Certified Mail #0603659

WM - 34

UNION CARBIDE CORPORATION
METALS DIVISION
URAVAN, COLORADO 81436

July 8, 1980

Colorado Department of Health
Air Pollution Control Division
James S. Geier, Public Health Engineer

Dear Sir:

This information is being submitted, in conjunction with our letter of April 28, 1980, concerning the new air pollution control equipment we are planning to install at the Uravan facility and in reply to your comments of May 23, 1980. This data, along with the first letter, is also being submitted to the Colorado Department of Health Radiological and Hazardous Wastes Division in application for a source material license minor health and safety amendment.

Attachment A is a discussion of the present yellowcake calciner and associated scrubber system. Attachment B discusses in more detail the proposed system to be installed along with copies of the scrubber bid specifications and calculations on emission rates.

Construction of the shell of this building and mounting of the seven hearth rotary calciner is scheduled to begin in Mid-July and operational by the first of February of 1981.

If you have any questions concerning this submittal, please contact me at (303) 862-7301.

Sincerely,

Roger Jones

R. K. Jones
Environmental Engineer

RKJ:ns
enclosures

ATTACHMENT A

Current Yellow Cake Calciner Description

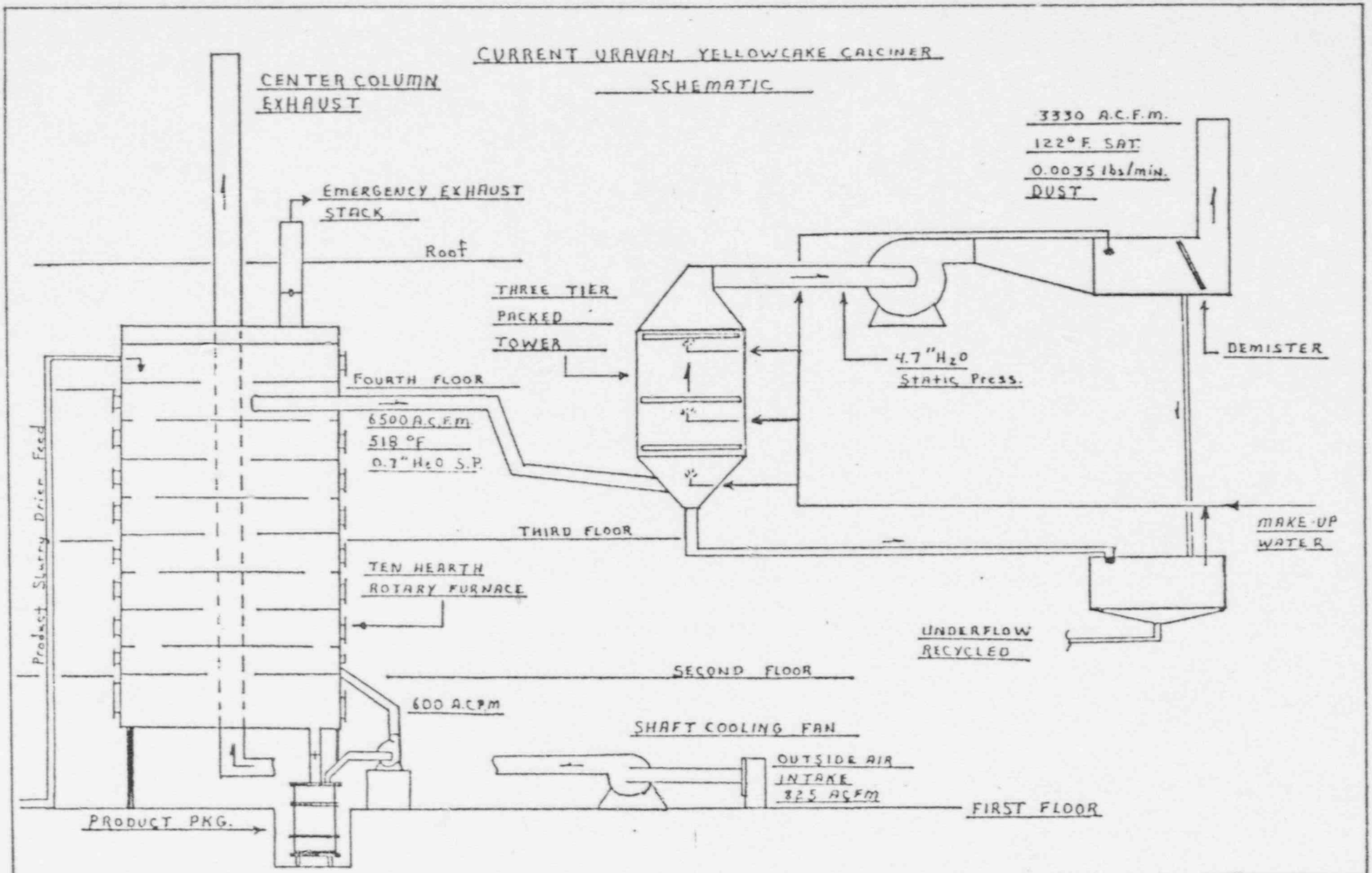
Yellowcake, in solution, is precipitated from the feed liquor through adjusting the pH of the solution with either hydrogen peroxide, caustic soda, or anhydrous ammonia. This thickened solution is pumped into one of four horizontal plate and frame filter presses where it is washed under pressure and a certain amount of liquor is forced from the cake.

The plate and frame presses, each containing approximately 40 plates, are cleaned manually by scraping the dewatered cake off each plate. The cake falls into a scoop which in turn transfers it to a repulper bin. By the nature of the work, occupational exposure to fresh yellowcake is dominant in the operation, providing extraneous pathways of introducing uranium contamination to employees. The cake is repulped, utilizing only the liquor remaining in the cake, and pumped by a diaphragm pump to the top of the calciner where it dumps onto one of the hearths. Plate 4.0 illustrates the current calciner and scrubber arrangement.

This calciner is a ten hearth rotary roaster constructed in the late 1930 era. The emergency exhaust stack shown on Plate 4.0 was the initial venting from the calciner, with no emission controls system; a manual damper shuts of this stack. An add-on ventilation duct, sixteen inches in diameter, is connected to the second to the top hearth, providing suction to the calciner of zero point seven inches of static pressure.

Employee exposure to airborne uranium dust is prevalent due to required maintenance of drop cleaning for each hearth through the calciner access doors. Negative static pressure throughout the calciner is not maintained due to development of back pressure caused by partially plugged drops, resulting in employee exposures during the cleaning of those drops. The access doors are not equipped with the double door plenum arrangement that is designed for the new calciner to minimize employee exposure.

Emissions from the current calciner are exhausted through a Ducon three tiered wet packed tower, consisting of three water sprayed beds of ceramic beryls, saddles, and marbles, and on the exhaust side of the fan, through an additional set of sprays and a demister. Liquor flows from the scrubbing circuit are recycled through a settler.


CURRENT URAVAN YELLOWCAKE CALCINER
SCHEMATIC
CENTER COLUMN EXHAUST
EMERGENCY EXHAUST STACK
Roof
3330 A.C.F.m.
122° F. SAT.
0.0035 lbs/min. DUST
THREE TIER PACKED TOWER
4.7 "H2O Static Press.
DEMISTER
FOURTH FLOOR
6500 A.C.F.M.
518 °F
0.7 "H2O S.P.
Product Slurry Drier Feed
THIRD FLOOR
MAKE-UP WATER
TEN HEARTH ROTARY FURNACE
UNDERFLOW RECYCLED
SECOND FLOOR
600 A.C.F.M.
SHAFT COOLING FAN
OUTSIDE AIR INTAKE 825 ACFM
PRODUCT PKG.
FIRST FLOOR
NOT TO SCALE
UNION CARBIDE CORP.
URAVAN, COLO.
PLATE 4.0

Attachment A, continued

Measurements of particle size obtained through a 1979 survey made by the E.P.A. Las Vegas Radiation Branch indicated the mean particle diameter at the scrubber inlet was between nine and ten microns. The discharge mean particle diameter was around three microns. The following information is a tabulation of emission monitoring completed through March 1980. The E.P.A. figures of 1977 were utilized for the 1977 updated APEN report, a copy of which is attached. On an annual average, the feed rate is not expected to exceed a theoretical feed ratio of 1.25 with a maximum operation of 1.50*.

