Report #24

JACOBS ENGINEERING GROUP INC.

WATER BALANCE STUDY

FOR

UNITED NUCLEAR CORPORATION

CHURCH ROCK URANIUM MILL

GALLUP, NEW MEXICO

Project No. 02-2925-02
December 21, 1979

TABLE OF CONTENTS

		Page No.
SUMMARY		1
1.0	INTRODUCTION	1
2.0	DISCUSSION	
2.1	Interim Liquor Neutralization and Recycle Scheme	2
2.2	Proposed Liquor Neutralization and Recycle Scheme	2
3.0	RECOMMENDATIONS	
3.1	Lime Neutralization of Decant Liquor	6
3.2	Liquor Neutralization with Solar Evaporation	8
3.3	Mechanical Evaporation of Decant Liquor (VRDD)	8

WATER BALANCE STUDY FOR UNITED NUCLEAR CORPORATION CHURCH ROCK URANIUM MILL GALLUP, NEW MEXICO

SUMMARY

The United Nuclear Corporation (UNC) Church Rock uranium mill solution balance was studied based on two proposed liquor neutralization and recycle schemes. These schemes were proposed by UNC to help alleviate their critical tailings solution problem. It was determined that the interim raffinate neutralization scheme using ammonia is a viable process that will significantly reduce mill aqueous effluent to tailings. The proposed tailings decant liquor neutralization scheme using ammonia, however, does not appear to be a feasible long term alternative because of excessive sulfate build-up. A recommended scheme based on lime neutralization of recycle liquor is given at the end of the report, as well as an alternative scheme based on partial recycle and partial solar evaporation of decant liquor. In addition, a proprietary mechanical evaporation system currently under development and which is capable of achieving "zero" discharge is described as an alternative to all of the above schemes.

1.0 INTRODUCTION

Jacobs Engineering was requested by United Nuclear Corporation to evaluate their current and proposed liquor neutralization and recycle schemes for the Church Rock uranium mill. On Friday, December 7, 1979 a meeting was held with UNC staff to discuss Jacobs Engineering's draft report on the same subject. Based on information gained from this meeting and from other UNC staff members, this report presents an evaluation of the liquor neutralization and recycle schemes as well as some recommendations.

2.0 DISCUSSION

2.1 Interim Liquor Neutralization and Recycle Scheme

The first scheme involves neutralization of UNC's current 200 GPM raffinate bleed with ammonia and subsequent recycle of the neutral liquor to the grinding circuit. The process is shown in Figure 1.0. This is an interim scheme designed to provide immediate relief for the tailings problem; however, it eventually will be replaced by a future tailings decant liquor ammonia neutralization scheme discussed later. The net effect of this interim process is reduction of mill aqueous effluent to only liquor associated with last CCD stage underflow. As a consequence, sulfate and chloride levels will increase from their present levels of 45 grams per liter (g/l) and 0.41 g/l to about 65 g/l and 0.59 g/l, respectively. These higher levels, however, will not affect the mill process. In addition, liquor specific gravities will increase slightly and pulp viscosities might also increase. In general, this scheme provides a viable interim process.

2.2 Proposed Liquor Neutralization and Recycle Scheme

The proposed liquor recycle scheme involves neutralization of tailings decant liquor with ammonia and subsequent recycle of neutral liquor to the mill. Two alternatives based on ammonia neutralization of decant liquor are under consideration by UNC and are shown in Figures 2.0 and 3.0. The first scheme is based on a one-step neutralization process while the second case is based on a two-step process.

2.0 DISCUSSION

2.2 Proposed Liquor Neutralization and Recycle Scheme - continued

In both processes, last stage CCD underflow and raffinate bleed are combined and fed to the cyclone sand/slime separation circuit as presently done. The sands report to the underflow for mine backfill use while the slimes and the bulk of the mill effluent liquor reports to the overflow for transfer into a solids settling area. As the ore solids settle out, decant liquor is pumped into a decant pond (burrow pit no. 1).

In the first ammonia neutralization scheme (Figure 2.0) acidic decant liquor at pH 1.2 is recycled to the mill where it is neutralized to pH 6 in a single neutralization step. Resulting "orange" sludge is thickened with thickener underflow advanced to the last CCD stage and overflow advanced to the grinding circuit and other mill uses.

In the second ammonia neutralization alternate (Figure 3.0), decant liquor is partially neutralized to pH 4.5 in the decant pond to allow settling of precipitated solids. Pond surface liquor is then recycled to the mill for subsequent neutralization to pH 6 with ammonia. Additional precipitated solids are thickened with thickener underflow advanced to the last CCD stage and overflow advanced to the grinding circuit and other mill uses. Final neutralization to pH 6 at the mill instead of in the decant pond allows recovery of soluble U_3O_8 values in the liquor.

2.0 DISCUSSION

2.2 Proposed Liquor Neutralization and Recycle Scheme - continued

The net aqueous bleed from the mill for the one-step neutralization scheme is made up of liquor associated with mine backfill material and liquor associated with settled tailings, while the two-step neutralization scheme has an additional liquor bleed associated with settled precipitated solids in the decant pond. Both schemes provide a significant reduction in total bleed liquor from the overall process. As a result, chloride levels will build up to about 1.3 g/l and 1.0 g/l for the first and second schemes, respectively. Sulfate levels, however, will build up to about 140 g/l and 118 g/l for the first and second schemes, respectively. These sulfate levels are high and exceed a desired maximum level of about 90 g/l, above which the mill process may be adversely affected. In actual operation, however, it will take some time for the sulfates to build up to a prohibitive level because of a large liquor inventory in the tailings system from which to draw. It is not known if the mill can operate until springtime before sulfates become a problem. A knowledge of the decant liquor inventory is needed to estimate how long the mill can operate before problems arise. In addition, higher levels of soluble metals such as iron and aluminum may cause pulp viscosity problems in the ore grinding circuit. Also, the addition of an "orange" sludge to the No. 6 CCD thickener may decrease the last CCD stage underflow density and thereby increase soluble U_3O_8 losses as well as hinder the settling of tailings in the tailings pond.

2.0 DISCUSSION

2.2 Proposed Liquor Neutralization and Recycle Scheme - continued

A problem associated only with the two-step ammonia neutralization scheme (Figure 3.0) is the deposition of voluminous settled sludge in the decant pond. Test data from the Church Rock mill laboratory indicate that neutralized liquor sludge will settle to one-tenth of the original liquor volume at about 10% solids content. Consequently, treatment of about 400 GPM of decant liquor will produce 40 GPM of precipitated settled solids. At this rate, burrow pit No. 1 (decant pond), having about 6 acres of area, will be filled to a depth of about 10 feet with sludge after one year of operation.

3.0 RECOMMENDATIONS

Two alternative processes are suggested that will avoid the sulfate build-up problem associated with UNC's proposed ammonia liquor neutralization and recycle scheme. The first process involves lime neutralization of decant liquor while the second process involves a combination of both neutralization and solar evaporation steps. A mechanical evaporation scheme currently under development is also discussed as an alternative to all of the schemes discussed thus far.

3.1 Lime Neutralization of Decant Liquor

The recommended decant liquor neutralization scheme using lime is shown in Figure 4.0. In this process, acidic tailings are allowed to settle followed by neutralization of resulting decant liquor with lime or limestone in two neutralization tanks to pH 8 - pH 8.5. The precipitated solids are subsequently thickened, filtered, and disposed of in the tailings area. Clear neutral liquor is then recycled to the mill.

This scheme eliminates the sulfate build-up problem because soluble sulfates are removed from the process with liquor associated with mine backfill material and settled tailings slurry, while additional sulfate is removed as precipitated gypsum. As a result, sulfate levels in plant liquors will range from 45-55 g/l. In addition, precipitated sludge that normally settles to only 10-15% solids can be dewatered on a filter to, say, 35-50% solids thereby producing a smaller volume of sludge.

Another advantage of this scheme is that neutralization to pH 8 - pH 8.5 removes all ferrous iron from solution and thereby

3.0 RECOMMENDATIONS

3.1 Lime Neutralization of Decant Liquor - continued

minimizes problems in grinding circuit where the recycled liquor might precipitate out gelatinous iron compounds upon contact with alkaline ore values. This would cause a pulp viscosity problem in both grinding and separation circuits.

A variation of this process similar to UNC's two-step neutralization alternate would be to incorporate lime neutralization to pH 4.5 in one stage followed by neutralization with ammonia to pH 6 in a second stage and subsequent recycle of liquor to the mill. Precipitated solids from the first neutralization step, however, would first be thickened, filtered and removed before the second neutralization step. Based on information from the Church Rock mill operation, partial neutralization of decant liquor to pH 4.5 would allow recovery of soluble U_3O_8 values in the decant liquor. The uranium values do not precipitate out at this pH level; consequently, they would report to the second neutralization step from where they would all be recycled to the process and resolubilized in the acidic mill liquors.

A disadvantage of lime neutralization scheme is high reagent cost. Once the recycle liquor loop is closed and sulfate and iron reach steady state levels in the mill liquors, lime consumption for neutralization is calculated to be about 0.30 lb/gal liquor. At a cost of $70/ton lime and treatment of 450 GPM decant liquor, reagent cost will be about $2,200,000 per year.

3.0 RECOMMENDATIONS - continued

3.2 Liquor Neutralization with Solar Evaporation

A process incorporating both neutralization and solar evaporation of decant liquor may warrant future investigation by UNC because of high neutralization reagent cost. Projected reagent costs of about $2,200,000 per year can be reduced by recycling a limited amount of ammonia neutralized decant liquor to the mill to maintain the maximum allowable sulfate levels of, say, 90 g/l in the mill. Excess acidic decant liquor would be advanced to an evaporation pond. An economic optimization study would be required to define this approach.

3.3 Mechanical Evaporation of Decant Liquor

Mechanical evaporation of tailings solution for recovery of pure water from acid liquor is an alternative to liquor neutralization. The Holl Research Vapor Reheat Direct Distillation (VRDD) system is more economical than lime neutralization and has the potential of making a "zero" discharge uranium mill.

It is recommended that the VRDD unit be tested in the laboratory at 1-2 liters per minute feed rate to validate the thermal efficiency and to investigate the isolation of the dry solid salt agglomerates. This Phase I work would be done at Hazen Research. The experimental VRDD unit could be fabricated for $10,000. The monthly charges for operating the unit are $15,000 with $10,000 for Hazen and $5000 for Jacobs for a period of one month's operation.

3.0 RECOMMENDATIONS

3.3 Mechanical Evaporation of Decant Liquor - continued

Phase II would be a continuation of Phase at Hazen after the approach was validated. An additional 2-3 months would be required to obtain design data for a prototype field module -- demonstration unit in Phase III.

Phase III would cover the fabrication and operation of a 5-10 GPM feed liquor unit over a period of six months.

Process Description

The VRDD approach is based on a vacuum sea water desalting unit being designed and fabricated by Holl Research for Kuwait. The concept for Church Rock, however, is based on a pressurized system to approach adiabatic conditions with the equivalent of multi-stage evaporation. The proprietary concept is illustrated by the sketch in Figure 5.0.

An organic medium is recirculated that allows water to evaporate and be removed as condensate. The isolated salt solids are separated from the organic medium prior to recycle. A proprietary dispersant is used to stabilize the water and salts in the organic medium so that agglomerates are formed. Special heat transfer techniques are also employed to achieve high fluxes with a minimum heat transfer area.

The VRDD operates under a pressure of 600 psig to achieve the maximum thermal efficiency. It is estimated that 1000 gallons

3.0 RECOMMENDATIONS

3.3 Mechanical Evaporation of Decant Liquor

Process Description - continued

of water can be recovered by expenditure of 50 KWH energy. This is about one-half that for the recompression evaporator offered by Resources Conservation Corporation (RCC) for neutralized liquor.

Batch laboratory tests have been performed by Holl Research. On May 23, 1979, in Test I, 375 cc of SX raffinate was evaporated with a terminal temperature of 143°C. The agglomerates of sulfate salts were easily separated, solvent washed, and saved for assay by Hazen. Tests II and III were made with SX raffinate plus 10% slimes to indicate a possible method of solidifying slimes for subsequent burial. The combined solids were taken to Hazen for assay as shown in Table 1.0.

These successful tests provided evidence that the VRDD concept has merit and deserves evaluation along with other schemes of tailings management being considered for uranium mills.

The primary advantage of the VRDD approach is that the acidic liquid can be evaporated directly without neutralization. Another possible advantage is that the slimes fraction of the tails can be agglomerated by the sulfate salts, isolated, and the agglomerates can then be buried free of any associated liquor.

3.0 RECOMMENDATIONS

3.3 Mechanical Evaporation of Decant Liquor - continued

Economic Evaluation

It was stated in the December 7, 1979 meeting that VRDD can be justified on the basis of evaporating acidic liquor without neutralization via the proprietary Holl Research process. The Church Rock lime usage is 150 pounds per 1000 gallons liquor and the corresponding chemical cost for neutralization is $5.25/1000 gallons based on a lime cost of $70/ton. The unit power cost at Church Rock is 6 cents/KWH and the corresponding unit evaporation cost is $3.00/1000 gallons liquor based on the estimated VRDD power usage of 50 KWH/1000 gallons liquor. The VRDD power usage must be confirmed in Phase I laboratory tests and, if valid, then engineering data acquired in Phase II will be used for design of a prototype module for field testing in Phase III test work.

A feasibility study would be made by JEG during Phase II.

Proposal

A formal proposal will be prepared by Jacobs as requested by UNC.

JACOBS ENGINEERING GROUP, INC.

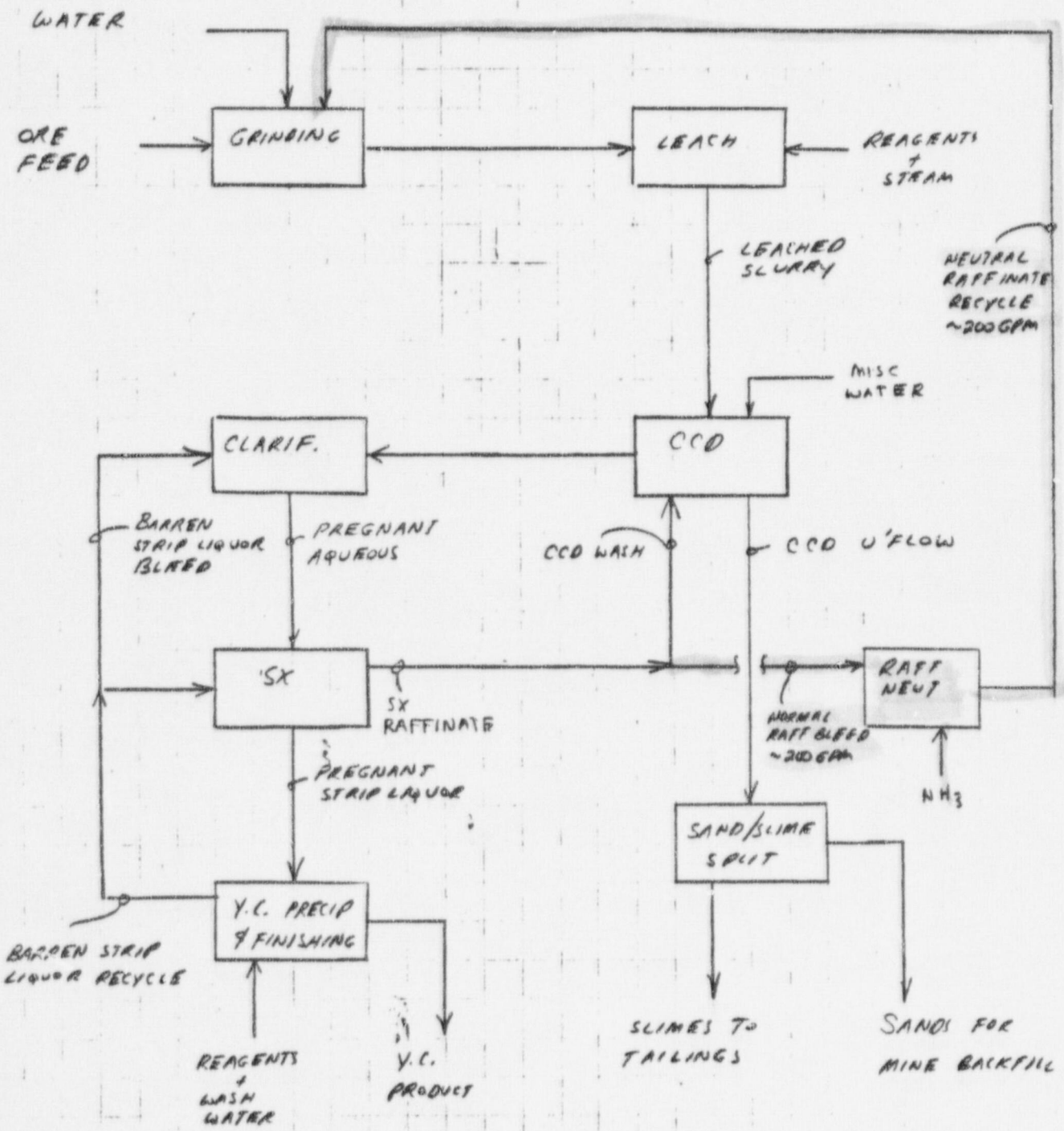
UNC

DATE 12/5/79 SUBJECT SHEET NO.

BY MG CHKD. JOB. NO. 02-2925-02

FIGURE 1.0

INTERIM RAFFINATE NEUTRALIZATION PROCESS BLOCK DIAGRAM



JACOBS ENGINEERING GROUP INC.

UNC

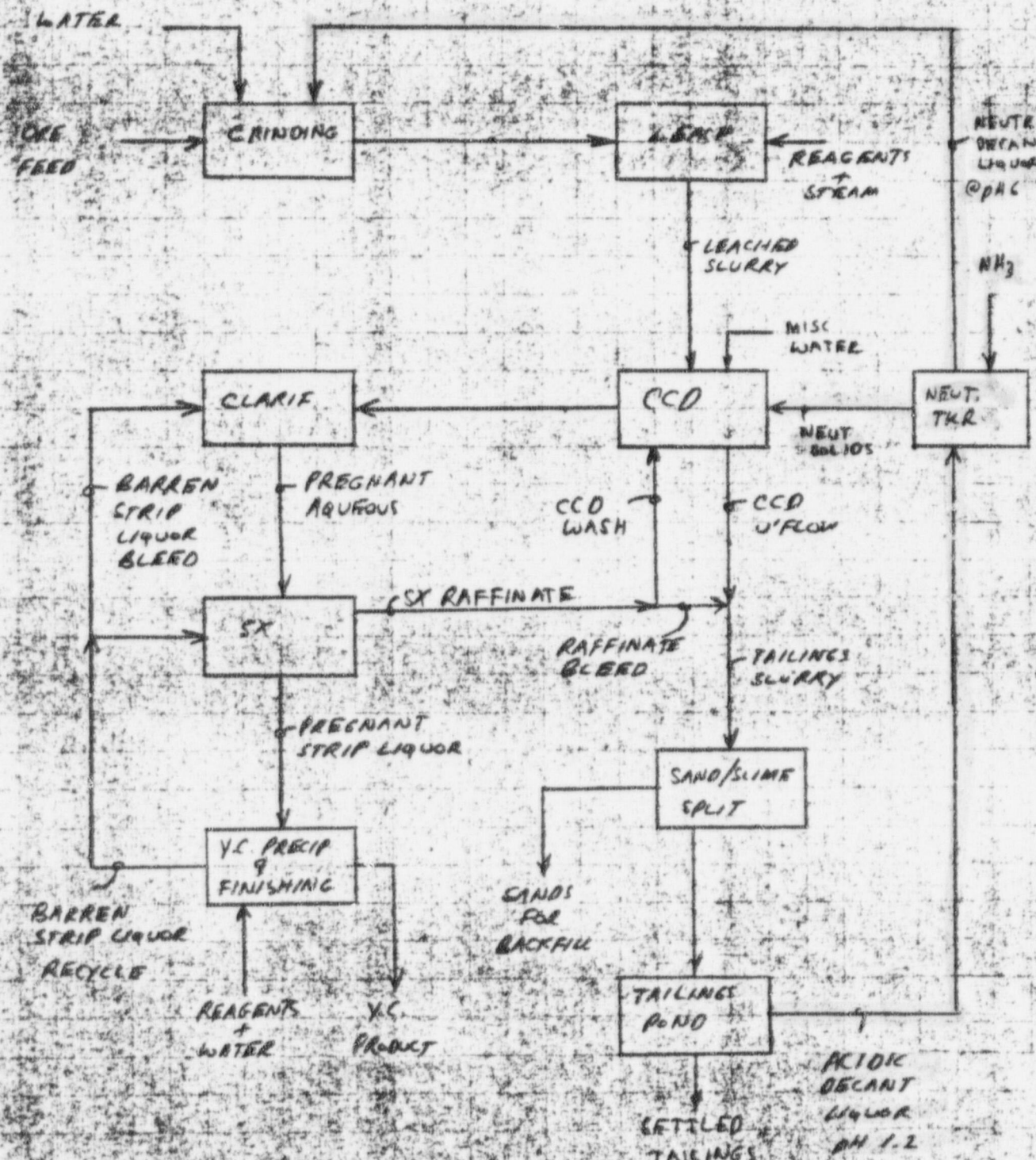
DATE 12/17/79 SUBJECT FIGURE 2.0 SHEET NO.

