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HW-80202

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DATE January 2, 1964

GENERAL ELECTRIC

HANFORD ATOMIC PRODUCTS OPERATION - RICHLAND, WASHINGTON

REDOX WEEKLY PROCESS REPORTS
JANUARY THROUGH DECEMBER, 1964

AUTHOR

R.E. Isaacson

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REDOX WEEKLY PROCESS REPORTS

JANUARY THROUGH DECEMBER, 1964

R. E. Isaacson

January 2, 1964

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EW-80202

No. 615

SUMMARY OF 202-S BLDG. OPERATION
FROM 0000 1-1-64 TO 2400 1-11-64

I. PRODUCTION

U Shipped 68.94 LAF Processed 69.88 Charged 76.44 E-metal

Pu Loaded 34890, including 7390 high in U which will be reworked.

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe(ppm)	Na(ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>1.9</u>	<u>3.84²</u>	<u>17.0</u>	<u>1.0</u>	<u>0.42</u>		<u>9.0</u>	<u>0</u>
Average	<u>3.9</u>	<u>1.77⁴</u>	<u>52.9</u>	<u>1.3</u>	<u>0.87</u>		<u>14.9</u>	<u>29.3</u>
Maximum	<u>17.0</u>	<u>1.25⁵</u>	<u>89.9</u>	<u>2.5</u>	<u>2.16</u>		<u>41.0</u>	<u>80.0</u>

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>0.005</u> %	U <u>38</u> Lbs.	<u>0.03</u> %	U <u>224</u> Lbs.	<u>0.17</u> %
Pu	<u>0.10</u> %	Pu <u>74</u> Gms.	<u>0.15</u> %	Pu <u>64</u> Gms.	<u>0.17</u> %
		Gallons <u>73447</u>		Gallons <u>10386</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.3</u>	<u>1.3</u>
Partition Cycle	<u>2.1</u>	<u>2.2</u>
Third U	<u>1.6</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.2</u>
Third Pu	<u>-</u>	<u>1.8</u>
Tail End	<u>1.8</u>	<u>-</u>
Total	<u>6.8</u>	<u>7.5</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>953</u>	<u>791</u>	<u>858</u>
Cooling Time	<u>501</u>	<u>243</u>	<u>353</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>4758</u>	<u>96</u>	<u>0.20</u>	<u>16</u>	<u>0.01</u>	<u>1</u>
HE	Sump Waste	<u>8012</u>	<u>16</u>	<u>0.03</u>	<u>31</u>	<u>0.02</u>	<u>11</u>
HE	Recycle	<u>-</u>	<u>550</u>	<u>1.12</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column							
E-3 or E-1							

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-3-

HW-80202
No. 615

a. Flowsheet

1) 1A-1S Parallel operation with equal rates:

1AF: 2AW: 1ABS: 1AX: 1AX HNO₃: 1AWR: 2EX: 2EX Butt =
89: 56: 140: 464: 0.15M : 32 : 110: 20

1SF: 1SA: 1SBS: 1SX: 1SX HNO₃: 1SWR =
89: 25: 140: 409: 0.15M : 229

2) 1A only operation:

1AF: 2AW: 1ABS: 1AX: 1AX HNO₃: 1AWR: 2EX: 2EX Butt =
89: 28: 140: 414: 0.15M : 105: 110: 20

2DFS: 2DA: 2DX: 2DO: 2DWR: 1EX: 1BS: 1BS HNO₃: 1CX =
160: 20: 400: 40: 55: 23: 82: 0.3M : 130

2AF: 2AS: 2AX: 2AX HNO₃: 2EX: E-5 Butt =
23: 5: 16: 0.25M : 9: 0.19

3DF: 3DA: 3DS: 3DX: 3EX: 1CX =
89: 25: 16: 328: 105: 50

3AF: 3AS: 3AX: 3AX HNO₃: 3EX: E-2-A Butt =
16: 5: 12: 0.1M : 13: 7

b. Stream Compositions

1) 1A-1S parallel operation with equal rates:

Stream	URE	AME	HNO ₃	Na ₂ Cr ₂ O ₇	NaNO ₃	Na ₂ SO ₃ H	Fe(NH ₂ SO ₃) ₂	Hexone
1A(S)F	2.25	-	0.23	0.07	-	-	-	-
1A(S)BS	-	1.55	0.29	0.032	2.49	0.0045	-	-
1A(S)X	-	-	0.2	-	-	-	-	100%
1SA	-	1.3	-	0.0093	-	-	-	-
2DFS	1.38	0.79	-0.44	0.026	1.73	0.003	-	-
2DWR	-	1.00	-0.47	0.028	1.84	0.0029	-	-
1AW	-	1.09	0.07	0.023	1.37	0.027	-	-

2) 1A only operation:

1AF	2.25	-	0.23	0.07	-	-	-	-
1ABS	-	1.54	0.29	0.047	2.42	0.026	-	-
1AX	-	-	0.2	-	-	-	-	-
2DFS	1.38	0.80	-0.44	0.026	1.72	0.003	-	-
2DWR	-	1.01	-0.47	0.028	1.82	0.003	-	-
1AW	-	1.06	0.07	0.035	1.48	0.029	-	-

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HW-80202
No. 615

2) 1A only operation - cont.

Stream	UOH	ANH	HNO ₃	Na ₂ Cr ₂ O ₇	NaNO ₃	NH ₂ SO ₃ H	Fe(NH ₂ SO ₃) ₂	Hexons
2EX	Demineralized H ₂ O							
2EX Butt	-	-	-	0.18	-	-	-	-
D-14 HNO ₃	-	-	-	-	-	-	-	-
Butt	-	-	7.9	-	-	-	-	-
2DO	-	-	0.2	-	-	-	-	100%
2DA	-	1.3	0.48	-	-	-	-	-
2DX	-	-	-	-	-	-	-	100%
1EX	-	1.1	0.48	-	-	-	0.07	-
1ES	-	-	0.3	-	-	-	-	100%
1CX	Demineralized H ₂ O							
3DF	2.49	-	-0.57	-	1.10	-	-	-
3DS	-	2.5	-0.27	-	-	-	-	-
3DA	-	-	-	-	-	-	0.0054	-
3DX	-	-	-	-	-	-	-	100%
3EX	Demineralized H ₂ O							
2AF	-	1.04	0.29	0.008	-	0.132	-	-
E-5 Na ₂ Cr ₂ O ₇ -	-	-	-	2.1	-	-	-	-
Butt	-	-	-	-	-	-	-	-
2AS	-	2.0	0.135	-	-	-	-	-
2AX	-	-	0.25	-	-	-	-	100%
2EX	-	-	0.60	-	-	-	-	-
E-2-A Butt	-	2.5	-0.27	-	-	-	-	-
3AF	-	1.09	0.44	-	-	-	-	-
3AS	-	2.0	0.135	-	-	-	-	-
3AX	-	-	0.1	-	-	-	-	100%
3EX	-	-	0.60	-	-	-	-	-

c. Extraction Rates

From	To	1A	1B	Remarks
0000 1-1-64	0115 1-1-64	8	-	
0115 1-1-64	1225 1-1-64	0	-	F-7 pump replacement
1225 1-1-64	0145 1-6-64	8	-	
0145 1-6-64	2100 1-6-64	0	-	F-7 pump replacement
2100 1-6-64	1600 1-7-64	8	-	
1600 1-7-64	2020 1-8-64	0	-	Reworking plutonium con-
2020 1-8-64	2400 1-11-64	8	-	centrated with uranium.

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d. Dissolvers

Following are the radiolabeling data for the report period:

Period Ending at 1000	Netal Dissolved mg, days	Cycles of 1-131 Available To Stock
--------------------------	-----------------------------	--

1-6-64 (2 days)	243-494	None	7 0.00035
1-3-64	244-495	"	7 0.00027
1-4-64	294-497	"	7 0.00033
1-6-64 (2 days)	270-498	"	7 0.00056
1-7-64	272-500	"	7 0.00026
1-8-64	273-501	"	7 0.00026
1-9-64	274-333	"	7 0.00028
1-10-64	251-334	"	7 0.00029
1-11-64	252-335	"	7 0.00036

The A-2 and B-2 dissolver heads were removed on 12-31-63 and 1-1-64 at the completion of sharking of the special test material from H-Area. The 293-6 Building recovered 63,568 pounds of 100 percent nitric acid during the report period with an average concentration of 44.6 percent.

e. Solvent Extraction

During the shutdown on 1-6-64, the 1A, 1B and 2D columns were flushed with 10 percent acid. Following the startup on 1-6-64, the plutonium product solution was found to be contaminated up to 500,000 parts uranium per million parts of plutonium. This out of specification plutonium material was recycled back to F-2 with a corresponding amount of uranium to maintain a safe plutonium to uranium ratio and re-processed through the partition cycle.

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Following are the waste storage tank data for the report period.

	<u>105-SX</u>	<u>107-SX**</u>	<u>108-SX</u>	<u>109-SX</u>	<u>110-SX</u>	<u>111-SX</u>	<u>112-SX</u>	<u>115-SX</u>
Liquid Level	19'1-3/8"	13'7-1/4"	20'6-1/2"	22'1-1/4"	22'1-1/2"	19'1"	22'4-3/4"	21'7-3/4"
Bulb 1" Sludge Temperature	121 F	264 F	285 F	283 F	232 F	240 F	274 F	211 F
Scanner 1" Sludge Temp.	-	268 F	311 F	292 F	292 F	246 F	285 F	223 F
2-Ft. Supernatant Temp.	-	221 F	252 F	250 F	214 F	205 F	217 F	197 F
Supernatant Temp. Gradient*	-	2 F	3 F	17 F	5 F	3 F	5 F	2 F
No. of Circulators Operating	0	3	4	3	2	1	4	1-
Specific Gravity	1.26	1.41	1.58	1.57	1.55	1.52	1.57	-
Apparent Sludge Depth	-	0'11-1/2"	0'10-1/2"	1'5-1/2"	1'6"	3'1-1/2"	1'8-1/2"	0'8-1/4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 107-SX is the current salt waste receiver tank.

NOTE: Filling of the 108-SX tank was completed on 1-7-64. The 107-SX tank began filling on 1-8-64 with waste batch FW-23.

R. E. Isaacson
 R. A. Yoder
~~O. F. Hill Anti-Photo~~
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~~R. E. Merrill~~
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RW-80202
 No. 616

SUMMARY OF 202-S BLDG. OPERATION
 FROM 0000 1-12-64 TO 2400 1-18-64

I. PRODUCTION

U Shipped 45.18 LAF Processed 49.77 Charged 31.77 E-metal
 Pu Loaded 32500

II. PRODUCT PURITY

	Plutonium			Uranium			
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum	<u>0.7</u>	<u>168.0</u>	<u>26.0</u>	<u>1.0</u>	<u>0.35</u>	<u>7.0</u>	<u>0</u>
Average	<u>1.5</u>	<u>367.3</u>	<u>53.7</u>	<u>1.2</u>	<u>0.83</u>	<u>12.9</u>	<u>14.3</u>
Maximum	<u>2.4</u>	<u>890.0</u>	<u>86.0</u>	<u>2.0</u>	<u>1.60</u>	<u>28.0</u>	<u>49.0</u>

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>0.002</u> %	U <u>36</u> Lbs.	<u>0.04</u> %	U <u>140</u> Lbs.	<u>0.18</u> %
Pu	<u>0.02</u> %	Pu <u>29</u> Gms.	<u>0.09</u> %	Pu <u>40</u> Gms.	<u>0.18</u> %
		Gallons <u>43010</u>		Gallons <u>6774</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.5</u>	<u>1.5</u>
Partition Cycle	<u>2.0</u>	<u>2.3</u>
Third U	<u>1.5</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.5</u>
Third Pu	<u>-</u>	<u>1.5</u>
Tail End	<u>1.8</u>	<u>-</u>
Total	<u>6.8</u>	<u>7.8</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>953</u>	<u>768</u>	<u>847</u>
Cooling Time	<u>370</u>	<u>253</u>	<u>268</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>None</u>					
HE	Sump Waste	<u>6833</u>	<u>466</u>	<u>1.47</u>	<u>1706</u>	<u>1.69</u>	<u>25</u>
HE	Recycle	<u>-</u>	<u>954</u>	<u>2.96</u>	<u>-</u>	<u>-</u>	<u>-</u>
HE	IS Column	<u>2-7</u>	<u>2101</u>	<u>6.29</u>	<u>-</u>	<u>-</u>	<u>-</u>
HE	E-3 or E-1	<u>204-3 out of spec URE</u>	<u>-</u>	<u>-</u>	<u>8057</u>	<u>7.49</u>	<u>-</u>

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-8-

HW-80202
No. 616

a. Flowsheet and Stream Compositions

The flowsheet and stream compositions were the same as reported on pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 1-12-64	1550 1-13-64	8	
1550 1-13-64	0200 1-14-64	9	
0200 1-14-64	0400 1-15-64	8	F-4 pump capacity limiting
0400 1-15-64	1100 1-15-64	7	1A Column starting to flood
1100 1-15-64	0200 1-16-64	0	Flushing 1A Column and replacing F-4 pump
0200 1-16-64	1800 1-18-64	8	
1800 1-18-64	2400 1-18-64	7	D-14 pump capacity limiting

c. Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stack</u>
1-13-64 (2 days)	253-285	None	< 0.00053
1-14-64	254-286	"	< 0.00029
1-15-64	255-287	"	< 0.00055
1-16-64	256-370	"	< 0.00030
1-17-64	228-282	"	< 0.00028

The 293-B Building recovered 39,196 pounds of 100 percent nitric acid during the report period with an average concentration of 44.0 percent.

The triple valve jumper on the B-2 off-gas system failed. The heel was removed from the dissolver and the dissolver shut down for repair or replacement of the jumper.

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No. 616

d. Solvent Extraction

Processing through solvent extraction was satisfactory. Product quality and waste losses were kept under good control. The process was shut down for 15 hours on 1-15-64 to complete a 10 percent acid flush of the 1A Column and replace the F-4 feed pump which was limiting rates.

Following are the waste storage tank data for the report period.

	<u>105-SX</u>	<u>107-SX**</u>	<u>108-SX</u>	<u>109-SX</u>	<u>110-SX</u>	<u>111-SX</u>	<u>112-SX</u>	<u>115-SX</u>
Liquid Level	18'11-1/4"	14'9-1/2"	20'4"	22'3-1/4"	22'7-1/4"	19'-3/4"	22'4-1/4"	21'7-1/2"
Bulb 1" Sludge Temperature	120 F	264 F	286 F	282 F	232 F	240 F	279 F	211 F
Scanner 1" Sludge Temp.	-	263 F	311 F	293 F	294 F	249 F	288 F	228 F
2-Ft. Supernatant Temp.	-	221 F	253 F	252 F	213 F	206 F	221 F	201 F
Supernatant Temp.Gradient*	-	2 F	3 F	20 F	5 F	0 F	6 F	3 F
No. of Circulators Operating	0	3	4	3	2	1	4	1
Specific Gravity	1.28	1.43	1.60	1.57	1.54	1.52	1.57	-
Apparent Sludge Depth	-	0'11"	0'10-1/2"	1'5-1/2"	1'6-1/2"	3'2"	1'8-1/2"	0'10-1/2"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 107-SX is the current salt waste receiver tank.

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EX-80202
No. 616

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IN-80202

No. 617

R. E. Isaacson
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 R. E. Tomlinson
~~E. T. Martin~~
 O. F. Beaulieu

-11-

SUMMARY OF 202-S BLDG. OPERATION
 FROM 0000 1-19-64 TO 2400 1-25-64

I. PRODUCTION

U Shipped 30.51 LAF Processed 27.29 Charged 40.50 E-metal
 Pu Loaded 17490

II. PRODUCT PURITY

	Plutonium		Uranium				
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum	<u>0.9</u>	<u>3.92²</u>	<u>28.0</u>	<u>1.0</u>	<u>0.18</u>	<u>1</u>	<u>22.0</u>
Average	<u>2.2</u>	<u>1.28³</u>	<u>51.2</u>	<u>1.4</u>	<u>0.85</u>	<u>27.2</u>	<u>34.5</u>
Maximum	<u>3.8</u>	<u>2.82³</u>	<u>92.0</u>	<u>3.0</u>	<u>2.08</u>	<u>181.0</u>	<u>48.0</u>

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>0.007</u> %	U <u>24</u> Lbs.	<u>0.04</u> %	U <u>84</u> Lbs.	<u>0.13</u> %
Pu	<u>0.005</u> %	Pu <u>15</u> Gms.	<u>0.09</u> %	Pu <u>32</u> Gms.	<u>0.13</u> %
		Gallons <u>23049</u>		Gallons <u>6341</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.3</u>	<u>1.3</u>
Partition Cycle	<u>2.1</u>	<u>2.1</u>
Third U	<u>1.7</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.8</u>
Third Pu	<u>-</u>	<u>1.6</u>
Tail End	<u>1.8</u>	<u>-</u>
Total	<u>6.9</u>	<u>7.8</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>899</u>	<u>517</u>	<u>828</u>
Cooling Time	<u>250</u>	<u>198</u>	<u>226</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
HE	Sump Waste	<u>6865</u>	<u>8</u>	<u>0.05</u>	<u>21</u>	<u>0.04</u>	<u>5</u>
HE	Recycle	<u>-</u>	<u>3125</u>	<u>15.27</u>	<u>-</u>	<u>-</u>	<u>-</u>
HE	LS Column	<u>204-3 out of spec.</u>	<u>UNK</u>	<u>-</u>	<u>7891</u>	<u>12.63</u>	<u>-</u>
	E-3 or E-1	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>

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-12-

EW-80202
No. 617

a. Flowsheet and Stream Compositions

The flowsheet and stream compositions are the same as reported on pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 1-19-64	0200 1-19-64	7	
0200 1-19-64	2030 1-21-64	0	Replacing D-14 pump
2030 1-21-64	2400 1-25-64	8	

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stack</u>
1-20-64 (3 days)	229-283	None	∠ 0.00093
1-21-64	No dissolving	"	∠ 0.00026
1-22-64	233	"	∠ 0.00026
1-23-64	234	"	∠ 0.00027
1-24-64	235	"	∠ 0.00028
1-25-64	236-254	"	∠ 0.00034

The 293-B Building recovered 20,771 pounds of 100 percent nitric acid during the report period with an average concentration of 43.1 percent.