EMISSION RATE SUMMARY - YELLOW CAKE CALCINER

Sampler	Date	Calciner Feed Rate Ratio*	Discharge Vol. Flow Rate x 10^5 (DSCFH)	Emmision Rate Pounds U308/hr.	Emission Rate Tons/Year
EPA-Las	10/13/77	1.125	2.1	0.14	0.61
Vegas Rad.	10/14/77	0.800	2.0	0.11	0.48
Branch	10/15/77	1.215	2.0	0.18	0.79
	10/16/77	1.155	1.9	0.25	1.10
	10/17/77	1.310	1.9	0.18	0.79
	10/18/77	1.715	1.9	0.31	1.36
	10/19/77	0.795	1.9	0.28	1.23
MEAN		1.159	1.96	0.21	0.91
NUS	3/4/80	1.163	1.04	0.26	1.14
CORP.	3/4/80	1.163	1.06	0.10	0.44
	3/5/80	1.60	1.48	0.37	1.62
MEAN		1.309	1.19	0.24	1.07
UNION	4/29/69	0.905	2.46	0.33	1.45
CARBIDE	9/14/76	0.480	3.31	0.45	1.98
	9/23/76	2.500	0.90	0.20	1.06
	12/5/76	1.410	2.10	0.17	0.76
	2/16/77	1.360	2.0	0.17	0.76
	2/21/77	0.965	1.9	0.14	0.61
MEAN		1.27	2.1	0.24	1.09
TOTAL MEAN		1.23	1.87	0.23	1.01

*An arbitrary feed rate was utilized as a denomination to develop a ratio between known feed rates for production versus emission comparisons.

ATTACHMENT B

New Yellow Cake Calciner Description

The precipitated yellow cake from the precipitation circuit, as described in the 1978 Uravan Environmental Report, is thickened and the overflow solution from the thickeners is pumped to a horizontal vacuum belt filter, located on the top floor of the new calciner building, where the yellow cake is sprayed onto a moving belt filter with suction applied to the underside of the filter. At the end of the horizontal belt travel, the moist cake drops vertically into a hopper which in turn feeds a screw conveyor. The enclosed screw conveyor transfers the pressed cake to the top of the calciner, eliminating any personnel exposure to supplying the material to the calciner.

The calciner consists of a seven hearth rotary furnace with access doors at each hearth to allow access for cleaning drops and rake arms. The access doors consist of a double door arrangement with approximately one foot clearance between doors. The plenum area between the two doors is maintained under negative pressure. When cleaning drops or rakes does occur, the negative pressure pulls any generated dust away from the personnel's breathing zone area and to the scrubbing system. Heavy particles, not entrained by the negative pressure system fall down the plenum chute, between the doors, to an enclosed five gallon container. This system has been designed specifically to minimize employee exposure during this required operating maintenance.

The product being discharged, from the base of the calciner, drops vertically through a lump breaker and magnetic trap onto the revolving screws of a screw conveyor which transports the product to a storage bin. The bin is emptied daily from the bottom by actuating a valve which discharges the yellow cake into a product shipping drum, 55-gallon capacity. The drum is enclosed at the top by a hood that maintains a negative pressure on the drum, drawing airborne particulates through a duct work to the calciner emission scrubbing system. The product drums, upon filling, roll on a horizontal roller conveying system where they are weighed, inspected, allowed to cool, and sealed. The drums are transported by this manner into another room for immediate storage and labeling.

Emissions from the calciner, product barreling, and calciner drop plenums pass through a dry cyclone, a venturi scrubber and a cyclonic separator prior to being vented to atmosphere.

Work area atmosphere is maintained under negative pressure by a separate ventilation system which includes a reverse jet fabric filter collector.

EMISSION CALCULATIONS

I. Proposed Yellow Cake Calciner Scrubber

1.0 Inlet Source #1

1.1 Calciner maximum production - 5.0 lb/min.
(corresponds to calciner feed rate ratio of 1.5)

1.2 Estimated dust lost to ventilation system - 2%
5 lb/min. x 0.02 = 0.10 lb/min.

2.0 Inlet Source #2

2.1 Drum packing (drum hood, surge bin, conveyor system)
Assume 1.2 grains per cubic foot in 600 cfm.

$$\frac{1.2 \times 600}{7000} = 0.10 \text{ lb/min.}$$

3.0 Total scrubber system feed - 0.20 lb/min.

4.0 Scrubber system reduction

4.1 Reduction in dry cyclone - 80% design efficiency
0.20 lb/min. x 0.80 = 0.16 lb/min.

4.2 Cyclone loss to Venturi scrubber 0.20 - 0.16 = 0.04 lb/min.

4.3 Venturi scrubber at 25" pressure drop is estimated to be 95% efficient for collecting the cyclone exhaust.

4.4 Therefore, stack emission rate is 0.04 lb/min. times 5% or 0.002 lb/min. or 0.12 lbs/hr. or 0.53 tons per year

II Proposed Yellow Cake Calciner Building Air Ventilation Scrubber

1.0 Inlet Source - Single hood
Estimated 0.001 grains/cubic foot dust in room atmosphere

2.0 Scrubber Efficiency
Fabri-Pulse Reverse jet baghouse design efficiency is 99.9%

3.0 Emission Rate
Calculation: $0.001 \times 0.0001 = 1 \times 10^{-6}$ grains/cubic foot

$$\frac{1 \times 10^{-6} \times 3800 \text{ cfm} \times 60 \times 24 \times 365}{7000} = 0.28 \text{ lbs./yr.}$$

Certified Mail #748063

UNION CARBIDE CORPORATION
METALS DIVISION
URAVAN, COLORADO 81436

April 28, 1980

Air Pollution Control Division
Colorado Department of Health
4210 East 11th Avenue
Denver, Colorado 80220

Attention: Mr. John Plog

Re: Union Carbide Corporation
Uravan, Colorado
Air Pollutant Emission Notice

Gentlemen:

Enclosed are two air pollutant emission notices and filing fees for new scrubbing systems at the Uravan Mill operated by Union Carbide Corporation.

The primary scrubbing system described under the first notice is the main replacement system for the packed tower scrubber itemized as emission number five in the Air Contaminant Emission Notice filed on June 25, 1970. Plates 1.0 and 2.0 illustrate the basic design of the system and describe designed flow rates and dust concentrations. The second notice is for a general room air dust ventilation and scrubbing system for the new yellowcake drier calciner for which the first notice scrubber will be operating from. Plates 3.0 illustrate the design, flow rates, and concentrations of this system. The combination of the two systems essentially replace emission number five of the 1970 notice.

The anticipated emissions of the combined replacement system is 0.53 tons per year (2.88 lb/hr) in comparison with the current systems 2.3 tons per year.

It is our interpretation that because this is a replacement of an existing scrubber and that because the higher efficiency of the replacement results in a significant decrease in emissions, that no emission permit is required as long as the attached Air Contaminant Emissions Notice, Form APC-200A-20, is filed.

Sincerely,

G. L. Schierman
Plant Superintendent

R. K. Jones
Environmental Engineer

GLS/RKJ:ns
enclosures

AIR POLLUTANT EMISSIONS NOTICE
Colorado Department of Health
(Stationary Source)

FIRM NAME: UNION CARBIDE CORPORATION

PERMIT NO. ..... (To be assigned by Health Dept) | Date Rec. ....
REG ___ EXISTING ___ MODIFICATION ___ FOLLOW UP ___

MAIL ADDRESS: P.O. BOX 94, URAVAN, COLORADO 81436 PLANT LOCATION: URAVAN COUNTY: MONTROSE

PERSON TO CONTACT REGARDING THIS INFORMATION: MR. G. L. SCHIERMAN TITLE: PLANT SUPERINTENDENT PHONE: (303) 862-7301

GENERAL DESCRIPTION OF THIS PLANT'S FUNCTION: URANIUM AND VANADIUM EXTRACTION Will you accept emission bill? Best hours to call: 8:30 - 4:00

A. GENERAL INFORMATION		Normal Operation of Plant*			Seasonal Throughput (% of Annual)				*Specify any significantly different schedule of a unit or process which emits air pollutants
No. of Employees	Land Area	Hours/Day	Days/Week	Weeks/Year	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov	
225	806	24	7	52	23.7	24.7	25.4	26.2	22.8; 27.0; 24.3; 25.9

B. STACK OR VENT INFORMATION FOR ..... (Identify which stack if plant has two or more; refer to attached sketch of plant layout)

Height	Diameter	Temperature	Flow Rate	Velocity	Moisture
47.25 ft	1 ft	150 °F	3000 ACFM	3820 ft/min	100%

C. FUEL INFORMATION Description of Combustion Unit	Design Rate (10^6BTU/Hr)	Kind of Fuel Burned	Annual Consumption (Tons, 10^3Gal, or 10^6SCF)	Heating Value (10^6BTU/Annual Unit)	Per Cent by Weight Sulfur (X.XX)	Per Cent by Weight Ash (XX.X)	Seasonal Use (% of Annual Use) Dec-Feb	Mar-May	Jun-Aug	Sep-Nov	Spare (% Ann.)
Seven Hearth	Not	Nat. Gas	N/A	N/A	N/A	N/A	24.6	20.6	33.4	21.4	0
Rotary Furnace	Available	Fuel Oil					57.8	42.2	0	0	0
Four Burners											

D. PROCESS INFORMATION Description of Processing Unit	Raw Materials, Solvents, Cleaning Agents, Waste, etc. Involved in Process	Annual Consumption (Specify Units)	Design Rate (Specify Units/Hour)	Finished Products: Product Name or Description	Finished Products: Annual Output	(AFCD Use) SCC
Seven Hearth	Uranium as Yellowcake	Proprietary	Proprietary	Yellowcake	Prop.	
Rotary Furnace		Information	Information		Info	