BY MG CHKD. JOB NO 02-2525-01

PROPOSED AMMONIA NEUTRALIZATION SCHEME

(ONE-STEP NEUTRALIZATION)

PROCESS BLOCK DIAGRAM



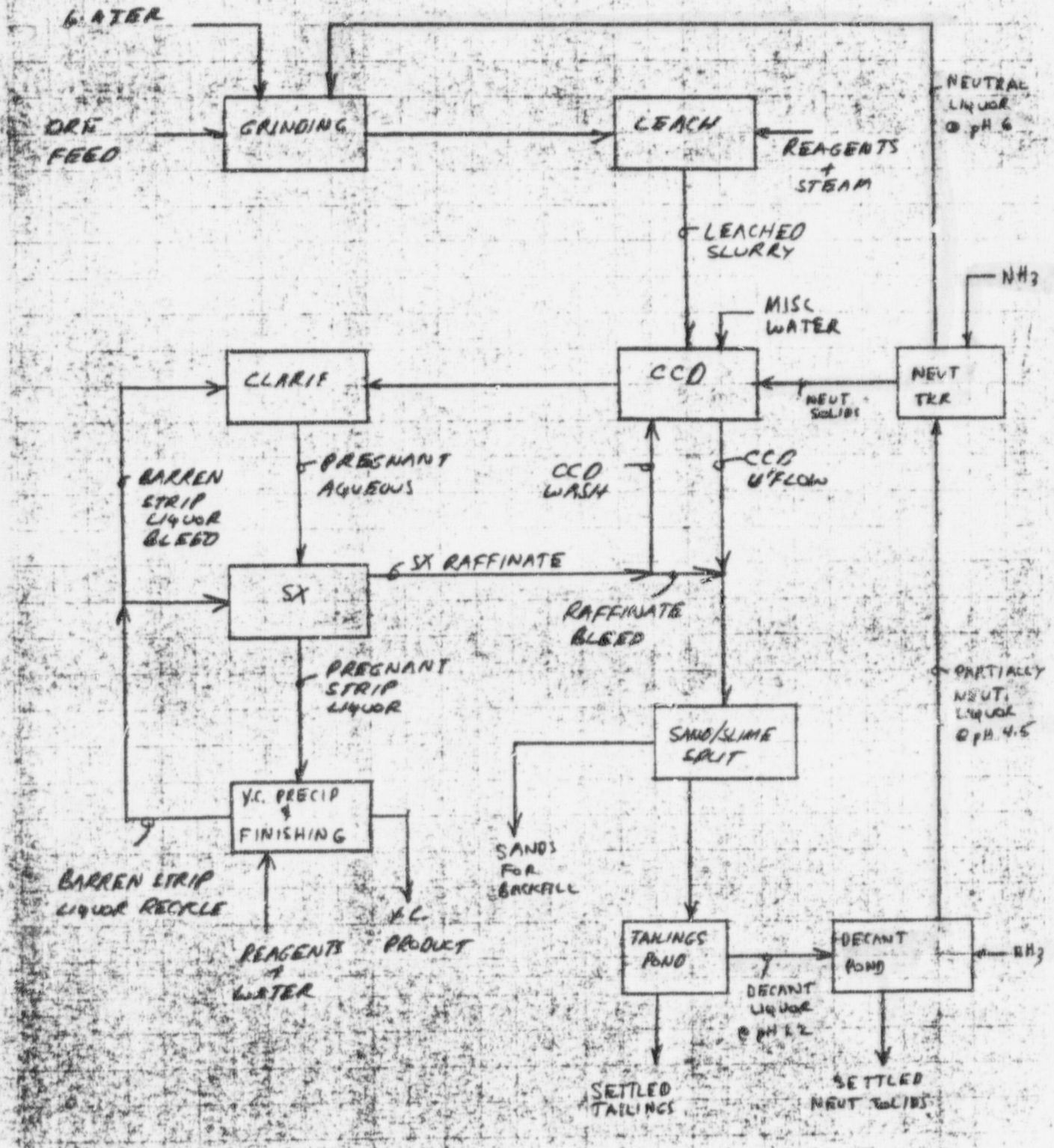
JACOBS ENGINEERING GROUP INC.

UNC

DATE 12/17/79 SUBJECT FIGURE 3.0 SHEET NO.

BY MG CHKD PROPOSED AMMONIA NEUTRALIZATION SCHEME (2 STEP NEUTRALIZATION) JOB NO 02-2925-02

PROCESS BLOCK DIAGRAM



JACOBS ENGINEERING GROUP, INC.

UNC

DATE 12/5/79 SUBJECT FIGURE 4.0 SHEET NO. _____

BY MC CHKD. _____ RECOMMENDED LIME NEUTRALIZATION JOB. NO. 02-2975-02

PROCESS BLOCK DIAGRAM

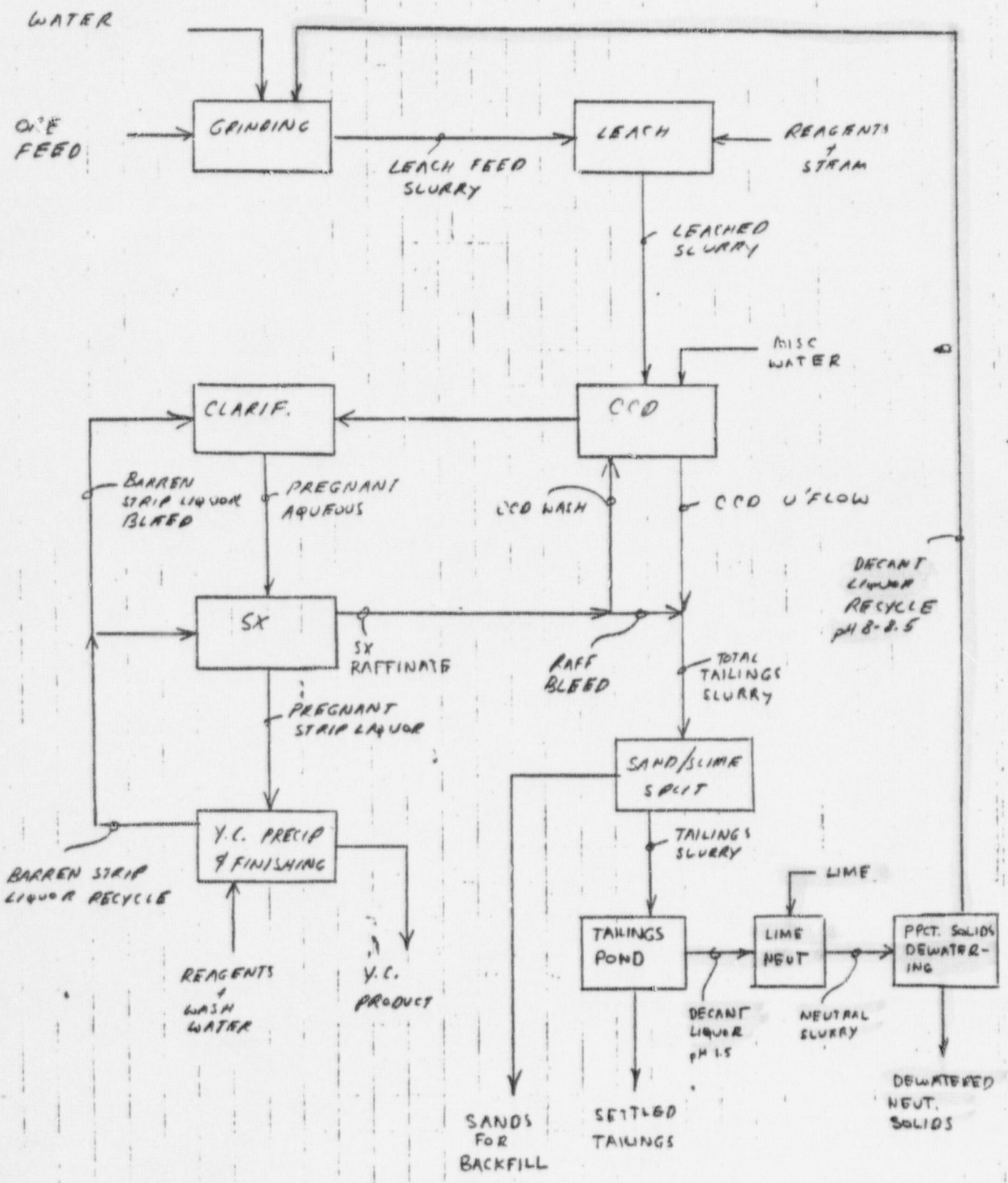


FIGURE 5.0

REMOVED

COMPANY PROPRIETORY

ON FILE NMOCD

TABLE 1.0

ANALYSES OF SOLIDS FROM
VRDD EVAPORATION TESTS

	Raffinate	Slime Plus Raffinate 1	Slime Plus Raffinate 2
Gross α pCi/g	1,070	3,890	2,270
Gross β pCi/g	3,020	5,440	4,830
U_3O_8, %	0.009	0.007	0.006
V_2O_5	0.37	0.19	0.23
Mo	0.022	0.013	0.012
SiO_2	1.55	32.4	37.0
Mg	1.28	0.60	0.58
Ca	0.45	0.65	0.59
Na	1.72	1.15	1.30
SO_4	49.0	22.4	18.2
Fe	7.3	3.9	3.4
Al	3.4	3.6	3.5
Cl	0.076	0.060	0.048

CALCULATIONS

JACOBS ENGINEERING GROUP. INC.

UNC.

DATE 12/5/79 SUBJECT SHEET NO.

BY MG CHKD. JOB NO. 02-2425-02

OUTLINE OF WATER BALANCE CALCULATIONS

A - EXISTING PROCESS

Page No.

A.1 BLOCK FLOW DIAGRAM

A.2 MILL SOLUTION BALANCE

A.3 APPROXIMATE $SO_4^=$ BALANCE

A.4 APPROXIMATE Cl^- BALANCE

B INTERIM PROCESS (NEUT. OF RAFF W/ NH_3 & RECYCLE)

Page No.

B.1 BLOCK FLOW DIAGRAM

B.2 MILL SOLUTION BALANCE

B.3 APPROXIMATE $SO_4^=$ & Cl^- BALANCE

C. PROPOSED AMMONIA NEUTRALIZATION SCHEME

Page No.

C.1 BLOCK FLOW DIAGRAM (ONE STEP NEUTRALIZATION)

C.2 MILL SOL'N BALANCE (" ")

C.3 APPROXIMATE $SO_4^=$ & Cl^- BALANCE (" ")

C.4 BLOCK FLOW DIAGRAM (TWO STEP NEUTRALIZATION)

C.5 APPROXIMATE $SO_4^=$ & Cl^- BALANCE (" ")

C.6 NH_3 USAGE ESTIMATE (FOR BOTH ONE-STEP & TWO-STEP NEUT.)

D. RECOMMENDED LIME NEUTRALIZATION SCHEME

Page No.

D.1 PROCESS SKETCH

D.2 MILL SOLUTION BALANCE

D.3 APPROXIMATE $SO_4^=$ & Cl^- BALANCE

E. COMPUTER PROGRAM RESULTS FOR VERIFICATION OF HANDCALCS FOR ITEMS A THRU D.

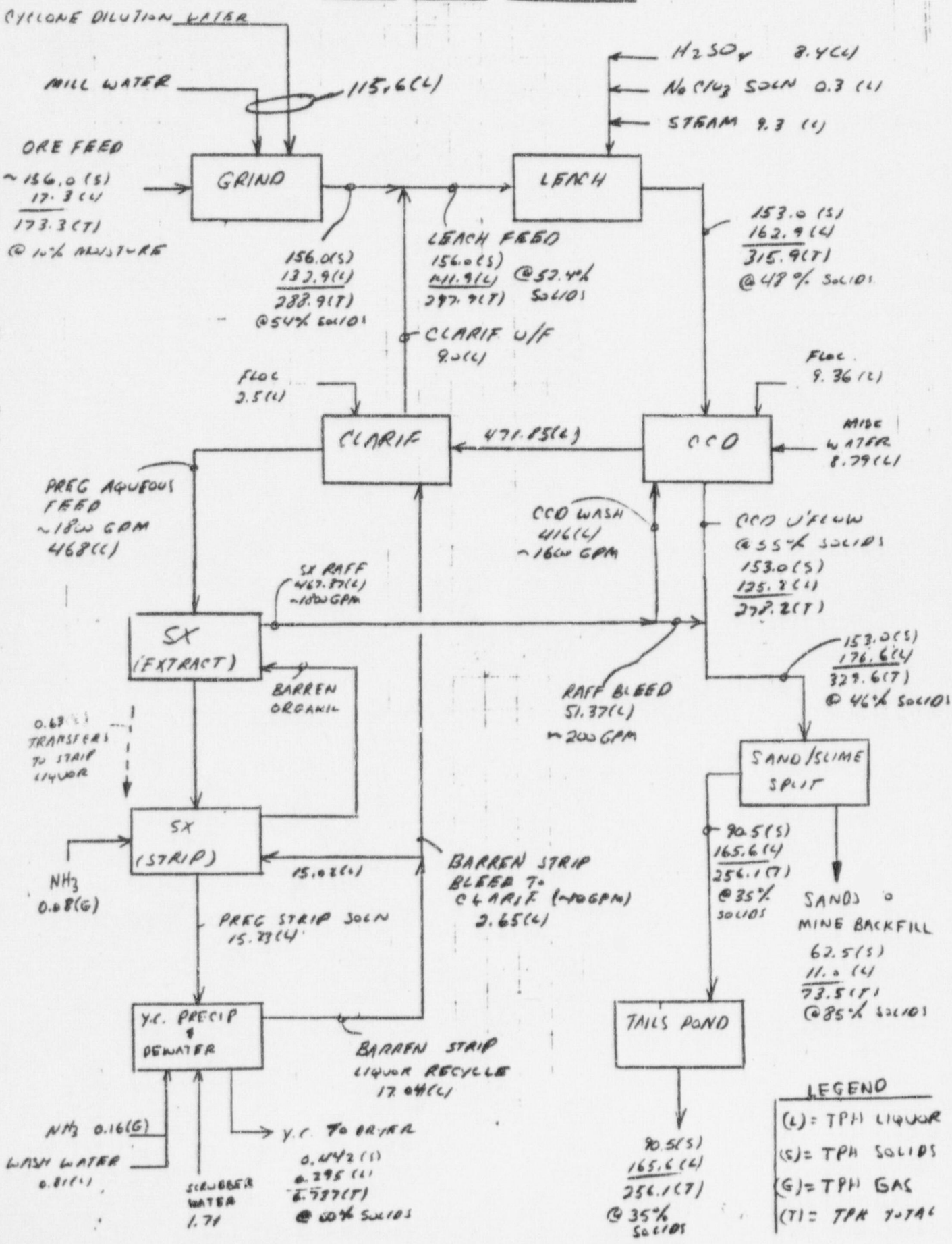
JACOBS ENGINEERING CO.

UNITED NUCLEAR CORP

DATE 12/17/79 SUBJECT FIGURE A SHEET NO. A.1

BY MG CHKD. EXISTING PROCESS JOB. NO. 02-2925-02

BLOCK FLOW DIAGRAM



JACOBS ENGINEERING CO.

UNC

DATE 11/27/79 BY MG CHKD.

SUBJECT TABLE A: EXISTING PROCESS MILL SOLUTION PROCESS

SHEET NO. A.2

JOB. NO. 02-2925-02

SOLUTION IN.

		TPH$_c$	GPM
1. MOISTURE IN ORE FEED		173	69
2. GRINDING WATER	} TOTAL GRINDING CIRCUIT MAKE UP WATER	115.6	462
3. CYCLONE FEED DIL WATER			
4. H_2SO_4 SOLN TO LEACH		8.4	18.2
5. $NaClO_3$ SOLN TO LEACH		0.3	0.9
6. STEAM TO LEACH		9.3	37.2
7. FLOC TO CCD		9.36	37.4
8 FLOC TO CLARIF		2.5	10
9. WASH WATER TO V.C. CIRCUIT		0.81	3.2
10 WATER FROM V.C SCRUBBER		1.71	6.8
11. NH_3 TO SX & XC		0.24	—
12. ORE DISSOLVING (ESTIMATED @ 2% OF ORE FEED)		3.0	—
13 MISC TO CCD		8.79	35
	TOTAL	177.31	680.2

OVERALL LIQUOR S.G.

$\frac{177.31 \text{ TPH}_c \times Y_c \ 1.043 \text{ S.G.}}{680}$

SOLUTION OUT [1]

1. LIQUOR ASSOC W/ BACKFILL SANDS	176.6(1)	11.0	42.2	678.4
2 LIQUOR ASSOC W/ SETTLED TAILINGS		165.60	636.1	
3. MOISTURE IN V.C. PRODUCT		0.30	1.2	
4 V.C. PRODUCT (LIQUOR EQUIV.)		0.41	0.4	
TOTAL		177.31	680	

BLEED LIQUOR S.G

$= \frac{176.60 \text{ TPH}_c \times Y_c \ 1.041 \text{ S.G.}}{678.4 \text{ GPM}}$

1). EVAPORATIVE LOSSES HAVE BEEN NEGLECTED.

JACOBS ENGINEERING GROUP. INC.