The B-2 dissolver off-gas jumper (H-2-30751) was replaced (the old one was repaired but still leaked) on 1-23-64. Two thermochu jumpers for nozzles BG-10 and BG-23 were also installed. The dissolver was again placed in service on 1-24.

d. Solvent Extraction

Waste losses and products quality were kept under good control during the report period.

e. Equipment

The hold-down nuts on the D-14 pump froze and it was necessary to remove both the pump and cooler. The pump was removed from the cooler by the Waste Handling and Decontamination crew at T-Plant. Approximately 76 hours were lost replacing the D-14 pump.

The J-6 hexone recovery scrubber was put into operation during the report period.

Following are the waste storage tank data for the report period.

	<u>105-SX</u>	<u>107-SX**</u>	<u>108-SX</u>	<u>109-SX</u>	<u>110-SX</u>	<u>111-SX</u>	<u>112-SX</u>	<u>115-SX</u>
Liquid Level	18'9-3/8"	15'6"	20'2-3/4"	22'5-1/4"	22'6-1/2"	19'-1/2"	22'3-1/4"	21'7"
Bulb 1" Sludge Temperature	124 F	261 F	287 F	281 F	229 F	239 F	277 F	211 F
Scanner 1" Sludge Temperature	-	262 F	310 F	292 F	291 F	252 F	289 F	231 F
2-Ft. Supernatant Temperature	-	221 F	252 F	257 F	211 F	212 F	225 F	204 F
Supernatant Temp. Gradient*	-	1 F	2 F	27 F	5 F	3 F	6 F	3 F
No. of Circulators Operating	0	3	4	3	2	1	4	1
Specific Gravity	1.28	1.42	1.59	1.57	1.54	1.52	1.57	-
Apparent Sludge Depth	-	0'9-1/2"	0'10-1/2"	1'5-1/2"	1'4"	3'2"	1'8-1/2"	0'10-1/2"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 107-SX is the current salt waste receiver tank.

NOTE: A flow regulator for continuous water addition to the 108-SX tank was installed on 1-23-64.

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EM-80202
No. 617

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NY-80232

No. 618

-14-

SUMMARY OF 202-S BIDG. OPERATION
 FROM 0000 1-26-64 TO 2400 2-1-64

I. PRODUCTION

U Shipped 44.77 IAF Processed 45.46 Charged 49.08 E-metal
 Pu Loaded 27540

II. PRODUCT PURITY

	Plutonium		Uranium				
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum	<u>1.6</u>	<u>133.0</u>	<u>46.0</u>	<u>0.6</u>	<u>0.49</u>	<u>10.0</u>	<u>25.0</u>
Average	<u>3.4</u>	<u>205.8</u>	<u>93.5</u>	<u>1.0</u>	<u>1.04</u>	<u>13.6</u>	<u>59.5</u>
Maximum	<u>6.0</u>	<u>313.0</u>	<u>119.0</u>	<u>1.3</u>	<u>2.41</u>	<u>23.0</u>	<u>118.0</u>

III. WASTE

<u>Extraction Losses</u>		<u>To Underground Storage</u>		<u>Coating Waste Losses</u>	
U	<u>0.009</u> %	U <u>20</u> Lbs.	<u>0.02</u> %	U <u>168</u> Lbs.	<u>0.15</u> %
Pu	<u>0.02</u> %	Pu <u>13</u> Gms.	<u>0.05</u> %	Pu <u>48</u> Gms.	<u>0.15</u> %
		Gallons <u>44191</u>		Gallons <u>10710</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.2</u>	<u>1.2</u>
Partition Cycle	<u>2.0</u>	<u>2.2</u>
Third U	<u>1.7</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.7</u>
Third Pu	<u>-</u>	<u>1.5</u>
Tail End	<u>2.0</u>	<u>-</u>
Total	<u>6.9</u>	<u>7.6</u>

V. METAL HISTORY

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
MWD/T	<u>1014</u>	<u>662</u>	<u>803</u>
Cooling Time	<u>305</u>	<u>136</u>	<u>212</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>3846</u>	<u>2</u>	<u>0.007</u>	<u>5</u>	<u>0.005</u>	<u>21</u>
HE	Sump Waste	<u>6070</u>	<u>2391</u>	<u>7.77</u>	<u>8433</u>	<u>8.49</u>	<u>32</u>
HE	Recycle	<u>-</u>	<u>576</u>	<u>1.99</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column	<u>-</u>	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
E-3 or E-1	<u>-</u>	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>

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EW-80202
No. 618

a. Flowsheet and Stream Compositions

The flowsheet and stream compositions were the same as reported on pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 1-26-64	0300 1-31-64	8	
0300 1-31-64	2245 1-31-64	0	Acid flushing 1A, 1B, 2D
2245 1-31-64	2400 2-1-64	8	

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved avg, days</u>	<u>Curies of I-131 Available</u>	<u>To Stack</u>
1-27-64 (2 days)	158-260	1.0	0.0082
1-28-64	160-239	0.4	0.016
1-29-64	173-240	None	0.015
1-30-64	136-241	4.2	0.020
1-31-64	225-304	None	0.0081
2-1-64	226-305	None	0.084

The 293-B Building recovered 50,094 pounds of 100 percent nitric acid during the report period with an average concentration of 45.3 percent.

High differential pressure across the A-4 filter limited dissolution in the A-2 dissolver during the report period. When repeated water flushing and steaming failed to remove a suspected pluggage, the filter was replaced on 2-1-64.

d. Solvent Extraction

The process was operated at an 8 rate during the entire report period except for 20 hours on 1-31-64. At that time the process was shut down in order to flush the 2D Column which had been flooding. The 1A and 1B Columns were also flushed.

The F-7 precycle pump failed and was replaced on 1-27-64. No lost time was incurred since the precycle feed was transferred to the F-8 tank, 1B Column operation during the F-7 pump changeout.

The waste losses and products quality were maintained under good control although some waste rework was necessary (via the 1B Column) because of batches high in neptunium content.

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EW-80202
No. 618

-16-

Following are the waste storage tank data for the report period.

	<u>105-EX</u>	<u>107-EX**</u>	<u>108-EX</u>	<u>109-EX</u>	<u>110-EX</u>	<u>111-EX</u>	<u>112-EX</u>	<u>115-EX</u>
Liquid Level	18'6-3/8"	16'9-1/2"	20'8-1/4"	22'3-3/4"	22'6-1/4"	19'-1/4"	22'2-3/4"	21'6-3/4"
Bull 1" Sludge Temperature	123 F	260 F	289 F	282 F	228 F	239 F	278 F	211 F
Scumner 1" Sludge Temperature	-	268 F	314 F	292 F	290 F	246 F	282 F	225 F
2-Ft. Supernatant Temperature	-	223 F	250 F	246 F	212 F	206 F	219 F	198 F
Supernatant Temp. Gradient*	-	6 F	4 F	15 F	4 F	3 F	7 F	3 F
No. of Circulators Operating	0	3	4	3	2	1	4	1
Specific Gravity	1.26	1.42	1.60	1.57	1.54	1.52	1.57	-
Apparent Sludge Depth	-	0'8-1/2"	0'10-1/2"	1'6"	1'4"	3'2"	1'8"	0'10-1/2"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 107-EX is the current salt waste receiver tank.

NOTE: During the month of January, 1964, 106-EX condensate was pumped as follows: 107-EX 19,285 gal; 108-EX 54,412 gal; 110-EX 17,908 gal.
Continuous water additions were made to the following tanks:
108-EX 16,533 gal; 109-EX 22,762 gal; 112-EX 5,700 gal.

AUG 5 1964

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 -17-

HW-80202
 No. 619

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 2-2-64 TO 2400 2-8-64

I. PRODUCTION

U Shipped 56.43 IAF Processed 59.20 Charged 56.29 E-metal
 Pu Loaded 35120

II. PRODUCT PURITY

	Plutonium		Uranium				
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum	<u>1.1</u>	<u>15.0</u>	<u>41.2</u>	<u>0.6</u>	<u>0.51</u>	<u>3.0</u>	<u>21.0</u>
Average	<u>3.6</u>	<u>201.0</u>	<u>75.0</u>	<u>1.1</u>	<u>0.87</u>	<u>10.0</u>	<u>33.2</u>
Maximum	<u>5.5</u>	<u>495.0</u>	<u>150.5</u>	<u>1.6</u>	<u>1.05</u>	<u>15.0</u>	<u>55.0</u>

III. WASTE

<u>Extraction Losses</u>			<u>To Underground Storage</u>		<u>Coating Waste Losses</u>	
U	<u>0.02</u>	%	U <u>16</u>	Lbs. <u>0.01</u> %	U <u>195</u>	Lbs. <u>0.17</u> %
Pu	<u>0.06</u>	%	Pu <u>16</u>	Gms. <u>0.04</u> %	Pu <u>56</u>	Gms. <u>0.17</u> %
			Gallons <u>55085</u>		Gallons <u>12208</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.3</u>	<u>1.3</u>
Partition Cycle	<u>2.1</u>	<u>2.3</u>
Third U	<u>1.6</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.6</u>
Third Pu	<u>-</u>	<u>1.6</u>
Tail End	<u>1.9</u>	<u>-</u>
Total	<u>6.9</u>	<u>7.8</u>

V. METAL HISTORY

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
MWD/T	<u>968</u>	<u>698</u>	<u>848</u>
Cooling Time	<u>561</u>	<u>180</u>	<u>286</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
HE	Sump Waste	<u>4873</u>	<u>665</u>	<u>1.72</u>	<u>1625</u>	<u>1.35</u>	<u>21</u>
HE	Recycle	<u>-</u>	<u>816</u>	<u>2.10</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column	<u>-</u>	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
E-3 or E-1	<u>-</u>	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>

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NW-80202
No. 619

a. Flowsheet and Stream Compositions

Flowsheet and stream compositions were the same as stated on pages 3 and 4 of this report.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 2-2-64	1750 2-3-64	8	
1750 2-3-64	0500 2-6-64	9	
0500 2-6-64	1130 2-6-64	0	F-2 overflow restricted. parallel Extraction operation initiated on startup.
1130 2-6-64	1415 2-6-64	8	Parallel operation 1A & 1B on startup.
1415 2-6-64	2200 2-7-64	8	1A on virgin; 1B on rework
2200 2-7-64	1420 2-8-64	10	1A and 1B 50% each
1420 2-8-64	1830 2-8-64	0	F-2 overflow restricted
1830 2-8-64	2400 2-8-64	8	1A and 1B 40% each

c. Dissolvers

Following are the radiiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved Age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
2-4-64 (3 days)	140-307	4.2	0.029
2-5-64	204-561	None	0.037
2-6-64	205-562	None	0.025
2-7-64	189-392	None	0.015

The 293-S Building recovered 59,883 pounds of 100 percent nitric acid during the report period with an average concentration of 44.8 percent.

d. Solvent Extraction

Processing through solvent extraction was very satisfactory at an 8 rate; however, a restricted F-2 to F-1 overflow prevented continued operation at higher rates.

Operation of the precycle columns, 1A and 1B, in parallel was initiated on 2-6-64. When neptunium losses from the 1B Column, and a pressurization of the feed concentrator (H-4) generated several waste batches requiring rework, the virgin feed processing was transferred to the 1A Column while the process waste was reworked through 1B.

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-19-

HW-80202
No. 619

a. 233-S Building

During the cleanup and renovation of the 233-S Building following the fire of November 6, 1963, the plutonium inventories in L-3, L-4 and L-6 were loaded into FR Cans and the L-12 Concentrator was emptied to the L-10-F tank. Leaching of the plutonium from the L-18 Contactor with 0.6M HNO_3 was attempted in late November. When several leaks, particularly at the flange above the Osmart, were found leaching was stopped, and the contactor was drained to the IS-1 sump. Prior to start-up and during processing in December, 1963, approximately 1825 units of plutonium from 233-S vessel flanges and the IS-1 sump were returned to the process via the 202-S Building feed oxidizer tank (K 4).

Detailed study of pictures of the L-18 Contactor before and after the incident indicated that the contactor had expanded in several locations. This observation was confirmed by several actual measurements on 1-8-64. A proposed program for examination of the L-18 Contactor and associated 233-S materials was accepted on 1-15-64. This program included additional physical measurements, installation of flange guards and tightening flanges, contactor leaching, resin sampling and analysis, sampling and analysis of L-10-F, L-10-W, etc., and possible sectioning and inspection of a portion of the contactor. Leaching of the contactor was completed on 1-30-64. 225 gallons of 0.6M HNO_3 was used. Resin samples were obtained from the L-18 resin sampler, 7 inches below the top of the L-18 spool piece flange, 3 inches above and below the XAF feed tee, and 58 inches below the "C" valve stem. Attempts to sample resin immediately below the "B" and "C" valves found no resin present. The resin level was found to be approximately 5 feet below the "B" valve and 4.5 feet below the "C" valve.

Plutonium returned to the process from the contactor leaching and the greenhouse floor was approximately 525 units.

Following are the waste storage tank data for the report period.

	<u>105-GX</u>	<u>107-GX**</u>	<u>108-GX</u>	<u>109-GX</u>	<u>110-GX</u>	<u>111-GX</u>	<u>112-GX</u>	<u>115-GX</u>
Liquid Level	18'3-1/8"	17'9"	20'8"	22'2-1/4"	22'5-3/4"	19'-1/4"	21'1-3/4"	21'6-1/2"
Bulb 1" Sludge Temperature	120 F	265 F	269 F	282 F	227 F	240 F	278 F	211 F
Scanner 1" Sludge Temperature	-	266 F	313 F	291 F	287 F	244 F	277 F	223 F
2-Ft. Supernatant Temperature	-	225 F	250 F	235 F	212 F	205 F	218 F	196 F
Supernatant Temp. Gradient*	-	1 F	4 F	4 F	5 F	4 F	2 F	2 F
No. of Circulators Operating	0	3	4	3	2	1	4	1
Specific Gravity	1.28	1.41	1.56	1.57	1.55	1.52	1.57	-
Apparent Sludge Depth	-	0'9-1/2"	0'10-1/2"	1'6"	1'5"	3'2-1/4"	1'9"	0'10-1/2"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 107-GX is the current salt waste receiver tank.

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No. 619

AUG 5 1964

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HW-80202
No. 620

SUMMARY OF 202-S BLDG. OPERATION
FROM 0000 2-9-64 TO 2400 2-15-65

I. PRODUCTION

DUCTION
U Shipped 50.78 IAF Processed 51.60 Charged 57.96 E-metal
Pu Loaded 32694

II. PRODUCT PURITY

Plutonium			Uranium				
Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe (ppm)	Na (ppm)	
Minimum	3.7	1.22 ²	37.5	/ 1.0	0.72	8.0	0
Average	7.4	1.47 ³	133.6	/ 1.6	1.61	12.7	16.3
Maximum	9.4	3.20 ³	308.0	6.5	5.52	30.0	34.0

III. WASTE

<u>Extraction Losses</u>		<u>To Underground Storage</u>		<u>Coating Waste Losses</u>	
U	<u>0.02 %</u>	U	<u>19 Lbs. 0.02 %</u>	U	<u>196 Lbs. 0.17 %</u>
Pu	<u>0.01 %</u>	Pu	<u>20 Gms. 0.06 %</u>	Pu	<u>56 Gms. 0.17 %</u>
		Gallons	<u>54634</u>	Gallons	<u>9734</u>

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

<u>REACTION - LOG DF BY CYCLE</u>	<u>U</u>	<u>Pu</u>
Precycle	<u>1.3</u>	<u>1.3</u>
Partition Cycle	<u>1.9</u>	<u>2.3</u>
Third U	<u>1.6</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.4</u>
Third Pu	<u>-</u>	<u>1.4</u>
Tail End	<u>1.9</u>	<u>-</u>
Total	<u>6.7</u>	<u>7.4</u>

V. METAL HISTORY

<u>RY</u>	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
MWD/T	<u>997</u>	<u>647</u>	<u>817</u>
Cooling Time	<u>252</u>	<u>151</u>	<u>183</u>

VI. REWORK

<u>REWORK</u>		<u>Pu</u>			<u>U</u>		<u>Neptunium</u>
<u>Route</u>	<u>Source</u>	<u>Gallons</u>	<u>Grams</u>	<u>%</u>	<u>Lbs.</u>	<u>%</u>	<u>Grams</u>
HE	Salt Waste	<u>1937</u>	<u>2</u>	<u>0.006</u>	<u>1</u>	<u>0.001</u>	<u>7.3</u>
HE	Sump Waste	<u>2777</u>	<u>389</u>	<u>1.16</u>	<u>1294</u>	<u>1.24</u>	<u>59.0</u>
HE	Recycle	<u>-</u>	<u>1923</u>	<u>5.47</u>	<u>-</u>	<u>-</u>	<u>-</u>
18-600000	<u>204-3 Out of spec. UNH</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>3000</u>	<u>2.82</u>	<u>-</u>
E-3 or E-1	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>

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HW-80202
No. 620

a. Flowsheet and Stream Compositions

The flowsheet and stream compositions were the same as reported on pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 2-9-64	0600 2-9-64	8	1A - 1B parallel
0600 2-9-64	0900 2-9-64	10	" " "
0900 2-9-64	1100 2-9-64	4.5	1B; 1A down
1100 2-9-64	1245 2-9-64	10	1A - 1B parallel
1245 2-9-64	1915 2-9-64	0	F-2 overflow restricted and suspected U in Pu
1915 2-9-64	1900 2-10-64	8	1A; 1B on rework
1900 2-10-64	0700 2-11-64	10	1A - 1B parallel
0700 2-11-64	1200 2-11-64	8	1A; 1B down
1200 2-11-64	0530 2-13-64	8	1A - 1B parallel
0530 2-13-64	1800 2-13-64	9	" " "
1800 2-13-64	1300 2-14-64	0	1A, 1B & 2D 10% flush and replace J-6 pump
1300 2-14-64	0400 2-15-64	8	1A - 1B parallel
0400 2-15-64	2400 2-15-64	9	" " "

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
2-10-64 (3 days)	180-393	None	< 0.034
2-11-64	181-209	"	0.0070
2-12-64	193-252	"	0.013
2-13-64	143-237	2.0	0.073
2-14-64	144-252	0.7	0.045

The 293-B Building recovered 49,876 pounds of 100 percent nitric acid during the report period with an average concentration of 45.0 percent.

