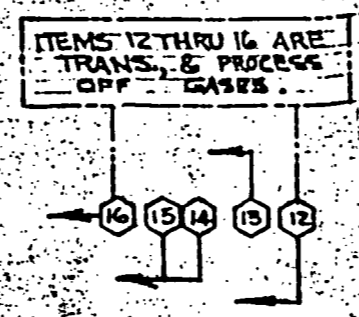


LEGEND

- ★ ALTERNATLY USED DUST PICKUP.
- * PERMANENTLY MOUNTED DUST PICKUP.
- ⊙ EXHAUST BLOWER.
- HEPA FILTER & PLENUM.
- AIR FLOW DIRECTION
- ORFICE: SEE SCHEDULE ON SHT. 4
- BLAST GATE; SEE DET. 1 SHT. 4
- AUTOMATIC END CAP: SEE DET. 2 SHT. 4

NOTES:

1. SEE SHTS 2, 3 & 4 THIS SERIES FOR DUCT LAYOUT.
2. ITEMS F1 THRU F11 ARE ABSOLUTE FILTERS, FOR
 - a. PLENUM DESIGN: DWS D-5007-8015
 - b. MICRONIZER ROOD: D-5007-8029
 - c. UTILITY HOOD: D-5007-8007
3. FOR INSTALLATION DWGS. OF THE FOLLOWING:
 - a. 12-2401 BLDG. FILTER EXH.: D-5007-4001
 - b. 12-2607 SHD.: D-5007-8008
 - c. 4703 FILTER CLEANUP HOOD: D-5007-8009
 SEE ALL OTHERS SEE NOTE #1
4. FOR DETAILS OF WARD 1 THIS DUST PICKUP HOODS SEE DWS. NO. 67204
5. ALL DUCT UP-STREAM OF ABSOLUTE FILTER TO BE 3/16" WALL A.Y.C. ALL OTHERS UNLESS NOTED OTHERWISE TO BE GALVANIZED SHEET METAL.



LICENSE: SHM-33
DOCKET: 70-36
GULF UNITED NUCLEAR FUELS CORP. HEMATITE MISSOURI
TITLE: CHEM. OFG. OXIDE PLANT AIR STREAMS
DATE: 3-22-71

Air Effluent System for License: SNM 33

Docket 70-36

Area or Location CO-Oxide Plant

PRESENT											FUTURE										
ITEM NO.	AIR INTAKE SOURCE AND OPERATION OR FUNCTION	VENT CLASS	AIR CL. TYPE	PRELIM. CLEANING	FINAL CLEANING	AIR FLOW. cfm	BLOWER	CONC. $\mu\text{C}/\text{cc} \times 10^{-12}$	EMISSION $\mu\text{C}/\text{yr}$	AIR SAMPLE POINT	VENT CLASS	AIR CL. TYPE	PRELIM. CLEANING	FINAL CLEANING	AIR FLOW. cfm	BLOWER	CONC. $\mu\text{C}/\text{cc} \times 10^{-12}$	EMISSION. $\mu\text{C}/\text{yr}$	AIR SAMPLE POINT	COMPLETION PERIOD	NOTE
1	Utility hood 12-4706A. Weigh. & sample UO_2F_2 .	C	2	Felt filter	Hepa filter	800	Single Blower 12-4312	Avg. 4.0 Max. 8.0	38	At stack discharge							4.0	38	At stack discharge		
2	Micronizer hood 12-4704. Contains milling equip.	D	2	None	Hepa filter	2000	Single Blower 12-4310	Avg. 5.0 Max. 22	120								Note A	96 Note B			
3	Filter clean-up hood 12-4075. Changing felt filters.	E	2	None	Hepa filter	2075	Comon blower system 12-4711	Avg. 4.0 Max. 7.0	98								4.0	98			
4	Local hoods for filter clean up. Dust pick-up when breaking flanges.	B	2	None																	
5	Utility hood 12-4706-B. Equipment clean-up.	C	2	Felt filter	Hepa filter	1600	Single blower														
6	Local hoods for micro blenders 1 & 2. Dust pick-up when breaking flanges, sample ports, and equip. clean-up.																				
7	Local hoods for micro blenders 3 & 4. Dust pick-up when breaking flanges, sample ports, and equip. clean-up.																				
8	Local hoods for silos 1 & 2. Dust pick-up when breaking flanges, sample ports and equip. clean-up.																				
9	Local hoods for reactor R-3 & UO_2 cooler. Dust pick-up when breaking flanges, sample ports and equip. clean-up.																				