E. POLLUTION CONTROL EQUIPMENT Pollutant	Type of Control Equipment: Primary	Secondary	Overall Collection Efficiency	Cost of Control Equipment: Initial Installation	Annual Total Operating Cost	Annual Energy Used (Specify Units & Type)	(To be completed by Air Pollution Control Division) Emissions Estimate Tons/Year	Uncontrolled Emissions Tons/Year	Allowable Emissions Tons/Year	Estimation Method
Particulate	Dry Cyclone	Wet Venturi	99	$190,000						
SO_x										
NO_x										
HC										
CO										
Pb										
Other:										

REMARKS: Design Emission Rate: 0.002 lb/min - 2.88 lbs/day

Signature of Person Legally Authorized to Supply Data: G L Schierman

Typed Name & Title: Mr. G. L. Schierman, Plant Superintendent

COLORADO DEPARTMENT OF HEALTH
AIR POLLUTION CONTROL DIVISION
4210 East 11th Avenue
Denver, Colorado 80220
(303) 320-8333

(For APCD Use)	Date of Record		UTM	Owner	Process Classif.	UTM Coordinates		Colorado Air Quality Control Regulations		Source

AIR POLLUTANT EMISSIONS NOTICE
Colorado Department of Health
(Stationary Source)

FIRM NAME UNION CARBIDE CORPORATION

PERMIT NO. ..... (To be assigned by Health Dept)
NEW ___ REVISION ___ MODIFICATION X FOR OF ___

Page No. 1

MAIL ADDRESS P.O. BOX 94, URAVAN, COLORADO 81436 PLANT LOCATION URAVAN COUNTY MONTROSE

PERSON TO CONTACT REGARDING THIS INFORMATION MR. G. L. SCHIERMAN TITLE PLANT SUPERINTENDENT PHONE (303) 862-7301
Will you accept collect calls? Yes ___ No ___

GENERAL DESCRIPTION OF THIS PLANT'S FUNCTION Uranium and Vanadium Extraction Best hours to call: .....

A. GENERAL INFORMATION

No. of Employees	Land Area	General Operation of Plant* Hours/Day	Days/Week	Weeks/Year	Seasonal Throughput (% of Annual) Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
225	806	24	7	52	23.7	24.7	25.4	26.2

*Specify any significantly different schedule of a unit or process which emits air pollutants: 25; 25; 25; 25

B. STACK OR VENT INFORMATION FOR ..... (Identify which stack if plant has two or more; refer to attached sketch of plant layout)

Height	Diameter	Temperature	Flow Rate	Velocity	Moisture
47.25 ft	1 ft	Ambient °F	3800 ACFM	ft/min	Ambient

C. FUEL INFORMATION

Description of Combustion Unit	Design Rate (10^6BTU/Hr)	Kind of Fuel Burned	Annual Consumption (Tons, 10^3Gal, or 10^6SCF)	Heating Value (10^6BTU/Annual Unit)	Per Cent by Weight: Sulfur (X.XX)	Ash (XX.XX)	Seasonal Use (% of Annual Use): Dec-Feb	Mar-May	Jun-Aug	Sep-Nov	Space (% Ann
Not Applicable											

D. PROCESS INFORMATION

Description of Processing Unit	Raw Materials, Solvents, Cleaning Agents, Waste, etc. Involved in Process	Annual Consumption (Specify Units)	Design Rate (Specify Units/Hour)	Finished Products: Product Name or Description	Annual Output	(APCD Use) SCC
Rotary Furnace	Not Applicable					
Building Gen. Ventilation						

E. POLLUTION CONTROL EQUIPMENT

Pollutant	Type of Control Equipment: Primary	Secondary	Overall Collection Efficiency	Cost of Control Equipment: Initial Installation	Annual Total Operating Cost	Annual Energy Used (Specify Units & Type)	(To be completed by Air Pollution Control Division) Emissions Estimate Tons/Year	Uncontrolled Emissions Tons/Year	Allowable Emissions Tons/Year	Estimation Method
Particulate	AAF Model	4-168-400	99.9	27,000						
SO_x	"m" Fabric Pulse Reverse									
NO_x	Jet Baghouse									
HC										
CO										
PB										
Other:										

REMARKS: .....

Signature of Person Legally Authorized to Supply Data: H. Schierman

Typed Name & Title: Mr. G. L. Schierman, Plant Superintendent

COLORADO DEPARTMENT OF HEALTH
AIR POLLUTION CONTROL DIVISION
4210 East 11th Avenue
Denver, Colorado 80220
(303) 320-8333

Regulation No. 1 | Form | Source Classif. | UTM Coordinates | Colorado Air Quality Control Regulations | Source