The A-2 south pot thermometer was replaced on 2-15-64.

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EW-86202
No. 620

423-

d. Solvent Extraction

Restriction of the F-2 to F-1 overflow continued to prevent sustained rates above 9. The precycle columns were shut down for 9 hours on 2-9-64 because of the restricted F-2 overflow and reported uranium above specification in the 3AF (E-1) sample. Laboratory re-runs failed to confirm the out of specification uranium but the 3AF and 3DF streams were recycled to F-2 while awaiting the re-run analyses. An additional shutdown of 19 hours was initiated on 2-13-64 for a 10 percent acid flush of the 1A, 1B and 2D Columns and the replacement of the failed J-6 hexone scrubber pump. A caustic wash of the O-2 hexone inventory was also completed during the shutdown. One waste batch, high in neptunium, was reworked through the 1B Column during the report period.

e. 233-S Building

A sample of the XAS solution taken at the XAS pump inlet found plutonium present at 2.4 g/l. The XAS feed tank (L-1) was drained and flushed to the 1B-1 sump on 2-7-64. Samples taken after 30, 60 and 90 percent was drained found Pu at 0.46, 0.45, and 0.45 g/l. Total chromium, as $\text{Na}_2\text{Cr}_2\text{O}_7 \cdot 2\text{H}_2\text{O}$, was present at 0.17, 0.25 and 0.19 g/l. The chromium was present as Cr^{+3} . It is apparent that pressurization of the L-1B Contactor forced solution from L-1B into the L-1 tank through the XAS pump.

A sample of the XAF feed tank (L-10-F) taken on 1-13-64 found Cr^{+6} at 1.7 g/l and Cr^{+3} at 4.9 g/l, both as $\text{Na}_2\text{Cr}_2\text{O}_7 \cdot 2\text{H}_2\text{O}$.

Screens in the XAF, XAS, XASR, XCP and XAW positions were removed from the contactor during the period 1-31 - 2-15-64. The XAW and XASR screens were ruptured; the others appeared undamaged. The backwash screen was removed later and also was undamaged. The gasket in the flange at the top of the 4-foot spool piece section was found to be missing and it is assumed that the pressure in the contactor was relieved when this gasket failed. Six samples of resin were taken from the greenhouse floor for examination and analyses. Resin samples were also taken from the XAF, XASR and XAW screens.

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HW-80202
No. 620

Following are the waste storage tank data for the report period.

	<u>105-SX</u>	<u>107-SX**</u>	<u>108-SX</u>	<u>109-SX</u>	<u>110-SX</u>	<u>111-SX</u>	<u>112-SX</u>	<u>115-SX</u>
Liquid Level	18'-1/4"	19'-1-3/4"	20'-6-1/2"	22'-3/4"	22'-5-1/4"	19'0"	22'1"	21'-6-1/4"
Bulb 1" Sludge Temperature	120 F	270 F	290 F	282 F	227 F	240 F	276 F	211 F
Scanner 1" Sludge Temp.	-	272 F	312 F	290 F	288 F	243 F	247 F	223 F
2-Ft. Supernatant Temp.	-	225 F	250 F	232 F	211 F	206 F	217 F	196 F
Supernatant Temp. Gradient*	-	1 F	4 F	4 F	5 F	6 F	6 F	0 F
No. of Circulators Operating	0	3	4	3	2	1	4	1
Specific Gravity	1.28	1.41	1.58	1.57	1.54	1.53	-	-
Apparent Sludge Depth	-	0'-7-1/2"	0'-10-1/2"	1'-6"	1'-6"	3'-2-1/2"	1'-8-1/2"	0'-11"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 107-SX is the current salt waste receiver tank.

R. E. Isaacson
R. A. Yoder
~~G. F. Hill~~
R. E. Tomlinson
~~E. W. Maxwell~~
O. F. Beaulieu

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HW-80202
No. 621

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 2-16-64 TO 2400 2-22-64

I. PRODUCTION

U Shipped 18.58 LAF Processed 19.20 Charged 16.56 E-metal
Pu Loaded 17777

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe (ppm)	Na (ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>9.9</u>	<u>576</u>	<u>144.0</u>	<u>/ 1.0</u>	<u>0.86</u>		<u>11.0</u>	<u>2.0</u>
Average	<u>26.8</u>	<u>666</u>	<u>156.2</u>	<u>/ 2.3</u>	<u>1.48</u>		<u>13.8</u>	<u>28.7</u>
Maximum	<u>42.7</u>	<u>704</u>	<u>170.8</u>	<u>4.9</u>	<u>2.40</u>		<u>20.0</u>	<u>56.0</u>

III. WASTE

Extraction Losses			To Underground Storage			Coating Waste Losses		
U	<u>0.04</u>	%	U	<u>12</u>	Lbs. <u>0.03</u> %	U	<u>54</u>	Lbs. <u>0.16</u> %
Pu	<u>0.10</u>	%	Pu	<u>18</u>	Gms. <u>0.15</u> %	Pu	<u>16</u>	Gms. <u>0.16</u> %
			Gallons	<u>30254</u>		Gallons	<u>2556</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.3</u>	<u>1.3</u>
Partition Cycle	<u>2.0</u>	<u>2.3</u>
Third U	<u>1.6</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.3</u>
Third Pu	<u>-</u>	<u>1.0</u>
Tail End	<u>2.0</u>	<u>-</u>
Total	<u>6.9</u>	<u>6.9</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>993</u>	<u>390</u>	<u>887</u>
Cooling Time	<u>233</u>	<u>136</u>	<u>182</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>1697</u>	<u>3</u>	<u>0.02</u>	<u>2</u>	<u>0.005</u>	<u>11</u>
HE	Sump Waste	<u>1966</u>	<u>1182</u>	<u>8.79</u>	<u>3637</u>	<u>8.65</u>	<u>18</u>
HE	Recycle	<u>-</u>	<u>378</u>	<u>2.99</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column		<u>None</u>					
E-3 or E-1		<u>None</u>					

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NW-80202
No. 621

a. Flowsheet and Stream Compositions

Flowsheet and stream compositions were the same as stated on pages 3 and 4 of this report.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 2-16-64	0600 2-16-64	9	1A -1B parallel
0600 2-16-64	1215 2-16-64	0	High gamma Pa product
1215 2-16-64	2100 2-16-64	8	1A - 1B parallel
2100 2-16-64	0640 2-17-64	8	1A; 1B down
0640 2-17-64	0630 2-18-64	0	D-14 pump
0630 2-18-64	1200 2-18-64	8	1A; 1B down
1200 2-18-64	0350 2-19-64	0	D-14 pump discharge jumper leak
0350 2-19-64	2030 2-19-64	8	1A; 1B on rework
2030 2-19-64	1015 2-22-64	0	H-4 pot replacement
1015 2-22-64	2400 2-22-64	8	1A

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
2-17-64 (3 days)	152-253	2.7	0.31
2-18-64	No dissolving	None	0.068
2-19-64	" "	None	0.067
2-20-64	" "	None	0.048
2-22-64 (2 days)	136-233	1.9	0.068

The 293-B Building recovered 14,983 pounds of 100 percent nitric acid during the report period with an average concentration of 43.5 percent.

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HW-80202
No. 621

-27-

d. Solvent Extraction

Virgin E-metal was processed only 36 percent of the operating period. Replacement of the D-14 pump and the H-4 pot required approximately 102 hours. The 1A and 1B Columns were given a 10 percent acid flush during the shutdown for the H-4 replacement. The O-2 hexone inventory was also caustic washed.

e. Equipment

The failed D-14 backcycle pump was replaced on 2-18-64. Shortly after start-up, a leak in the D-14 pump discharge jumper made it necessary to shut down for replacement of this jumper. An additional leak, the 1AB3 valve jumper, was also replaced on 2-18-64.

The leaking H-4 pot was replaced with a new one on 2-21-64.

D-Board controls for operation of D-Board at K-Panel were moved to K-Panel by 2-18-64.

f. 233-S Building

Three PR Cans of out of gamma specification plutonium were produced on 2-16-64.

The neptunium concentrator (1-2) was sampled on 2-18-64 to determine if its contents had been contaminated with plutonium product solution during the 233-S fire. Analyses indicated no contamination.

Following are the waste storage tank data for the report period.

	<u>105-EX</u>	<u>107-EX**</u>	<u>108-EX</u>	<u>109-EX</u>	<u>110-EX</u>	<u>111-EX</u>	<u>112-EX</u>	<u>115-EX</u>
Liquid Level	17'11-3/4"	19'4-3/4"	20'5-1/2"	22'4"	22'4-3/4"	18'11-3/4"	22'-1/4"	21'6"
Bulk 1" Sludge Temperature	120 F	270 F	290 F	282 F	229 F	239 F	269 F	211 F
Scanner 1" Sludge Temp.	-	271 F	310 F	289 F	287 F	241 F	230 F	221 F
2-Ft. Supernatant Temp.	-	227 F	250 F	236 F	210 F	206 F	214 F	193 F
Supernatant Temp. Gradient*	-	3 F	4 F	7 F	4 F	9 F	7 F	2 F
No. of Circulators Operating	0	3	4	3	2	1	4	1
Specific Gravity	1.28	1.32	-	1.57	1.54	1.52	-	1.62
Apparent Sludge Depth	-	0'8"	0'10-1/2"	1'5"	1'5-1/2"	3'2-1/2"	1'9-1/2"	0'11"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 107-EX is the current salt waste receiver tank.

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NO. 621

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NW-80202
No. 622

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 2-23-64 TO 2400 2-29-64

I. PRODUCTION

U Shipped 50.14 1AF Processed 49.14 Charged 40.15 K-metal
Pu Loaded 29680

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe (ppm)	Na (ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>7.3</u>	<u>1.06³</u>	<u>128.0</u>	<u>/ 1.0</u>	<u>0.98</u>		<u>7.0</u>	<u>22.0</u>
Average	<u>11.3</u>	<u>2.60³</u>	<u>166.5</u>	<u>/ 1.6</u>	<u>1.29</u>		<u>12.8</u>	<u>44.3</u>
Maximum	<u>18.3</u>	<u>5.26³</u>	<u>201.0</u>	<u>6.0</u>	<u>1.40</u>		<u>23.0</u>	<u>70.0</u>

III. WASTE

<u>Extraction Losses</u>			<u>To Underground Storage</u>			<u>Coating Waste Losses</u>		
U	<u>0.01</u>	%	U <u>49</u>	Lbs. <u>0.05</u>	%	U <u>168</u>	Lbs. <u>0.17</u>	%
Pu	<u>0.09</u>	%	Pu <u>20</u>	Gms. <u>0.06</u>	%	Pu <u>48</u>	Gms. <u>0.17</u>	%
			Gallons <u>43733</u>			Gallons <u>8435</u>		

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	<u>U</u>	<u>Pu</u>
Precycle	<u>1.2</u>	<u>1.2</u>
Partition Cycle	<u>2.1</u>	<u>2.4</u>
Third U	<u>1.5</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.5</u>
Third Pu	<u>-</u>	<u>1.4</u>
Tail End	<u>2.1</u>	<u>-</u>
Total	<u>6.9</u>	<u>7.5</u>

V. METAL HISTORY

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
MWD/T	<u>956</u>	<u>390</u>	<u>807</u>
Cooling Time	<u>306</u>	<u>127</u>	<u>197</u>

VI. REWORK

<u>Route</u>	<u>Source</u>	<u>Gallons</u>	<u>Pu</u>		<u>U</u>		<u>Neptunium</u>
			<u>Grams</u>	<u>%</u>	<u>Lbs.</u>	<u>%</u>	<u>Grams</u>
HE	Salt Waste	<u>None</u>					
HE	Sump Waste	<u>2522</u>	<u>3</u>	<u>0.009</u>	<u>4</u>	<u>0.004</u>	<u>1</u>
HE	Recycle	<u>-</u>	<u>1252</u>	<u>3.83</u>	<u>-</u>	<u>-</u>	<u>-</u>
<u>204-3 Out of spec. UNH</u>			<u>-</u>	<u>-</u>	<u>5175</u>	<u>5.0</u>	<u>-</u>
E-3 or E-1	<u>None</u>						

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NW-80202
No. 622

a. Flowsheet and Stream Compositions

The flowsheet and stream compositions were the same as reported on pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 2-23-64	2200 2-23-64	8	1A; 1S down
2200 2-23-64	0930 2-24-64	8	1A - 1S parallel
0930 2-24-64	0500 2-25-64	9	" " "
0500 2-25-64	1205 2-27-64	8	1A; 1S on rework
1205 2-27-64	1400 2-27-64	0	F-7 pump failed
1400 2-27-64	2340 2-27-64	8	1S; 1A down
2340 2-27-64	0530 2-28-64	7	1S; 1A down
0530 2-28-64	1000 2-28-64	8	1A, 1S down
1000 2-28-64	2250 2-28-64	0	Install 2D to F-8 jumper for Hp processing
2250 2-28-64	2330 2-29-64	8	1A; 1S down
2330 2-29-64	2400 2-29-64	8	1A; 1S on Hp recovery

c. Dissolvers

Following are the radiiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
2-24-64 (2 days)	136-234	1.9	0.083
2-25-64	138-266	0.4	0.075
2-26-64	164-267	0.3	0.054
2-27-64	140-307	13.1	0.034
2-28-64	126-239	3.3	0.025

The 293-B Building recovered 42,448 pounds of 100 percent nitric acid during the report period with an average concentration of 44.7 percent.

Four canisters of PRIR Pu-Al fuel elements were received and stored in the J-1 tank.

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HW-80202
No. 622

d. Solvent Extraction

Virgin feed was processed at an 8 rate during 91 percent of the operating period. A column shutdown of 2 hours was necessary on 2-27-64 to put the 1S Column on virgin feed when the 1A Column feed (F-7) pump failed. On 2-28-64 the columns were shut down approximately 12 hours for installation of a 2D to F-8 jumper required for the planned neptunium recovery run. Three waste batches were reworked through the 1S Column to recovery uranium and plutonium losses.

e. Equipment

A new F-7 pump, No. 28 FA-F7 was installed on 2-28-64. Since the impeller shaft on this pump was 6 inches shorter than on previous F-7 pumps, the F-7 pump cut-off switch was changed to 15 weight factor vice 13.

A jumper routing 2DNR to F-8 was installed on 2-28-64 to allow accumulation of the neptunium inventory in F-8 prior to the planned neptunium recovery run.

f. 233-B Building

Scraping, cleaning and re-painting of wall areas in the 233-B viewing room was completed. A sample of solids accumulated on the blown-out section of greenhouse wall panel was taken for examination and analysis.

Following are the waste storage tank data for the report period.

	<u>105-6X</u>	<u>107-6X**</u>	<u>108-6X</u>	<u>109-6X</u>	<u>110-6X</u>	<u>111-6X</u>	<u>112-6X</u>	<u>115-6X</u>
Liquid Level	17'9"	19'11"	20'5"	22'2-1/2"	22'4-1/4"	18'11-1/2"	22'3-1/2"	21'5-3/4"
Bull 1" Sludge Temperature	117 F	270 F	288 F	281 F	230 F	239 F	252 F	211 F
Scanner 1" Sludge Temp.	-	270 F	309 F	292 F	289 F	244 F	224 F	223 F
2-Ft. Supernatant Temp.	-	228 F	250 F	262 F	210 F	210 F	215 F	196 F
Supernatant Temp. Gradient*	-	1 F	3 F	32 F	5 F	9 F	6 F	3 F
No. of Circulators Operating	0	3 F	4 F	3 F	2 F	1 F	4 F	1 F
Specific Gravity	1.28	1.32	-	1.57	1.54	1.52	-	1.62
Apparent Sludge Depth	-	0'8"	0'10-1/2"	1'6"	1'3-1/2"	3'2-1/2"	1'9"	0'11"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 107-6X is the current salt waste receiver tank.

NOTE: During the month of February, 68,708 gallons of water were added to 108-6X and 12,257 gallons to 111-6X. 11,020 gallons were jettied from the 151-6-1 catch tank to 109-6X.