UNC

DATE 12/17/79 SUBJECT EXISTING PROCESS SHEET NO. A.3

BY MG CHKD. JOB. NO. 02-2925-02

APPROXIMATE $SO_4^=$ 'Cl' BALANCE

< BASED ON EXISTING PROCESS BLOCK DIAGRAM, FIG A >

1. $SO_4^=$ BALANCE

- H_2SO_4 CONSUMPTION: 65 #/TON CHURCH ROCK ORE
  140 #/TON @ ANTHONY ORE
  100 #/TON AVG (BASED ON ABOVE 2 ORES)
- ASSUME ALL $SO_4^=$ ENTERING WITH H_2SO_4 LEACH REAGENT MUST LEAVE PROCESS THRU THE RAFFINATE BLEED & CCD U/F BLEED. THIS IS AN APPROX. BECAUSE BASED ON $CaCO_3$ CONTENT IN THE ORE, ABOUT 10% OF THE SO_4 SHOULD GET TIED UP AS PRECIPITATED GYPSUM. NEGLECT THIS SO_4 LOSS TO BE CONSERVATIVE & TO ALLOW FOR H_2SO_4 ADDITION VARIATIONS.
- TOTAL MILL BLEED LIQUOR IS: 11.0 TPH, S/S L/4 42.2 GPM
  165.6 TPH, TAILS L/4 636.1 GPM
  176.6 TPH, TOTAL 678.4 GPM
- TOTAL SO_4 LEAVING PROCESS BASED ON CHURCH ROCK ORE
  $$150 \text{ TPH ORE FEED} \times \frac{65\#}{\text{TON}} \times \frac{96 \# SO_4}{98 \# H_2SO_4} = 9933 \#/HR$$
- TOTAL SO_4 LEAVING PROCESS BASED ON ST. ANTHONY ORE
  $$9933 \frac{\#}{HR} SO_4 \times \frac{140 \#/TON}{65 \#/TON} = 21,390 \#/HR$$
- TOTAL SO_4 LEAVING PROCESS BASED ON AVG ORE (CHURCH ROCK & ST. ANTHONY)
  $$\frac{100\#}{65\#} \times 9933 = 15,280 \#/HR$$
- SO_4 CONC IN MILL BLEED LIQUOR BASED ON CHURCH ROCK ORE
  $$\frac{9933 \#/HR \ SO_4}{678.4 \text{ GPM} \times 60} \times \frac{454}{3.785} = 29.3 \text{ g/l}$$
- SO_4 CONC IN MILL BLEED LIQUOR BASED ON ST. ANTHONY ORE
  $$\frac{21,390}{9933} \times 29.3 \text{ g/l} = 63 \text{ g/l}$$
- SO_4 CONC IN MILL BLEED LIQUOR BASED ON AVG ORE (COMPOSITE)
  $$\frac{15,280}{9933} \times 29.3 = 45.1 \text{ g/l}$$

** USE AVG ACID CONSUMPTION OF 100 #/TON FOR ALL SUBSEQUENT CALCULATIONS.

JACOBS ENGINEERING GROUP, INC.
UNC

DATE 12/17/79 SUBJECT EXISTING PROCESS SHEET NO. A.4
BY MG CHKD. JOB. NO. 02-2925-02

APPROXIMATE $SO_4^{=}$ / Cl^- BALANCE (CONTD)

2. CHLORIDE BALANCE

SODIUM CHLORATE TO LEACH = 2.3 LB $NaClO_3$ / TON ORE FEED

$$Cl^- \text{ INPUT TO MILL} = \frac{2.3 \text{ LB } NaClO_3}{\text{TON ORE FEED}} \times \frac{156 \text{ TON ORE}}{\text{HR}} \times \frac{0.32 \# Cl^-}{\text{LB } NaClO_3} = 144 \frac{\text{LB}}{\text{HR}} \; Cl^-$$

$$Cl^- \text{ CONC IN BLEED LIQUOR} = \frac{144 \text{ LB } Cl^- \times 454}{671.46 \text{ IM} \times 6 \times 3.75} = 0.41 \frac{g}{l} \; Cl^-$$

↑ THIS AGREES WITH VALUE OF 0.44 g/l GIVEN BY GUY SWANQUIST

GENERAL COMMENT:

BASED ON PILOT PLANT DATA ON SIMILAR URANIUM MILL PROCESSES, $SO_4^{=}$ / Cl^- LEVELS AS HIGH AS 90 g/l AND 3 g/l, RESPECTIVELY, CAN BE TOLERATED WITH NO PROBLEMS.

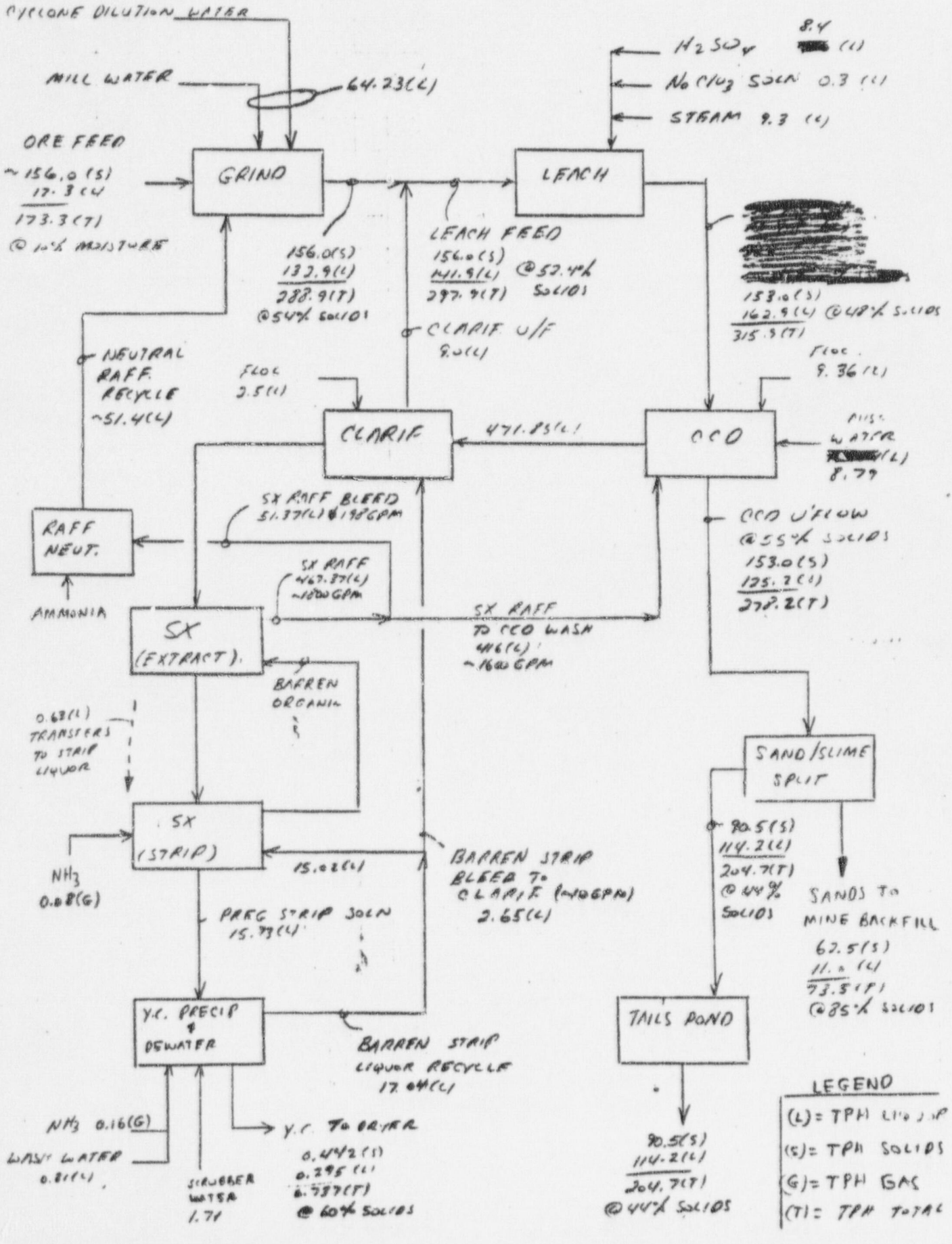
JACOBS ENGINEERING CO.

UNITED NUCLEAR CORP

DATE 11/27/79 SUBJECT FIGURE B SHEET NO. B.1

BY MG CHKD. INTERIM RAFF NEUT. PROCESS JOB. NO. 02-2975-02

BLOCK FLOW DIAGRAM



JACOBS ENGINEERING GROUP. INC.

UNC

DATE 11/27/79 SUBJECT SHEET NO. B.1.1

BY MG CHKD JOB. NO. 02-2925-02

INTERIM RAFFINATE NEUTRALIZATION PROCESS DESCRIPTION

IN ORDER TO PROVIDE IMMEDIATE RELIEF FROM UNC'S CRITICAL WATER BALANCE PROBLEM (TOO MUCH WATER GOING TO TAILINGS), A TEMPORARY RAFFINATE NEUTRALIZATION AND RECYCLE SCHEME IS BEING INCORPORATED AT THE CHURCH-ROCK MILL. SPECIFICALLY, THE PRESENT 200 GPM RAFFINATE "BLEED" IS TO BE NEUTRALIZED WITH NH_3 TO pH 7.1 AND RECYCLED TO THE GRINDING MILL DISCHARGE, THEREBY, REDUCING FRESH WATER INPUT TO THE PLANT. THIS INTERIM SCHEME WILL EVENTUALLY BE REPLACED BY A PROCESS INVOLVING NEUTRALIZATION OF TAILINGS POND DECANT LIQUOR USING LIME WHICH IS CURRENTLY UNDER STUDY.

THE NET EFFECT IS THAT LIQUOR IN CCD U/F IS THE ONLY BLEED STREAM FROM THE MILL. THEREFORE, ALL SO$_4$ & Cl- VALUES WILL LEAVE THE PROCESS THRU THIS STREAM. THE MILL SOLUTION BALANCE IS SHOWN IN TABLE B ON THE NEXT PAGE.

JACOBS ENGINEERING GROUP. INC.

UNC

DATE 11/27/79 SUBJECT TABLE B: SHEET NO. B.2

BY MG CHKD. _____ INTERIM RAFF NEUT. PROCESS JOB. NO. 02-2925-02

MILL SOLUTION BALANCE

SOLUTION IN

		TPH	GPM
1.	MOISTURE IN ORE FEED	17.3	69
2.	GRINDING WATER } TOTAL WATER TO GRINDING CIRCUIT	} 61.23	257
3.	CYCLONE FEED DILUTION WATER }		
4.	H_2SO_4 SOLN TO LEACH	8.4	18.2
5	$NaClO_3$ SOLN TO LEACH	0.3	0.9
6	STEAM TO LEACH	9.3	37.2
7	FLOCC TO CCD	9.36	37.4
8	FLOCC TO CLARIFIER	2.5	10
9	WASH WATER TO Y.C CIRCUIT.	0.81	3.2
10	WATER FROM Y.C. SCRUBBER	1.71	6.8
11	NH_3 TO SX & Y.C.	0.24	—
12	ORE DISSOLVING (2% OF ORE FEED)	3.0	—
13	MISC WATER TO CCD	8.79	35
14	NH_3 FOR RAFF NEUT. (NEGLECT FOR MATL BAL.)	TOTAL = 125.94	474.7

→ OVERALL LIQUOR S.G.

$\frac{125.94 \text{ TPH} \times 4}{474.7 \text{ GPM}} = 1.061$

SOLUTION OUT. 1)

1.	LIQUOR ASSOC. W/BACKFILL SANDS	11.0	41.6 } 473.1
2	LIQUOR ASSOC W/ SETTLED TAILINGS	114.2	431.5 }
3.	MOISTURE IN Y.C PRODUCT.	0.30	1.2
4.	Y.C. PRODUCT (LIQUOR EQUIVALENT)	0.14	0.4
	TOTAL	125.9	474.7

S.G. OF BLEED LIQUOR

$= \frac{125.2 \text{ TPH} \times 4}{474.7 \text{ GPM}} = 1.055$

1) EVAPORATIVE LOSSES HAVE BEEN NEGLECTED

JACOBS ENGINEERING GROUP, INC.

UNC

DATE 11/27/79 SUBJECT INTERIM RAFF NEUT PROCESS SHEET NO. B.3

BY MG CHKD _____ JOB. NO. 02-C925-02

APPROXIMATE $SO_4^=$ & Cl^- BALANCE

TOTAL CCD U/FLOW LIQUOR = 205.2 TPH OF 423 GPM @ 1.044 S.G. (SEE TABLE B)

CHECK BUILDUP OF $SO_4^=$ & Cl^- IN MILL SOLUTIONS:

- $SO_4^=$ BUILDUP

THE PREVIOUSLY CALCULATED AMOUNT OF $SO_4^=$ LEAVING THE MILL OF ABOUT 15,280 LB/HR MUST EXIT THRU CCD U/F. CONC OF SO_4 IN U/F IS

$$SO_4 \text{ CONC} = \frac{15{,}280 \frac{LB}{HR}}{423 GPM \times 60} \times \frac{454 \frac{GRAMS}{LB}}{3.785 \frac{LITER}{GAL}} = \boxed{64.8 g/l \; SO_4^=}$$

- Cl^- BUILDUP

ALL Cl^- ENTERING MILL (ABOUT 140 LB/HR AS PREVIOUSLY CALCULATED) MUST EXIT THRU CCD U/F.

$$Cl^- \text{ CONC} = \frac{140 \times 454}{423 \times 60 \times 3.785} = \boxed{0.59 g/l \; Cl^-}$$

BOTH SO_4 & Cl^- LEVELS ARE LOW!

SHOULD NOT AFFECT MILL PROCESS.

JACOBS ENGINEERING GROUP. INC.

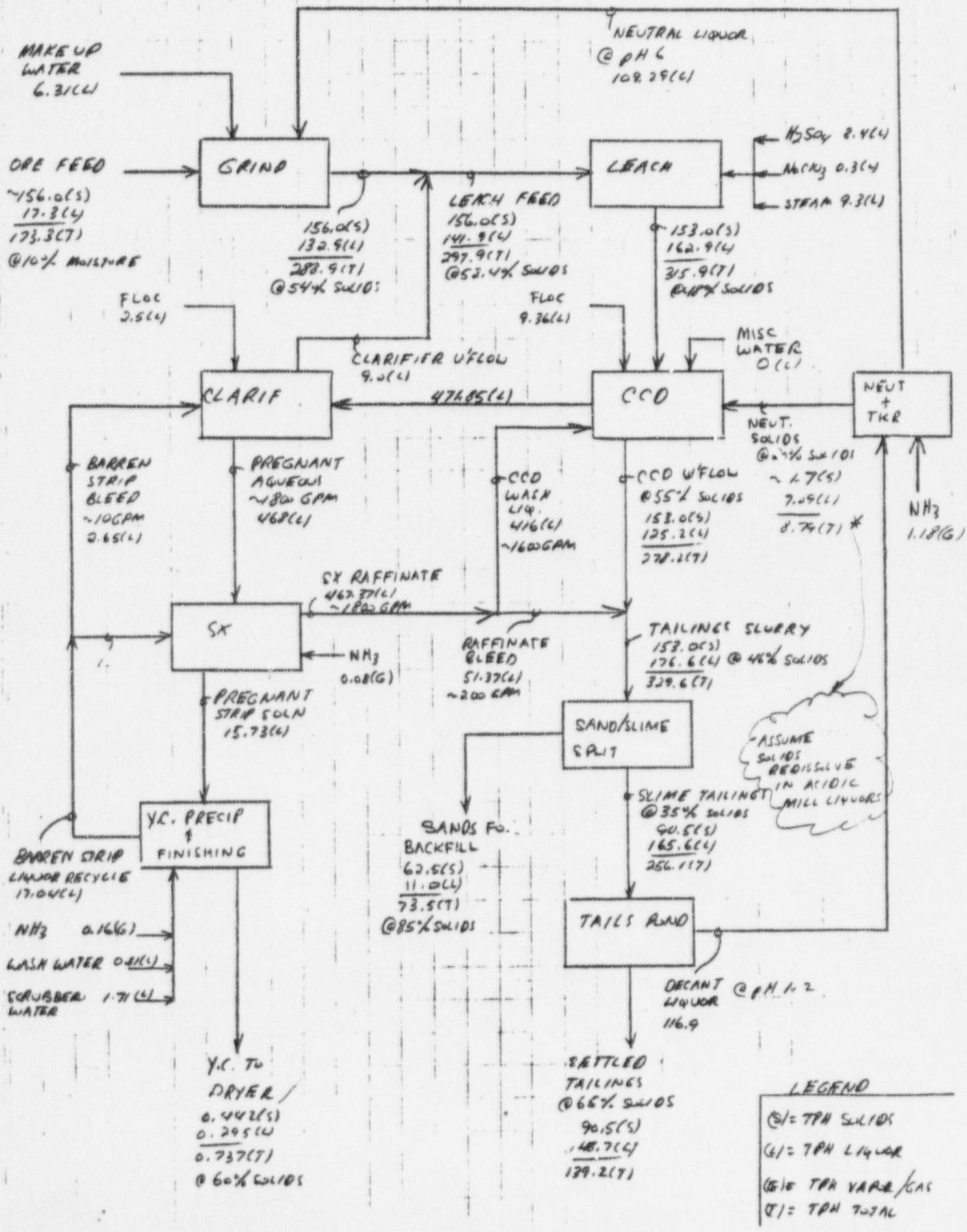
UNC

FIGURE C

DATE 12/17/79 SUBJECT PROPOSED AMMONIA NEUT. SCHEME (ONE-STEP NEUTRALIZATION) SHEET NO. C.1

BY MG CHKD. JOB. NO. 02-2925-02

BLOCK FLOW DIAGRAM



JACOBS ENGINEERING GROUP INC.

UNC

DATE 12/17/79 SUBJECT PROPOSED AMMONIA NEUT. SCHEME (ONE-STEP NEUT. SCHEME) SHEET NO. C.2

BY MG CHKD. MILL SOLN BALANCE JOB NO. 02-2925-02

SOLUTION IN

		TPH	GPM
1	MOISTURE IN ORE FEED	17.2	69
2	GRINDING MAKEUP WATER	6.21	25.2
3	H_2SO_4 SOLN TO LEACH	8.41	19.2
4	$NaClO_3$ SOLN TO LEACH	0.3	0.9
5	STEAM TO LEACH	9.3	37.2
6	FLOC TO CCD	9.36	37.4
7	FLOC TO CLARIFIER	2.5	10
8	WASH WATER TO V.C. CIRCUIT	0.81	3.2
9	WATER FROM V.C SCRUBBER	1.71	6.8
10	NH_3 TO SX & V.C	0.24	~.7
11	ORE DISSOLVING	3.0	~4
12	MISC WATER TO CCD	0	0
13	NH_3 FOR LIQUOR NEUT.	1.18	~3.6
	TOTAL	60.41	216.2

SOLUTION OUT

1.	LIQUOR ASSOC. W/ BACKFILL SANDS	11.0	39.5 } 2N.L
2.	LIQUOR ASSOC. W/ SETTLED TAILINGS	49.7	175.0 }
3.	MOISTURE IN V.C. PRODUCT	0.3	~1.2
4.	V.C. PRODUCT (LIQUOR EQUIV.)	0.44	~0.4
	TOTAL	60.44	216.2

Lin. 5 = (11+49.7)(4) = ~1.11 / 214.6 GPM

* MATL BALANCE ASSUMES ALL NEUT. PPT. SOLNS REDISSOLVE UPON CONTACT WITH ACIDIC MILL LIQUORS

JACOBS ENGINEERING GROUP, INC.