URAVAN YELLOWCAKE CALCINER SCHEMATIC

NOT TO SCALE

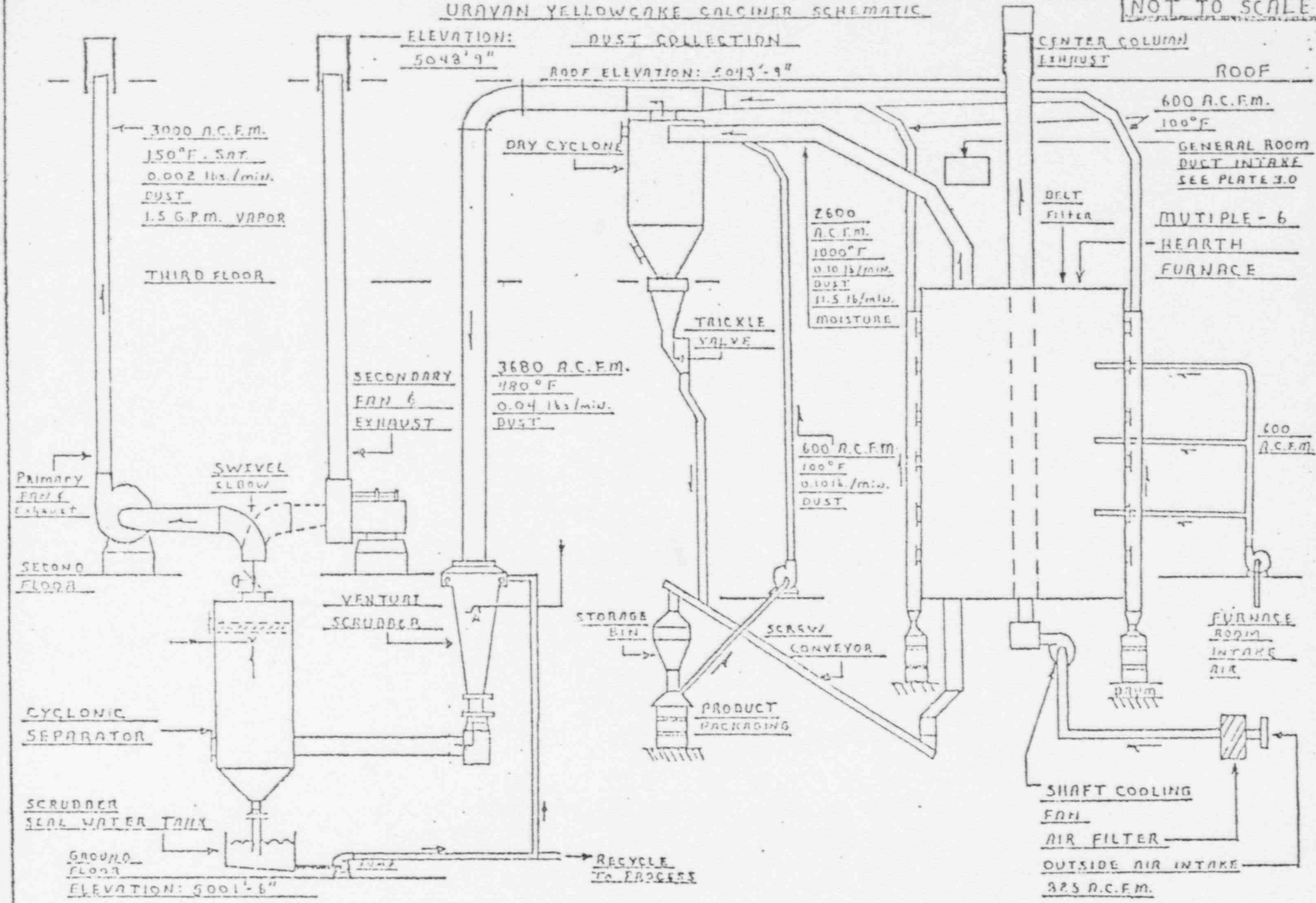


PLATE 1.0

UNION CARBIDE CORPORATION

PROPOSED YELLOWCAKE SCRUBBER LIQUID AND MATERIAL BALANCE

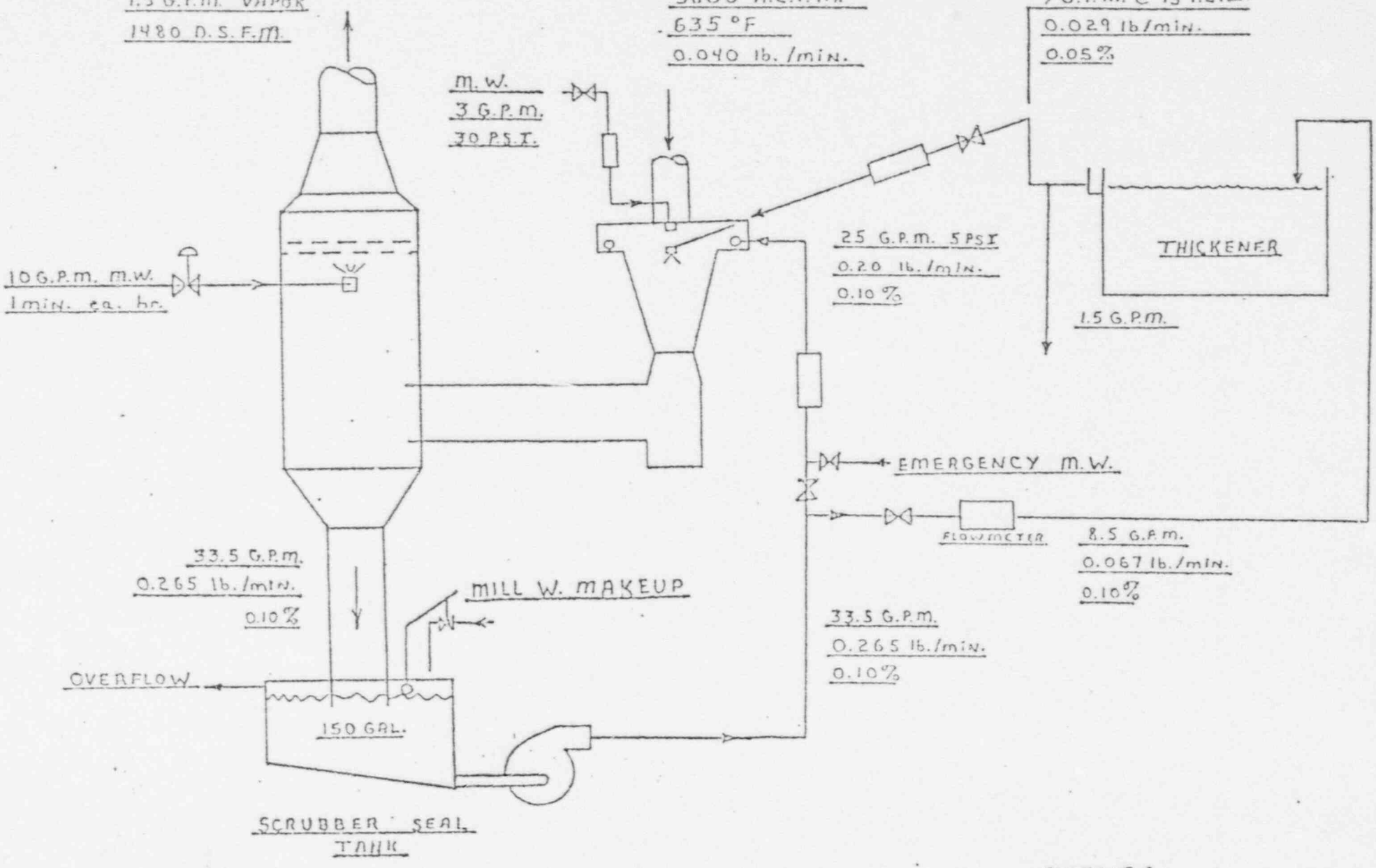


PLATE: 2.0

UNION CARBIDE CORP.
URAVAN, COLORADO

PROPOSED Y.C. DRYER BLDG.

AIR VENTILATION EMISSION

SCRUBAER

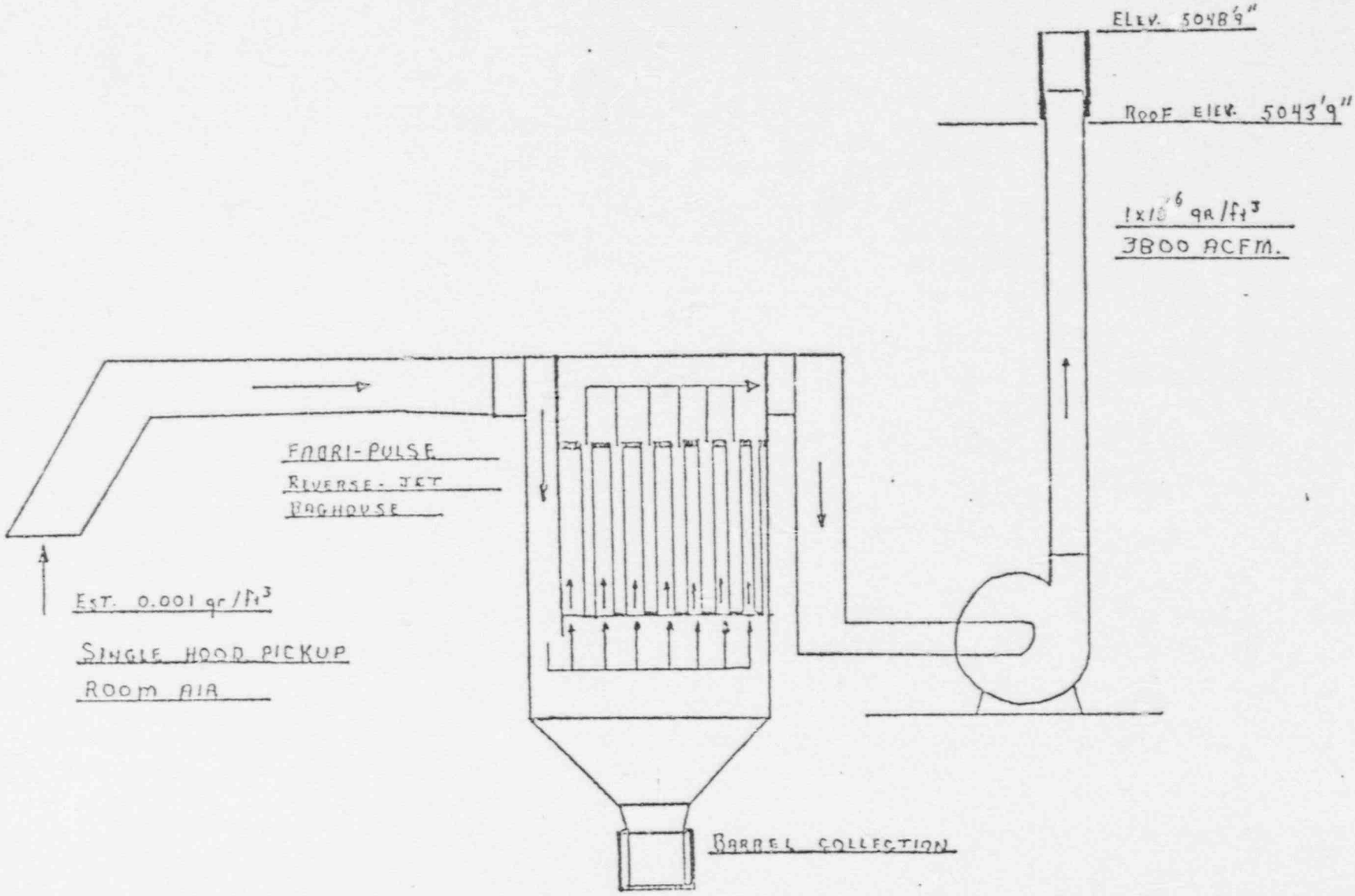


PLATE 3.0

NOT TO SCALE

UNION CARBIDE CORP.
URAVAN, COLO.

URAVAN DRAWER FUND
P. O. Box 94 - 862-7301
Uravan, Colorado 81436

№ 2718

THE MONTROSE COUNTY BANK
NATURITA, COLORADO
82-186/1021

PAY Forth & no/100 ---dollars

DATE	AMOUNT
29 April 1980	$ 40.00

TO THE ORDER OF

Colorado Department of Health
Air Pollution Control Division

Uravan Drawer Fund

⑆1021018651⑆ 00236 7⑈

PAYEE: DETACH THIS STATEMENT BEFORE DEPOSITING CHECK

Uravan Drawer Fund

DATE	INVOICE NO.	DESCRIPTION	AMOUNT	DISCOUNT OR DEDUCTION	NET AMOUNT
4-29-80		Filing Fee for Air Pollutant Emissions Notice			40.00
		Acct # 2305-06-03			

URAVAN DRAWER FUND
P. O. Box 94 - 862-7301
Uravan, Colorado 81436

No. 2717

THE MONTROSE COUNTY BANK
NATURITA, COLORADO
82-186/1021

PAY Forty & no/100 ----------dollars

DATE	AMOUNT
29 April 1980	$ 40.00

TO THE ORDER OF Colorado Department of Health
Air Pollution Control Division

Uravan Drawer Fund
D L Peterman
R. A Belt

⑈102101865⑈ 00236 7⑈

PAYEE: DETACH THIS STATEMENT BEFORE DEPOSITING CHECK

Uravan Drawer Fund

DATE	INVOICE NO.	DESCRIPTION	AMOUNT	DISCOUNT OR DEDUCTION	NET AMOUNT
4-29-80		Filing Fee for Air Pollutant Emissions Notice Acct # 2305-06-03			40.00

2.0 PROPOSED CALCINER - TECHNICAL DESCRIPTION

2.1 Detailed Drawings

The proposed yellowcake calciner general arrangement, elevations, flow diagrams, and scrubber instrumentation design are represented in detail on the following attached drawings.