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No. 622

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EW-80202
No. 623

SUMMARY OF 202-S BLDG. OPERATION
FROM 0000 3-1-64 TO 2400 3-7-64

I. PRODUCTION

U Shipped 34.94 LAF Processed 22.56 Charged None
Pu Loaded 22580

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe (ppm)	Na (ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>1.6</u>	<u>2.66²</u>	<u>98.3</u>	<u>1.0</u>	<u>0.79</u>		<u>9.0</u>	<u>13.0</u>
Average	<u>5.5</u>	<u>7.80²</u>	<u>124.2</u>	<u>1.5</u>	<u>4.55</u>		<u>19.9</u>	<u>37.5</u>
Maximum	<u>8.8</u>	<u>1.64³</u>	<u>163.0</u>	<u>4.0</u>	<u>18.2</u>		<u>49.0</u>	<u>138.0</u>

III. WASTE

<u>Extraction Losses</u>			<u>To Underground Storage</u>			<u>Coating Waste Losses</u>		
U	<u>0.01</u>	%	U	<u>170</u>	Lbs. <u>0.38</u> %	U		Lbs. %
Pu	<u>0.01</u>	%	Pu	<u>47</u>	Gms. <u>0.35</u> %	Pu		Gms. %
			Gallons	<u>58302</u>		Gallons	<u>None</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.2</u>	<u>1.2</u>
Partition Cycle	<u>2.0</u>	<u>2.3</u>
Third U	<u>1.7</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.4</u>
Third Pu	<u>-</u>	<u>1.7</u>
Tail End	<u>1.4</u>	<u>-</u>
Total	<u>6.3</u>	<u>7.6</u>

V. METAL HISTORY

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
MWD/T	<u>-</u>	<u>-</u>	<u>-</u>
Cooling Time	<u>-</u>	<u>-</u>	<u>-</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>None</u>					
HE	Sump Waste	<u>1774</u>	<u>40</u>	<u>0.30</u>	<u>827</u>	<u>1.80</u>	<u>22</u>
HE	Recycle	<u>-</u>	<u>2654</u>	<u>16.56</u>	<u>-</u>	<u>-</u>	<u>-</u>
HE	Column <u>204-3</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>9022</u>	<u>16.67</u>	<u>-</u>
E-3 or E-1		<u>None</u>					

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NW-80202
No. 623

a. Flowheet and Stream Compositions

The flowheet and stream compositions were the same as stated on pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 3-1-64	0455 3-1-64	8	1A; 1B on Rp recovery
0455 3-1-64	0600 3-1-64	0	No feed
0600 3-1-64	1000 3-3-64	8	1A; 1B on Rp recovery
1000 3-3-64	1655 3-3-64	6	1A; 1B on Rp recovery
1655 3-3-64	1200 3-4-64	7	1A; 1B on Rp recovery
1200 3-4-64	2400 3-4-64	8	1A; 1B on Rp recovery
0000 3-5-64	0822 3-5-64	0	1A on waste rework
0820 3-5-64	2200 3-7-64	0	Inventory cleanout
2200 3-7-64	2400 3-7-64	0	1B Rp recovery

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved avg. days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
3-2-64 (3 days)	127-240	3.3	0.23
3-3-64	130-243	2.3	0.28
3-4-64	No dissolving	None	0.39
3-5-64	" "	None	0.14
3-6-64	" "	None	0.042

The 293-B Building recovered 9,162 pounds of 100 percent nitric acid during the report period with an average concentration of 44.2 percent.

The A-2 and B-2 dissolver heels were removed. Following the building cleanout and acid flush a campaign of FTR Pu-Al fuels will be dissolved in the B-2 dissolver. The north pot thermocouple jumper was replaced on the A-2 dissolver on 3-1-64.

d. Solvent Extraction

Virgin E-metal processing was completed at 2400 on 3-4-64. The building inventory processing was completed and heels displaced from process vessels by 2200 on 3-7-64. The neptunium recovery run was started on 3-7-64.

Following are the waste storage tank data for the report period.

	<u>105-GI</u>	<u>107-GI**</u>	<u>108-GI</u>	<u>109-GI</u>	<u>110-GI</u>	<u>111-GI</u>	<u>112-GI</u>	<u>115-GI</u>
Liquid Level	17'9"	21'2-1/2"	20'9"	22'-1/2"	22'3-3/4"	18'11-3/4"	22'5"	21'5-1/2"
Bulb 1" Sludge Temperature	117 F	276 F	285 F	280 F	231 F	239 F	250 F	210 F
Scanner 1" Sludge Temp.	-	279 F	307 F	290 F	286 F	240 F	231 F	219 F
2-Ft. Supernatant Temp.	-	227 F	248 F	247 F	208 F	204 F	209 F	192 F
Supernatant Temp. Gradient*	-	2 F	4 F	18 F	4 F	7 F	5 F	3 F
No. of Circulators Operating	0	3	4	3	2	1	4	1
Specific Gravity	1.28	1.32	1.58	1.57	1.54	1.51	1.58	1.62
Apparent Sludge Depth	-	0'8"	0'10-1/2"	1'6"	1'3-1/2"	3'2-1/2"	1'9"	0'11"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 107-GI is the current salt waste receiver tank.

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HW-80202
No. 623

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HW-80202
No. 624

SUMMARY OF 202-S BLDG. OPERATION
FROM 0000 3-8-64 TO 2400 3-14-64

I. PRODUCTION

U Shipped None LAF Processed None Charged PRTR 2042.5 grams Pu
Pu Loaded 5962, including 130 acid flush material which will be reworked.

II. PRODUCT PURITY

	Plutonium		Uranium				
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum	8.4	8.12 ²					
Average	10.6	1.24 ³					
Maximum	12.9	1.67 ³					

III. WASTE

<u>Extraction Losses</u>		<u>To Underground Storage</u>		<u>Coating Waste Losses</u>		
U	%	U	Lbs.	U	Lbs.	%
Pu	%	Pu	Gms.	Pu	Gms.	%
		Gallons	2226	Gallons	5972	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle		
Partition Cycle		
Third U		
Second Pu		
Third Pu		
Tail End		
Total		

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	-	-	-
Cooling Time	-	-	-

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	11802	143		586		593
HE	Sump Waste	2243	133		456		26
HE	Recycle	-	143		-		-
LS Column							
E-3 or E-1							

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EW-80202
No. 624

a. Flowsheet (Neptunium Processing)

2DWS: 2DA: 2DX: 2DX HNO₃: 2DO: 1RX: 1RS: 1CX =
160: 20: 160: 0.1M: None: 62: None: 100

2AF: 2AS: 2AX: 2AX HNO₃: 2RX =
0.2 gpm: 0.7 gpm: 1.1 gpm: 0.2M: 0.2 gpm

3AF: 3AS: 3AX: 3AX HNO₃: 3RX =
0.3 gpm: 0.5 gpm: 0.8 gpm: 0.2M: 0.2 gpm

b. Stream Compositions (Neptunium Processing)

Stream	H ₂ O	AMN	HNO ₃	Na ₂ Cr ₂ O ₇	Hexone
2RX	-	-	0.1M	-	100%
2DWS	-	2.0	0.3	0.04	-
2DA	-	1.30	0.5	-	-
1RX	Demin.	-	-	-	-
1CX	Demin.	-	-	-	-
2AF	-	-	0.30	0.02	-
2AS	-	2.0	0.14	0.04	-
2AX	-	-	0.25	-	100%
2RX	Demin.	-	0.60	-	-
3AF	0	-	0.40	-	-
3AS	-	2.00	0.14	0.04	100%
3AX	-	-	0.10	-	-
3RX	Demin.	-	-	-	-

c. Dissolvers

Following are the radiiodine data for the report period:

Period Ending at 1000	Metal Dissolved age, days	Curies of I-131 Available	To Stack
3-9-64 (3 days)	PRTR Pu-A1 58-1022	2.7	∠ 0.017
3-10-64	" Pu-A1 59-1023	2.7	∠ 0.0051
3-11-64	No dissolving	None	0.0023
3-12-64	PRTR Pu-A1 421-559	None	∠ 0.0028
3-13-64	No dissolving	None	0.0036

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NW-80202
No. 624

-30-

Dissolution of the FTR Pu-Al alloy fuels in the B-2 dissolver was begun on 3-8-64. The following charges were made during the report period:

<u>Date</u>	<u>Charge No.</u>	<u>Canisters</u>	<u>Total Gas Pu</u>	<u>% Pu-240</u>
3-8-64	1	A & B (8 elements)	1,557.62	16.35
3-11-64	2	C (cut rods)	233.44	17.16
3-12-64	3	E (cut rods)	251.35	32.41

Peak hydrogen and ammonia concentrations in the diluted dissolver off-gases are tabulated below:

<u>Charge No.</u>	<u>Dissolution</u>	<u>Peak Hydrogen, %</u>	<u>Peak Ammonia, %</u>
1	Aluminum canister	1.28	-
"	Zr cladding	1.42	-
"	First cut Pu-Al	2.12	-
"	Second cut Pu-Al	2.99	-
"	Third cut Pu-Al	2.70	-
"	Fourth cut Pu-Al	1.97	-
"	Reel	1.77	-
2	Aluminum canister	1.04	0.12
"	Zr cladding	0.49	0.83
"	First cut	0.69	-
3	Aluminum canister	0.50	-
"	Zr cladding (monitor plugged)		

The hydrogen concentration in the dissolver off-gas stream was maintained below the control limit of three volume percent during the alloy dissolution step by limiting the amount of rod activated. During previous FTR runs, hydrogen concentrations slightly exceeded three percent but did not exceed the lower explosive limit of four percent.

The dissolution of the Pu-Al alloy fuels was done in three steps:

1. Aluminum canister dissolution used 1500 gallons sodium nitrate solution recovered from tank farm sludge (4M NaNO_3 , 0.4M NaOH) for hydrogen suppression. The aluminum was dissolved by incrementally adding 1200 pounds 19M NaOH .

[REDACTED]

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EW-80202
No. 624

2. The zircaloy cladding was dissolved using 1600 gallons of 4M $\text{NH}_4\text{-O.34M NH}_4\text{NO}_3$.
3. The Pu-Al alloy rods were dissolved in several cuts using an initial addition of 3,168 pounds of 1M $\text{HNO}_3\text{-O.003M Hg(NO}_3)_2$ for activation. When the reaction began, 1225 pounds of 12.2M (57%) HNO_3 was added. Approximately an 18-inch length of rod was activated and dissolved in each cut. UEN was transferred from the 204 Area to H-7 via the A-2 dissolver and H-9 tank for blending the plutonium nitrate solution to 650 grams Pu/Ton U.

d. Extraction Rates

No virgin E-metal feed was processed during the report period.

e. Solvent Extraction

The original plan for neptunium recovery used 1S as a combination extraction and stripping column with the neptunium product stream (1SEB) routed to the E-1 tank. The recovered neptunium would then be decontaminated in the 3A-3B Columns. Processing of the first neptunium feed batch through the 1S Column was completed by 0300, 3-8-64. When analysis of the E-1 sample found only 20 percent of the neptunium had been recovered (80 percent found in F-2, F-1), E-1 was transferred to F-2, F-1 and the remainder of the neptunium feed solution was processed via 1A to F-2, F-1.

The F-2, F-1 solution was butted to 0.2M $\text{HNO}_3\text{-O.08M Na}_2\text{Cr}_2\text{O}_7\cdot 2\text{H}_2\text{O}$ and processed through the partition cycle. The neptunium product solution was butted with dibasic aluminum nitrate in the E-7 tank for processing through the plutonium decontamination columns, 2A-2B and 3A-3B. Several passes through these columns plus ozonation was required for gamma decontamination and purification.

f. Head-End Processing

Apparently the cut fuel rods from PRTR charge No. 2 were not completely dissolved before the third charge was made. The H-10 sample of the canister waste from the third charge contained approximately 75 units of plutonium.

An operating error overflowed the H-7 tank into the vent header to D-8 and to the H-Cell floor. Dissolution of PRTR fuel was suspended until the H-10 tank could be emptied.

HW-80202
No. 624

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8. Equipment

The P-1 agitator setled on 3-9-64. The P-4 agitator was placed in the P-1 position but it also setled on 3-10-64. P-4 agitator started to work when water was hooked and heated to the seal to replace gas as a seal medium (the P-4 agitator in P-1 position). The P-1 agitator was placed in the P-4 position and worked.

The B-2 off-gas monitor plugged in the Davis analyzer No. 2 (H_2 and H_2) line. The Davis instrumentation is very sensitive. The Repulse pressure sensor in No. 2 line was ruptured.

h. 233-B Building

The I-18, 4-foot spoolpiece was removed on 3-11-64. Heatin samples were taken from the top and bottom of the spoolpiece.

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No. 624

Following are the waste storage tank data for the report period:

	<u>105-SX</u>	<u>107-SX**</u>	<u>108-SX</u>	<u>109-SX</u>	<u>110-SX</u>	<u>111-SX</u>	<u>112-SX</u>	<u>115-SX</u>
Liquid Level	17'7-1/2"	20'8-1/2"	20'5"	22'2-3/4"	22'3-1/4"	18'11"	22'4-1/2"	21'5-1/4"
Bulb 1" Sludge Temperature	116 F	279 F	285 F	280 F	232 F	239 F	249 F	210 F
Seamster 1" Sludge Temperature	-	284 F	309 F	292 F	289 F	244 F	232 F	222 F
2-Ft. Supernatant Temperature	-	229 F	249 F	234 F	210 F	207 F	213 F	195 F
Supernatant Temp. Gradient*	-	4 F	6 F	6 F	5 F	11 F	5 F	5 F
No. of Circulators Operating	0	3	4	3	2	1	2	1
Specific Gravity	-	1.32	1.58	1.57	1.54	1.51	1.58	1.62
Apparent Sludge Depth	-	0'8"	0'10-1/2"	1'6"	1'5-1/2"	3'2-1/2"	1'6-1/2"	0'11"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 107-SX is the current salt waste receiver tank.

NOTE: 148,786 gallons of coating waste was pumped from the 107-SX tank to the 107-J cascade on 3-10 and 3-11-64.

Monitoring of the laterals under the 107-SX tank on 3-10-64 detected 5500 counts per minute in the lateral bearing S 68° 15' E at a point approximately 15 feet from the outer edge of the tank. Monitoring of the other two laterals and vertical wells found no activity. Further monitoring will be scheduled.

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~~SECRET~~ **DECLASSIFIED**

EW-80202
No. 625

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 **3-15-64** TO 2400 **3-21-64**

I. PRODUCTION

U Shipped None IAF Processed None Charged None
Pu Loaded None

II. PRODUCT PURITY

	Plutonium		Uranium				
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum							
Average							
Maximum							

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	%	U	Lbs. %	U	Lbs. %
Pu	%	Pu	Gms. %	Pu	Gms. %
		Gallons		Gallons	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle		
Partition Cycle		
Third U		
Second Pu		
Third Pu		
Tail End		
Total		

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T			
Cooling Time			

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste						
HE	Sump Waste						
HE	Recycle						
1S Column							
E-3 or E-1							

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-43-

EW-80202
No. 625

a. Flowsheet and Stream Compositions

The flowsheet and stream compositions were the same as reported on pages 3 and 4 of this document; the neptunium flowsheet and stream compositions were the same as reported on page 37 of this report.

b. Extraction Rates

No virgin E-metal was processed during the report period.

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending</u> <u>at 1000</u>	<u>Metal Dissolved</u> <u>avg. days</u>	<u>Curies of I-131</u> <u>Available</u>	<u>To Stack</u>
3-16-64 (3 days)	No dissolving	None	0.0064
3-17-64	" "	"	0.0026
3-18-64	" "	"	0.0024
3-19-64	" "	"	0.0014
3-20-64	" "	"	0.0015

Charge No. 3 was held in airflex waste solution from 3-13-64 until 3-18-64. No abnormal loss of plutonium to the airflex waste resulted. Since there was no space available in E-8 for dissolver solution, the charge was covered with water and held.

d. Solvent Extraction

Decontamination and final concentration of the recovered neptunium was nearly complete by 3-22-64. Twelve cans containing 2593 grams were loaded out. Rework of six batches of waste through the 1A and 1B Columns was completed on 3-22-64.

Neptunium decontamination was done with considerable difficulty since the product collected in E-7 was a factor of 20 higher in grams than normal. Decontamination data are tabulated below.

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No. 625

<u>Columns</u>	<u>Batch No.</u>	<u>No of Pass</u>	<u>Decontamination Factor</u>
2D and 1B	Combined	1	1.84
2A, 2B and E-2 oxidation	1st batch	1	22.0
3A and 3B	1st batch	1	2.79
3A and 3B (E-1 not flushed)	1st batch	2	3.07
Persulfate treatment	1st batch	2	17.50
2A, 2B and E-2 oxidation	2nd batch	1	51.5
3A and 3B	Combined (2nd batch persulfate treatment)	1	13.2
3A and 3B	Combined	2	2.56

e. Head-End Processing

Jets were installed to permit routing D-8 to H-10 and H-10 to H-9 in order to recover the HTR plutonium from D-8 and H-10.

On 3-17-64 H-10 was jetted to H-9, permitting the sircaloy dissolution waste to be emptied to H-10 and waste storage. On 3-19 the D-8 tank was emptied to H-10, H-10 emptied to H-9 which overflowed to H-8 and the ES-2 sump. The ES-2 sump was jetted to D-1 to D-7 to D-8 to H-10 for plutonium recovery. H-10, H-9 and H-8 must be acidified in H-7 before processing in H-4.

f. Equipment

The H-10 thermomix jumper and the H-10 to H-9 jet jumper were replaced on 3-17-64. A jet routing D-8 to H-10 was installed on 3-19-64. At the completion of transfers from D-8 to H-10 the H-10 to D-8 routing was returned to standby service. The No. 2 demineralizer pump was lost at 1400, 3-15-64, when a coupling broke. Pump No. 1 was temporarily lost several hours later when the breaker failed. Operation of the No. 1 pump was restored by using the No. 2 pump breaker.

g. 213-B Building

Twelve cans of neptunium product solution (2593 grams) were loaded out by 3-22-64.