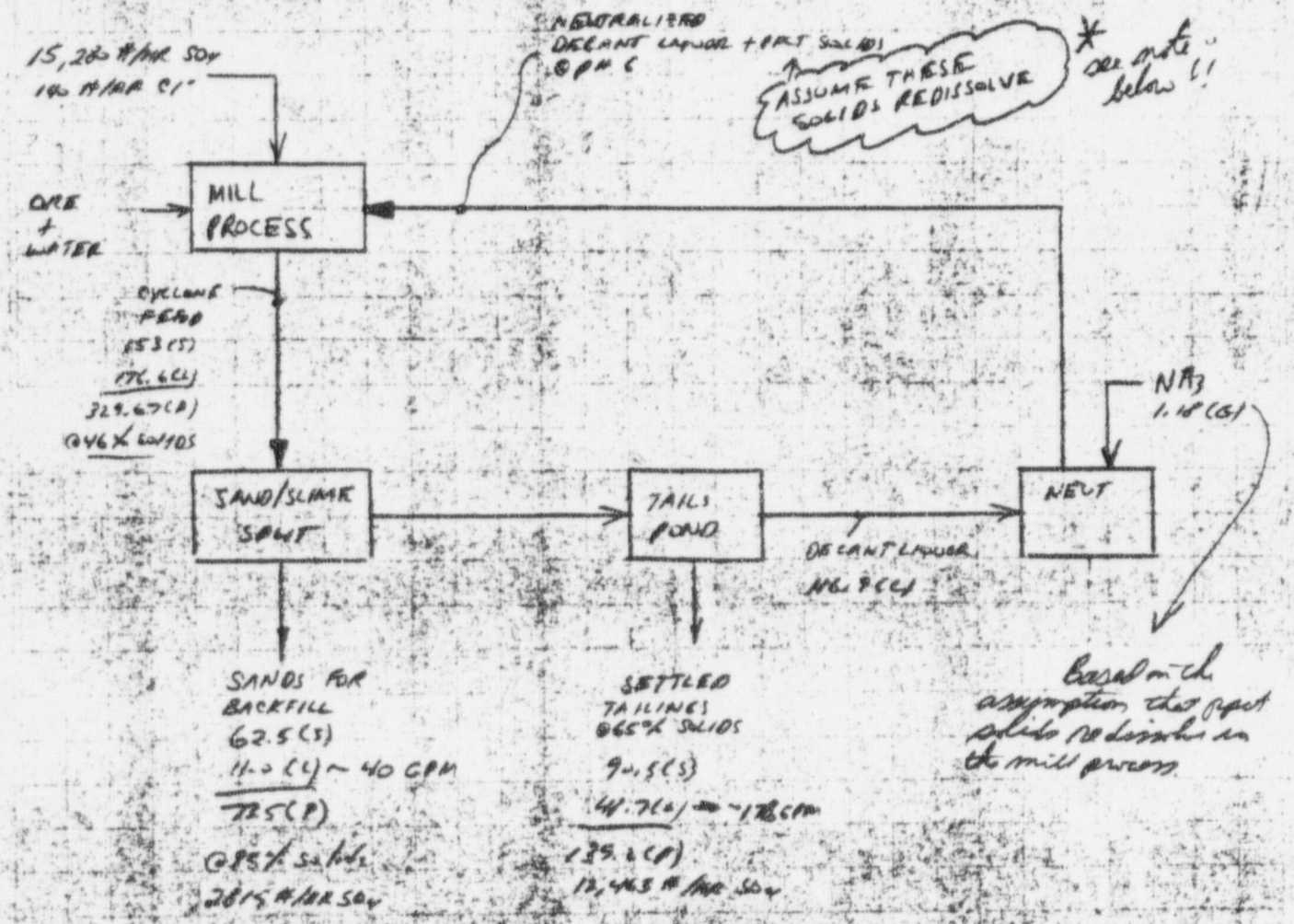
UNC

DATE 12/17/79 SUBJECT FIGURE C SHEET NO. C-3

BY MG CHKD. PROPOSED AMMONIA NEUT. SCHEME (ONE STEP NEUTRALIZATION) JOB NO. 02-2925-02

APPROXIMATE SO_4 & Cl^- BALANCE

1. ASSUME PRECIPITATED SOLIDS IN RECYCLE STREAM REDISSOLVE IN THE MILL PROCESS



All SO_4 & Cl^- entering mill must exit thru liquor bleed streams:

SO_4 bleed = 15,280 #/HR — 12% wt = 2815 #/HR SO_4

— REST = 12,465 #/HR SO_4 ⇒ SO_4 conc = $\frac{12{,}465 \times 46\%}{176.9\ GPM \times 8.345} = 149$ g/l SO_4

Cl^- bleed = 100 #/HR ⇒ conc = $\frac{100\ \#/HR \times 454}{(176.9\ GPM) \times 8.345} = 1.28$ g/l

* If slimes do not redissolve, about 62% of precipitated iron will also remove 62% of ammonia SO_4 by some type of complex. This would have the effect of reducing the bleed to mill liquid stream to only 130 g/l SO_4. Also NH_3 usage could be reduced to about 1/3 the amt shown on the sketch above.

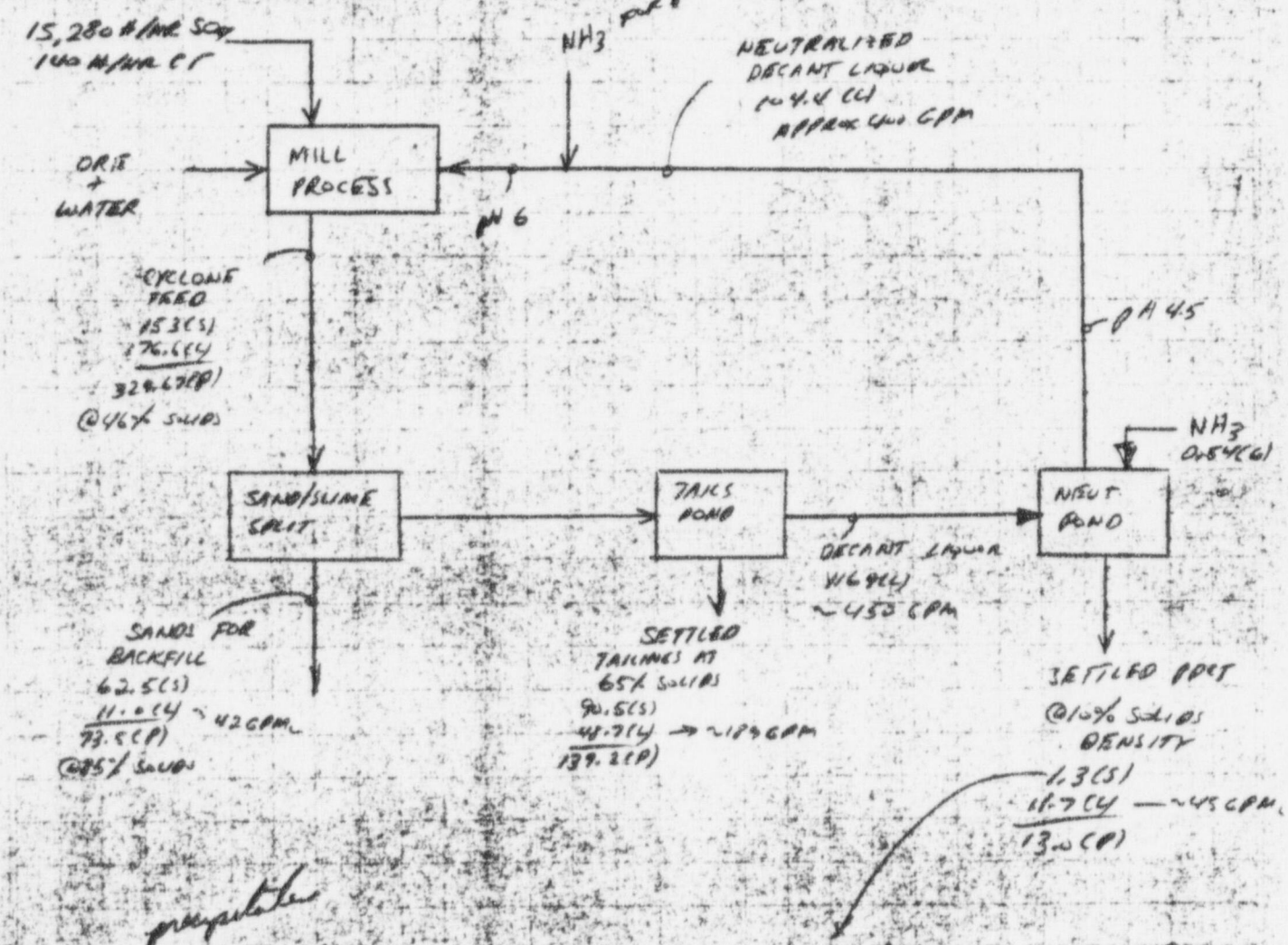
JACOBS ENGINEERING GROUP INC.

DATE 12/17/79 SUBJECT UNC FIGURE C.1 SHEET NO. C.4

BY MG CHKD. PROPOSED AMMONIA NEUT. SCHEME JOB NO. 02-C925-02

(TWO STEP NEUTRALISATION)

PROCESS SKETCH 1



precipitates

Ppt solids estimates at .12 gram solids per liter of liquor treated

$= \frac{12}{100}$ solids $\Rightarrow$ 0.10 # solids/gal

$\therefore$ Ppt rate = 45.0 GPM X 60 X 0.10 = 270 #/hr solids ppt. ~ 1.37 DMS/hr

APPROXIMATE SO_4 & Cl BALANCE

(Refer to Process Sketch, pp. C.2)

SO_4 BALANCE

Amt SO_4 to be removed = 15,280 #/HR.

ABOUT ½ OF THE PRET. SOLIDS IS SO_4 ∴ (0.5)(1.3 TPD) = 0.65 TPD

OR

1300 #/HR SO_4

IS REMOVED AS SOLIDS

Also, Partially neutralized liquor associated with settled precip solids contains about 4g/l soluble SO_4 based on lab data.

~~SO_4~~ Soluble SO_4 lost in this aqueous stream

= 4 gal $\frac{14.2\ lb\ SO_4}{gal} \times \frac{1\ kg}{454\ g} \times 7.785 = 0.117\ \#\ SO_4/gal$

SO_4 lost = $\frac{0.117\ \#\ SO_4}{gal} \times 45\ GPM \times 60 = 316\ \#/HR$

Remaining SO_4 (15,280 − 1300 − 316 = 13,664 #/HR) must leave thru the other 2 liquor blow streams

Lagg Blood Lig Conc = $\frac{13,664\ \#/HR}{(42+183)\ GPM \times 60} \times \frac{454}{3.785} = 110\ g/l\ SO_4$

Cl Balance

Chloride bleed of 160 #/HR leaves at system in equal concentrations from all three liquor blow streams

Cl conc = $\frac{160\ \#/HR\ Cl}{(42+183+45)\ GPM \times 60} \times \frac{454}{3.785} = 1.0\ g/l$

NH_3 USAGE ESTIMATE FOR BOTH NEUT. SCHEMES
(REFER TO DIAGRAMS ON PP. C.3 & C.4)

NH_3 consumption based on the interim process is 10 lb NH_3 per volume ton liquid (~240 gal). In this interim process, the overall bleed liquid is 125 TPH (CCD OVERFLOW) & approx. 480 GPM. It was also learned from the UNC mill staff that about 6 g/l of soluble ferric iron is precipitated in the neutralization step and that the precipitate contained about 50% = associated SO_4 by weight. Therefore total precipitate was about 12 g/l of solution.

In the one step neutralization process (Fig E.1), total process bleed liquid is about 218 GPM (liq associated backfill moisture plus liquid associated with settled solids). Therefore soluble iron levels will be higher than in the interim case by a factor of $\frac{480}{218} = 2.2$ assuming that all precipitated solids in the recycle liquid re-dissolve upon contact with acidic mill process liquids. Assume NH_3 usage will increase by the same factor to say $(2.2 \times 10) = 22$ lb NH_3 per volume ton liquid. Therefore NH_3 usage for neutralizing 430 GPM decant liquid = $\frac{430 \times 60}{240 \frac{gal}{vol\ ton}} \times \frac{22\ lb\ NH_3}{vol\ ton} = 2365\ \#/hr \Rightarrow 1.18$ TPH

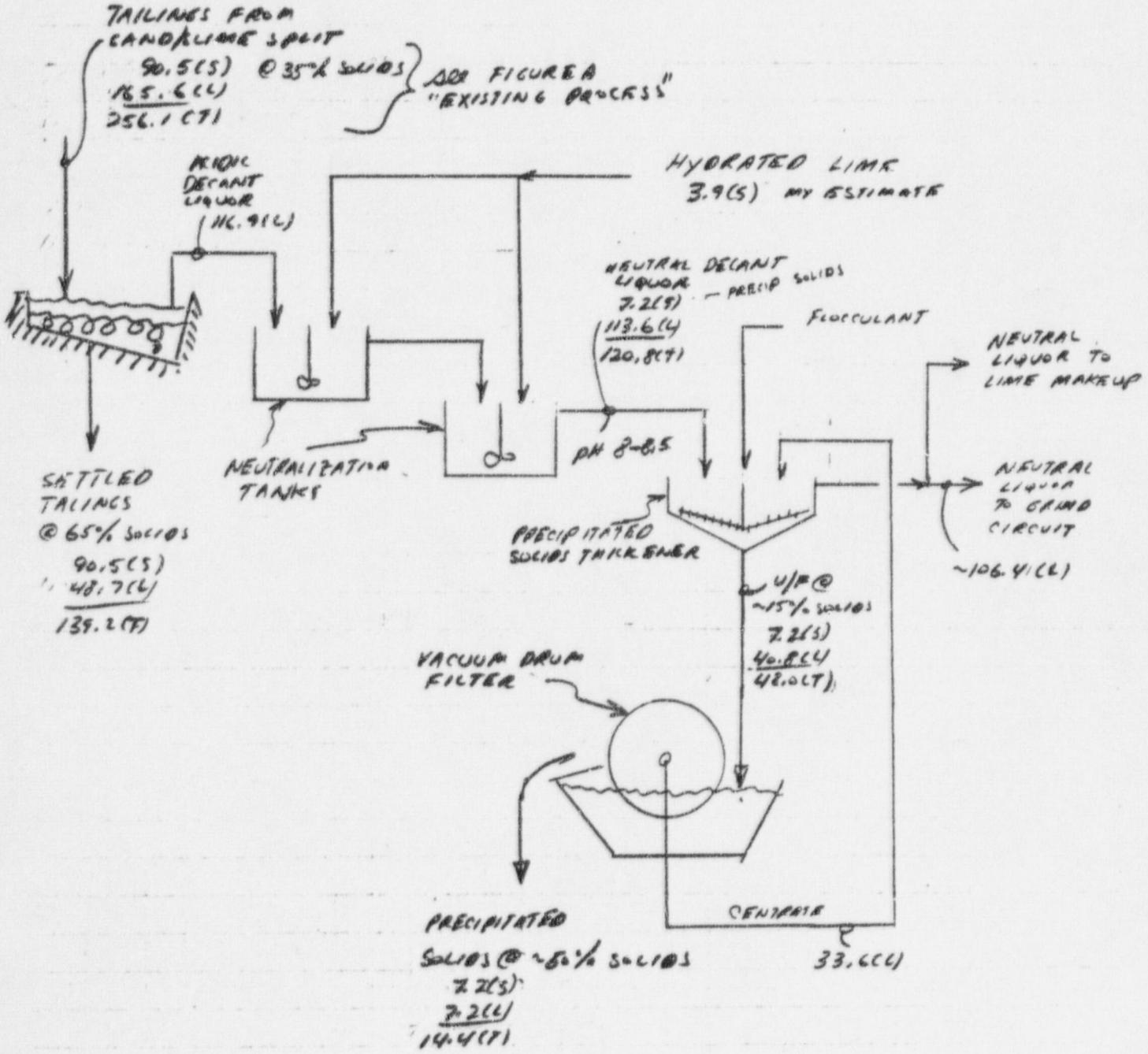
Note: If part precipitated solids do not re-dissolve when recycled the NH_3 usage will be about the same as for the interim process or about 10 lb/vol ton. Lab tests work is needed to confirm this.

In the two-step neutralization process where precipitated solids are allowed to settle out in the decant pond, NH_3 usage will be about the same as in the interim process or about 10 lb/vol ton. Amt. of precipitate will be about 12 g/l

JACOBS ENGINEERING CO.

DATE 11/27/74 SUBJECT UNC FIGURE D RECOMMENDED LIME NEUT PROCESS SKETCH SHEET NO. D.1

BY MC CHKD. JOB. NO. 02-4525-01



JACOBS ENGINEERING GROUP. INC

DATE 11/27/79 SUBJECT UNC TABLE D RECOMMENDED LIME NEUT. PROCESS MILL SOLUTION BALANCE SHEET NO. D.2

BY MG CHKD. JOB. NO. 02-2925-02

SOLUTION IN.

		TPH	GPM
1.	MOISTURE IN ORE FEED	17.3	69
2.	GRINDING WATER } TOTAL WATER TO GRINDING CIRCUIT	9.2	36.8
3.	CYCLONE FEED DILUTION WATER }		
4.	H_2SO_4 SOLN TO LEACH	8.4	18.2
5	$NaClO_3$ SOLN TO LEACH	0.3	0.9
6	STEAM TO LEACH	9.3	37.2
7	FLOCC TO CCD	9.36	37.4
8	FLOCC TO CLARIFIER	2.5	10
9	WASH WATER TO Y.C. CIRCUIT.	0.81	3.2
10	WATER FROM Y.C. SCRUBBER	1.71	6.8
11	NH_3 TO SX & Y.C.	0.24	—
12	ORE DISSOLVING (2% OF ORE FEED)	3.0	—
13	MISC WATER TO CCD	8.79	35.2
14.	LIME ADDITION (LIQUOR EQUIV).	3.9	~7.3
	TOTAL	74.84	261.9

OVERALL LIQ S.G.
$\frac{74.8 + 74}{261.9} = 1.143$

SOLUTION OUT.[1]

		TPH	GPM	
1.	LIQUOR ASSOC. W/ BACKFILL SANDS	11.0	40.2	218.3
2	LIQUOR ASSOC W/ SETTLED TAILINGS	48.7	178.1	
3.	MOISTURE IN Y.C PRODUCT.	0.3	1.2	
4.	Y.C. PRODUCT (LIQUOR EQUIVALENT)	0.44	0.4	
5.	LIQUOR ASSOC W/ DEWATERED NEUT. SOLIDS	7.2	~28	
6.	PRT. SOLIDS LIQUOR EQUIV.	7.2	~14	
	TOTAL	74.84	261.9	

BLEED LIQ S.C.
$= \frac{(11+48.7-17.2)(4)}{246.3\ GPM} = 1.086$

1) NEGLECTED EVAPORATIVE LOSSES

JACOBS ENGINEERING GROUP, INC.

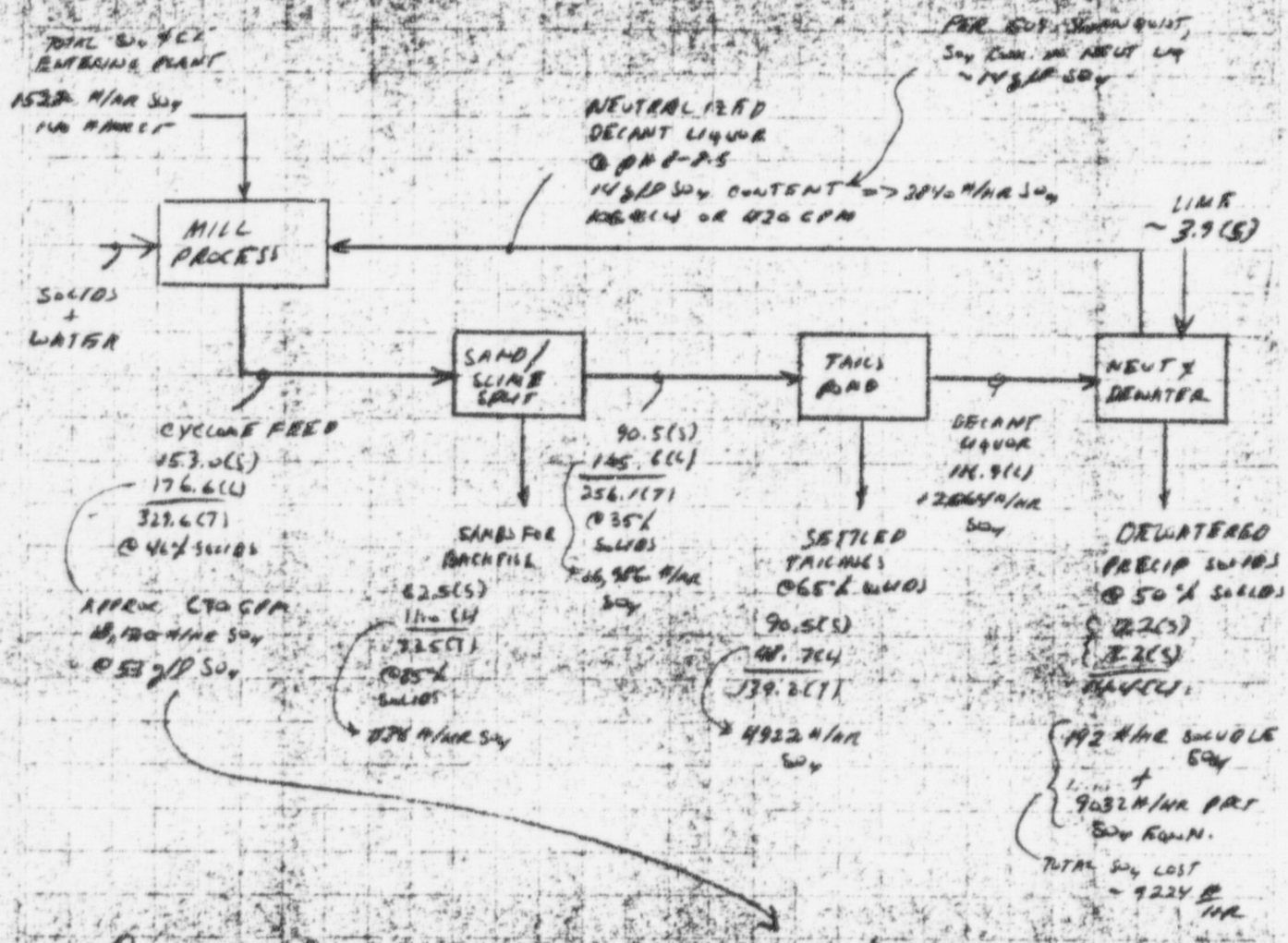
DATE 11/27/79 BY MG CHKD. ____

SUBJECT RECOMMENDED LIME NEUT. PROCESS

SHEET NO. D.3

JOB NO. 02-2925-02

APPROXIMATE SO_4 - Cl^- BALANCE



CONCLUDE SO_4 CONC IN REF. = 53 g/l SO_4

Cl^- CONC = $\frac{140 \text{ \#/HR}}{340 \text{ GPM} \times 60} \times \frac{454}{3785} = 4.14$ g/l Cl^-

↑ TOTAL BLEED FROM PROCESS (SEE MILL SOLN BALANCE)

AMT LIME REQD: $Ca(OH)_2 + H_2SO_4 \rightarrow CaSO_4 \cdot 2H_2O$

$\frac{9224 \text{ \#/HR SO4}}{96 \text{ \# SO4}} \times \frac{74 \text{ \# LIME}}{1 \text{ \# MOL}} = 7106 \text{ \#/HR} = 3.56 \text{ TPH LIME}$; add 10% for 110% eff.