1. Drawing No. SF-7403 Changeroom - Alt. #4
2. Drawing No. S-15190 Gen. Arrangement-Ground Floor
3. Drawing No. S-15191 Gen. Arrangement-2nd & 3rd Floor
4. Drawing No. 244-1540 Instrumentation-Calciner
5. Drawing No. 244-1542 Instrumentation-Scrubber
6. Drawing No. S-15192 Sectional Elevations
7. Drawing No. S-15193 Exhaust Details

Plates 1-5 represent simplified drawings of the current calciner, new calciner and scrubber system, and location of the new calciner in the A plant section of the mill.

2.2 Environmental Aspects

2.2.1 Stack Emissions

Based upon the May 30th 40 CFR190 NUS report submitted to your department, an effort has been made in the following table to determine emission rate comparisons in curies per year for the current operation, the proposed operation with a twenty-five inch pressure drop, and the proposed operation with a fifty inch pressure drop. These emission control scenarios correspond to the 67% and 83% reduction scenarios presented in the NUS report. NUS reduction scenarios were based upon a known 0.24 pounds per hour emission with a theoretical addition of 0.10 pounds per hour coming from the building itself, which would be controlled in the new design by the building ventilation system.

RADIOACTIVE STACK PARTICULATE EMISSIONS

YELLOWCAKE STACKS - Curies/year

Isotope	Current Operation	Proposed Op. with 25" Press. Drop	Proposed Op. with 50" Press. Drop
U-Nat.	1.608	8.04 E-01	4.02 E-01
Th-230	8.51 E-03	4.26 E-03	2.13 E-03
Ra-226	3.45 E-04	1.73 E-04	8.63 E-05
Pb-210	4.00 E-03	2.00 E-03	1.00 E-03

As shown in drawing No. S-15192, the scrubber system is designed so that if fan mechanical failure occurred, a change-over to a backup fan would not be time consuming or difficult. The system has been designed with the intention that if the twenty-five inch pressure drop across the venturi does not prove adequate to meet 40 CFR 190 regulations, a second fan in series can be installed to boost the drop to fifty inches. The electrical and foundation work needed for the third fan are to be installed pending the outcome of stack emission studies with the twenty-five inch pressure drop. The second fan could be utilized in series with the first during any necessary period needed for delivery of the third fan, if deemed necessary.

Ducted air temperature and pressure are to be monitored through instrumentation at the fan inlet, as shown in drawing No. 244-1542. High temperature and low pressure alarms will be connected to these monitors. Calciner shutdown is controlled through manual operator response to these alarms.

Emission and scrubber efficiency monitoring will begin within two weeks of the startup of this calciner, and will consist of the following:

1. Six Emission Stack Tests/Runs,

2. Three of which will consist of two simultaneous monitoring tests of both scrubber inlet conditions and emission conditions.

Particulate mass determination results would be summarized in report form, and available for review within two weeks of the last run. Radioactive emission rates, by isotope, would tenatively be available within forty-five days of the last run.

40 CFR 190 related radiological doses due to the yellowcake stacks for existing, and both control scenarios are discussed in the May 30th NUS report.

2.2.2. NPDES Discharges

The installation of the new calciner and horizontal vacuum belt filter will not alter the chemical composition or quantity of flows of the industrial process waste-water discharge or of any liquid waste retained for evaporation. Chemical additions and water balances will not be significantly affected.

2.2.3. Flood Plain

Based upon the 1978 Dames & Moore Environmental Report for Uravan, at the section of the San Miguel Canyon where the calciner will be located, the maximum elevation for a Probable Maximum Flood is estimated to be 5000 feet. Determination of this is shown on Plate 6.0. The base elevation of the yellowcake calciner is 5000 feet ten inches for the barreling room floor, and 5001 feet six inches for the calciner room floor. The base of the calciner is at 5009 feet eight inches.