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NY-80202
No. 625

Following are the waste storage tank data for the report period:

	<u>105-6X</u>	<u>107-6X</u>	<u>108-6X</u>	<u>109-6X</u>	<u>110-6X</u>	<u>111-6X</u>	<u>112-6X</u>	<u>115-6X</u>
Liquid Level	17'7"	19'11-1/2"	20'4"	22'4-1/2"	21'7-1/2"	18'10-3/4"	22'4"	21'4-3/4"
Balls 1" Sludge Temperature	114 F	276 F	285 F	280 F	236 F	239 F	220 F	210 F
Boomer 1" Sludge Temperature	-	280 F	305 F	289 F	287 F	240 F	214 F	219 F
2-74. Superantant Temperature	-	229 F	248 F	251 F	207 F	202 F	210 F	191 F
Superantant Temp. Gradient*	-	6 F	3 F	26 F	3 F	6 F	5 F	2 F
No. of Circulators Operating	0	3	4	3	2	1	2	1
Specific Gravity	-	1.33	1.59	1.57	1.54	1.51	1.58	1.58
Apparent Sludge Depth	-	0'8"	0'7"	1'6"	1'5-1/2"	3'2-1/2"	1'8"	0'11-1/2"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 107-6X is the current salt waste receiver tank.

NOTE: Further monitoring of the 107-6X laterals was done. The reading at the point 15 feet from the edge of the tank in the lateral bearing S 68° 15' E rose to 10,000 counts per minute. No activity was detected in the vertical wells surrounding the tank.

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HW-80202

No. 606

SUMMARY OF 202-S BLDG. OPERATION
FROM 0000 3-22-64 TO 2400 3-22-64

I. PRODUCTION

U Shipped None IAF Processed None Charged None
Pu Loaded None

II. PRODUCT PURITY

	Plutonium		Uranium			
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm) Na(ppm)
Minimum						
Average						
Maximum						

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	%	U	Lbs. %	U	Lbs. %
Pu	%	Pu	Gms. %	Pu	Gms. %
		Gallons	164.81	Gallons	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle		
Partition Cycle		
Third U		
Second Pu		
Third Pu		
Tail End		
Total		

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T			
Cooling Time			

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste						
HE	Sump Waste						
HE	Recycle						
1S Column							
E-3 or E-1							

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EW-60202
No. 626

a. Flowheet and Stream Compositions

The flowheet and stream compositions were the same as stated on pages 3 and 4 of this document.

b. Extraction Rates

No virgin E-metal processing was done during the report period. Fifty-seven percent acid flush in progress.

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved avg. days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
3-23-64 (3 days)	No dissolving	None	0.0041
3-24-64	" " "	"	0.00090
3-25-64	" " "	"	0.00085
3-26-64	" " "	"	0.00067
3-27-64	" " "	"	0.00086

E-2 dissolver was held in water with out rods from charge No. 3 waiting to be dissolved.

d. Solvent Extraction

During the week of March 21-28, 1964, the process vessels in the 202-S and 213-S Buildings were flushed with 57 percent nitric acid. All of the acid used for the 202-S Building flushes contained 2.0 percent boric acid.

The procedure used followed closely the procedure which has been used since March, 1963. Beginning in G-5 tank, all process lines and vessels in the 202-S Building were acid flushed with the exception of the JE Column, the tail-end uranium equipment downstream of the JE Column, the G-Cell hexone recovery equipment, and the Sile Column vent header.

The D-12, D-14, F-2, F-5, and E-4 concentrators were given a boil-up flush. The F-2 overflow line to F-1 was given a three-hour flush by dropping 2KI to a boiling F-2 vessel, overflowing to F-1, and recirculating back to F-1 via 2D Column to F-2 to F-1.

The towers of the E-2 and E-4 plutonium exchangers were acid flushed by overflowing the towers to the inert gas vent header which drains to D-13. The tower flushes were not measured separately.

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NW-80202
No. 626

-48-

The water flushes of the 3A, 3B Columns, the 803-B, 801-O head tanks and lines, and the E-4, E-3 vessels were more extensive than previous flushes to assure that boron would not contaminate the final plutonium product.

A breakdown of plutonium pick-up as measured in the various pieces of equipment is tabulated below.

202-6 BuildingSOURCEPu. grams

G-5, E-4, E-1 vessels flush	3.1
1A and 1B Columns overflow flush	22.5
1A Column flush	3.0
1B Column flush	1.0
2E Column flush	8.0
1B Column, E-6 flush	1.0
2D Column extraction section flush	2.5*
2D Column flush	47.7
2D Column overflow flush (first)	4.3
(second)	7.8
(third)	3.9
2D Column drain, F-2 boil-up, F-1, 3D flush	23.5
1C Column, F-5 boil-up, F-4 flush	0
2A Column overflow, 2B, E-2, E-1 flush	18.5
2A Column flush	0.2
3A Column overflow, 3B, E-4, E-3 flush	12.5
3A Column flush	0
D-14 boil-up, 1AB3, 1B3S lines flush	13.2
E-2 tower flush	11.9
E-4 tower flush	2.5
E-7 vessel flush	7.2
Total	194.3

* The 2DW samples of the 2D Column extraction section flush do not appear to be representative. Two samples were taken and the laboratory specific gravity was reported as less than 0.998 on each sample.

All the flushes were collected in D-13, concentrated, and moved to E-4. Another measurement of the plutonium pick-up was obtained in the D-9 tank as the combined flushes moved through this vessel. The total plutonium measured in D-9 (FW-29) was 297 grams. This amounts to 102.7 grams more than was accounted for in the total of the individual flushes.

Two HF flushes of 6 percent and 10 percent by weight were sent through the head-end vessels. HNO_3 was used with HNO_3 to clear sludge from D-1, D-7, E-4, G-5, E-1, F-6 and F-7. The HF flushes were still in progress as of 3-28-64. Segregation of acid flushes and HF flushes for sampling purposes was underway in D-Cell.

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No. 626

•. Equipment

P-7 pump failed at 0500, 3-22-64 after 1 1/2 hours' use. A new P-7 pump was installed at 2000, 3-24-64.

The G-3 vent tube bundle was replaced on 3-25-64.

The D-14 pump failed on 3-27-64 after 3 1/2 hours' use. It was replaced on 3-29-64.

The B-2 off-gas monitor has been down most of the week. The Davis analyzer elements are poisoned when water is used to flush the plug of H₂NO₃. The Davis No. 2 line plugs most frequently.

2. 233-B Building

The last of the neptunium was loaded out on 3-24-64. The total neptunium recovered was 3120 grams. Impurities in neptunium solution in parts per part neptunium were:

Uranium	6.54
Plutonium	0.029
Ag	0.00031
Al	0.00078
As	M.D.
B	M.D.
Bi	0.00031
Ca	0.16
Cr	0.017
Cu	0.0062
Fe	0.087
Ga	M.D.
K	0.031
Li	0.0031
Mg	0.16
Mo	0.0031
Nb	0.031
Ni	0.062
Na	0.16
P	0.0062
Pb	0.0016
Si	0.0016
Total	0.73

The following 233-B Building tanks were acid flushed with the following plutonium pickup:

1-12, 1-6, 1-14 (1st flush)	4.82
1-12, 1-6, 1-14 (2nd flush)	96
1-12, 1-6, 1-14 (3rd flush)	34
	612
	809

Total combined pick-up from 202-B & 233-B:

Following are the waste storage tank data for the report period:

	<u>105-6X</u>	<u>107-6X**</u>	<u>108-6X</u>	<u>109-6X</u>	<u>110-6X</u>	<u>111-6X</u>	<u>112-6X</u>	<u>115-6X</u>
Liquid Level	, 17'6-3/4"	19'7-1/2"	20'4-3/4"	22'3"	21'7"	3'10-1/2"	22'3"	22'4-1/2"
Bulk 1" Sludge Temperature	117 F	369 F	284 F	280 F	235 F	237 F	214 F	210 F
Scanner 1" Sludge Temperature	-	269 F	307 F	289 F	286 F	241 F	216 F	216 F
2-Ft. Supernatant Temp.	-	228 F	248 F	242 F	207 F	160 F	212 F	192 F
Supernatant Temp. Gradient*	-	3 F	4 F	15 F	4 F	-	5 F	3 F
No. of circulators operating	0	3	4	3	2	0	2	1
Specific Gravity	-	1.35	1.59	1.57	1.54	1.50	1.60	1.57
Apparent Sludge Depth	-	0'6-3/4"	0'10"	1'6"	-	3'2-1/2"	1'8-1/2"	0'10-3/4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 107-6X is the current salt waste receiver tank.

The 111-6X tank contents were pumped to the 103-6X during the report period. A total of 486,336 gallons was transferred from the 111-6X tank. Dilution water was added to the pump suction to prevent freezing in the transfer line. A total of 535,912 gallons was received in the 103-6X tank, (49,576 gallons dilution). The 111-6X tank will be filled with water to a depth of approximately 10 feet for sodium nitrate leaching.

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-51-

HW-80202

No. 627

SUMMARY OF 202-S BLDG. OPERATION
FROM 0000 3-29-64 TO 2400 4-4-64

I. PRODUCTION

U Shipped None LAF Processed None Charged 1214 grams PTRA Pu
Pu Loaded None

II. PRODUCT PURITY

	Plutonium		Uranium				
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum							
Average							
Maximum							

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	%	U <u>56</u>	Lbs. %	U <u>0</u>	Lbs. <u>0</u> %
Pu	%	Pu <u>33</u>	Gms. %	Pu <u>38</u>	Gms. <u>3.13</u> %
		Gallons <u>49712</u>		Gallons <u>4087 PTRA</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle		
Partition Cycle		
Third U		
Second Pu		
Third Pu		
Tail End		
Total		

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T			
Cooling Time			

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste						
HE	Sump Waste						
HE	Recycle						
1S Column							
E-3 or E-1							

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-52-

HW-80202
No. 627

a. Flowsheet and Stream Compositions

The following flowsheet was used for PRTR solvent extraction processing:

1AF: 1ABS or 1AS: 1AA: 1AX: 1AX HNO₃: 2EX: 2EX Butt=
130: 40 : 25: 340: None: 130: 20

2DF: 2DA: 2DX: 2DO: 2DWR: 1EX: 1BS: 1EX HNO₃: 1CX =
160: 20: 375: 40: 80: 23: 82: 0.3M : 130

2AF: 2AS: 2AX: 2AX HNO₃: 2EX =
23: 5: 16: 0.25M : 9

3AF: 3AS: 3AX: 3AX HNO₃: 3EX =
16: 5: 12: 0.1M : 13

3DF: 3DA: 3DS: 3DX: 3EX =
89: 25: 16: 328: 130

Stream compositions were the same as reported on pages 3 and 4 of this document.

b. Extraction Rates

From	To	Rate	Remarks
0000 3-29-64	2130 4-3-64	0	57 percent HNO ₃ flush
2130 4-3-64	1500 4-4-64	8	1A on PRTR HE 1 and 2
1500 4-4-64	2400 4-4-64	0	No feed

c. Dissolvers

Following are the radioiodine data for the report period:

Period Ending at 1000	Metal Dissolved age, days	Curies of I-131 Available	To Stack
3-30-64(3 days)	No dissolving	None	0.0037
3-31-64	" "	"	0.0018
4-1-64 PRTR Pu-A1	168-351	"	0.026
4-2-64	No dissolving	"	0.066
4-3-64	" "	"	0.025
4-4-64 PRTR Pu-A1	112-213	"	0.015

Dissolution of charge No. 3 (cut rods) was completed on 4-1-64. Analysis of B-2 samples proved that the Pu found in the canister waste from charge No. 3 resulted from incomplete heel removal of charge No. 2. This was also

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EW-80202
No. 627

shown by isotopic Pu analysis of the canister waste. Canisters "D" and "E" containing 8 elements, 1,214.05 gms Pu, with 32.61 percent as Pu-240 were charged on 4-2-64. Inspection of the dissolver found that the canisters had not been completely dissolved. An additional 1200-pound addition of 19M NaOH removed the canisters. The zircaloy removal and three Pu-Al dissolution cuts were made according to standard procedure. Inspection of the dissolver found numerous 18-inch and one four-foot long rod which appeared to have zircaloy cladding. A second zircaloy removal was made using 500 gallons 4M NH_4F -0.34M NH_4NO_3 . Approximately 18 units of plutonium were lost to waste in this solution. Data on the peak hydrogen concentration in the diluted dissolver off-gas is tabulated below:

<u>Charge No.</u>	<u>Dissolution</u>	<u>% Hydrogen</u>
4	Zr cladding	-
4	1st cut Pu-Al	2.6
4	2nd cut Pu-Al	1.4
4	3rd cut Pu-Al	Monitor down
4	4th cut Pu-Al	"
4	Zr cladding	"
4	5th	"
4	6th	2.2
4	7th	2.1
4	8th	1.1

Difficulty was experienced in getting the PRTR rods to dissolve. It appears that the rods are hanging up in the space between the crib staves and are not being covered with solution.

d. Solvent Extraction

Processing of the PRTR fuel through solvent extraction was started at 2130 on 4-3-64. Feed batches HE-1 and HE-2 were processed through the precycle columns by 1500 on 4-4-64. The partition columns were started at 0600, 4-4-64.

e. Head-End Processing

The two HF flushes and several ensuing water flushes of D-1, D-7, H-4, G-5, H-1, F-8 and H-7 were neutralized and discarded to underground storage. Approximately 15,000 gallons of solution containing 372 pounds U, 420 grams Pu, and 39 grams Np were sent to the 107-SX tank for storage. Product recovered in the 57 percent nitric acid flush of the solvent extraction columns and process vessels was segregated into G-5 and F-8 for storage during the PRTR processing.

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HW-80202
No. 627

The caustic solutions containing PRTR Pu from the incomplete heel removal and the H-7 overflow to D-8, stored in H-8, H-9 and H-10, were acidified in H-7, using excess acid and a reverse strike. The head-end vessels were cleared so that PRTR Pu-Al dissolution was resumed on 4-1-64.

f. Equipment

The Davis off-gas monitors have required frequent line flushes to remove NH_4NO_3 plugs. The piping revision completed in February, 1964, expected to minimize line pluggage, has not solved the problem. Since the ammonia concentration in the dissolver off-gas has been well below the lower explosive limit, monitoring of the off-gas during canister and zircaloy cladding dissolution was discontinued.

A system for recovering hexone from the Redox condenser vent header was put into operation on February 22, 1964. The recovery operation consists of scrubbing the hexone from the condenser off-gas with water in the J-6 scrubber, and stripping the hexone from the water in the D-4 stripper. The overheads from the D-4 stripper are combined with the overheads from the D-5 hexone stripper, condensed in the D-6 condenser and returned to the G-3 hexone recovery still. Approximately 95 percent of the hexone in the condenser vent off-gas system is now being recovered.

g. 233-B Building

A critical mass hazards control specification covering the shipping, handling and resin removal from the L-18 contactor spool piece was prepared and the necessary signatures for approval and acceptance obtained. A special procedure for resin removal was prepared. Resin removal and sampling was completed, using a special hood installed in the 202-B Building remote maintenance shop, on 4-2-64. Photographs of the resin column and of the screens removed from the L-18 contactor have been taken.

Following are the waste storage tank data for the report period:

	<u>105-SX</u>	<u>107-SX**</u>	<u>108-SX</u>	<u>109-SX</u>	<u>110-SX</u>	<u>111-SX</u>	<u>112-SX</u>	<u>115-SX</u>
Liquid Level	17'6"	19'7-1/2"	20'5-1/2"	22'2"	21'6-1/2"	9'4-3/4"	22'2-1/4"	21'4-1/2"
Bulb 1" Sludge Temperature	112 F	281 F	282 F	279 F	237 F	234 F	213 F	210 F
Scanner 1" Sludge Temperature	-	286 F	307 F	290 F	288 F	238 F	216 F	220 F
2-Ft. Supernatant Temperature*	-	229 F	246 F	236 F	207 F	179 F	212 F	193 F
Supernatant Temperature Gradient*-		2 F	6 F	9 F	5 F	1 F	5 F	3 F
No. of Circulators Operating	0	3	4	3	2	0	2	1
Specific Gravity	-	1.35	1.59	1.57	1.54	-	1.60	1.57
Apparent Sludge Depth	-	0'7"	0'10"	1'6"	-	3'2-1/2"	1'8-1/2"	0'11-1/2"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 107-SX is the current salt waste receiver tank.

The 111-SX tank is being filled to approximately 10 feet with 106-SX tank condensate for sodium nitrate leaching and removal.

During the month of March, 137,755 gallons of 106-SX condensate were pumped to the 111-SX tank. Continuous water additions of 64,438 gallons to 108-SX, 18,614 gallons to 109-SX, and 2,040 gallons to 112-SX were made.

