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GENERAL ELECTRIC
COMPANY

HW-35055

-1-

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By Authority of

February 9, 1955

W. J. Browne, Superintendent
Plant Processes and Utilities
Separations Section
MANUFACTURING DEPARTMENT

ADDENDUM TO PRODUCTION TEST 221-T-19,
"REDUCTION OF TIME CYCLE IN DISSOLVER SECTION"

Although laboratory data indicated that the uranium could be separated from the plutonium in the extraction section by precipitation of the plutonium in the valence IV state with bismuth phosphate at a hydrogen ion concentration of 1.1 molar, the seventeen runs processed under this production test indicate that this hydrogen ion concentration cannot exceed 0.85 molar to maintain the average waste losses at 1.5 per cent of a run or less. The seventeen runs also indicated that the moles of nitric acid per mol of uranium dissolved was 5.16. With these two factors included, the attached flowsheet has been calculated for the proposed processing of uranium through the extraction step.

It is recommended that this flowsheet be followed when the production test is resumed. The specific changes from the old flowsheet are:

- (a) Charge dissolver with 1050 eight inch slugs.
- (b) Add 12,185 lbs. of 60 per cent nitric acid per cut.
- (c) Add 2500 lbs. of dilution water per cut.
- (d) Add 33 oz. of mercuric nitrate per cut.
- (e) Dissolve to a specific gravity of 1.71 with the dissolver boiling. Estimated boiling point is 112 C.

It is also recommended that the dissolvers be operated as fast as possible once the acid is added, instead of dissolving to just meet the demand for metal solution. This type of operation will demonstrate the maximum dissolving capacity of the plant.

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MASTER

H. C. Schmidt
Plant Processes Sub-Section
ENGINEERING DEPARTMENT

WC Schmidt:et

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4285# NO & NO₂
8300# U
24370# 60% HNO₃

Dissolver			
UN	13750	48.4	2.1 M
HNO ₃	3248	11.5	3.1
H ₂ O	11370	40.1	
	28368	100.0	
Sp.G. 1.71 BP 112			
Gal. 1990 FP 35°C			

4-8			
UN	13750	38.2	1.45
HNO ₃	3270	9.1	2.16
H ₂ O	18955	52.7	
	36005	100.0	
Sp.G. 1.49 FP 2°C			
Gal. 2890			

4-7			
UN	13750	37.2	2.38
HNO ₃	3270	8.8	2.05
H ₂ O	20035	54.0	
	37055	100.0	
Sp.G. 1.46 FP -4°C			
Gal. 3040			

6-1			
UN	13750	36.0	1.32
HNO ₃	3270	8.6	1.97
H ₂ O	21145	55.4	
	38165	100.0	
Sp.G. 1.44 FP -10°C			
Gal. 3170			

Dissolver			
After D11 H ₂ O Added			
UN	13750	41.1	1.82 M
HNO ₃	3248	9.8	2.41
H ₂ O	16370	49.1	
	33368	100.0	
Sp.G. 1.55 FP 10°C			
Gal. 2590			

D11 H₂O
5000#

Jet D11
1080# H₂O

Jet D11
1110

Jet D11
440# H₂O

380# H₂O

Jet D11
1000#

100# H₂O

37# 60% HNO₃

D11 H₂O
2756

83# H₂SO₄
262# H₂O

606#
151# NaNO₂
455# H₂O

9300# (7440# H₂O)
20% (1860# H₂SO₄)
Soln.

1500# wash

7-1			
UN	5340	17.4	0.57 M
HNO ₃	1270	4.1	2.84
H ₂ O	20862	67.7	
NaNO ₂	186	0.6	0.09
Na ₂ SO ₄	1860	6.0	0.55
BiONO ₃	83	0.3	0.01
H ₃ PO ₄	1200	3.9	0.51
Sp.G. 1.30			
Gal. 2840			

6-3			
UN	5340	21.2	
HNO ₃	1270	5.1	
H ₂ O	16535	65.7	
Na ₂ SO ₄	1860	7.4	
NaNO ₂	151	0.6	
	25156	100.0	
Sp.G. 1.33			
Gal. 2270			

100# H₂O
Flush

155# 73#
1200# H₃PO₄
454# H₂O

Jet D11
755# H₂O

UN-35055

END

DATE

FILMED

3/28/94