See next page for Items 6, 7, 8, 9

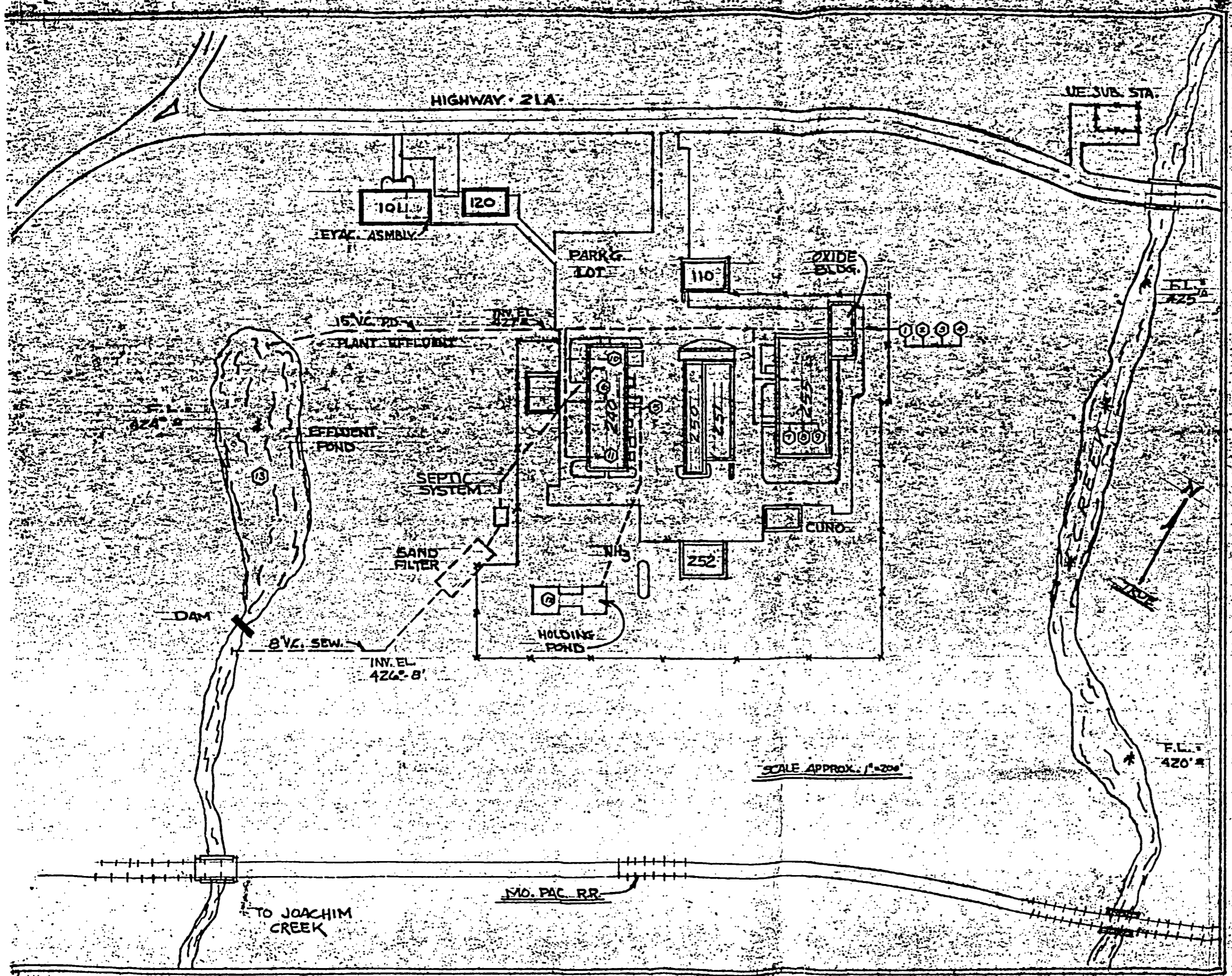
← Same →

Air Effluent System for License: SNM 33

Docket 70-36

Area or Location CO-Oxide Plant

ITEM NO.	AIR INTAKE SOURCE AND OPERATION OR FUNCTION	PRESENT									FUTURE										
		VENT CLASS	AIR CL. TYPE	PRELIM. CLEANING	FINAL CLEANING	AIR FLOW, cfm	BLOWER	CONC. $\mu\text{C}/\text{cc} \times 10^{-12}$	EMISSION $\mu\text{C}/\text{yr}$	AIR SAMPLE POINT	VENT CLASS	AIR CL. TYPE	PRELIM. CLEANING	FINAL CLEANING	AIR FLOW, cfm	BLOWER	CONC. $\mu\text{C}/\text{cc} \times 10^{-12}$	EMISSION $\mu\text{C}/\text{yr}$	AIR SAMPLE POINT	COMPLETION PERIOD	NOTE
10	Local hoods for R-2. Dust pick-up when breaking flanges, sample parts and equip. clean-up.	B	2	Felt filters	Hepa filters	7325	Common blower system 12-4703	Avg. 5.0 Max. 10	520	At stack discharge							Note A	42 Note B	At stack discharge		
11	Local hoods for R-1. Dust pick-up when breaking flanges, sample parts and equip. clean-up.																				
12	Product transfer to silos 1 & 2. Positive pressure system.	None	5 & 2	Felt filters	Hepa filters	60	Low vol. high vac. system	Est. Avg. 2.0 Est. Max. 4.0	0.28								4.0	0.28			
13	Product transfer to micro blenders 1, 2, 3, & 4. Positive pressure system.	None	5 & 2	Felt filters	Hepa filter	3350	Low vol. high vac. system	Est. Avg. 2.0 Est. Max. 4.0	4.3								4.0	4.3			
14	Reactors 1, 2, & 3. UF ₆ -UO ₂ conversion.	E	6 & 5	Sint. metal	Dry scrubber	1200	Common system	Avg. 11 Max. 17	160								Note A	58 Note B			
15	Dry scrubber. Off gases from dry scrubber.	B	None	None	None																
16	Local hood for UF ₆ vaporizer. Exhaust for UF ₆ vaporizer connections.	B	3	None	Scrubber	400	Single system														Emergency use only.



LICENSE: SNM-93
DOCKET: 70-36
GULF UNITED NUCLEAR FUELS CORP. HEMATITE, MISSOURI
TITLE: CHEM. OPS LIQUID WASTE STREAMS
DATE: 3-19-71

GULF UNITED NUCLEAR FUELS CORPORATION

Liquid Effluent System for License: SNM-33

Docket: 70-36

Area or Location: CO-Liquid Waste Streams

ITEM NO	SOURCE	FLOW RATE GAL/DAY	HOLDING STATIONS	HOLDUP VOLUME GAL	SAMPLE		CONC. $\mu\text{C}/\text{cc}$	TREATMENT	DISCHARGE POINT	CONC. DISCHARGE POINT. $\mu\text{C}/\text{cc}$	COMMENTS
					POINTS	METHOD					