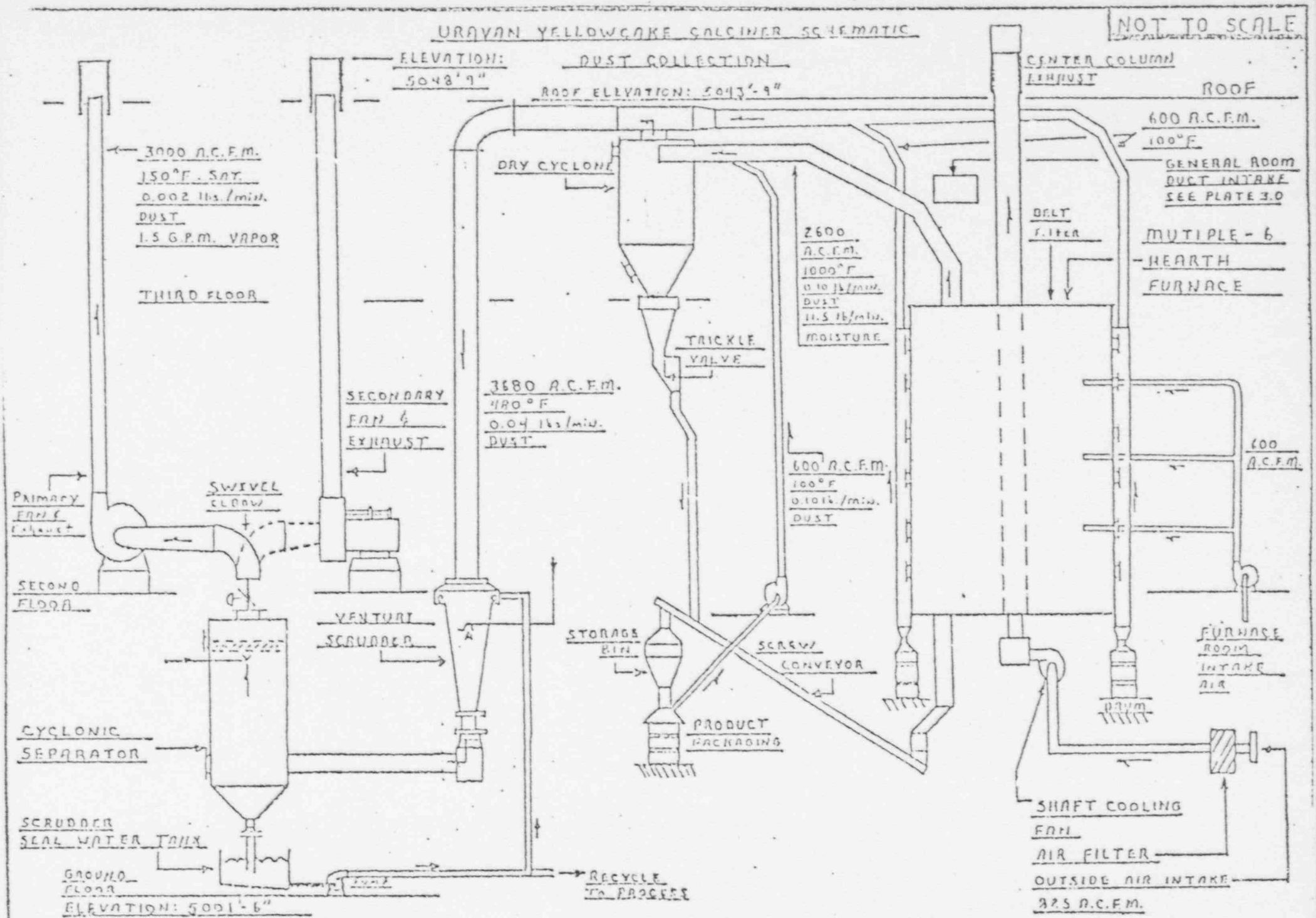


PLATE 1.0

UNION CARBIDE CORPORATION

PROPOSED YELLOWCAKE SCRUBBER LIQUID AND MATERIAL BALANCE

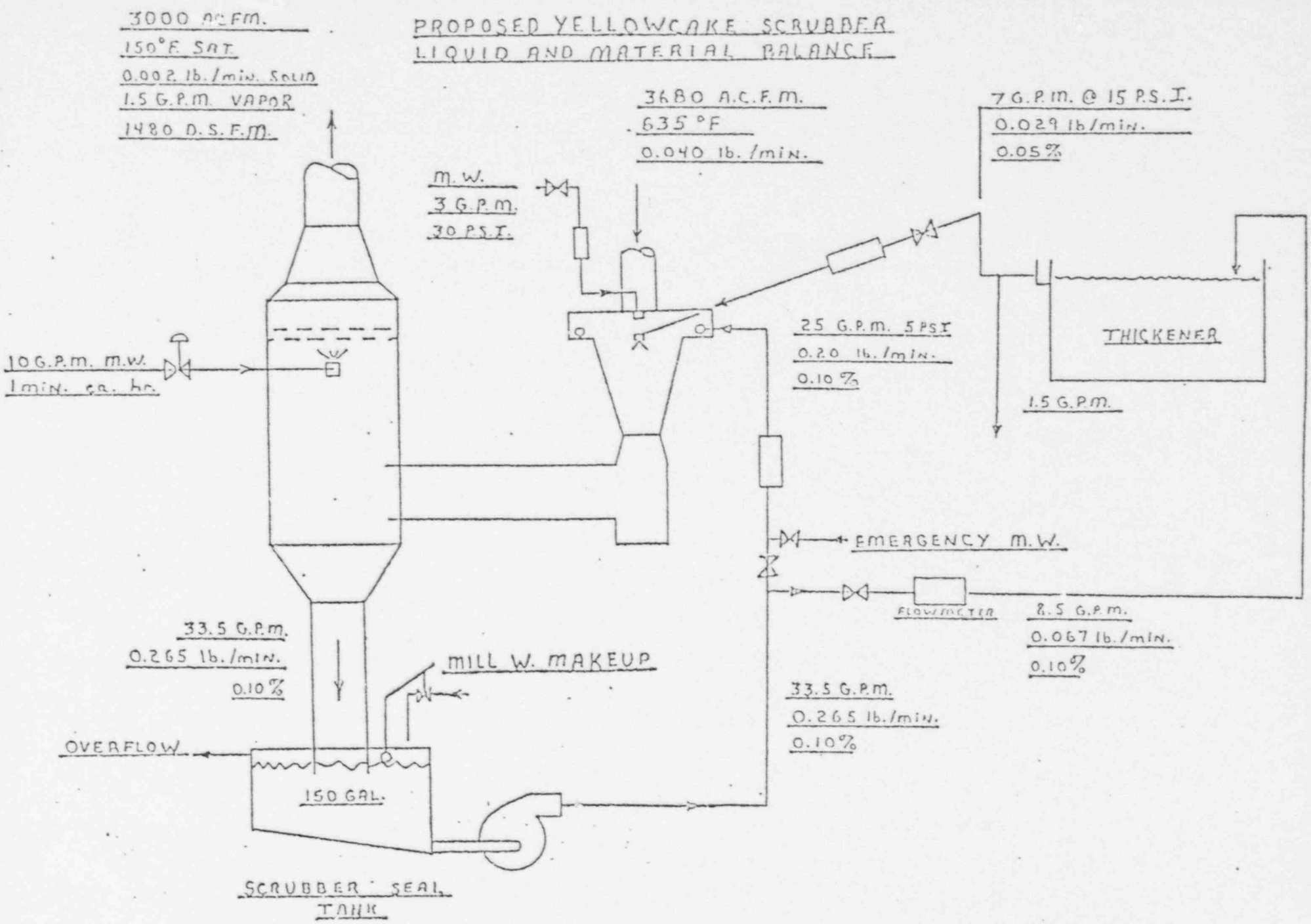


PLATE: 2.0

UNION CARBIDE CORP.
URAVAN, COLORADO

PROPOSED Y.C. DRYER BLDG.
AIR VENTILATION EMISSION
SCRUBAER

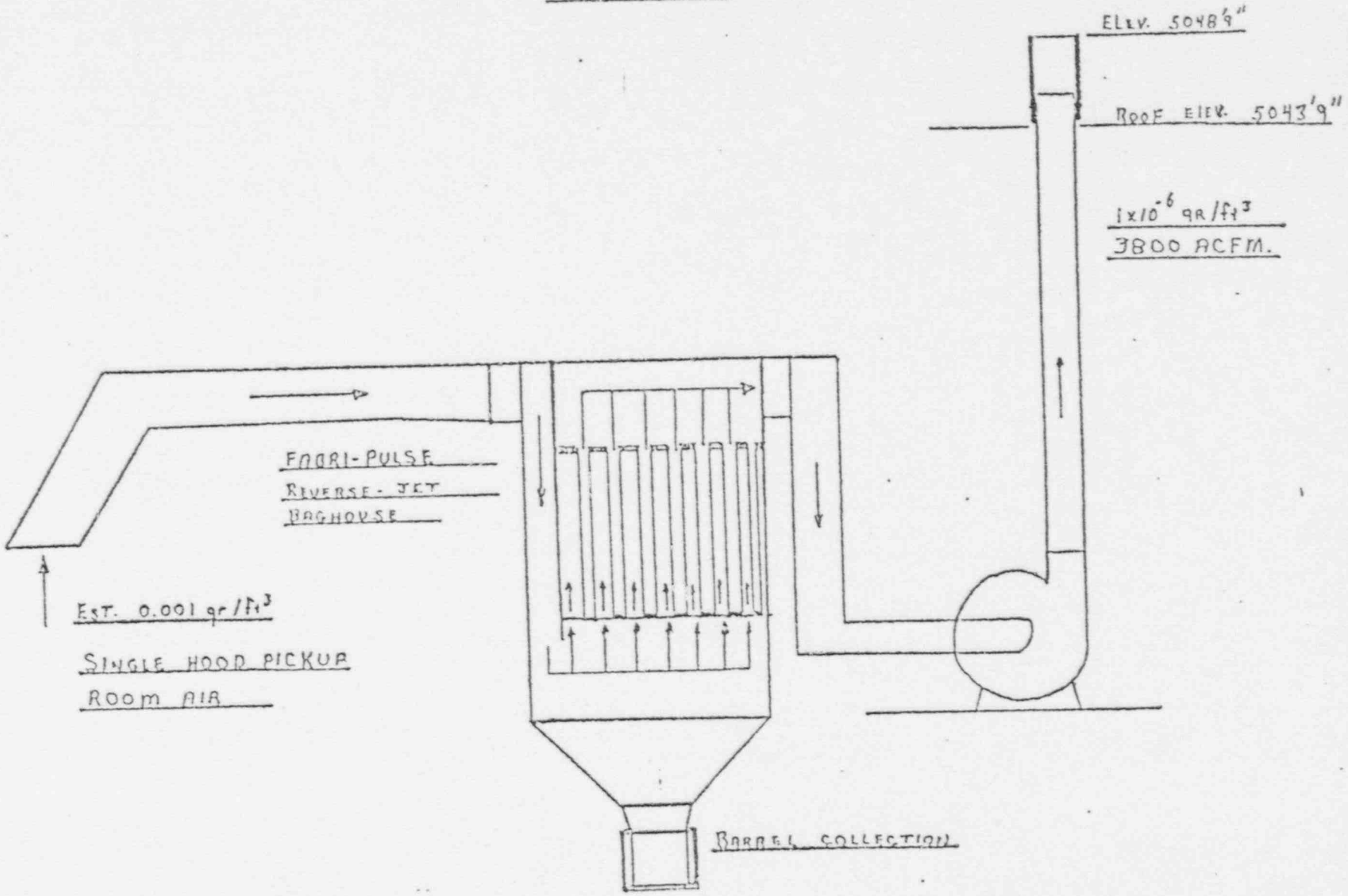
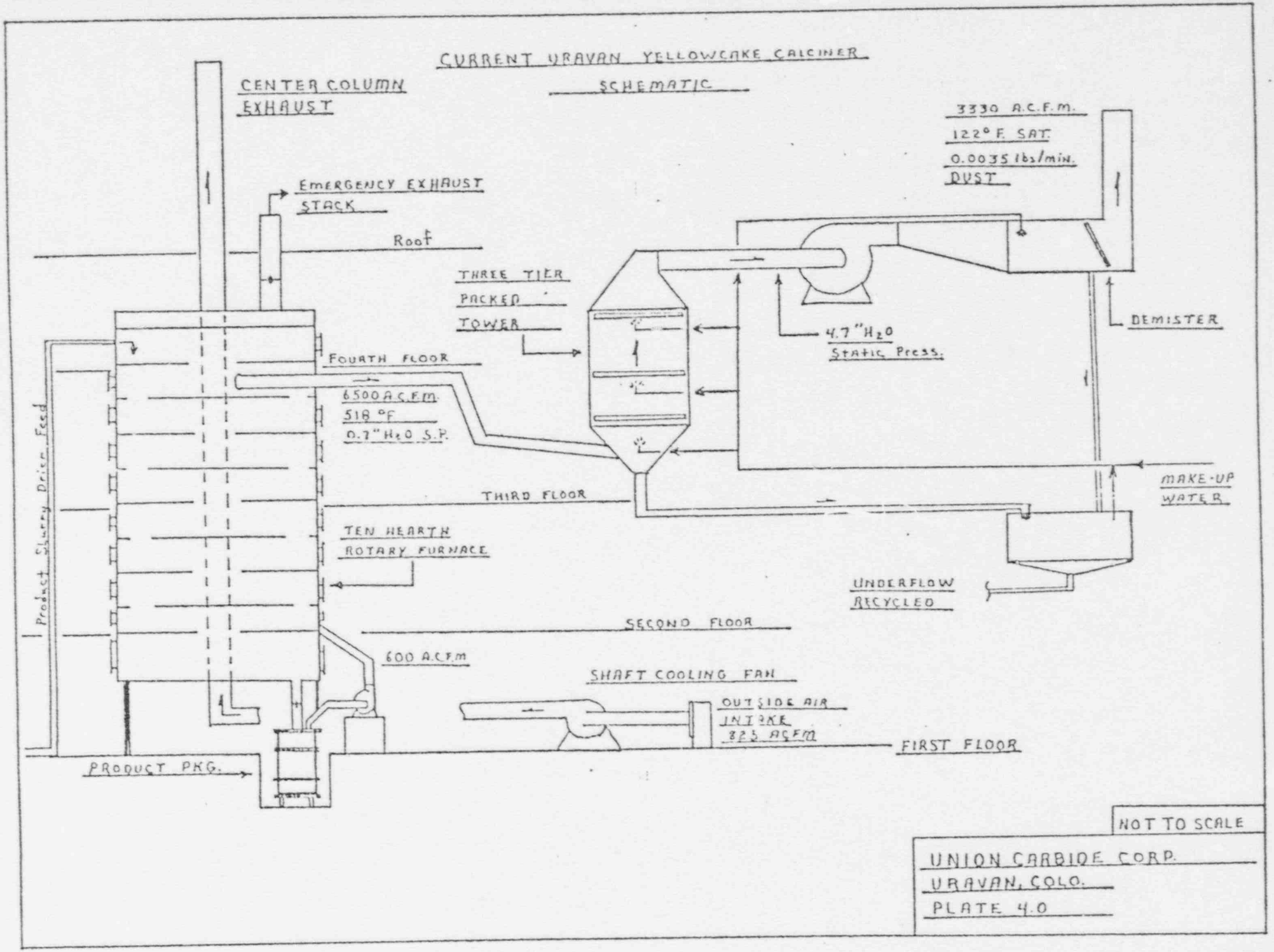
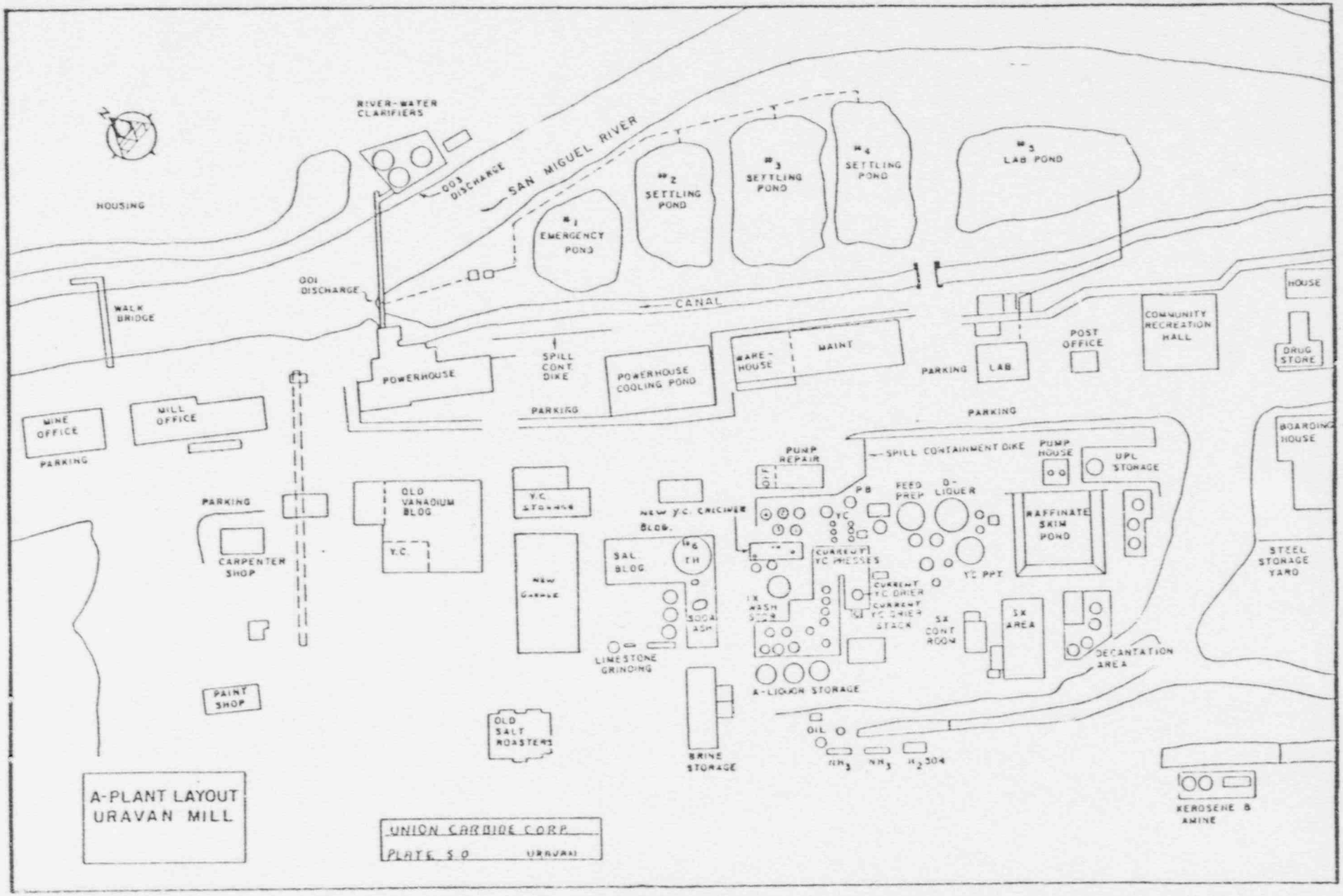