NW-80202
No. 627

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NY-80202
No. 628

SUMMARY OF 202-S BLDG. OPERATION
FROM 0000 4-5-64 TO 2400 4-11-64

I. PRODUCTION

U Shipped None 1AF Processed 8139 grams Charged 2890.65 grams PWR Pu
Pu Loaded 11 grams flush 7.98 E-metal

II. PRODUCT PURITY

	Plutonium		Uranium				
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum							
Average							
Maximum							

III. WASTE

<u>Extraction Losses</u>		<u>To Underground Storage</u>		<u>Coating Waste Losses</u>		
U	%	U <u>2</u>	Lbs. %	U <u>26</u>	Lbs. <u>0.18</u>	% E-metal
Pu	%	Pu <u>2</u>	Gms. %	Pu <u>11</u>	Gms. <u>0.18</u>	% E-metal -- 0.38 PWR
		Gallons <u>3642</u>		Gallons <u>11412</u>		

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle		
Partition Cycle		
Third U		
Second Pu		
Third Pu		
Tail End		
Total		

V. METAL HISTORY

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
MWD/T	<u>1018</u>	<u>632</u>	<u>882</u>
Cooling Time	<u>313</u>	<u>232</u>	<u>276</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	<u>204 LBS for PWR</u>		<u>-</u>	<u>-</u>	<u>20641</u>	<u>100.0</u>	<u>-</u>
HE	Sump Waste						
HE	Recycle						
1S Column							
E-3 or E-1							

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EW-80202
No. 628

-57-

a. Flowsheet and Stream Compositions

The flowsheet for the PKTR solvent extraction processing was the same as stated on page 52 of this document. The flowsheet for E-metal processing was the same as stated on page 3 of this document. Stream compositions for PKTR and E-metal processing were the same as stated on pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 4-5-64	0800 4-5-64	8	HE-3 1A
0800 4-5-64	2030 4-10-64	0	PKTR dissolving and feed make-up.
2030 4-10-64	1800 4-11-64	8	HE-4, HE-5 1A
1800 4-11-64	2400 4-11-64	0	1A down, other columns running out inventories.

c. Dissolvers

Following are the radiiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved Age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
4-6-64 (2 days)	172-355 (PKTR Pu-Al)	None	0.045
4-7-64	114-356 " "	0.3	0.016
4-8-64	99-216 " "	0.15	0.061
4-9-64	100-217 " "	0.15	0.019
4-10-64	91-243 " "	0.4	0.0091

Dissolution of the PKTR Pu-Al fuel elements for this campaign was completed by 0800 4-10-64. Considerable difficulty was experienced on charges 4, 5, and 6 when 7 and 8 cuts were required for complete dissolution. Hold-up of rods in the stove openings of the outer crib wall is believed responsible. Large volume cuts using 1M HNO₃-0.003M HF were required to dislodge and dissolve the elements. Since only a few additional PKTR Pu-Al elements are scheduled for Redox processing, no dissolver modification is planned.

The B-2 dissolver was flushed to E-8 and E-metal was charged to A-2 and B-2 on 4-11-64.

PKTR fuel charges during the report period are tabulated below:

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EW-80202
No. 628

-58-

<u>Date</u>	<u>Charge</u>	<u>Canisters</u>	<u>Total Grams Pu</u>	<u>Percent Pu-240</u>
4-5-64	5	F & G	1,038.69	32.78
4-7-64	6	I & J	1,221.13	32.21
4-9-64	7	K	630.83	31.97

Peak hydrogen concentrations in the diluted dissolver off-gas is tabulated below:

<u>Charge No.</u>	<u>Dissolution</u>	<u>Peak % Hydrogen</u>
5	1st cut Pu-Al	2.7
"	2nd	2.2
"	3rd	2.7
"	4th	2.2
"	5th	2.0
"	6th	0.3
"	7th	1.6
6	1st	-
"	2nd	2.7
"	3rd	2.2
"	4th	2.6
"	5th	2.6
"	6th	1.1
"	7th	0.5
7	1st	2.9
"	2nd	2.4
"	3rd	2.5

d. Solvent Extraction

Processing of the HE-3 feed batch through the 1A Column was completed on 4-5-64. Additional feed was not available until 4-10-64. The final two feed batches, HE-4 and HE-5 were processed through the 1A Column by 1800 on 4-11-64.

The hexone inventory in the O-2 tank was caustic washed on 4-8-64.

39- [REDACTED] **DECLASSIFIED**

NY-80202
No. 628

e. Heel-End

High volumes of acid solution from the extra dissolution cuts required for Pu-241 heel removal were boiled off in the H-4 condenser, prior to oxidation. The H-Cell vessels were emptied and flushed of FHR solutions and processed forward to minimize cross contamination with production plutonium to follow.

f. 233-S Building

The Gchart was bagged and removed from the L-18 Contactor enclosure on 4-10-64. The L-18 Contactor spool piece was sent to the 231-Z Laboratory for sectioning and visual and photographic inspection on 4-6-64. The resin from the spool piece section was loaded into 4-liter plastic bottles for storage pending disposition.

Final acid and water flushes of the H-Cell and 233-S plutonium vessels was completed on 4-9-64. Concentration of FHR plutonium product was started at 0530, 4-11-64.

g. Equipment

Repair of the steam turbine and re-alignment was completed and the unit was put on automatic operation on 4-9-64.

The D-14 backcycle pump discharge jumper was replaced with a new jumper on 4-9-64.

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NY-60202
No. 628

Following are the waste storage tank data for the report period:

	<u>105-GX</u>	<u>107-GX**</u>	<u>108-GX</u>	<u>109-GX</u>	<u>110-GX</u>	<u>111-GX</u>	<u>112-GX</u>	<u>115-GX</u>
Liquid Level	17'4-1/4"	19'3-1/4"	20'5-1/2"	22'-3/4"	22'2"	10'5-1/4"	22'2"	21'4"
Bulb 1" Sludge Temperature	114 F	273 F	282 F	280 F	238 F	227 F	225 F	210 F
Scummer 1" Sludge Temperature	-	278 F	309 F	289 F	289 F	235 F	221 F	222 F
2-Ft. Supernatant Temperature	-	230 F	247 F	248 F	207 F	167 F	216 F	194 F
Supernatant Temperature Gradient*	-	4 F	5 F	20 F	5 F	3 F	6 F	3 F
No. of Circulators Operating	0	3	4	3	2	2	4	1
Specific Gravity	-	1.35	1.61	1.57	1.53	1.14	1.60	1.57
Apparent Sludge Depth	-	0'7"	0'10-1/2"	1'6"	1'7"	2'6-1/4"	1'9"	0'11-1/2"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 107-GX is the current salt waste receiver tank.

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HW-80202
No. 629

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 4-12-64 TO 2400 4-18-64

I. PRODUCTION

U Shipped 6.78 1AF Processed 15.69 Charged 31.77 E-metal
Pu Loaded 63.84 ~~None~~

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		
	Microcuries/gram	U(ppm)			E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum	<u>23.2</u>	<u>2.073</u>	<u>11.3</u>	<u>1.0</u>	<u>0.35</u>	<u>16.0</u>	<u>35.0</u>
Average	<u>35.1</u>	<u>9.133</u>	<u>32.8</u>	<u>9.7</u>	<u>0.68</u>	<u>21.2</u>	<u>85.2</u>
Maximum	<u>47.1</u>	<u>1.624</u>	<u>51.2</u>	<u>25.5</u>	<u>1.02</u>	<u>33.0</u>	<u>127.0</u>

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>0.02</u> %	U <u>80</u> Lbs.	<u>0.29</u> %	U <u>112</u> Lbs.	<u>0.18</u> %
Pu	<u>0.04</u> %	Pu <u>29</u> Gms.	<u>0.26</u> %	Pu <u>32</u> Gms.	<u>0.18</u> %
		Gallons	<u>29073</u>	Gallons	<u>5781</u>

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.5</u>	<u>1.5</u>
Partition Cycle	<u>2.0</u>	<u>2.3</u>
Third U	<u>1.7</u>	<u>-</u>
Second Pu	<u>-</u>	<u>1.3</u>
Third Pu	<u>-</u>	<u>1.5</u>
Tail End	<u>1.7</u>	<u>-</u>
Total	<u>6.9</u>	<u>6.6</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>1017</u>	<u>826</u>	<u>862</u>
Cooling Time	<u>313</u>	<u>252</u>	<u>234</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
HE	Sump Waste	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
HE	Recycle	<u>-</u>	<u>72</u>	<u>0.63</u>	<u>-</u>	<u>-</u>	<u>-</u>
HE	18-64-204-3 Out of spec. UMI	<u>-</u>	<u>-</u>	<u>-</u>	<u>500</u>	<u>1.57</u>	<u>-</u>
E-3 or E-1	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>

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HW-80202
No. 629

a. Flowsheet and Stream Compositions

The flowsheet and stream compositions were the same as stated on pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 4-12-64	0040 4-17-64	0	PIER rework, inventory runout, heel displacement and water flushes.
0040 4-17-64	0400 4-17-64	8	1A; 1B down
0400 4-17-64	1845 4-18-64	0	1ARS valve jumper failure.
1845 4-17-64	1500 4-18-64	8	1A; 1B on recycle to D-14.
1500 4-18-64	2400 4-18-64	0	Replace F-1 and F-3 agitators.

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved avg. days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
4-13-64(3 days)	232-315	None	0.0036
4-14-64	235-316	"	0.0077
4-15-64	236-314	"	0.0068
4-16-64	237-294	"	0.0038
4-17-64	238-295	"	0.0053

The 293-B Building recovered 12,860 pounds of 100 percent nitric acid during the report period with an average concentration of 35.8 percent.

Both the A-2 and B-2 dissolvers were charged with E-metal on 4-11-64 following the completion of the PIER Pu-41 dissolution. Since the 293-B nitric acid was diluted to approximately 33 percent during the Pu-41 dissolution, the 293-B acid addition was reduced to 550 gallons on A-2; 500 gallons for B-2 and 7,775 pounds 57 percent acid vice 4875 pounds was used initially on cuts from the first two charges to each dissolver. The 293-B acid strength had increased so that the standard dissolving procedure was in use at the end of the report period.

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NW-80202
No. 629**d. Solvent Extraction**

Four D-9 waste batches from FTR processing required rework through the 1A Column. During the rework processing on 4-13-64 the 3A Column was overflowed to 3B. This required shutdown of the third plutonium cycle columns so that the 3B Column could be drained and flushed to E-4. The E-4 tank contents were then successfully re-processed through the 3A and 3B Columns. The extraction battery was water flushed after completion of the FTR processing.

E-metal processing through the 1A Column, started at 0040 4-17-64, was suspended at 0400 when the 1AHS valve stuck open. A new jumper was installed and the 1A Column started at 1845, 4-17-64. The process was again shut down at 1500 on 4-18-64 for replacement of the F-1 and E-13 agitators.

Underevalting of the 2A and 3A Columns on startup, following replacement of the 1AHS valve jumper, resulted in a high loss of plutonium in the 2AW and 3AW waste streams. The always critically-safe plutonium to uranium ratio in the F-2 (2DPS concentrator) and F-1 (2DPS) vessels was exceeded by 10 percent. Water heels in the E-5 and E-1 tanks at startup, which were not AHS butted, diluted E-5 and E-1. Recycle of additional uranium via 3D to F-2 reduced the plutonium to uranium ratio to specifications.

e. Equipment

The D-12 tank had a leak in the east tube bundle gasket. The east tube bundle gasket was successfully replaced on 4-15-64. A second new D-12 steam supply jumper was installed on 4-17-64 after a new jumper would not fit the wall nozzle.

The F-1 agitator, installed on 7-21-61 failed on 4-18-64. A new F-1 agitator was installed 4-19-64.

E-13 agitator, installed on 9-1-62, failed on 4-18-64. A new E-13 agitator was installed 4-18-64.

f. 233-B Building

Processing of the FTR plutonium followed by six flushes of the L-12, L-6, L-14 and L-7 vessels was completed on 4-18-64.

Data on the FTR processing:

	<u>Pu, grams</u>	<u>% Pu-240</u>
1. Input of Pu		
a. Charged to dissolver (based on pile calculations)	6,147	27.79
b. Added as recycle (from Plutonium Chemistry Lab.)	126	21.47
Total	<u>6,273</u>	<u>27.66</u>

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EW-80202
No. 629

	<u>Pu. grams</u>	<u>1 Pu-240</u>
2. Output of Pu - Loaded out	6,384	
a. Discarded		
Canister waste	38	
Zircaloy cladding waste	34	
D-8 waste	19	
b. Left behind		
Heels and flushes	33	
Total	124	

The plutonium loaded out plus discards and that remaining in heels and flushes ($6384 + 124 = 6508$ grams) was 235 grams above the input.

Piping changes were made in preparation for draining the plutonium-bearing solution from the L-10-F (XAF) tank to the LS-1 sump for re-cycle to the process.

Following are the waste storage tank data for the report period:

	105-SX	107-SX**	108-SX	109-SX	110-SX	111-SX	112-SX	114-SX	115-SX
Liquid Level	17'2-1/8"	19'3-1/4"	20'6-1/4"	22'3-1/2"	22'1-1/4"	10'5-1/4"	22'1-1/2"		21'3-3/4"
Bulb 1" Sludge Temp.	114 F	270 F	283 F	280 F	239 F	218 F	231 F		210 F
Scummer 1" Sludge Temp.	-	270 F	307 F	286 F	287 F	224 F	218 F		218 F
2-Ft. Supernatant Temp.	-	230 F	246 F	245 F	205 F	163 F	214 F		192 F
Supernatant Temp. Gradient*	-	2 F	5 F	21 F	4 F	2 F	5 F		4 F
No. of Circulators Oper.	0	3	4	3	2	2	2		1
Specific Gravity	1.28	1.33	1.60	1.57	1.53	1.15	1.59		1.59
Apparent Sludge Depth	-	0'6-1/2"	0'10-1/2"	1'6"	1-6-3/4"	2'5-3/4"	1'9"		0'10-1/2"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 107-SX is the current salt waste receiver tank.

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-66-

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SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 4-19-64 TO 2400 4-25-64

I. PRODUCTION

U Shipped 43.78 IAF Processed 34.97 Charged 55.44 E-metal
Pu Loaded 25157

II. PRODUCT PURITY

	Plutonium		Uranium				
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum	<u>3.4</u>	<u>6.80²</u>	<u>34.0</u>	<u>1.0</u>	<u>1.0</u>	<u>2.0</u>	<u>6.0</u>
Average	<u>7.4</u>	<u>3.02³</u>	<u>95.5</u>	<u>2.2</u>	<u>6.17</u>	<u>21.0</u>	<u>27.2</u>
Maximum	<u>14.7</u>	<u>5.24³</u>	<u>189.0</u>	<u>7.6</u>	<u>16.0</u>	<u>69.0</u>	<u>140.0</u>

III. WASTE

Extraction Losses			To Underground Storage			Coating Waste Losses		
U	<u>0.01</u>	%	U <u>75</u>	Lbs. <u>0.11</u>	%	U <u>168</u>	Lbs. <u>0.18</u>	%
Pu	<u>0.02</u>	%	Pu <u>53</u>	Gms. <u>0.23</u>	%	Pu <u>48</u>	Gms. <u>0.18</u>	%
			Gallons	<u>57453</u>		Gallons	<u>8222</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.4</u>	<u>1.4</u>
Partition Cycle	<u>2.3</u>	<u>2.5</u>
Third U	<u>1.1</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.1</u>
Third Pu	<u>-</u>	<u>1.0</u>
Tail End	<u>1.2</u>	<u>-</u>
Total	<u>6.0</u>	<u>7.0</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>1047</u>	<u>623</u>	<u>885</u>
Cooling Time	<u>282</u>	<u>190</u>	<u>231</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	<u>204-3 out of spec. URM</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>2000</u>	<u>2.78</u>	<u>-</u>
HE	Sump Waste	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
HE	Recycle	<u>-</u>	<u>1016</u>	<u>4.22</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
Excess E-1	<u>Out of spec. FR</u>	<u>-</u>	<u>567</u>	<u>2.40</u>	<u>-</u>	<u>-</u>	<u>-</u>

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EW-80202
No. 630

-6/-

a. Flowsheet and Stream Compositions

The flowsheet and stream compositions were the same as stated on pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 4-19-64	0915 4-19-64	0	F-1 and E-13 agitator replacement
0915 4-19-64	0330 4-21-64	8	1A; 1B down
0330 4-21-64	1500 4-22-64	10	1A - 1B parallel
1500 4-22-64	0100 4-23-64	8	1A - 1B parallel
0100 4-23-64	1545 4-23-64	8	1A; 1B down
1545 4-23-64	1030 4-24-64	0	D-14 tube bundle replacement
1030 4-24-64	2000 4-24-64	8	1A; 1B on rework
2000 4-24-64	1200 4-25-64	0	High U in Pu product
1200 4-25-64	2400 4-25-64	8	1A; 1B on rework

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
4-20-64 (3 days)	238-295	None	0.025
4-21-64	241-251	"	0.0096
4-22-64	242-282	"	0.0090
4-23-64	253-283	"	0.0063
4-24-64	222-233	"	0.0037
4-25-64	223-234	"	0.0037

The 293-S Building recovered 48,065 pounds of 100 percent nitric acid during the report period with an average concentration of 42.1 percent.

d. Solvent Extraction

Virgin E-metal was processed during 74 percent of the report period. The 1A Column was given a 10 percent nitric acid flush during the shutdown period for the D-14 tube bundle replacement on 4-23-64.

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EW-80202
No. 630

-68-

The always critically-safe plutonium to uranium ratio in the F-2 and F-1 vessels was exceeded by 19 percent on 4-22-64, based on a sample taken at 1710. Sample results indicated that the 2DFS sample (F-1), which normally contains greater than 0.01M $\text{Na}_2\text{Cr}_2\text{O}_7 \cdot 2\text{H}_2\text{O}$, contained no detectable $\text{Na}_2\text{Cr}_2\text{O}_7 \cdot 2\text{H}_2\text{O}$ (0900 sample). The Pu to U ratio was returned to specification by butting E-2, D-14, F-1 and F-2 with sodium dichromate and recycling uranium to F-2 and F-1 via the 3D Column waste. The reason for the complete reduction of the sodium dichromate has not been determined. To prevent recurrence it was recommended that the 2DFS sample (F-1) be analyzed for dichromate each shift, rather than once per day as previously done.

A second shutdown was required on 4-24-64 when the plutonium product streams were found contaminated with uranium from poor partition cycle performance. Plutonium product streams were recycled to the partition cycle for reprocessing and UHM was returned from the 204 Area for blending with 1380 units plutonium, high in uranium, from F-7. Concurrently, the shutdown and startup waste batches, high in neptunium, were reworked via the 1A Column.

Several additional operating problems occurred. The D-4 hexone stripper did not operate well because of inadequate air lift transfer of water to D-2. The F-8 pump kicked out several times during 1S Column operation. Larger heaters in the switchgear have allowed normal operation of the pump.

Almost all of the UHM produced during the report period was out of gamma specifications. All plutonium product was in specifications.

e. Equipment

The D-14 tube bundle, which failed on 4-23-64, was replaced with a new one on 4-24-64.