= 3.9 TPH LIME

JACOBS ENGINEERING GROUP INC.

UNC

DATE 12/17/79 SUBJECT SHEET NO. E.1

BY MG CHKD JOB NO. 02-2925-02

SECTION E

JEG HYDROMETALLURGICAL PROCESS SIMULATOR COMPUTER PROGRAM RESULTS

(FOR VERIFICATION OF HANDCALCS OF ITEMS A THRU D)

JACOBS ENGINEERING GROUP, INC.

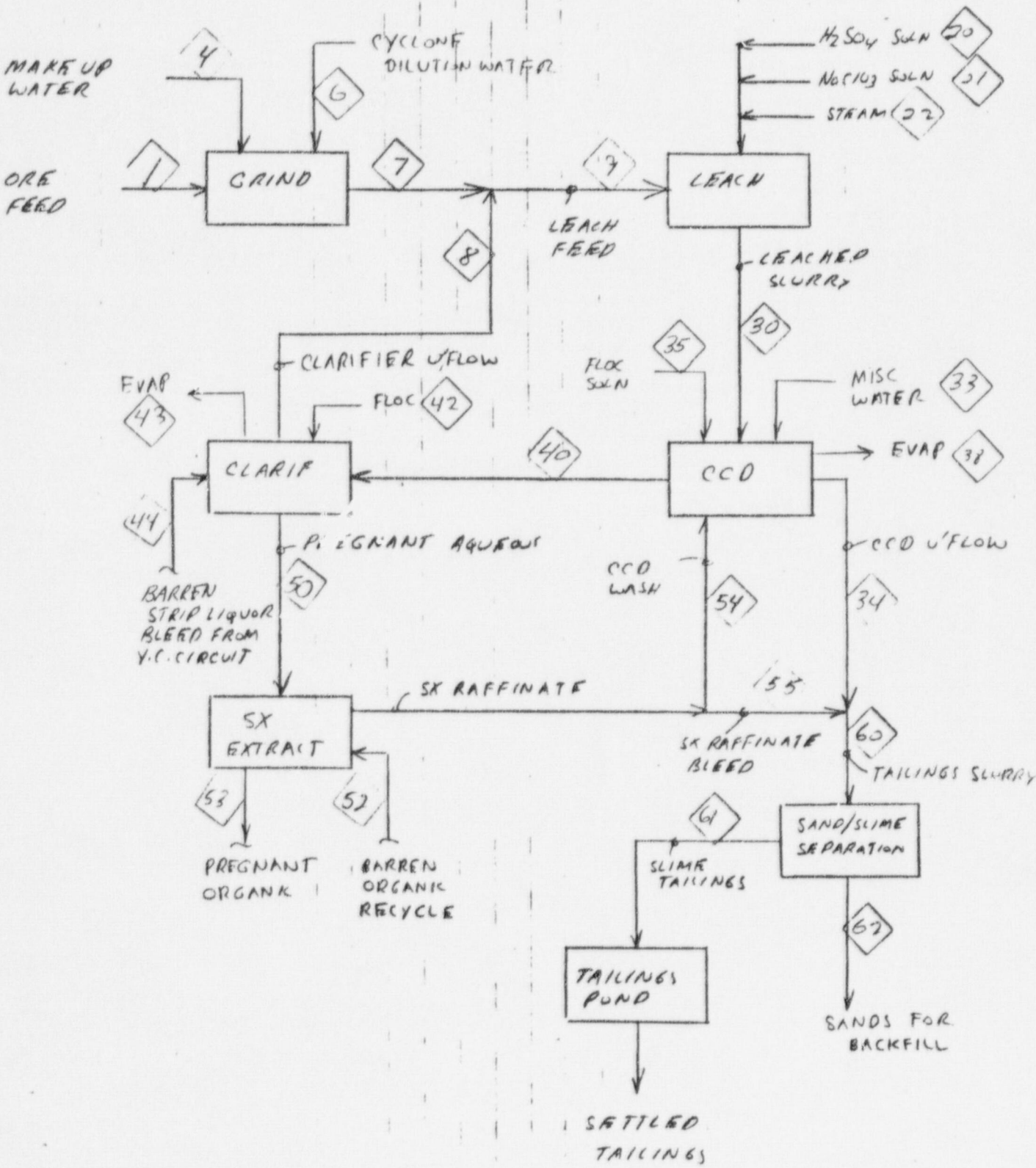
UNC

DATE 12/17/79 SUBJECT SHEET NO. E.2

BY MG CHKD. JOB NO. 02-2925-02

EXISTING PROCESS

BLOCK FLOW DIAGRAM



E.3

UNC URANIUM PROCESS: PRESENT CONFIGURATION

(EXISTING PROCESS)

F.4

STREAM # 1 MAIN ORE FEED INTO PLANT

TOTAL FLOW = 346599.94 # 1.000 LBS/HR. OR 336.494 GPM ---- GPM LIQ = 69.158 GPM SOLIDS = 267.336
TEMPERATURE = 50.00 DEG F SP.GR. = 2.06007 SP.GR. LIQ = 0.99960 SP.GR. SOLIDS = 2.33180
FRACTION SOLIDS = 0.900173

→ USE 2.7 S.G. FOR OPE SOLIDS ON NEXT RUN"

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	34600.00	34600.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	311999.94	0.0	468.00	0.0	0.0	5772.00	0.0	305760.00	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		999.191	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	468.00	5772.00	305760.00	0.0	0.0

STREAM # 4 MILL WATER TO GRINDER

TOTAL FLOW = 31200.00 # 1.000 LBS/HR. OR 62.362 GPM ---- GPM LIQ = 62.362 GPM SOLIDS = 0.0
TEMPERATURE = 50.00 DEG F SP.GR. = 1.00060 SP.GR. LIQ = 0.99960 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	31200.00	31200.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		999.192	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

(F.5)

STREAM # 6 CYCLONE DILUTION WATER

TOTAL FLOW = 200000.00 * 1.000 LBS/HR. OR 399.758 GPM ---- GPM LIQ = 399.759 GPM SOLIDS = 0.0
TEMPERATURE = 50.00 DEG F SP.GR. = 1.00060 SP.GR. LIQ = 0.99960 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	200000.00	200000.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		999.192	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 7 GRINDER EFFLUENT

TOTAL FLOW = 577799.94 * 1.000 LBS/HR. OR 798.615 GPM ---- GPM LIQ = 531.280 GPM SOLIDS = 267.336
TEMPERATURE = 50.00 DEG F SP.GR. = 1.44701 SP.GR. LIQ = 0.99960 SP.GR. SOLIDS = 2.33180
FRACTION SOLIDS = 0.539979

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	265800.00	265800.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	311999.94	0.0	468.00	0.0	0.0	5772.00	0.0	305760.00	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		999.192	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	468.00	5772.00	305760.00	0.0	0.0

E.6

STREAM # 8 CLARIFIER UNDERFLOW RECYCLE

TOTAL FLOW = 17991.95 * 1.000 LBS/HR. OR 34.896 GPM ---- GPM LIQ = 34.775 GPM SOLIDS = 0.122
TEMPERATURE = 88.30 DEG F SP.GR. = 1.03116 SP.GR. LIQ = 1.02558 SP.GR. SOLIDS = 2.33000
FRACTION SOLIDS = 0.007889

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	17850.01	16740.93	8.92	771.99	0.0	320.83	0.0	0.0	0.0	7.34
SOLID	141.94	0.0	0.0	0.0	0.0	0.0	0.0	141.94	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		93.78667	0.04999	4.32486	0.0	1.79737	0.0	0.0	0.0	0.04111
GRAMS/LITER IN LIQUOR		961.461	0.512	44.337	0.0	18.426	0.0	0.0	0.0	0.421

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	141.94	0.0	0.0

STREAM # 9 MAINSTREAM TO EACH TANK

TOTAL FLOW = 595791.87 * 1.000 LBS/HR. OR 833.443 GPM ---- GPM LIQ = 565.987 GPM SOLIDS = 267.458
TEMPERATURE = 51.85 DEG F SP.GR. = 1.42971 SP.GR. LIQ = 1.00132 SP.GR. SOLIDS = 2.33180
FRACTION SOLIDS = 0.523911

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	283650.00	282540.87	8.92	771.99	0.0	320.83	0.0	0.0	0.0	7.34
SOLID	312141.87	0.0	468.00	0.0	0.0	5772.00	0.0	305901.94	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		99.60898	0.00315	0.27216	0.0	0.11311	0.0	0.0	0.0	0.00259
GRAMS/LITER IN LIQUOR		996.993	0.031	2.724	0.0	1.132	0.0	0.0	0.0	0.026

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	468.00	5772.00	305901.94	0.0	0.0

(E.7)

STREAM # 20 SULPHURIC ACID TO LEACH

TOTAL FLOW = 16774.50 # 1.000 LBS/HR. OR 19.314 GPM ---- GPM LIQ = 19.314 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 1.73703 SP.GR. LIQ = 1.73529 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	16774.50	1174.21	0.0	15281.57	0.0	318.72	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		7.00000	0.0	91.10001	0.0	1.90000	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		121.421	0.0	1580.202	0.0	32.957	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 21 CHLORIDE REAGENT FEED TO LEACH: 40% SOLN

TOTAL FLOW = 1050.04 # 1.000 LBS/HR. OR 1.739 GPM ---- GPM LIQ = 1.739 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 1.20788 SP.GR. LIQ = 1.20667 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	1050.04	630.03	0.0	0.0	0.0	280.05	0.0	0.0	0.0	139.97
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		60.00000	0.0	0.0	0.0	26.67000	0.0	0.0	0.0	13.32999
GRAMS/LITER IN LIQUOR		723.703	0.0	0.0	0.0	321.686	0.0	0.0	0.0	160.783

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

E.1

STREAM # 22 STEAM FOR LEACH HEATING

TOTAL FLOW = 16628.99 # 1.000 LBS/HR. OR 1964.732 ACFM ---- GPM LIQ = 0.0 GPM SOLIDS = 0.0
TEMPERATURE = 300.00 DEG F SP.GR. = 0.00226 SP.GR. LIQ = 0.0 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	16628.99	16628.99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 30 MAT[illegible]TREAM TO CCD

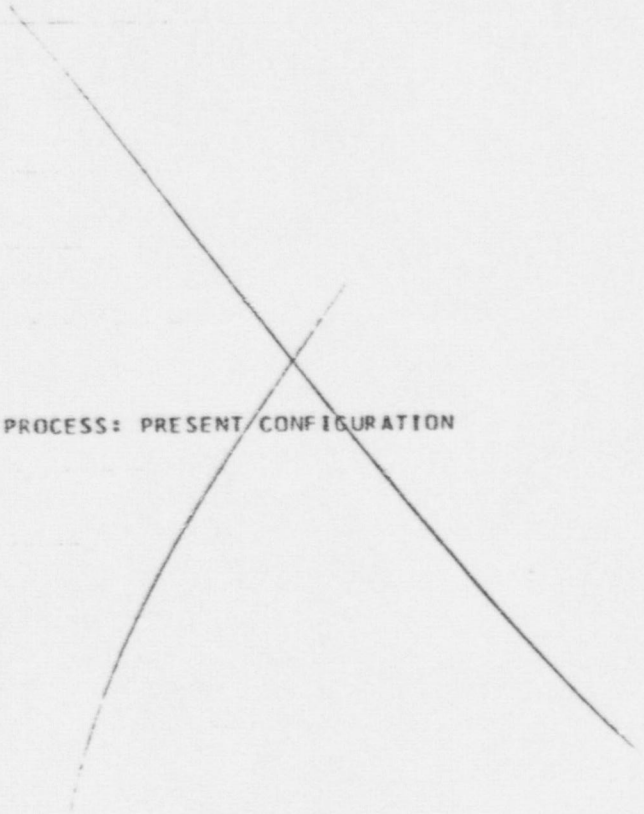
TOTAL FLOW = 630245.19 # 1.000 LBS/HR. OR 897.685 GPM ---- GPM LIQ = 635.372 GPM SOLIDS = 262.314
TEMPERATURE = 139.91 DEG F SP.GR. = 1.40416 SP.GR. LIQ = 1.01993 SP.GR. SOLIDS = 2.33000
FRACTION SOLIDS = 0.485370

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	324343.31	300974.00	476.92	16053.55	0.0	6691.59	0.0	0.0	0.0	147.31
SOLID	305901.87	0.0	0.0	0.0	0.0	0.0	0.0	305901.94	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		92.79488	0.14704	4.94956	0.0	2.06312	0.0	0.0	0.0	0.04542
GRAMS/LITER IN LIQUOR		946.058	1.499	50.461	0.0	21.034	0.0	0.0	0.0	0.463

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	305901.94	0.0	0.0

E.9



UNC URANIUM PROCESS: PRESENT CONFIGURATION

STREAM # 33 MAKEUP WATER FOR CCD

TOTAL FLOW = 36904.73 # 1.000 LBS/HR. OR 73.943 GPM ---- GPM LIQ = 73.943 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 0.99819 SP.GR. LIQ = 0.99719 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	36904.73	36904.73	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		996.782	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 34 CCD UNDERFLOW

TOTAL FLOW = 555927.12 # 1.000 LBS/HR. OR 749.702 GPM ---- GPM LIQ = 487.511 GPM SOLIDS = 262.192
TEMPERATURE = 79.54 DEG F SP.GR. = 1.48306 SP.GR. LIQ = 1.02528 SP.GR. SOLIDS = 2.33000
FRACTION SOLIDS = 0.550000

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	250167.19	235377.25	2.87	10376.14	0.0	4312.29	0.0	0.0	0.0	98.60
SOLID	305759.87	0.0	0.0	0.0	0.0	0.0	0.0	305759.94	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		94.08798	0.00115	4.14768	0.0	1.72376	0.0	0.0	0.0	0.03941
GRAMS/LITER IN LIQUOR		964.267	0.012	42.508	0.0	17.666	0.0	0.0	0.0	0.404

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	305759.94	0.0	0.0

(E.11)

STREAM # 35 FLOCCULANT SOLN FOR CCD

TOTAL FLOW = 18715.07 * 1.000 LBS/HR. OR 37.498 GPM ---- GPM LIQ = 37.498 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 0.99919 SP.GR. LIQ = 0.99719 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	18715.07	18715.07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		996.783	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 38 EVAPORATION FROM CCD

TOTAL FLOW = 16376.04 * 1.000 LBS/HR. OR 5965.320 ACFM ---- GPM LIQ = 0.0 GPM SOLIDS = 0.0
TEMPERATURE = 79.45 DEG F SP.GR. = 0.00073 SP.GR. LIQ = 0.0 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	16376.04	16376.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

E.12

STREAM # 39

TOTAL FLOW = 947855.87 # 1.000 LBS/HR. OR 1846.422 GPM ---- GPM LIQ = 1846.425 GPM SOLIDS = 0.0
TEMPERATURE = 90.74 DEG F SP.GR. = 1.02669 SP.GR. LIQ = 1.02567 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	947855.87	888061.06	477.41	41613.25	0.0	17313.83	0.0	0.0	0.0	390.27
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		93.69157	0.05037	4.39025	0.0	1.82663	0.0	0.0	0.0	0.04117
GRAMS/LITER IN LIQUOR		960.568	0.516	45.011	0.0	18.727	0.0	0.0	0.0	0.422

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 40

TOTAL FLOW = 947997.81 # 1.000 LBS/HR. OR 1846.545 GPM ---- GPM LIQ = 1846.427 GPM SOLIDS = 0.122
TEMPERATURE = 90.74 DEG F SP.GR. = 1.02678 SP.GR. LIQ = 1.02567 SP.GR. SOLIDS = 2.33000
FRACTION SOLIDS = 0.000150

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	947855.87	888061.06	477.41	41613.25	0.0	17313.83	0.0	0.0	0.0	390.27
SOLID	141.94	0.0	0.0	0.0	0.0	0.0	0.0	141.94	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		93.69157	0.05037	4.39025	0.0	1.82663	0.0	0.0	0.0	0.04117
GRAMS/LITER IN LIQUOR		960.567	0.516	45.011	0.0	18.727	0.0	0.0	0.0	0.422

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	141.94	0.0	0.0

E-13

STREAM # 42 FLOCCULANT SOLN TO CLARIFIER

TOTAL FLOW = 5010.43 # 1.000 LBS/HR. OR 10.039 GPM ---- GPM LIQ = 10.039 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 0.99819 SP.GR. LIQ = 0.99719 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	5010.43	5010.43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		996.782	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 43 EVAPORATION FROM CLAFIFIER

TOTAL FLOW = 2282.75 # 1.000 LBS/HR. OR 843.951 ACFM ---- GPM LIQ = 0.0 GPM SOLIDS = 0.0
TEMPERATURE = 88.38 DEG F SP.GR. = 0.00072 SP.GR. LIQ = 0.0 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	2282.75	2282.75	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 44 BARREN RECYCLE STRIPPER SOLN TO CLARIFIER

(E-14)

TOTAL FLOW = 5300.00 # 1.000 LBS/HR. OR 10.619 GPM ---- GPM LIQ = 10.619 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 0.99819 SP.GR. LIQ = 0.99719 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	5300.00	5300.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		996.782	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 50 CLARIFIER UNDERFLOW RECYCLE

TOTAL FLOW = 938033.25 # 1.000 LBS/HR. OR 1827.445 GPM ---- GPM LIQ = 1827.448 GPM SOLIDS = 0.0
TEMPERATURE = 88.38 DEG F SP.GR. = 1.02561 SP.GR. LIQ = 1.02558 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	938033.25	879750.19	468.88	40568.66	0.0	16859.89	0.0	0.0	0.0	385.60
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		93.78667	0.04999	4.32486	0.0	1.79737	0.0	0.0	0.0	0.04111
GRAMS/LITER IN LIQUOR		961.460	0.512	44.337	0.0	18.426	0.0	0.0	0.0	0.421