1	Oxide plant UF ₆ scrubber system	5.8	Eleven litter bottle	2.9	From bottle after mixing	Grab sample & chemical analysis	Max 5.4×10^{-5} see Note A	None	See comments	See Effluent Pond	a) Discharge to effluent pond if U conc. is less than 0.02 gms U/liter. b) Discharge to holding pond if U conc. is between 0.02 & 0.03 gms U/liter. c) Routed for recovery if greater than 0.03 gms U/liter.
2	Oxide plant UF ₆ scrubber overflow bottle	0.5	Eleven litter bottle	2.9	From bottle after mixing						
3	Oxide plant UF ₆ vaporizer pan	0.9	None	None	Pan						
4	Oxide plant sump liquor	0.5	Sump	8	Sump						
5	Green Room ADU filtrates	350	Boron ring tanks	400	From tanks after mixing	Drain sample & chemical analysis	Max 2.7×10^{-3} see Note A	Lime	Holding pond		
			Lime treatment tanks	2000							
6	Red room ADU filtrates	100	Same as above				Max 1.5×10^{-3} see Note A	Lime	Effluent pond		Note A: These are maximum release concentration values. Concentrations which exceed these values result in routing the liquid waste through recovery processing.
7	Item plant substrate washing	24	None	None	Discharge line	Random grab sample & chemical analysis	Max 3.7×10^{-3} see Note A	Metal frit filter			
8	Item plant finished washing	50					Max 3.7×10^{-3} see Note A	Metal frit filter			
9	Item plant "titer" discard	300					Max 3.7×10^{-3} see Note A	None			

Liquid Effluent System for License: SNM-33

Docket: 70-36

Area or Location: CO-Liquid Waste Streams

ITEM NO	SOURCE	FLOW RATE GAL/DAY	HOLDING STATIONS	HOLDUP VOLUME GAL	SAMPLE		CONC. $\mu\text{C}/\text{cc}$	TREATMENT	DISCHARGE POINT	CONC. DISCHARGE POINT. $\mu\text{C}/\text{cc}$	COMMENTS
					POINTS	METHOD					
10	Laundry	85	None	None	Dis-charge from washing machine	Grab sample	Avg. 3×10^{-6} max 4.7×10^{-6}	None	Effluent pond.	See Effluent Pond	/
11	Chem lab	1000	None	None	None	None	---	None			
12	Holding Pond	Total of Item 5 & part of 1, 2, 3 & 4	Pond is holding station		Pond	Grab sample	8.1×10^{-5}	sediment	None		
13	Effluent pond	Total of 6, 7, 8, 9, 10, 11 & part of 1, 2, 3 & 4	None		Pond outfall	Grab sample	Avg. 1.2×10^{-7} Max 4.3×10^{-7}	None	Joachim Creek	See comments	Nominal flow rate at outfall is 4.5×10^{-6} gals/wk. resulting in annual discharge of 100 mc.