PLATE 3.0 NOT TO SCALE

UNION CARBIDE CORP.
URAVAN, COLO.

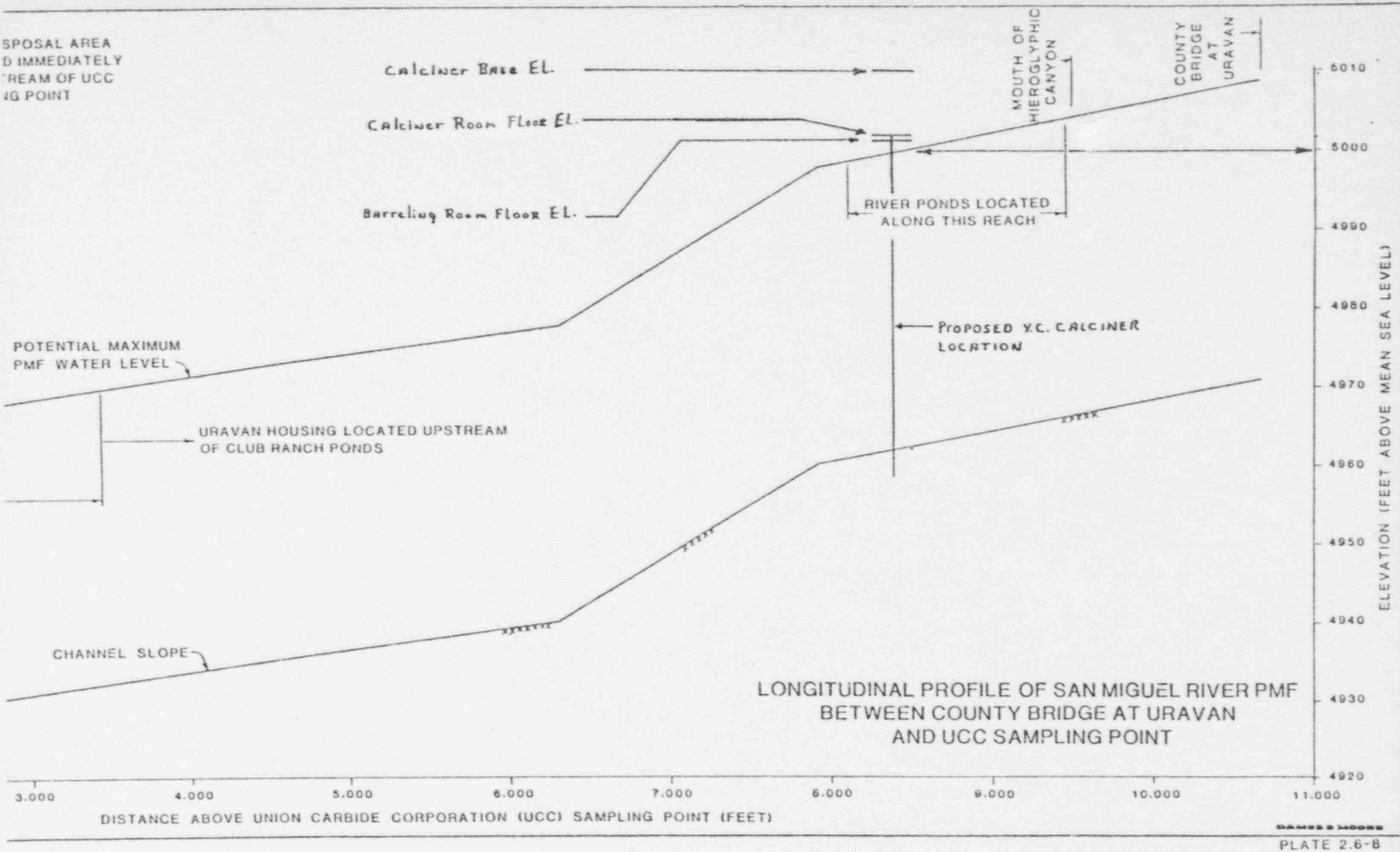

CURRENT URAVAN YELLOWCAKE CALCINER
SCHEMATIC
CENTER COLUMN EXHAUST
EMERGENCY EXHAUST STACK
Roof
3330 A.C.F.M.
122° F. SAT.
0.0035 lbs/min.
DUST
THREE TIER PACKED TOWER
4.7 "H2O Static Press.
DEMISTER
FOURTH FLOOR
6500 A.C.F.M.
518 °F
0.7 "H2O S.P.
Product Slurry Drier Feed
THIRD FLOOR
MAKE-UP WATER
TEN HEARTH ROTARY FURNACE
UNDERFLOW RECYCLED
SECOND FLOOR
600 A.C.F.M.
SHAFT COOLING FAN
OUTSIDE AIR INTAKE 825 ACFM
FIRST FLOOR
PRODUCT PKG.
NOT TO SCALE
UNION CARBIDE CORP.
URAVAN, COLO.
PLATE 4.0