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

E.15

STREAM # 51 ~~MAINSTREAM TO LEACH TANK~~ SX RAFFINATE

TOTAL FLOW = 937568.25 # 1.000 LBS/HR. OR 1826.432 GPM ---- GPM LIQ = 1826.435 GPM SOLIDS = 0.0
TEMPERATURE = 85.43 DEG F SP.GR. = 1.02667 SP.GR. LIQ = 1.02564 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	937568.25	879750.19	3.96	40568.66	0.0	16859.89	0.0	0.0	0.0	385.60
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		93.83318	0.00042	4.32701	0.0	1.79826	0.0	0.0	0.0	0.04113
GRAMS/LITER IN LIQUOR		961.994	0.004	44.361	0.0	18.436	0.0	0.0	0.0	0.422

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 52 BARREN ORGANIC TO SX

TOTAL FLOW = 294917.62 # 1.000 LBS/HR. OR 709.932 GPM ---- GPM LIQ = 709.933 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 0.83083 SP.GR. LIQ = 0.83000 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	294917.62	0.0	0.0	0.0	0.0	0.0	294917.62	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		0.0	0.0	0.0	0.0	0.0	829.661	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 53 PREGNANT ORGANIC

TOTAL FLOW = 295382.50 * 1.000 LBS/HR. OR 710.061 GPM ---- GPM LIQ = 710.062 GPM SOLIDS = 0.0
TEMPERATURE = 88.37 DEG F SP.GR. = 0.83199 SP.GR. LIQ = 0.83116 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

E.16

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	295382.50	0.0	464.92	0.0	0.0	0.0	294917.62	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		0.0	1.308	0.0	0.0	0.0	829.510	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 54 SX RAFFINATE TO CCD

TOTAL FLOW = 834435.69 * 1.000 LBS/HR. OR 1625.524 GPM ---- GPM LIQ = 1625.527 GPM SOLIDS = 0.0
TEMPERATURE = 85.43 DEG F SP.GR. = 1.02667 SP.GR. LIQ = 1.02564 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	834435.69	782977.62	3.52	36106.11	0.0	15005.30	0.0	0.0	0.0	343.18
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		93.83318	0.00042	4.32701	0.0	1.79826	0.0	0.0	0.0	0.04113
GRAMS/LITER IN LIQUOR		961.994	0.004	44.361	0.0	18.436	0.0	0.0	0.0	0.422

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 55 SX RAFFINATE BLEED TO TAILS

E.17

TOTAL FLOW = 103132.56 # 1.000 LBS/HR. OR 200.908 GPM ---- GPM LIQ = 200.908 GPM SOLIDS = 0.0
TEMPERATURE = 85.43 DEG F SP.GR. = 1.02667 SP.GR. LIQ = 1.02564 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	103132.56	96772.56	0.44	4462.55	0.0	1854.59	0.0	0.0	0.0	42.42
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		93.83318	0.00042	4.32701	0.0	1.79826	0.0	0.0	0.0	0.04113
GRAMS/LITER IN LIQUOR		961.994	0.004	44.361	0.0	18.436	0.0	0.0	0.0	0.422

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 60 FEED TO SAND/SLIME SPLIT

TOTAL FLOW = 659059.69 # 1.000 LBS/HR. OR 950.574 GPM ---- GPM LIQ = 688.383 GPM SOLIDS = 262.192
TEMPERATURE = 80.96 DEG F SP.GR. = 1.38866 SP.GR. LIQ = 1.02544 SP.GR. SOLIDS = 2.33000
FRACTION SOLIDS = 0.463933

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	353299.75	332149.81	3.30	14838.70	0.0	6166.87	0.0	0.0	0.0	141.02
SOLID	305759.87	0.0	0.0	0.0	0.0	0.0	0.0	305759.94	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		94.01360	0.00093	4.20003	0.0	1.74551	0.0	0.0	0.0	0.03991
GRAMS/LITER IN LIQUOR		963.653	0.010	43.051	0.0	17.892	0.0	0.0	0.0	0.409

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	305759.94	0.0	0.0

STREAM # 61 TAILS TO TAILS POND

TOTAL FLOW = 511575.56 # 1.000 LBS/HR. OR 799.971 GPM ---- GPM LIQ = 645.279 GPM SOLIDS = 154.693
TEMPERATURE = 80.96 DEG F SP.GR. = 1.27899 SP.GR. LIQ = 1.02544 SP.GR. SOLIDS = 2.33000
FRACTION SOLIDS = 0.352633

F-12

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	331177.12	311351.50	3.09	13909.54	0.0	5780.72	0.0	0.0	0.0	132.19
SOLID	180398.31	0.0	0.0	0.0	0.0	0.0	0.0	180398.31	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		94.01360	0.00093	4.20003	0.0	1.74551	0.0	0.0	0.0	0.03991
GRAMS/LITER IN LIQUOR		963.653	0.010	43.051	0.0	17.892	0.0	0.0	0.0	0.409

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	180398.31	0.0	0.0

STREAM # 62 SAND TO MINE BACKFILL

TOTAL FLOW = 147484.12 # 1.000 LBS/HR. OR 150.603 GPM ---- GPM LIQ = 43.105 GPM SOLIDS = 107.499
TEMPERATURE = 80.96 DEG F SP.GR. = 1.95858 SP.GR. LIQ = 1.02544 SP.GR. SOLIDS = 2.33000
FRACTION SOLIDS = 0.850000

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	22122.62	20798.27	0.21	929.16	0.0	386.15	0.0	0.0	0.0	8.83
SOLID	125361.56	0.0	0.0	0.0	0.0	0.0	0.0	125361.56	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		94.01360	0.00093	4.20003	0.0	1.74551	0.0	0.0	0.0	0.03991
GRAMS/LITER IN LIQUOR		963.653	0.010	43.051	0.0	17.892	0.0	0.0	0.0	0.409

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	125361.62	0.0	0.0

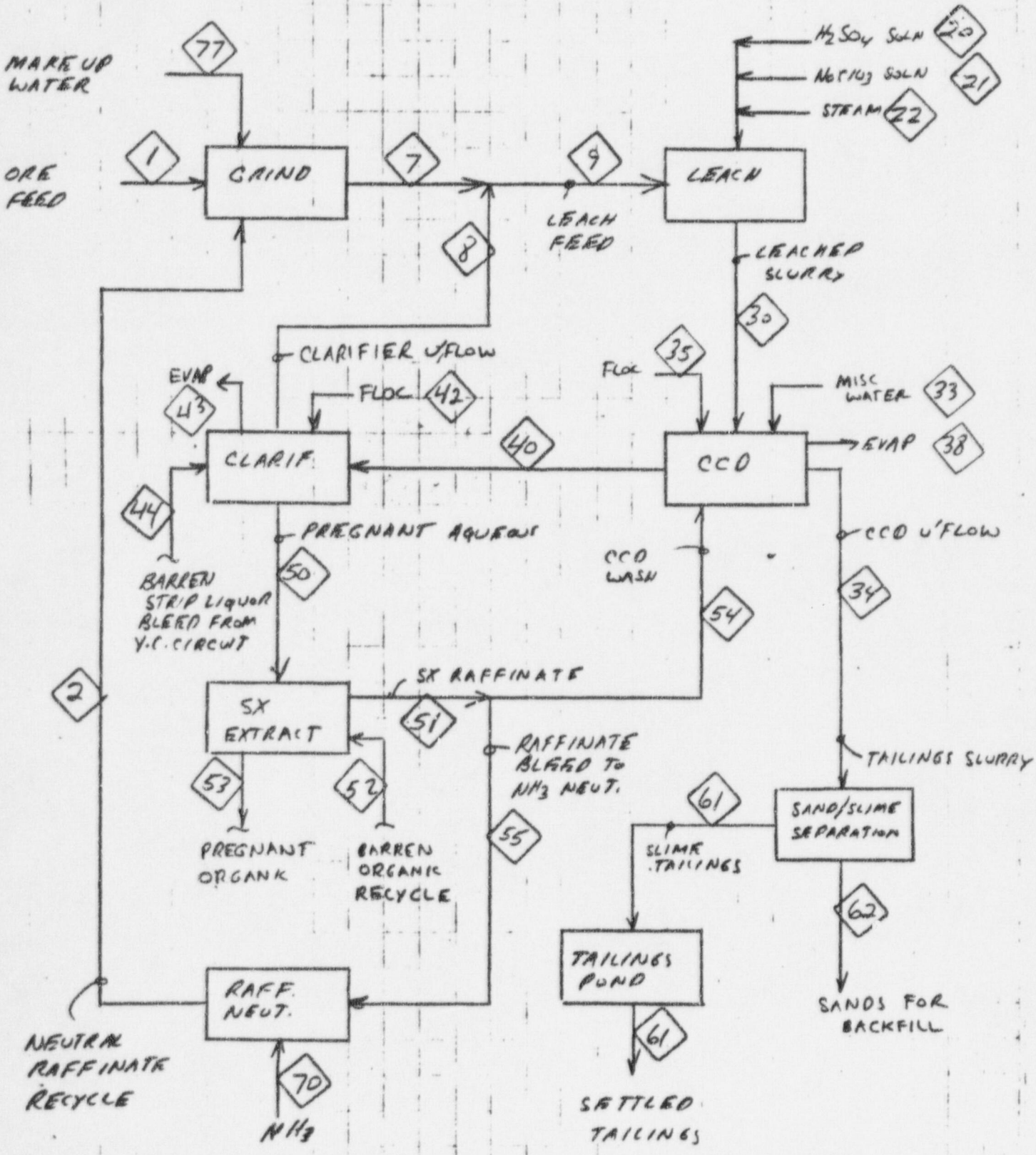
JACOBS ENGINEERING GROUP, INC.

UNC

DATE 12/17/79 SUBJECT SHEET NO. E.19

BY MG CHKD. JOB. NO. 02-2925-02

INTERIM RAFFINATE NEUTRALIZATION BLOCK FLOW DIAGRAM *



* NUMBERS IN ◇ REFER TO STREAM NUMBERS IDENTIFIED IN THE COMPUTER PROGRAM OUTPUT.

(E.20)

UNC URANIUM PROCESS: SX RAFFINATE RECYCLE TO GRINDER

(INTERIM RAFFINATE NEUTRALIZATION)

(E.21)

STREAM # 1 MAIN ORE FEED INTO PLANT

TOTAL FLOW = 346599.94 # 1.000 LBS/HR. OR 336.494 GPM ---- GPM LIQ = 69.158 GPM SOLIDS = 267.336
TEMPERATURE = 50.00 DEG F SP.GR. = 2.06007 SP.GR. LIQ = 0.99960 SP.GR. SOLIDS = 2.33180
FRACTION SOLIDS = 0.900173

→ USE 2.7 S.G. FOR ORE SOLIDS ON NEXT RUN!!

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	34600.00	34600.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	311999.94	0.0	468.00	0.0	0.0	5772.00	0.0	305760.00	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		999.191	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	468.00	5772.00	305760.00	0.0	0.0

STREAM # 2 NEUTRALIZED SX RAFFINATE TO GRINDER

TOTAL FLOW = 103651.06 # 1.000 LBS/HR. OR 199.198 GPM ---- GPM LIQ = 198.243 GPM SOLIDS = 0.955
TEMPERATURE = 89.74 DEG F SP.GR. = 1.04068 SP.GR. LIQ = 1.03502 SP.GR. SOLIDS = 1.99998
FRACTION SOLIDS = 0.009220

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	102695.37	93809.00	0.44	5666.42	0.0	2425.78	0.0	0.0	733.66	60.06
SOLID	955.64	95.56	0.0	573.39	0.0	286.69	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		91.34685	0.00043	5.51770	0.0	2.36211	0.0	0.0	0.71441	0.05849
GRAMS/LITER IN LIQUOR		945.067	0.004	57.086	0.0	24.438	0.0	0.0	7.391	0.605

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	955.64

STREAM # 3

TOTAL FLOW = 450251.00 * 1.000 LBS/HR. OR 535.236 GPM ---- GPM LIQ = 266.946 GPM SOLIDS = 268.291
TEMPERATURE = 68.86 DEG F SP.GR. = 1.68244 SP.GR. LIQ = 1.02761 SP.GR. SOLIDS = 2.33062
FRACTION SOLIDS = 0.695069

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	137295.37	128409.00	0.44	5666.42	0.0	2425.78	0.0	0.0	733.66	60.06
SOLID	312955.56	95.56	468.00	573.39	0.0	6058.69	0.0	305760.00	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		93.52755	0.00032	4.12717	0.0	1.76683	0.0	0.0	0.53437	0.04375
GRAMS/LITER IN LIQUOR		960.703	0.003	42.394	0.0	18.149	0.0	0.0	5.489	0.449

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	468.00	5772.00	305760.00	0.0	955.64

STREAM # 77 MAKEUP WATER TO GRINDER

TOTAL FLOW = 129311.37 * 1.000 LBS/HR. OR 258.466 GPM ---- GPM LIQ = 258.467 GPM SOLIDS = 0.0
TEMPERATURE = 50.00 DEG F SP.GR. = 1.00061 SP.GR. LIQ = 0.99960 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	129311.37	129311.37	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		999.193	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

F.23

STREAM # 7 GRINDER EFFLUENT

TOTAL FLOW = 579562.37 # 1.000 LBS/HR. OR 793.798 GPM ---- GPM LIQ = 525.508 GPM SOLIDS = 268.291
TEMPERATURE = 61.58 DEG F SP.GR. = 1.46023 SP.GR. LIQ = 1.01365 SP.GR. SOLIDS = 2.33062
FRACTION SOLIDS = 0.539986

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	266606.75	257720.37	0.44	5666.42	0.0	2425.78	0.0	0.0	733.66	60.06
SOLID	312955.56	95.56	468.00	573.39	0.0	6058.69	0.0	305760.00	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		96.66685	0.00017	2.12538	0.0	0.90987	0.0	0.0	0.27519	0.02253
GRAMS/LITER IN LIQUOR		979.460	0.002	21.535	0.0	9.219	0.0	0.0	2.788	0.228

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	468.00	5772.00	305760.00	0.0	955.64

STREAM # 8 CLARIFIER UNDERFLOW RECYCLE

TOTAL FLOW = 17953.16 # 1.000 LBS/HR. OR 34.361 GPM ---- GPM LIQ = 34.239 GPM SOLIDS = 0.121
TEMPERATURE = 88.28 DEG F SP.GR. = 1.04498 SP.GR. LIQ = 1.03937 SP.GR. SOLIDS = 2.33000
FRACTION SOLIDS = 0.007889

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	17811.52	16209.17	8.90	1077.07	0.0	468.21	0.0	0.0	37.80	10.37
SOLID	141.63	0.0	0.0	0.0	0.0	0.0	0.0	141.63	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		91.00382	0.04999	6.04705	0.0	2.62868	0.0	0.0	0.21225	0.05821
GRAMS/LITER IN LIQUOR		945.480	0.519	62.826	0.0	27.311	0.0	0.0	2.205	0.605

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	141.63	0.0	0.0

F.24

STREAM # 9 MAINSTREAM TO LEACH TANK

TOTAL FLOW = 597515.50 # 1.000 LBS/HR. OR 828.118 GPM ---- GPM LIQ = 559.707 GPM SOLIDS = 268.413
TEMPERATURE = 62.86 DEG F SP.GR. = 1.44307 SP.GR. LIQ = 1.01530 SP.GR. SOLIDS = 2.33062
FRACTION SOLIDS = 0.523998

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	284418.25	273929.50	9.35	6743.49	0.0	2893.99	0.0	0.0	771.47	70.43
SOLID	313097.19	95.56	468.00	573.39	0.0	6058.69	0.0	305901.62	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		96.31221	0.00329	2.37098	0.0	1.01751	0.0	0.0	0.27124	0.02476
GRAMS/LITER IN LIQUOR		977.452	0.033	24.063	0.0	10.327	0.0	0.0	2.753	0.251

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	468.00	5772.00	305901.62	0.0	955.64

STREAM # 20 INTRODUCE SULPHATE AS 93% H2SO4

TOTAL FLOW = 16825.84 # 1.000 LBS/HR. OR 19.373 GPM ---- GPM LIQ = 19.373 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 1.73703 SP.GR. LIQ = 1.73529 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	16825.84	1177.81	0.0	15328.34	0.0	319.69	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		7.00000	0.0	91.10001	0.0	1.90000	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		121.421	0.0	1580.202	0.0	32.957	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 21 CHLORIDE REAGENT FEED TO LEACH: 40% SOLN

TOTAL FLOW = 1053.26 # 1.000 LBS/HR. OR 1.744 GPM ---- GPM LIQ = 1.744 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 1.20788 SP.GR. LIQ = 1.20667 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	1053.26	631.96	0.0	0.0	0.0	280.90	0.0	0.0	0.0	140.40
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		60.00000	0.0	0.0	0.0	26.67000	0.0	0.0	0.0	13.32999
GRAMS/LITER IN LIQUOR		723.703	0.0	0.0	0.0	321.686	0.0	0.0	0.0	160.783

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 22 STEAM FOR LEACH TANK HEATING

TOTAL FLOW = 13797.14 # 1.000 LBS/HR. OR 1581.484 ACFM ---- GPM LIQ = 0.0 GPM SOLIDS = 0.0
TEMPERATURE = 300.00 DEG F SP.VOL. = 6.877445 CUB.FT/LB
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	13797.14	13797.14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

F. 26

STREAM # 30 MAINSTREAM TO CCD

TOTAL FLOW = 629191.62 # 1.000 LBS/HR. OR 885.754 GPM ---- GPM LIQ = 623.441 GPM SOLIDS = 262.314
TEMPERATURE = 139.62 DEG F SP.GR. = 1.42069 SP.GR. LIQ = 1.03608 SP.GR. SOLIDS = 2.33000
FRACTION SOLIDS = 0.486182

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	323290.06	289631.87	477.35	22645.21	0.0	9553.26	0.0	0.0	771.47	210.83
SOLID	305901.50	0.0	0.0	0.0	0.0	0.0	0.0	305901.62	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		89.58886	0.14765	7.00461	0.0	2.95501	0.0	0.0	0.23863	0.06521
GRAMS/LITER IN LIQUOR		927.829	1.529	72.543	0.0	30.604	0.0	0.0	2.471	0.675

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	305901.62	0.0	0.0

UNC URANIUM PROCESS: SX RAFFINATE RECYCLE TO GRINDER

(E.77)

STREAM # 33 MAKEUP WATER FOR CCD

TOTAL FLOW = 37733.16 * 1.000 LBS/HR. OR 75.603 GPM ---- GPM LIQ = 75.603 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 0.99819 SP.GR. LIQ = 0.99719 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	37733.16	37733.16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		996.782	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

E.17

STREAM # 34 CCD UNDERFLOW

TOTAL FLOW = 555926.87 # 1.000 LBS/HR. OR 743.532 GPM ---- GPM LIQ = 481.341 GPM SOLIDS = 262.192
TEMPERATURE = 79.33 DEG F SP.GR. = 1.49537 SP.GR. LIQ = 1.03842 SP.GR. SOLIDS = 2.33000
FRACTION SOLIDS = 0.550000

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	250167.06	228721.69	2.89	14494.60	0.0	6299.73	0.0	0.0	508.66	139.50
SOLID	305759.75	0.0	0.0	0.0	0.0	0.0	0.0	305759.94	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		91.42758	0.00116	5.79397	0.0	2.51821	0.0	0.0	0.20333	0.05576
GRAMS/LITER IN LIQUOR		949.012	0.012	60.141	0.0	26.139	0.0	0.0	2.111	0.579

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	305759.94	0.0	0.0

STREAM # 35 FLOCCULANT SOLN FOR CCD

TOTAL FLOW = 18715.05 # 1.000 LBS/HR. OR 37.498 GPM ---- GPM LIQ = 37.498 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 0.99819 SP.GR. LIQ = 0.99719 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	18715.05	18715.05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		996.783	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 38 EVAPORATION FROM CCD