An in-line hexone scrubber, located in the incoming hexone line to the receiver tank (O-2) was put into operation on 4-23-64. Caustic washing of hexone can now be done continuously during building operation. Previously the columns were shut down when the hexone inventory was being washed.

f. 233-B Building

Recycle of high gamma plutonium, produced during 1963 and early 1964 through the third plutonium cycle was started on 4-21-64. The plutonium is recycled to E-1 from L-16, butted with AHH and processed. The L-16 to E-4 recycle line was taken out of service. Piping was installed

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No. 630

by 4-22-64 so that the L-10-F contents could be drained to the IS-1 sump and returned to the process via L-16 and E-1.

Resin removal from the L-18 Contactor was started on 4-22-64. Resin from above and below the L-18 Contactor spool piece was removed and stored in 4-liter plastic bottles for disposition. Samples of the resin from the L-18 Contactor spool piece taken at the bottom flange, 9-inches above, 15 inches above, 21 inches above, 24 inches above, and 48 inches above were analyzed for plutonium. Sample results indicated a total of 8.12 grams plutonium present. The resin was packaged and buried.

Following are the waste storage tank data for the report period.

	<u>105-SI</u>	<u>107-SI**</u>	<u>108-SI</u>	<u>109-SI</u>	<u>110-SI</u>	<u>111-SI</u>	<u>112-SI</u>	<u>115-SI</u>
Liquid Level	16'11-3/4"	20'2-1/4"	20'5-1/2"	22'4-1/4"	22'-3/4"	10'5"	22'1"	21'3-3/4"
Bulb 1" Sludge Temp.	115 F	277 F	282 F	280 F	239 F	213 F	221 F	210 F
Scanner 1" Sludge Temp.	-	280 F	307 F	287 F	288 F	220 F	218 F	220 F
2-Ft. Supernatant Temp.	-	230 F	246 F	229 F	207 F	165 F	217 F	194 F
Supernatant Temp. Gradient*	-	1 F	5 F	5 F	5 F	2 F	6 F	2 F
No. of Circulators Operating	0	3	4	3	2	2	4	1
Specific Gravity	1.28	1.35	1.59	1.57	1.53	1.16	1.60	1.61
Apparent Sludge Depth	-	0'6-1/2"	0'10-1/2"	1'6"	1'10"	2'5-1/4"		

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 107-SI is the current salt waste receiver tank.

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No. 637

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 4-26-64 TO 2400 5-2-64

I. PRODUCTION

U Shipped 57.51 1AF Processed 61.62 Charged 40.62 E-metal
Pu Loaded 36910

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe(ppm)	Na(ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>3.7</u>	<u>7.58²</u>	<u>75.0</u>	<u>1</u>	<u>1.30</u>		<u>8.0</u>	<u>3.0</u>
Average	<u>4.8</u>	<u>1.55³</u>	<u>123.7</u>	<u>1</u>	<u>2.71</u>		<u>12.5</u>	<u>28.5</u>
Maximum	<u>6.5</u>	<u>3.06³</u>	<u>272.0</u>	<u>2</u>	<u>7.70</u>		<u>20.0</u>	<u>54.0</u>

III. WASTE

<u>Extraction Losses</u>			<u>To Underground Storage</u>			<u>Coating Waste Losses</u>		
U	<u>0.02</u>	%	U <u>51</u>	Lbs. <u>0.04</u>	%	U <u>168</u>	Lbs. <u>0.17</u>	%
Pu	<u>0.03</u>	%	Pu <u>24</u>	Gms. <u>0.06</u>	%	Pu <u>48</u>	Gms. <u>0.17</u>	%
			Gallons	<u>43496</u>		Gallons	<u>8200</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.4</u>	<u>1.4</u>
Partition Cycle	<u>2.2</u>	<u>2.4</u>
Third U	<u>1.2</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.4</u>
Third Pu	<u>-</u>	<u>1.3</u>
Tail End	<u>1.7</u>	<u>-</u>
Total	<u>6.5</u>	<u>7.5</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>1025</u>	<u>812</u>	<u>901</u>
Cooling Time	<u>361</u>	<u>169</u>	<u>223</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	<u>204-3 Out of spec. URM</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>4590</u>	<u>3.59</u>	<u>-</u>
HE	<u>Sump Waste</u>	<u>1718</u>	<u>130</u>	<u>0.33</u>	<u>371</u>	<u>0.30</u>	<u>3.8</u>
HE	<u>Recycle</u>	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
HE	<u>204-3 E-7 RM</u>	<u>-</u>	<u>1380</u>	<u>3.36</u>	<u>-</u>	<u>-</u>	<u>-</u>
HE	<u>204-3 E-1 Out of spec. FR</u>	<u>-</u>	<u>4656</u>	<u>10.50</u>	<u>-</u>	<u>-</u>	<u>-</u>

-72- **DECLASSIFIED**

HW-80202
No. 631

a. Flowsheet and stream compositions

The flowsheet and stream compositions were the same as stated on pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 4-26-64	1500 4-28-64	8.0	1A
1500 4-28-64	1400 4-29-64	8.5	1A
1400 4-29-64	0400 4-30-64	9.0	1A
0400 4-30-64	0720 5-1-64	9.5	1A; 1A88 flow limiting
0720 5-1-64	1600 5-1-64	8.5	1A
1600 5-1-64	0845 5-2-64	9.0	1A
0845 5-2-64	2400 5-2-64	8.0	1A

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved gms, days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
4-27-64 (2 days)	192-236	None	0.0058
4-28-64	193-237	"	0.0019
4-29-64	194-275	"	0.0022
4-30-64	163-362	0.65	0.0027
5-1-64	164-360	0.62	0.0035
5-2-64	143-213	2.70	0.0066

The 293-B Building recovered 49,331 pounds of 100 percent nitric acid during the report period with an average concentration of 43.4 percent.

d. Solvent Extraction

The column operation was satisfactory. Approximately 50 percent of the UHM produced was above specifications in gamma ratio and was sent to the 204-2 tank for subsequent rework and/or blending. The hexones underwent a total of 9 washings using the in-line hexone blender to try and clean the nitroso compounds out of the hexone. The washing was with 5% and 30% Wt. NaOH. The UHM produced varied in gamma with the condition of the hexone.

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-73-

EW-80202
No. 631

A column capacity check was started 4-28-64 with incremental flow rates being increased in the columns. The L/V was changed to 0.56 at a 9 rate and to 0.58 at a 9.5 rate. The UEN loss increased slightly at an L/V of 0.58. Taking the worst figures for an L/V of 0.58 and 0.56 respectively, the waste loss calculated for UEN was 0.09% and 0.016%. At the end of this report period the 1A Column was on an L/V of 0.56. At a 9.5 rate the IANS flow was limiting. Therefore the column feed rate was cut back to 9. At a 9 rate the IANS flow slowly began dropping off. The IANS pump was limited by the F-7 pump pressure to the 1A Column and by a loss of capacity due to wear. The D-4 tank's airlift flow line to D-2 could not handle the water from the hexone stripper at a 9.5 rate.

The 1B Column was used as a pipe to run rework batches back via the D-14 tank into the extraction battery. Approximately four D-9 waste batches were high in products and were returned to the process via the 1B Column and D-14 backcycle procedure and by head-end bleedings. One waste batch was high in uranium.

e. 233-S Building

Out of gamma specification Pu from 233-S was re-run through the third Pu cycle starting on 4-29-64 and running through the end of the report period.

Twelve small volume drains from L-10-F to IS-1 sump have been made. The L-10-F tank is nearly empty.

Following are the waste storage tank data for the report period.

	<u>105-EX</u>	<u>107-EX</u>	<u>108-EX</u>	<u>109-EX</u>	<u>110-EX</u>	<u>111-EX</u>	<u>112-EX</u>	<u>114-EX</u>	<u>115-EX</u>
Liquid Level	16'9-3/4"	20'10"	20'6"	22'3"	22'-1/2"	10'4-1/2"	22'-1/2"	4'5"	21'3-1/2"
Bulb 1" Sludge Temp.	111 F	277 F	283 F	280 F	240 F	206 F	217 F	157 F	209 F
Scanner 1" Sludge Temp.	-	279 F	308 F	289 F	288 F	221 F	222 F	157 F	224 F
2-Ft. Superstant Temp.	-	230 F	246 F	229 F	207 F	167 F	222 F	156 F	198 F
Superstant Temp.gradient*	-	3 F	6 F	4 F	4 F	2 F	6 F	-	4 F
No. of Circ. Operating	0	3	4	3	2	2	4	0	1
Specific Gravity	1.28	1.35	1.59	1.57	1.53	1.16	1.60	-	1.61
Apparent Sludge Depth	-	0'7"	0'10-1/2"	1'6"	1'8"	2'5"	1'9"	0'8-1/4"	0'11-1/2"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-EX is the current salt waste receiver tank.

NOTE: The D-8 salt waste was routed to the 114-EX tank on 4-30-64 beginning with FW-45. Tank farm condensate from the 106-EX tank was pumped to the 114-EX tank to a level of 3'6-1/2" before the D-8 salt waste was routed to 114-EX.

The 107-EX tank will be allowed to concentrate before any additional waste is added.

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SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 5-3-64 TO 2400 5-9-64

I. PRODUCTION

U Shipped 28.86 1AF Processed 30.58 Charged 30.63
Pu Loaded 20,118 (3210 out of spec. in U; will be reworked)

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe(ppm)	Na(ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>6.0</u>	<u>5.93²</u>	<u>120.0</u>	<u>.52</u>	<u>1.33</u>	<u>8</u>	<u>40</u>	
Average	<u>7.5</u>	<u>4.44³</u>	<u>193.0</u>	<u>1.8</u>	<u>1.81</u>	<u>13.4</u>	<u>83.</u>	
Maximum	<u>12.2</u>	<u>1.56⁴</u>	<u>336.8</u>	<u>3.1</u>	<u>14.9</u>	<u>26</u>	<u>210</u>	

III. WASTE

Extraction Losses			To Underground Storage			Coating Waste Losses		
U	<u>0.01</u>	%	U	<u>26</u>	Lbs. <u>0.04</u> %	U	<u>112</u>	Lbs. <u>0.18</u> %
Pu	<u>0.04</u>	%	Pu	<u>27</u>	Gms. <u>0.13</u> %	Pu	<u>32</u>	Gms. <u>0.18</u> %
			Gallons	<u>34,231</u>		Gallons	<u>5515</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.3</u>	<u>1.3</u>
Partition Cycle	<u>2.3</u>	<u>2.4</u>
Third U	<u>1.2</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.8</u>
Third Pu	<u>-</u>	<u>0.9</u>
Tail End	<u>1.7</u>	<u>-</u>
Total	<u>6.3</u>	<u>7.4</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>1089</u>	<u>810</u>	<u>897</u>
Cooling Time	<u>295</u>	<u>145</u>	<u>195</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>339</u>	<u>2</u>	<u>.01</u>	<u>6</u>	<u>.01</u>	<u>0</u>
HE	Sump Waste	<u>1416</u>	<u>4</u>	<u>.02</u>	<u>9</u>	<u>.01</u>	<u>1</u>
HE	Recycle	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
LS Column	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
E-1 Out of spec. PR			<u>3228</u>	<u>12.83</u>	<u> </u>	<u> </u>	<u> </u>
L-10 drain and flush			<u>1417</u>	<u>5.63</u>	<u> </u>	<u> </u>	<u> </u>

The flowsheet and stream compositions were the same as stated on pages 3 and 4 of this document.

Flowsheet and Stream Compositions

Extraction Rates

From	To	Rate	Remarks
0800 5-3-64	1015 5-4-64	8	1A
1015 5-4-64	1330 5-7-64	0	D-14 pump replacement and equipment repair.
1330 5-7-64	1605 5-7-64	8	
1605 5-7-64	0400 5-8-64	0	New D-14 pump failed
0400 5-8-64	2400 5-9-64	8	

Distillates

Following are the radiolabeling data for the report period:

Period Ending at 1000	Material Dissolved, gms, days	Curies of I-131 Available	Curies of I-131 To Stock
5-4-64 (2 days)	144-215	4.87	0.28
5-5-64	147-187	0.7	0.053
5-6-64	No dissolving	None	0.11
5-7-64	" "	None	0.084
5-8-64	190-219	None	0.020

The 293-B Building recovered 27,048 pounds of 100 percent nitric acid during the report period with an average concentration of 41.4 percent.

Solvent Extraction

The column operation for the report period was poor. During the first of the week a continuing lower JARS rate due to D-14 pump forced a building shutdown. While shut down, a 10 percent acid flush of 1A was done. The D-14 pump was replaced along with a modification of D-4 to D-2 strift. The unit was still being produced out of normal specifications during column operation but was reduced from a gamma rate of 10 to 4.5 by occasion. During startup on 5-7-64 the new D-14 pump failed. The columns were shut down and a second new D-14 pump was installed. During the second startup on 5-8-64 attention was experienced. Plutonium product solution was

DECLASSIFIED

-77-

EW-80202
No. 632

contaminated with uranium up to 27,000 parts per million from the two startups. There was a loss of acid control in D-14. The D-14 specifications are from 0.2M to 0.4M HNO_3 . The D-14 analyzed 0.12M HNO_3 . A process test which lowered the IAX acid from 0.2M to 0.1M failed to keep neptunium from being lost to the IAW stream. The IAX was increased to 0.2M HNO_3 until D-14 came into acid specifications.

e. Hexone Wash Summary

The following data are tabulated to show the results of several hexone washes using the new in-line hexone blender. The spectrograph reading gives an arbitrary indication of the nitroso compounds in hexone. Nitroso compounds contribute significantly to poor decontamination of UHM. By comparison of spectrograph readings a relative idea of the efficiency of the washes can be gained.

<u>Wash No.</u>	<u>Date</u>	<u>Hexone Sample</u>	<u>Spectrograph Reading</u>	<u>Wash % out NaOH used</u>
1	4-23	Prewash	3.42	4.6
1	4-23	After wash	6.3	4.6
2	4-24	Prewash	6.4	4.6
2	4-25	After wash	5.8	4.6
3	4-25	After wash	2.31	4.6
4	4-26	After wash	2.0	4.6
5	4-27	Prewash	2.01	4.6
5	4-27	After wash	1.78	4.6
6	4-29	After wash	1.70	2.8
7	4-30	After wash	1.50	2.8
8	5-1	Prewash	2.78	2.8
8	5-1	After wash	0.905	2.8
8a	5-1	Acid wash	-	1% HNO_3
9	5-2	After wash	2.87	1% HNO_3
10	5-3	After wash	2.22	10.0
11	5-4	After wash	1.07	2.8
12	5-4	Prewash	1.73	10.0
12	5-5	After wash	0.48	(old method)

f. Equipment

The D-14 pump was replaced on 5-7-64 after an operating life of 406 hours. A new D-14 pump was installed on 5-7-64 and replaced on 5-8-64 after an operating life of 2 hours.

HW-80202
No. 632

The leaking D-12 west tube bundle was removed. The new D-12 tube bundle could not be repositioned and was damaged because of sludge in the bottom of the D-12 reboiler. The reboiler was blanked until a new tube bundle could be fabricated.

The D-4 to D-2 airlift line was modified to handle a large volume of flow.

g. 233-B Building

The L-10-F tank was drained and flushed during the report period. Approximately 1625 units of plutonium were present in the drain solution. Additional flushing will be required.

Following are the waste storage tank data for the report period.

	<u>105-EX</u>	<u>107-EX</u>	<u>108-EX</u>	<u>109-EX</u>	<u>110-EX</u>	<u>111-EX</u>	<u>112-EX</u>	<u>114-EX**</u>	<u>115-EX</u>
Liquid Level	16'8"	20'1-1/2"	20'6-1/2"	22'1-3/4"	22'0"	10'4"	22'0"	5'4-1/2"	21'3-3/4"
Bull 1" Sludge Temp.	109 F	272 F	283 F	279 F	240 F	201 F	219 F	162 F	209 F
Summer 1" Sludge Temp. -		275 F	309 F	289 F	287 F	215 F	221 F	158 F	225 F
2-Ft. Supernatant Temp. -		232 F	247 F	228 F	207 F	165 F	221 F	157 F	197 F
Supernatant Temp.Gradient* -		1 F	5 F	2 F	5 F	2 F	6 F	0 F	2 F
No. of Circ. Operating	0	3	4	3	2	2	4	None	1
Specific Gravity	1.28	1.36	1.59	1.57	1.53	1.17	1.61	-	1.61
Apparent Sludge Depth	-	0'8-1/4"	0'10-1/2"	1'8"	1'11-1/2"	2'4-1/2"	1'9"	0'8"	1'0"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-EX is the current salt waste receiver tank.