A-PLANT LAYOUT
URAVAN MILL

UNION CARBIDE CORP
PLATE 5.0 URAVAN

SPOSAL AREA
D IMMEDIATELY
'REAM OF UCC
NG POINT



LONGITUDINAL PROFILE OF SAN MIGUEL RIVER PMF
BETWEEN COUNTY BRIDGE AT URAVAN
AND UCC SAMPLING POINT

DAMES & MOORE

PLATE 2.6-8

UNION CARBIDE CORPORATION
URAVAN, CO.

PLATE 6.0

2.3 Health Physics

The following is a discussion by area of health physics related changes with the proposed yellowcake calciner.

2.3.1. The yellowcake calciner building is designed to be a total wash down facility such that yellowcake buildup on walls and floors can be sprayed and cleaned with water. The current facility does not allow for this type of cleaning system. The proposed facility would be washed down daily with the liquor produced entering floor sumps and returned to the precipitation circuit.

The access doors to the building, and isolated rooms within, are equipped with pneumatic door closures to help maintain an interior negative room pressure as induced by the room ventilation system. Room air dust pickup points are to be located in the vicinity of the top of the calciner. These points are connected to a fabric collector and fan located on the third floor of the building. This collector is of the reverse jet pulse type to minimize maintenance personnel exposure to airborne uranium dust.

The calciner itself is equipped with a double door access arrangement for each hearth whereby negative pressure can be maintained around the seals of each door to prevent movement of uranium dust into the operators environment. This system consists of a channel of air, moving upward to the scrubber system, contained inside a metal trough attached over the calciner access doors. The trough is ducted at the top to the main calciner ventilation exhaust system and at the bottom to a collection drum. Opposite each calciner door, the trough has a similar access door which, when opened, allows the operator to clean the drops and rotary rakes of the calciner, a necessary task. The negative pressure between the doors forces the lighter dust particulates to become entrained in the air flow to the main ventilation duct work while the heavier particulates, not entrained, fall to the collection drum. This reduces the migration of dust particulates to the operators breathing zone, thereby reducing his exposure to uranium.

The current calciner is a single door arrangement which increases dust exposure levels by not having a system to pick up door seal leaks or generated dust from the maintenance operations.

2.3.2 Dewatering of yellowcake by means of the current plate and frame filter presses allows for uncontrollable employee and clothing exposure to moist yellowcake which, if personal hygiene is not maintained, can lead to excessive uranium burdens to the body through the ingestion pathway.

The proposed calciner is equipped with a horizontal belt vacuum filter which drastically reduces potential for employee handling of wet yellowcake. This is essentially in the transport of moist cake from the dewatering equipment to the calciner. Currently, each plate of the filter press is manually scraped by the operator into a hopper. The hopper is then dumped into a repulper where the cake is pumped to the calciner. The proposed system has the dewatered cake falling a short distance off a belt filter into a hopper. The base of the hopper contains an enclosed screw conveyor which moves the cake horizontally to the calciner, and dumps it into the calciner. There is essentially no employee involvement in the transfer of the cake.

2.3.3. Product barreling of the yellowcake produces, during the barrel changing operation, a major source of employee exposure to uranium dust. The current system has a barrel sitting on top of a moveable dolly in a concrete pit, which moves the barrel away from the loading hood. The barrel is then lifted out of the pit by an overhead pulley, and is placed on weighing scales. The movement of the open container of cake generates dust in the vicinity of the employees breathing zone. The proposed system consists of a storage bin to contain the daily production. This bin is emptied daily into product drums mounted on a roller conveyor system. The barrels fit inside a dust pickup hood equipped with two plenums that maintain a negative pressure around the rim of the barrel. Dust generated during the filling operation is vented at 600 cfm. to the main scrubber duct. Movement of open filled barrels is along the horizontal roller system, which will produce less dust than the

present overhead pulley system. Filling operations, occurring at set daily periods, allow for closer and more consistent monitoring of employee breathing zones for uranium dust.

2.3.4. Along with the proposed calciner and horizontal belt filter is the intended installation of a changeroom facility for yellowcake operator personnel. This changeroom facility is to be constructed on the current site of the present calciner or pressroom. The changeroom consists of separate areas for "clean" personnel and "dirty personnel", for both sexes. The dirty area is equipped with a lunch bench, restrooms, bootwash, respirator and paper suit cleaning and storage. Personnel leaving the "dirty" section for the "clean" section pass through a "dirty" locker room, a shower facility, and then a "clean" locker room. Personnel will be required to shower prior to exiting the yellowcake compound area. The lunch facility area will be monitored weekly for removable and fixed alpha. The entire facility can be washed down by hoses. Shower and floor drains return solutions to the yellowcake circuit. Personnel will be equipped with clothing that will remain within the "dirty" side of the changeroom when they leave. The same requirements apply to maintenance personnel.

2.3.5 Monitoring, in respect to health physics, will continue as noted in the 1980 operational monitoring program with changes made as deemed necessary to facilitate maintaining the best possible employee monitoring coverage.

Reference No. 2

NAME: Terry N. Washburn

POSITION: Plant Superintendent EFFECTIVE DATE: August 1, 1980

EDUCATION: New Mexico State University
B. Sci. in Mechanical Engineering - 1962

EMPLOYMENT HISTORY:

1962-1965	Humble Oil & Refining Production Engineer
1965-1967	Union Carbide Corporation/ Uravan, Colorado Plant Engineer
1967-1973	Union Carbide Corporation/ Uravan, Colorado Maintenance Superintendent
2/1973-6/1973	Union Carbide Corporation/ Uravan, Colorado "B" Plant Superintendent
1973-1980	Union Carbide Corporation/ Hot Springs, Arkansas Vanadium Milling Facility Maintenance Superintendent & Department Head

Supplement To Attachment B

New Yellow Cake Calciner Description

1.0 Introduction

Attachment B of the request for the Minor Health and Safety Amendment submitted to Mr. A. J. Hazle by Mr. R. K. Jones on July 11, 1980 describes the process design features of the new system. This supplement outlines the operational procedures that will be used to minimize employee exposure.

2.0 Alarm and Shut-Off Systems Relating to Personnel Exposure

The emissions from the calciner, product barreling station, and calciner drop plenums are controlled by the venturi scrubber system; the work area atmosphere in the dryer enclosure and packing area is maintained by a separate ventilation system. The alarm point on the venturi scrubber can be set for a range of pressure drops. The features of these systems are as follows:

Event	Response
Pressure loss on the venturi or room ventilation system	Alarms will sound at the barreling station, first floor, second floor of the dryer, and packing area. Light alarm in the filter room and in the Plant 5 control room.

Loss of the emission control units will also stop the feed to the dryer and place the burners on low fire.

Other actions are at the discretion of the operator.

3.0 Cleanup of Spilled Yellow Cake

A vacuum system for cleaning up spills will be installed. The air discharge from the system will pass through an absolute filter (less than one micron particle size) prior to discharge.

4.0 Start-Up Procedures

Repirators will be required in all areas until acceptable airborne concentrations in the working areas are established by field measurement. The exhaust stacks from the operation would be sampled 8 times during the first month of operation, and then monthly for the rest of 1981.

5.0 Change Room Facilities

The new facilities will be built as personnel become available during the six-month shutdown in 1981.

WM-34
FDR

COLORADO DEPARTMENT OF HEALTH
Division or Section of Radiation & Hazardous Wastes

INTER-OFFICE COMMUNICATION

TO : Union Carbide Uravan File

DATE : January 14, 1981

FROM: Ken Weaver

SUBJECT: Yellowcake calciner authorization

By telcon January 14, 1981 (0930) notified Terry Washburn, Uravan Plant Superintendent of the Department's January 13, 1981 letter provisionally authorizing operation of the yellowcake calciner.

Washburn mentioned a question raised by MSHA about hazards from using natural gas without further protection's but believed this would be resolved.

KLKW/ddb

Ken LK Weaver 1-19-81
Signature

12047