TOTAL FLOW = 16183.94 * 1.000 LBS/HR. OR 5892.836 ACFM ---- GPM LIQ = 0.0 GPM SOLIDS = 0.0
TEMPERATURE = 79.21 DEG F SP.VOL. = 21.846970 CUB.FT/LB
FRACTION SOLIDS = 0.0

F, 29

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	16183.94	16183.94	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 39

TOTAL FLOW = 947855.50 * 1.000 LBS/HR. OR 1821.421 GPM ---- GPM LIQ = 1821.424 GPM SOLIDS = 0.0
TEMPERATURE = 90.44 DEG F SP.GR. = 1.04079 SP.GR. LIQ = 1.03974 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	947855.50	861203.12	477.92	58464.74	0.0	25125.38	0.0	0.0	2028.80	555.65
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		90.85806	0.05042	6.16811	0.0	2.65076	0.0	0.0	0.21404	0.05862
GRAMS/LITER IN LIQUOR		944.303	0.524	64.106	0.0	27.550	0.0	0.0	2.225	0.609

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

E.30

STREAM # 40

TOTAL FLOW = 947997.12 # 1.000 LBS/HR. OR 1821.542 GPM ---- GPM LIQ = 1821.424 GPM SOLIDS = 0.121
TEMPERATURE = 90.44 DEG F SP.GR. = 1.04087 SP.GR. LIQ = 1.03974 SP.GR. SOLIDS = 2.33000
FRACTION SOLIDS = 0.000149

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	947855.50	861203.12	477.92	58464.74	0.0	25125.38	0.0	0.0	2028.80	555.65
SOLID	141.63	0.0	0.0	0.0	0.0	0.0	0.0	141.63	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		90.85806	0.05042	6.16811	0.0	2.65076	0.0	0.0	0.21404	0.05862
GRAMS/LITER IN LIQUOR		944.303	0.524	64.106	0.0	27.550	0.0	0.0	2.225	0.609

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	141.63	0.0	0.0

STREAM # 42 FLOCCULANT SOLN TO CLARIFIER

TOTAL FLOW = 4999.62 # 1.000 LBS/HR. OR 10.017 GPM ---- GPM LIQ = 10.017 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 0.99819 SP.GR. LIQ = 0.99719 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	4999.62	4999.62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		996.782	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

E.31

STREAM # 43 EVAPORATION FROM CLARIFIER

TOTAL FLOW = 2274.18 # 1.000 LBS/HR. OR 840.664 ACFM ---- GPM LIQ = 0.0 GPM SOLIDS = 0.0
TEMPERATURE = 88.28 DEG F SP.VOL. = 22.179306 CUB.FT/LB
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	2274.18	2274.18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 44 BARREN RECYCLE STRIPPER SOLN TO CLARIFIER

TOTAL FLOW = 5300.00 # 1.000 LBS/HR. OR 10.619 GPM ---- GPM LIQ = 10.619 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 0.99819 SP.GR. LIQ = 0.99719 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	5300.00	5300.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		996.782	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

E.32

STREAM # 50 PREGNANT AQUEOUS TO SX N

TOTAL FLOW = 938069.19 # 1.000 LBS/HR. OR 1803.261 GPM ---- GPM LIQ = 1803.264 GPM SOLIDS = 0.0
TEMPERATURE = 88.28 DEG F SP.GR. = 1.04041 SP.GR. LIQ = 1.03937 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	938069.19	853678.94	468.90	56725.52	0.0	24658.84	0.0	0.0	1991.01	546.03
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		91.00384	0.04999	6.04705	0.0	2.62868	0.0	0.0	0.21225	0.05821
GRAMS/LITER IN LIQUOR		945.480	0.519	62.826	0.0	27.311	0.0	0.0	2.205	0.605

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 51 SX RAFFINATE N

TOTAL FLOW = 937604.37 # 1.000 LBS/HR. OR 1802.263 GPM ---- GPM LIQ = 1802.266 GPM SOLIDS = 0.0
TEMPERATURE = 85.29 DEG F SP.GR. = 1.04047 SP.GR. LIQ = 1.03943 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	937604.37	853678.94	4.04	56725.52	0.0	24658.84	0.0	0.0	1991.01	546.03
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		91.04894	0.00043	6.05005	0.0	2.62998	0.0	0.0	0.21235	0.05824
GRAMS/LITER IN LIQUOR		946.003	0.004	62.860	0.0	27.326	0.0	0.0	2.206	0.605

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

(E.33)

STREAM # 52 BARREN ORGANIC TO SX

TOTAL FLOW = 294928.94 # 1.000 LBS/HR. OR 709.959 GPM ---- GPM LIQ = 709.960 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 0.83083 SP.GR. LIQ = 0.83000 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	294928.94	0.0	0.0	0.0	0.0	0.0	294928.94	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		0.0	0.0	0.0	0.0	0.0	829.660	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 53

TOTAL FLOW = 295393.75 # 1.000 LBS/HR. OR 710.088 GPM ---- GPM LIQ = 710.089 GPM SOLIDS = 0.0
TEMPERATURE = 88.27 DEG F SP.GR. = 0.83199 SP.GR. LIQ = 0.83116 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	295393.75	0.0	464.86	0.0	0.0	0.0	294928.94	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		0.0	1.307	0.0	0.0	0.0	829.510	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

F.34

STREAM # 54 SX RAFFINATE TO CCD

TOTAL FLOW = 834467.87 * 1.000 LBS/HR. OR 1604.014 GPM ---- GPM LIQ = 1604.017 GPM SOLIDS = 0.0
TEMPERATURE = 85.29 DEG F SP.GR. = 1.04047 SP.GR. LIQ = 1.03943 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	834467.87	759774.19	3.59	50485.71	0.0	21946.36	0.0	0.0	1772.00	485.97
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		91.04894	0.00043	6.05005	0.0	2.62998	0.0	0.0	0.21235	0.05824
GRAMS/LITER IN LIQUOR		946.003	0.004	62.860	0.0	27.326	0.0	0.0	2.206	0.605

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 55 SX RAFFINATE BLEED TO AMMONIA NEUTRALIZATION & GRINDER

TOTAL FLOW = 103136.50 * 1.000 LBS/HR. OR 198.249 GPM ---- GPM LIQ = 198.249 GPM SOLIDS = 0.0
TEMPERATURE = 85.29 DEG F SP.GR. = 1.04047 SP.GR. LIQ = 1.03943 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	103136.50	93904.75	0.44	6239.81	0.0	2712.47	0.0	0.0	219.01	60.06
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		91.04894	0.00043	6.05005	0.0	2.62998	0.0	0.0	0.21235	0.05824
GRAMS/LITER IN LIQUOR		946.004	0.004	62.860	0.0	27.326	0.0	0.0	2.206	0.605

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 70 AMMONIA FOR SX RAFFINATE NEUTRALIZATION

TOTAL FLOW = 514.65 * 1.000 LBS/HR. OR 64.712 ACFM ---- GPM LIQ = 0.0 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.VOL. = 7.544325 CUB.FT/LB
FRACTION SOLIDS = 0.0

E.35

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	514.65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	514.65	0.0

CONCENTRATION IN LIQUOR , %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

UNC URANIUM PROCESS: SX RAFFINATE RECYCLE TO GRINDER

E.36

STREAM # 60

TOTAL FLOW = 0.0 * 1.000 LBS/HR. OR 0.0 GPM ---- GPM LIQ = 0.0 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 0.0 SP.GR. LIQ = 0.0 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 61 TAILS TO TAILS POND

TOTAL FLOW = 408442.75 # 1.000 LBS/HR. OR 593.468 GPM ---- GPM LIQ = 438.775 GPM SOLIDS = 154.693
TEMPERATURE = 79.33 DEG F SP.GR. = 1.37646 SP.GR. LIQ = 1.03842 SP.GR. SOLIDS = 2.33000
FRACTION SOLIDS = 0.441673

E.37

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	228044.44	208495.50	2.64	13212.82	0.0	5742.63	0.0	0.0	463.67	127.16
SOLID	180398.19	0.0	0.0	0.0	0.0	0.0	0.0	180398.25	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		91.42758	0.00116	5.79397	0.0	2.51821	0.0	0.0	0.20333	0.05576
GRAMS/LITER IN LIQUOR		949.012	0.012	60.141	0.0	26.139	0.0	0.0	2.111	0.579

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	180398.31	0.0	0.0

STREAM # 62 SAND TO MINE BACKFILL

TOTAL FLOW = 147484.12 # 1.000 LBS/HR. OR 150.064 GPM ---- GPM LIQ = 42.566 GPM SOLIDS = 107.499
TEMPERATURE = 79.33 DEG F SP.GR. = 1.96561 SP.GR. LIQ = 1.03842 SP.GR. SOLIDS = 2.33000
FRACTION SOLIDS = 0.850000

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	AMMONIA	CHLOR
AQUEOUS	22122.62	20226.17	0.26	1281.78	0.0	557.09	0.0	0.0	44.98	12.34
SOLID	125361.56	0.0	0.0	0.0	0.0	0.0	0.0	125361.62	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		91.42758	0.00116	5.79397	0.0	2.51821	0.0	0.0	0.20333	0.05576
GRAMS/LITER IN LIQUOR		949.011	0.012	60.141	0.0	26.139	0.0	0.0	2.111	0.579

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	YEL CAKE	NEUT PPT
SOLID MASS FLOW	0.0	0.0	0.0	125361.62	0.0	0.0

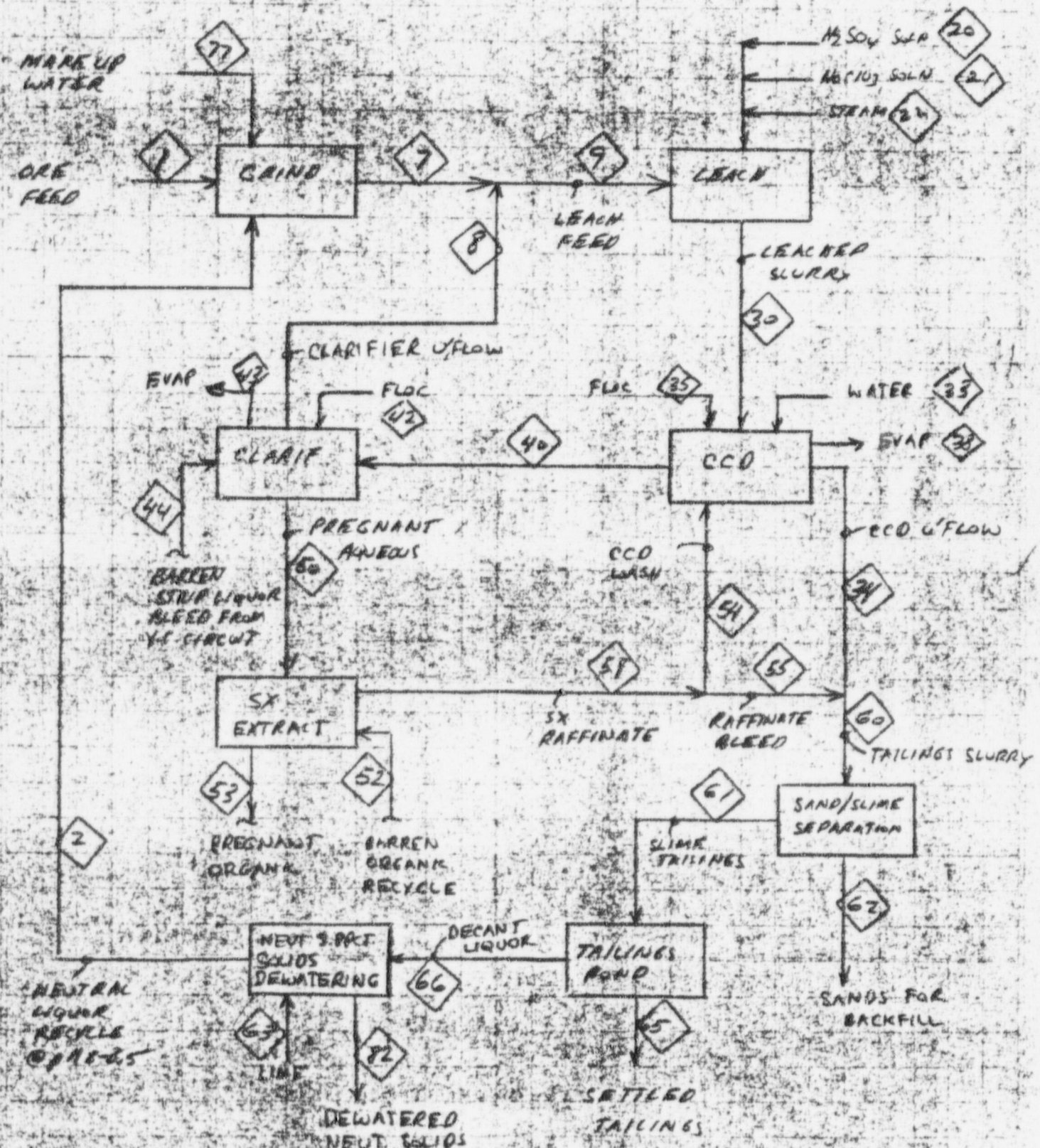
JACOBS ENGINEERING GROUP. INC.

UNC

DATE 12/17/79 SUBJECT RECOMMENDED LIME NEUTRALIZATION SHEET NO.

BY MG CHKD. JOB. NO. 02-2925-02

BLOCK FLOW DIAGRAM *



* NUMBERS IN ◇ REFER TO STREAM NUMBERS IDENTIFIED IN THE COMPUTER PROGRAM OUTPUT.

UNC URANIUM PROCESS: LIME NEUTRALIZATION ALTERNATIVE

STREAM # 1 MAIN ORE FEED INTO PLANT

TOTAL FLOW = 346599.94 # 1.000 LBS/HR. OR 328.638 GPM ---- GPM LIQ = 69.158 GPM SOLIDS = 259.480
TEMPERATURE = 50.00 DEG F SP.GR. = 2.10931 SP.GR. LIQ = 0.99960 SP.GR. SOLIDS = 2.40240
FRACTION SOLIDS = 0.900173

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	34600.00	34600.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	311999.94	0.0	468.00	0.0	0.0	5772.00	0.0	305760.00	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		999.191	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	468.00	5772.00	305760.00	0.0	0.0

STREAM # 2 NEUTRALIZED DECANT LIQUOR TO GRIND

TOTAL FLOW = 205526.75 # 1.000 LBS/HR. OR 405.350 GPM ---- GPM LIQ = 405.351 GPM SOLIDS = 0.0
TEMPERATURE = 50.00 DEG F SP.GR. = 1.01407 SP.GR. LIQ = 1.01305 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	205526.75	199967.81	2.03	3010.48	0.00	2349.42	0.0	0.0	0.00	196.95
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		97.29527	0.00099	1.46476	0.00000	1.14312	0.0	0.0	0.00000	0.09583
GRAMS/LITER IN LIQUOR		985.250	0.010	14.833	0.000	11.576	0.0	0.0	0.000	0.970

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 77 MAKEUP WATER TO GRINDER

TOTAL FLOW = 25665.94 # 1.000 LBS/HR. OR 51.301 GPM ---- GPM LIQ = 51.301 GPM SOLIDS = 0.0
TEMPERATURE = 50.00 DEG F SP.GR. = 1.00060 SP.GR. LIQ = 0.99960 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	25665.94	25665.94	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		999.192	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 7 GRINDER EFFLUENT

TOTAL FLOW = 577792.62 # 1.000 LBS/HR. OR 785.289 GPM ---- GPM LIQ = 525.810 GPM SOLIDS = 259.480
TEMPERATURE = 50.00 DEG F SP.GR. = 1.47154 SP.GR. LIQ = 1.00997 SP.GR. SOLIDS = 2.40240
FRACTION SOLIDS = 0.539986

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	265792.69	260233.75	2.03	3010.48	0.00	2349.42	0.0	0.0	0.00	196.95
SOLID	311999.94	0.0	468.00	0.0	0.0	5772.00	0.0	305760.00	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		97.90854	0.00076	1.13264	0.00000	0.88393	0.0	0.0	0.00000	0.07410
GRAMS/LITER IN LIQUOR		988.444	0.008	11.435	0.000	8.924	0.0	0.0	0.000	0.748

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	468.00	5772.00	305760.00	0.0	0.0

STREAM # 8 CLARIFIER UNDERFLOW

TOTAL FLOW = 17991.95 * 1.000 LBS/HR. OR 34.575 GPM ---- GPM LIQ = 34.457 GPM SOLIDS = 0.118
TEMPERATURE = 88.15 DEG F SP.GR. = 1.04075 SP.GR. LIQ = 1.03504 SP.GR. SOLIDS = 2.40000
FRACTION SOLIDS = 0.007889

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	17850.01	16421.10	8.95	954.23	0.00	448.81	0.0	0.0	0.00	16.91
SOLID	141.94	0.0	0.0	0.0	0.0	0.0	0.0	141.94	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		91.99492	0.05015	5.34584	0.00000	2.51435	0.0	0.0	0.00000	0.09471
GRAMS/LITER IN LIQUOR		951.794	0.519	55.309	0.000	26.014	0.0	0.0	0.000	0.980

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	141.94	0.0	0.0

STREAM # 9 MAINSTREAM TO LEACH

TOTAL FLOW = 595784.56 * 1.000 LBS/HR. OR 819.798 GPM ---- GPM LIQ = 560.201 GPM SOLIDS = 259.598
TEMPERATURE = 51.83 DEG F SP.GR. = 1.45349 SP.GR. LIQ = 1.01163 SP.GR. SOLIDS = 2.40240
FRACTION SOLIDS = 0.523917

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	283642.69	276654.81	10.98	3964.71	0.00	2798.23	0.0	0.0	0.00	213.86
SOLID	312141.87	0.0	468.00	0.0	0.0	5772.00	0.0	305901.94	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		97.53638	0.00387	1.39778	0.00000	0.98653	0.0	0.0	0.00000	0.07540
GRAMS/LITER IN LIQUOR		986.306	0.039	14.135	0.000	9.976	0.0	0.0	0.000	0.762

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	468.00	5772.00	305901.94	0.0	0.0

STREAM # 20 SULPHURIC ACID SOLN TO LEACH

TOTAL FLOW = 16958.66 # 1.000 LBS/HR. OR 19.526 GPM ---- GPM LIQ = 19.526 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 1.73703 SP.GR. LIQ = 1.73529 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	16958.66	1187.11	0.0	15449.34	0.0	322.21	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		7.00000	0.0	91.10001	0.0	1.90000	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		121.421	0.0	1580.203	0.0	32.957	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 21 CHLORIDE REAGENT FEED TO LEACH: 40% SOLN

TOTAL FLOW = 1050.04 # 1.000 LBS/HR. OR 1.739 GPM ---- GPM LIQ = 1.739 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 1.20788 SP.GR. LIQ = 1.20667 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	1050.04	630.03	0.0	0.0	0.0	280.05	0.0	0.0	0.0	139.97
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		60.00000	0.0	0.0	0.0	26.67000	0.0	0.0	0.0	13.32999
GRAMS/LITER IN LIQUOR		723.703	0.0	0.0	0.0	321.686	0.0	0.0	0.0	160.783

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 22 STEAM TO LEACH

TOTAL FLOW = 16547.85 # 1.000 LBS/HR. OR 1896.782 ACFM ---- GPM LIQ = 0.0 GPM SOLIDS = 0.0
TEMPERATURE = 300.00 DEG F SP.VOL. = 6.877444 CUB.FT/LB
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	16547.85	16547.85	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 30 MAINSTREAM TO CCD

TOTAL FLOW = 630340.94 # 1.000 LBS/HR. OR 884.227 GPM ---- GPM LIQ = 629.565 GPM SOLIDS = 254.663
TEMPERATURE = 140.68 DEG F SP.GR. = 1.42574 SP.GR. LIQ = 1.02965 SP.GR. SOLIDS = 2.40000
FRACTION SOLIDS = 0.485296

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	324439.06	295019.69	478.98	19414.05	0.00	9172.48	0.0	0.0	0.00	353.83
SOLID	305901.87	0.0	0.0	0.0	0.0	0.0	0.0	305901.94	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		90.93223	0.14763	5.98388	0.00000	2.82718	0.0	0.0	0.00000	0.10906
GRAMS/LITER IN LIQUOR		935.896	1.519	61.587	0.000	29.098	0.0	0.0	0.000	1.122

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	305901.94	0.0	0.0

UMC URANIUM PROCESS: LIME NEUTRALIZATION ALTERNATIVE

STREAM # 33 MAKEUP WATER FOR CCD

TOTAL FLOW = 36440.45 # 1.000 LBS/HR. OR 72.837 GPM ---- GPM LIQ = 72.837 GPM SOLIDS = 0.0
TEMPERATURE = 50.00 DEG F SP.GR. = 1.00060 SP.GR. LIQ = 0.99960 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	36440.45	36440.45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		999.192	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 34 CCD UNDERFLOW N

TOTAL FLOW = 555927.12 # 1.000 LBS/HR. OR 737.741 GPM ---- GPM LIQ = 483.198 GPM SOLIDS = 254.545
TEMPERATURE = 78.58 DEG F SP.GR. = 1.50710 SP.GR. LIQ = 1.03443 SP.GR. SOLIDS = 2.40000
FRACTION SOLIDS = 0.550000

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	250167.19	231075.75	2.87	12827.71	0.00	6033.52	0.0	0.0	0.00	227.31
SOLID	305759.87	0.0	0.0	0.0	0.0	0.0	0.0	305759.75	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		92.36853	0.00115	5.12766	0.00000	2.41180	0.0	0.0	0.00000	0.09086
GRAMS/LITER IN LIQUOR		955.095	0.012	53.020	0.000	24.938	0.0	0.0	0.000	0.940

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	305759.75	0.0	0.0

STREAM # 35 FLOCCULANT SOLN FOR CCD

TOTAL FLOW = 18715.07 # 1.000 LBS/HR. OR 37.498 GPM ---- GPM LIQ = 37.498 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 0.99819 SP.GR. LIQ = 0.99719 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	18715.07	18715.07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		996.783	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 38 EVAPORATION FROM CCD

TOTAL FLOW = 16023.70 # 1.000 LBS/HR. OR 5834.336 ACFM ---- GPM LIQ = 0.0 GPM SOLIDS = 0.0
TEMPERATURE = 79.20 DEG F SP.VOL. = 21.846390 CUB.FT/LB
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	16023.70	16023.70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 39

TOTAL FLOW = 947855.87 # 1.000 LBS/HR. OR 1829.755 GPM ---- GPM LIQ = 1829.758 GPM SOLIDS = 0.0
TEMPERATURE = 91.04 DEG F SP.GR. = 1.03605 SP.GR. LIQ = 1.03501 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	947855.87	871137.00	479.62	51199.93	0.00	24122.44	0.0	0.0	0.00	916.95
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		91.90606	0.05060	5.40166	0.00000	2.54495	0.0	0.0	0.00000	0.09674
GRAMS/LITER IN LIQUOR		950.845	0.524	55.885	0.000	26.330	0.0	0.0	0.000	1.001

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 40

TOTAL FLOW = 947997.81 # 1.000 LBS/HR. OR 1829.873 GPM ---- GPM LIQ = 1829.758 GPM SOLIDS = 0.118
TEMPERATURE = 91.04 DEG F SP.GR. = 1.03613 SP.GR. LIQ = 1.03501 SP.GR. SOLIDS = 2.40000
FRACTION SOLIDS = 0.000150

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	947855.87	871137.00	479.62	51199.93	0.00	24122.44	0.0	0.0	0.00	916.95
SOLID	141.94	0.0	0.0	0.0	0.0	0.0	0.0	141.94	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		91.90606	0.05060	5.40166	0.00000	2.54495	0.0	0.0	0.00000	0.09674
GRAMS/LITER IN LIQUOR		950.845	0.524	55.885	0.000	26.330	0.0	0.0	0.000	1.001

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	141.94	0.0	0.0

STREAM # 42 FLOCCULANT SOLN FOR CLARIFIER

TOTAL FLOW = 5010.43 # 1.000 LBS/HR. OR 10.039 GPM ---- GPM LIQ = 10.039 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 0.99819 SP.GR. LIQ = 0.99719 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	5010.43	5010.43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		996.782	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 43 EVAPORATION FROM CLARIFIER

TOTAL FLOW = 2263.30 # 1.000 LBS/HR. OR 836.450 ACFM ---- GPM LIQ = 0.0 GPM SOLIDS = 0.0
TEMPERATURE = 88.15 DEG F SP.VOL. = 22.174284 CUB.FT/LB
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	2263.30	2263.30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 44 BARREN STRIP SOLUTION BLEED TO CLARIFIER

TOTAL FLOW = 5300.00 # 1.000 LBS/HR. OR 10.619 GPM ---- GPM LIQ = 10.619 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 0.99819 SP.GR. LIQ = 0.99719 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	5300.00	5300.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		100.00000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		996.782	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 50 PREGNANT AQUEOUS TO SX N

TOTAL FLOW = 938052.87 # 1.000 LBS/HR. OR 1810.777 GPM ---- GPM LIQ = 1810.780 GPM SOLIDS = 0.0
TEMPERATURE = 88.15 DEG F SP.GR. = 1.03608 SP.GR. LIQ = 1.03504 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	938052.87	862961.25	470.43	50146.81	0.00	23585.97	0.0	0.0	0.00	888.47
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		91.99495	0.05015	5.34584	0.00000	2.51435	0.0	0.0	0.00000	0.09471
GRAMS/LITER IN LIQUOR		951.793	0.519	55.309	0.000	26.014	0.0	0.0	0.000	0.980

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 51 BARREN AQUEOUS FROM SX N

TOTAL FLOW = 937586.44 # 1.000 LBS/HR. OR 1809.782 GPM ---- GPM LIQ = 1809.785 GPM SOLIDS = 0.0
TEMPERATURE = 85.20 DEG F SP.GR. = 1.03613 SP.GR. LIQ = 1.03509 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	937586.44	862961.25	3.96	50146.81	0.00	23585.97	0.0	0.0	0.00	888.47
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		92.04071	0.00042	5.34850	0.00000	2.51561	0.0	0.0	0.00000	0.09476
GRAMS/LITER IN LIQUOR		952.316	0.004	55.339	0.000	26.028	0.0	0.0	0.000	0.980

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 52 BARREN ORGANIC TO SX

TOTAL FLOW = 294923.81 # 1.000 LBS/HR. OR 709.947 GPM ---- GPM LIQ = 709.948 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 0.83083 SP.GR. LIQ = 0.83000 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	294923.81	0.0	0.0	0.0	0.0	0.0	294923.81	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		0.0	0.0	0.0	0.0	0.0	829.660	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 53 PREGNANT ORGANIC FROM SX

TOTAL FLOW = 295390.25 # 1.000 LBS/HR. OR 710.076 GPM ---- GPM LIQ = 710.077 GPM SOLIDS = 0.0
TEMPERATURE = 88.14 DEG F SP.GR. = 0.83200 SP.GR. LIQ = 0.83116 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	295390.25	0.0	466.47	0.0	0.0	0.0	294923.81	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		0.0	1.312	0.0	0.0	0.0	829.509	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 54 SX RAFFINATE TO CCD

TOTAL FLOW = 834451.87 # 1.000 LBS/HR. OR 1610.706 GPM ---- GPM LIQ = 1610.709 GPM SOLIDS = 0.0
TEMPERATURE = 85.20 DEG F SP.GR. = 1.03613 SP.GR. LIQ = 1.03509 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	834451.87	768035.50	3.52	44630.66	0.00	20991.51	0.0	0.0	0.00	790.74
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		92.04071	0.00042	5.34850	0.00000	2.51561	0.0	0.0	0.00000	0.09476
GRAMS/LITER IN LIQUOR		952.317	0.004	55.339	0.000	26.028	0.0	0.0	0.000	0.980

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 55 SX RAFFINATE TO SAND/SLIME SPLIT

TOTAL FLOW = 103134.56 # 1.000 LBS/HR. OR 199.076 GPM ---- GPM LIQ = 199.076 GPM SOLIDS = 0.0
TEMPERATURE = 85.20 DEG F SP.GR. = 1.03613 SP.GR. LIQ = 1.03509 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	103134.56	94925.75	0.44	5516.15	0.00	2594.46	0.0	0.0	0.00	97.73
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		92.04071	0.00042	5.34850	0.00000	2.51561	0.0	0.0	0.00000	0.09476
GRAMS/LITER IN LIQUOR		952.316	0.004	55.339	0.000	26.028	0.0	0.0	0.000	0.980

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 60 CONBINED SX RAFFINATE & CCD UNDERFLOW TO SAND/SLIME SPLIT

TOTAL FLOW = 659061.69 # 1.000 LBS/HR. OR 936.890 GPM ---- GPM LIQ = 682.347 GPM SOLIDS = 254.545
TEMPERATURE = 80.22 DEG F SP.GR. = 1.40691 SP.GR. LIQ = 1.03451 SP.GR. SOLIDS = 2.40000
FRACTION SOLIDS = 0.463932

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	353301.75	326111.06	3.31	18281.09	0.00	8585.07	0.0	0.0	0.00	321.20
SOLID	305759.87	0.0	0.0	0.0	0.0	0.0	0.0	305759.75	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		92.30383	0.00094	5.17435	0.00000	2.42996	0.0	0.0	0.00000	0.09091
GRAMS/LITER IN LIQUOR		954.504	0.010	53.507	0.000	25.128	0.0	0.0	0.000	0.940

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	305759.75	0.0	0.0

STREAM # 61 SAND/SLIME SPLIT OVERFLOW

TOTAL FLOW = 511577.56 # 1.000 LBS/HR. OR 789.800 GPM ---- GPM LIQ = 639.620 GPM SOLIDS = 150.181
TEMPERATURE = 80.22 DEG F SP.GR. = 1.29546 SP.GR. LIQ = 1.03451 SP.GR. SOLIDS = 2.40000
FRACTION SOLIDS = 0.352631

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	331179.12	305691.00	3.10	17136.38	0.00	8047.50	0.0	0.0	0.00	301.08
SOLID	180398.31	0.0	0.0	0.0	0.0	0.0	0.0	180398.19	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		92.30383	0.00094	5.17435	0.00000	2.42996	0.0	0.0	0.00000	0.09091
GRAMS/LITER IN LIQUOR		954.503	0.010	53.507	0.000	25.128	0.0	0.0	0.000	0.940

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	180398.19	0.0	0.0

STREAM # 62 SANDS TO MINE BACKFILL

TOTAL FLOW = 147484.12 # 1.000 LBS/HR. OR 147.090 GPM ---- GPM LIQ = 42.726 GPM SOLIDS = 104.364
TEMPERATURE = 80.22 DEG F SP.GR. = 2.00537 SP.GR. LIQ = 1.03451 SP.GR. SOLIDS = 2.40000
FRACTION SOLIDS = 0.850000

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	22122.62	20420.02	0.21	1144.70	0.00	537.57	0.0	0.0	0.00	20.11
SOLID	125361.56	0.0	0.0	0.0	0.0	0.0	0.0	125361.50	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		92.30783	0.00094	5.17435	0.00000	2.42996	0.0	0.0	0.00000	0.09091
GRAMS/LITER IN LIQUOR		954.503	0.010	53.507	0.000	25.128	0.0	0.0	0.000	0.940

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	125361.56	0.0	0.0

STREAM # 63 LIME FOR DECANT LIQUOR NEUTRALIZATION:

TOTAL FLOW = 4500.00 # 1.000 LBS/HR. OR 4.014 GPM ---- GPM LIQ = 0.0 GPM SOLIDS = 4.014
TEMPERATURE = 70.00 DEG F SP.GR. = 2.24224 SP.GR. LIQ = 0.0 SP.GR. SOLIDS = 2.24000
FRACTION SOLIDS = 1.000000

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	4500.00	0.0	0.0	0.0	2435.40	0.0	0.0	0.0	2064.60	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	4500.00	0.0

STREAM # 64

TOTAL FLOW = 4500.00 # 1.000 LBS/HR. OR 9.765 GPM ---- GPM LIQ = 9.765 GPM SOLIDS = 0.0
TEMPERATURE = 199.30 DEG F SP.GR. = 0.92161 SP.GR. LIQ = 0.92069 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	4500.00	0.0	0.0	0.0	2435.40	0.0	0.0	0.0	2064.60	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		0.0	0.0	0.0	54.12004	0.0	0.0	0.0	45.88003	0.0
GRAMS/LITER IN LIQUOR		0.0	0.0	0.0	498.073	0.0	0.0	0.0	422.239	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 65 NEUTRAL SETTLED TAILINGS

TOTAL FLOW = 277535.87 # 1.000 LBS/HR. OR 337.787 GPM ---- GPM LIQ = 187.606 GPM SOLIDS = 150.181
TEMPERATURE = 80.22 DEG F SP.GR. = 1.64326 SP.GR. LIQ = 1.03451 SP.GR. SOLIDS = 2.40000
FRACTION SOLIDS = 0.650000

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	97137.62	89661.69	0.91	5026.24	0.00	2360.40	0.0	0.0	0.00	88.31
SOLID	180398.31	0.0	0.0	0.0	0.0	0.0	0.0	180398.19	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		92.30383	0.00094	5.17435	0.00000	2.42996	0.0	0.0	0.00000	0.09091
GRAMS/LITER IN LIQUOR		954.503	0.010	53.507	0.000	25.128	0.0	0.0	0.000	0.940

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	180398.19	0.0	0.0

STREAM # 66

TOTAL FLOW = 234041.69 # 1.000 LBS/HR. OR 452.013 GPM ---- GPM LIQ = 452.014 GPM SOLIDS = 0.0
TEMPERATURE = 80.22 DEG F SP.GR. = 1.03555 SP.GR. LIQ = 1.03451 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	234041.50	216029.25	2.19	12110.13	0.00	5687.10	0.0	0.0	0.00	212.77
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		92.30383	0.00094	5.17435	0.00000	2.42996	0.0	0.0	0.00000	0.09091
GRAMS/LITER IN LIQUOR		954.504	0.010	53.507	0.000	25.128	0.0	0.0	0.000	0.940

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 67

TOTAL FLOW = 238541.62 # 1.000 LBS/HR. OR 461.896 GPM ---- GPM LIQ = 461.897 GPM SOLIDS = 0.0
TEMPERATURE = 81.92 DEG F SP.GR. = 1.03288 SP.GR. LIQ = 1.03184 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	238541.44	216029.25	2.19	12110.13	2435.40	5687.10	0.0	0.0	2064.60	212.77
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		90.56256	0.00092	5.07674	1.02095	2.38411	0.0	0.0	0.86551	0.08920
GRAMS/LITER IN LIQUOR		934.081	0.009	52.363	10.530	24.590	0.0	0.0	8.927	0.920

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 68

TOTAL FLOW = 238541.62 # 1.000 LBS/HR. OR 448.289 GPM ---- GPM LIQ = 444.387 GPM SOLIDS = 3.903
TEMPERATURE = 81.92 DEG F SP.GR. = 1.06423 SP.GR. LIQ = 1.04528 SP.GR. SOLIDS = 3.10000
FRACTION SOLIDS = 0.025384

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	232486.31	216029.25	2.19	9082.60	2435.40	2659.57	0.0	0.0	2064.60	212.77
SOLID	6055.07	0.0	0.0	3027.53	0.0	3027.53	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		90.56256	0.00092	3.80755	1.02095	1.11493	0.0	0.0	0.86551	0.08920
GRAMS/LITER IN LIQUOR		970.886	0.010	40.819	10.945	11.953	0.0	0.0	9.279	0.956

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	6055.07

STREAM # 69

TOTAL FLOW = 238541.62 # 1.000 LBS/HR. OR 438.742 GPM ---- GPM LIQ = 408.736 GPM SOLIDS = 30.007
TEMPERATURE = 81.92 DEG F SP.GR. = 1.08739 SP.GR. LIQ = 1.08535 SP.GR. SOLIDS = 1.09912
FRACTION SOLIDS = 0.069201

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	222033.94	213842.56	2.19	3252.27	0.00	2659.57	0.0	0.0	2064.60	212.77
SOLID	16507.43	2186.63	0.0	8857.86	2435.40	3027.53	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		89.64580	0.00092	1.36340	0.00000	1.11493	0.0	0.0	0.86551	0.08920
GRAMS/LITER IN LIQUOR		1044.885	0.011	15.891	0.000	12.995	0.0	0.0	10.088	1.040

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	10452.36	0.0	0.0	0.0	0.0	6055.07

UNC URANIUM PROCESS: LIME NEUTRALIZATION ALTERNATIVE

STREAM # 80

TOTAL FLOW = 238541.62 * 1.000 LBS/HR. OR 470.046 GPM ---- GPM LIQ = 440.040 GPM SOLIDS = 30.007
TEMPERATURE = 86.35 DEG F SP.GR. = 1.01497 SP.GR. LIQ = 1.00814 SP.GR. SOLIDS = 1.09912
FRACTION SOLIDS = 0.069201

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	222033.94	216028.56	2.19	3252.27	0.00	2538.12	0.0	0.0	0.00	212.77
SOLID	16507.43	2186.63	0.0	8857.86	2435.40	3027.53	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONCENTRATION IN LIQUOR , %		97.29528	0.00099	1.46476	0.00000	1.14312	0.0	0.0	0.00000	0.09583
GRAMS/LITER IN LIQUOR		980.475	0.010	14.761	0.000	11.520	0.0	0.0	0.000	0.966

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	10452.36	0.0	0.0	0.0	0.0	6055.07

STREAM # 81 EVAPORATION FROM THICKENER

TOTAL FLOW = 0.0 # 1.000 LBS/HR. OR 0.0 GPM ---- GPM LIQ = 0.0 GPM SOLIDS = 0.0
TEMPERATURE = 70.00 DEG F SP.GR. = 0.0 SP.GR. LIQ = 0.0 SP.GR. SOLIDS = 0.0
FRACTION SOLIDS = 0.0

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOLID	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CONCENTRATION IN LIQUOR , %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GRAMS/LITER IN LIQUOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	0.0	0.0	0.0	0.0	0.0	0.0

STREAM # 82 SOLIDS FROM THICKENER

TOTAL FLOW = 33014.83 # 1.000 LBS/HR. OR 62.723 GPM ---- GPM LIQ = 32.715 GPM SOLIDS = 30.007
TEMPERATURE = 86.35 DEG F SP.GR. = 1.05272 SP.GR. LIQ = 1.00814 SP.GR. SOLIDS = 1.09912
FRACTION SOLIDS = 0.500000

PHASE AND COMPONENT MASS FLOWS IN 1.000 LBS/HR.

PHASE	TOTAL	WATER	U3O8-EQ	SULPHATE	CALCIUM	SOLUBLES	SOLVENT	INSOLS	OH-	CHLOR
AQUEOUS	16507.41	16060.94	0.16	241.79	0.00	188.70	0.0	0.0	0.00	15.82
SOLID	16507.41	2186.63	0.0	8857.86	2435.40	3027.53	0.0	0.0	0.0	0.0
ORGANIC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VAPOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CONCENTRATION IN LIQUOR , %	97.29530	0.00099	1.46476	0.00000	1.14312	0.0	0.0	0.00000	0.09583
GRAMS/LITER IN LIQUOR	980.474	0.010	14.761	0.000	11.520	0.0	0.0	0.000	0.966

SOLID PHASE NAME	GYPSUM	U3O8-EQ	SOLUBLES	INSOLS	LIME	FE PPT
SOLID MASS FLOW	10452.36	0.0	0.0	0.0	0.0	6055.07