HW-80202
No. 632

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DECLASSIFIED
No. 633

-80-

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 5-10-64 TO 2400 5-16-64

I. PRODUCTION

U Shipped 43.42 1AF Processed 39.80 Charged 54.62
Pu Loaded 39760

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe(ppm)	Na(ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>5.9</u>	<u>3.36²</u>	<u>118</u>	<u>4.0</u>	<u>2.27</u>		<u>10</u>	<u>0</u>
Average	<u>11.8</u>	<u>1.83</u>	<u>178</u>	<u>5.8</u>	<u>5.85</u>		<u>16</u>	<u>36</u>
Maximum	<u>21.7</u>	<u>6.03</u>	<u>258</u>	<u>8.6</u>	<u>13.0</u>		<u>27</u>	<u>86</u>

III. WASTE

<u>Extraction Losses</u>			<u>To Underground Storage</u>			<u>Coating Waste Losses</u>		
U	<u>0.02</u>	%	U	<u>72</u>	Lbs. <u>0.09</u> %	U	<u>196</u>	Lbs. <u>0.18</u> %
Pu	<u>0.02</u>	%	Pu	<u>42</u>	Gms. <u>0.16</u> %	Pu	<u>56</u>	Gms. <u>0.18</u> %
			Gallons	<u>44841</u>		Gallons	<u>9648</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.1</u>	<u>1.1</u>
Partition Cycle	<u>2.2</u>	<u>2.3</u>
Third U	<u>1.4</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.8</u>
Third Pu	<u>-</u>	<u>1.0</u>
Tail End	<u>1.5</u>	<u>-</u>
Total	<u>6.2</u>	<u>7.2</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>1122</u>	<u>697</u>	<u>833</u>
Cooling Time	<u>371</u>	<u>159</u>	<u>210</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
HE	Sump Waste	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
HE	Recycle	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
1A and 1S Columns		<u>12,956</u>	<u>235</u>	<u>0.66</u>	<u>301</u>	<u>0.38</u>	<u>7</u>
Extrax 2-1	Out of spec. PR		<u>8175</u>	<u>22.88</u>	<u>-</u>	<u>-</u>	<u>-</u>
	1-10-F drain & flush		<u>506</u>	<u>1.42</u>	<u>-</u>	<u>-</u>	<u>-</u>

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EW-80202
No. 633

a. Flowsheet and stream Compositions

Flowsheet and stream compositions were the same as stated on pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 5-10-64	2000 5-14-64	8	1A
2000 5-14-64	2200 5-14-64	0	Crashed down to replace D-12 trap jumper.
2200 5-14-64	0930 5-15-64	8	1A
0930 5-15-64	2400 5-16-64	0	Acid flush of 1A and 2D ; Rework of high waste batches

c. Dissolvers

Following are the radiiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved Age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stack</u>
5-11-64 (3 days)	191-331	None	0.081
5-12-64	160-332	1.35	0.017
5-13-64	217-371	None	0.016
5-14-64	159-218	0.19	0.017
5-15-64	160-219	0.19	0.013

The 293-B Building recovered 35,010 pounds of 100 percent nitric acid during the report period with an average concentration of 40.6 percent.

d. Solvent Extraction

Virgin E-metal was processed 70 percent of the time. Column operation was ragged with high products content in the waste stream. UMH was out of gamma specifications with Zr-Nb contributing to the gamma activity. 1A Column interface control and 2D startup difficulties were the major contributing factors to poor column operation. The precycle columns were given a 10 percent nitric acid flush on 5-16-64. Five waste batches were then re-processed through the columns to recover product lost to waste. Pressurization of the H-4 vessel was the source of the high waste.

e. Hexone Wash

The hexone was washed during the shutdown period. The spectrograph reading before was 1.98 and after the wash was 1.6.

f. 204 Tanks

The high gamma activity in the uranium product was lowered to an acceptable gamma ratio. The uranium was re-ozonated, blended and stored. In addition, 20 tons of the uranium in storage were processed through the silica gel facility to lower the Zr-Nb gamma activity to acceptable ratios.

g. 233-S Building

Four FR Cans of the high gamma plutonium in storage were successfully re-worked through the 3A-3B Columns via E-1. The L-10-F tank drain and flush were completed. The plutonium was returned to the process via L-16 to E-1. A total of 1923 units was present in the drain and flushes.

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Following are the waste storage tank data for the report period.

	<u>105-SX</u>	<u>107-SX</u>	<u>108-SX</u>	<u>109-SX</u>	<u>110-SX</u>	<u>111-SX</u>	<u>112-SX</u>	<u>114-SX**</u>	<u>115-SX</u>
Liquid Level	16'5-1/2"	19'5"	20'6"	22'-1/2"	21'11-1/2"	10'3-3/4"	21'11-3/4"	6'11"	21'3-1/4"
Bulb 1" Sludge Temp.	110 F	273 F	284 F	280 F	239 F	197 F	221 F	184 F	209 F
Scanner 1" Sludge Temp.	-	276 F	309 F	289 F	286 F	209 F	222 F	163 F	223 F
2-Ft. Supernatant Temp.	-	234 F	247 F	227 F	206 F	162 F	221 F	163 F	195 F
Supernatant Temp.Gradient*	-	1 F	5 F	4 F	3 F	3 F	1 F	2 F	3 F
No. of Circulators Operating	0	3	4	3	2	2	4	0	1
Specific Gravity	1.28	1.39	1.58	1.58	1.53	1.17	1.61	-	1.61
Apparent Sludge Depth	-	0'8"	0'10"	1'8"	2'10"	2'4-1/4"	-	0'7-3/4"	1'0"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-SX is the current salt waste receiver tank.

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EW-80202
No. 634

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 5-17-64 TO 2400 5-23-64

I. PRODUCTION

U Shipped 49.86 1AF Processed 48.07 Charged 46.86
Pu Loaded 21,810

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe(ppm)	Na(ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>4.0</u>	<u>3.38²</u>	<u>105</u>	<u>1</u>	<u>1.51</u>		<u>12.0</u>	<u>2</u>
Average	<u>7.7</u>	<u>1.33³</u>	<u>153.1</u>	<u>5.5</u>	<u>20.8</u>		<u>16.8</u>	<u>35.3</u>
Maximum	<u>17.6</u>	<u>3.30³</u>	<u>332</u>	<u>31.9</u>	<u>85.0</u>		<u>28.0</u>	<u>154</u>

III. WASTE

<u>Extraction Losses</u>			<u>To Underground Storage</u>			<u>Coating Waste Losses</u>		
U	<u>0.01</u>	%	U	<u>48</u>	Lbs. <u>0.05</u> %	U	<u>140</u>	Lbs. <u>0.15</u> %
Pu	<u>0.07</u>	%	Pu	<u>48</u>	Gms. <u>0.17</u> %	Pu	<u>40</u>	Gms. <u>0.15</u> %
			Gallons	<u>49,184</u>		Gallons	<u>6929</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.2</u>	<u>1.2</u>
Partition Cycle	<u>2.1</u>	<u>2.4</u>
Third U	<u>1.5</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.6</u>
Third Pu	<u>-</u>	<u>1.3</u>
Tail End	<u>0.9</u>	<u>-</u>
Total	<u>5.7</u>	<u>7.5</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>980</u>	<u>528</u>	<u>803</u>
Cooling Time	<u>244</u>	<u>142</u>	<u>165</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste						
HE	Sump Waste	<u>783</u>	<u>1</u>	<u>1.01</u>	<u>1370</u>	<u>1.40</u>	<u>31</u>
HE	Reactor	<u>123</u>	<u>4.59</u>	<u>1.40</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column	E-7 rework	<u>10,255</u>	<u>36</u>	<u>0.11</u>	<u>14</u>	<u>.01</u>	<u>153</u>
E-2 rework	E-1 Out of spec PR		<u>3391</u>	<u>10.38</u>			

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EW-80202
No. 634

a. Flowsheet and Stream Compositions

Flowsheet and stream compositions were the same as stated on pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 5-17-64	1230 5-17-64	0	1A and 1B on rework
1230 5-17-64	1545 5-19-64	8	1A; 1B down
1545 5-19-64	1100 5-20-64	8.5	1A; 1B on rework
1100 5-20-64	2030 5-20-64	9.0	1A; 1B on rework
2030 5-20-64	0700 5-21-64	9.25	1A; 1B down
0700 5-21-64	1630 5-21-64	9.75	1A; 1B on rework
1630 5-21-64	1630 5-22-64	8	1A; 1B on rework
1630 5-22-64	0400 5-23-64	9	1A; 1B on rework
0400 5-23-64	1600 5-23-64	0	Fe omitted from 1B
1600 5-23-64	2400 5-23-64	9	1A; 1B on rework

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stack</u>
5-18-64 (3 days)	162-222	2.18	0.065
5-19-64	151-183	1.26	0.016
5-20-64	142-184	6.92	0.028
5-21-64	143-185	8.24	0.073
5-22-64	144-167	5.52	0.12

The 293-B Building recovered 39,350 pounds of 100 percent nitric acid during the report period with an average concentration of 42.0 percent.

d. Solvent Extraction

Virgin E-metal was processed during 87 percent of the report period, however column operation was marginal with high product losses to waste. The

DECLASSIFIED

EW-80202

No. 634

-66-

final product uranium was out of gamma specification and required processing through the silica gel facility for Zr-Nb decontamination. Column instrument problems and poor acid control were largely responsible for the poor column performance.

Aqueous solution was overflowed into the final plutonium product stream (3B Column) when the 3A Column static pressure dip tube was excessively purged on 5-20-64. The 3B Column was drained and flushed to F-2, and the E-3 and E-4 tank inventories segregated for possible rework.

The ferrous iron addition to a batch of LKX solution was omitted and the solution used without analysis on 5-23-64. This resulted in loss of partition and gross contamination of the uranium product with plutonium. The precycle columns were shut down and the F-4 and F-5 tank contents recycled to F-2 for reprocessing through the partition cycle. Two uranium product batches, out of plutonium specifications, were segregated for rework or blending.

Processing rates were incrementally increased, during the operating period, to determine the rate at which the restricted F-2 to F-1 overflow became limiting. A rate of 9.75 could not be maintained.

e. 233-S Building

Rework of high-gamma plutonium product as recycle to E-1 was continued.

The 233-S Building was shut down and flushed to remove aluminum resulting from the 3A Column overflow. The flushes are being reworked via recycle to E-1.

f. Tail End Uranium

All high gamma uranium product generated was brought into gamma specification by processing through the silica gel facility.

Following are the waste storage tank data for the report period.

	<u>105-SX</u>	<u>107-SX</u>	<u>108-SX</u>	<u>109-SX</u>	<u>110-SX</u>	<u>111-SX</u>	<u>112-SX</u>	<u>114-SX**</u>	<u>115-SX</u>
Liquid Level	16'3-1/2"	18'9-1/4"	20'6"	22'3-1/2"	21'11"	10'3-1/4"	20'10"	8'1-1/4"	21'3"
Bulb 1" Sludge Temperature	110 F	283 F	285 F	279 F	239 F	194 F	227 F	202 F	208 F
Scanner 1" Sludge Temperature	-	286 F	312 F	290 F	286 F	211 F	225 F	178 F	227 F
2-Ft. Supernatant Temperature	-	236 F	249 F	226 F	208 F	167 F	225 F	178 F	199 F
Supernatant Temp. Gradient*	-	2 F	5 F	3 F	4 F	2 F	1 F	8 F	3 F
No. of Circulators Operating	0	3	4	3	2	0	2	2	0
Specific Gravity	1.28	1.40	1.60	1.58	1.54	1.18	1.61	-	1.61
Apparent Sludge Depth	-	0'6-1/2"	0'8"	2'2"	2'0"	2'4"	-	0'7-1/2"	1'0"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-SX is the current salt waste receiver tank.

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 HM-80202
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-88-

DECLASSIFIED 80202 635

SUMMARY OF 202-S BLDG. OPERATION
FROM 0000 5-24-64 TO 2400 5-30-64

I. PRODUCTION

U Shipped 23.95 1AF Processed 26.75 Charged 33.12

Pu Loaded 20.910

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe(ppm)	Na(ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>9.5</u>	<u>4.642</u>	<u>128</u>	<u>1</u>	<u>0.94</u>		<u>10</u>	<u>2</u>
Average	<u>17.7</u>	<u>8.682</u>	<u>159</u>	<u>3.6</u>	<u>4.07</u>		<u>14.4</u>	<u>16.2</u>
Maximum	<u>24.3</u>	<u>1.773</u>	<u>206</u>	<u>14</u>	<u>14.5</u>		<u>18</u>	<u>38</u>

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>0.01</u> %	U <u>19</u> Lbs.	<u>0.04</u> %	U <u>140</u> Lbs.	<u>0.17</u> %
Pu	<u>0.03</u> %	Pu <u>31</u> Gms.	<u>0.20</u> %	Pu <u>40</u> Gms.	<u>0.17</u> %
		Gallons <u>36.455</u>		Gallons <u>6776</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.3</u>	<u>1.3</u>
Partition Cycle	<u>2.0</u>	<u>2.3</u>
Third U	<u>1.6</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.6</u>
Third Pu	<u>-</u>	<u>1.0</u>
Tail End	<u>1.6</u>	<u>-</u>
Total	<u>6.5</u>	<u>7.2</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>932</u>	<u>807</u>	<u>856</u>
Cooling Time	<u>237</u>	<u>141</u>	<u>169</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>612</u>	<u>3</u>	<u>.01</u>	<u>15</u>	<u>.03</u>	<u>-</u>
HE	Sump Waste	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
HE	Recycle	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
LS Column		<u>18,629</u>	<u>78</u>	<u>.36</u>	<u>181</u>	<u>.34</u>	<u>240</u>
Excess E-1	Out of spec FR		<u>5374</u>	<u>24.84</u>			
	E-7 Pu		<u>345</u>	<u>1.60</u>			

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HW-80202
No. 635

a. Flowsheet and Stream Compositions

The flowsheet and stream compositions were the same as stated on pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 5-24-64	0400 5-25-64	9	1A; 1B on rework
0400 5-25-64	0920 5-25-64	8	1A; 1B on rework
0920 5-25-64	2300 5-26-64	0	Waste rework; 1A and 1B
2300 5-26-64	2000 5-27-64	8	1B; 1A down
2000 5-27-64	23000 5-27-64	0	Switch from 1B to 1A
2300 5-27-64	0900 5-28-64	8	1A; 1B on rework
0900 5-28-64	0210 5-29-64	0	Replace D-14 pump and G-3 tube bundle
0210 5-29-64	0845 5-29-64	8	1A; 1B on rework
0845 5-29-64	2100 5-30-64	0	1A and 1B on rework
2100 5-30-64	2400 5-30-64	8	1A; 1B on rework

c. Dissolvers

Following are the radiiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved avg. days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
5-25-64 (3 days)	144-245	17.39	0.31
5-26-64	162-235	0.46	0.044
5-27-64	No dissolving	-	0.18
5-28-64	167-203	0.89	0.059
5-30-64 (2 days)	142-238	0.63	0.22

The 293-B Building recovered 29,138 pounds of 100 percent nitric acid during the report period with an average concentration of 41.4 percent.

d. Solvent Extraction

Virgin E-metal was processed only 60 percent of the operating period, due to continued poor column operation and equipment failure. A pressurization

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NW-80202

No. 635

-90-

of the E-4 (feed oxidizer) put feed solution to D-13 and three waste batches required rework.

Additional rework resulted from insufficient salting of the 1A Column (1AW Sp.Gr. out of calibration). 1B Column flooding and poor acid control also lost several hundred grams of neptunium to waste, which required rework.

The 1A Column was given a 10 percent nitric acid flush on 5-26-64. The 1B Column was flushed with 10 percent nitric acid on 5-28-64. When the 1A Column was started up after its acid flush, it plugged. Virgin feed was started to the 1B Column on 5-26-64; however, poor acid control in the D-14 backcycle stream and 1B Column flooding (approximately 2000 gallons of hexons were lost to D-13) resulted in high neptunium waste. The 1A Column was unplugged and started up on 5-27-64, but another process shutdown was required on 5-28 to replace the leaking D-14 pump and the G-3 tube bundle.

Faulty 1A Column instrumentation on startup, 5-29-64, resulted in more waste rework. The waste rework was completed and the 1A Column again started on virgin feed at 2100, 5-30-64.

The large volume of rework increased gamma activity throughout the process. All uranium product was out of gamma specification and required processing through the silica gel facility.

Plutonium nitrate solution from E-7, contaminated with uranium from a 1B Column upset, was returned to F-8, butted with 4,142 pounds uranium from the 204-3 tank, and reworked.

e. Equipment

The D-14 pump and the D-14 pump discharge jumper were replaced on 5-29-64. The D-14 pump had operated 402 hours. The G-3 east tube bundle was also replaced on 5-29-64.

f. 233-S Building

Rework of high gamma plutonium by recycle, L-16 to E-1, was continued.

The 233-S Building vessel vent system was re-routed to discharge into the G-Cell air tunnel in the 202-S Building in December, 1963. This system allows drainage to the IS-1 sump in 233-S of any overflow to the vessel vent system. Additional entrainment or condensate will drain to the ES-1 sump through a seal leg and sampler in the north sample gallery. The vent jet is located at the GT-1 nozzle and discharges to the air tunnel in G-Cell. This system replaced the filters, French drain and high stack arrangement previously used.

DECLASSIFIED

-91-

HW-80202

No. 635

A new exhaust ventilation system for the 233-S Building is nearing completion. Piping changes have been completed (5-22-64) so that the 233-S floor drains and the new filter building are tied together and drain to the D-1 tank in the 202-S Building.

6. 202-S Building

The silica gel facility was used for additional decontamination of the out of gamma specification UHM produced during the operating period. All UHM met gamma specification after processing through this facility.

Following are the waste storage tank data for the report period.

	105-EX	107-EX	108-EX	109-EX	110-EX	111-EX	112-EX	114-EX	115-EX
Liquid Level	16'-1/2"	18'-2-1/4"	20'-5-1/2"	22'-5-1/2"	21'-10-3/4"	10'-3-1/4"	20'-9-1/2"	9'-0"	21'-2-3/4"
Bull 1" Sludge Temp.	105-F	281 F	285 F	280 F	239 F	192 F	227 F	218 F	209 F
Summer 1" Sludge Temp.	-	280 F	307 F	290 F	285 F	208 F	224 F	185 F	226 F
2-Ft. Supernatant Temp.	-	236 F	246 F	258 F	206 F	167 F	224 F	184 F	198 F
Supernatant Temp. Gradient*	-	1 F	6 F	33 F	3 F	3 F	2 F	5 F	4 F
No. of Circulators Oper.	-	3	4	3	2	2	2	4	1
Specific Gravity	1.28	1.40	1.60	1.58	1.53	1.18	1.61	1.12	1.61
Apparent Sludge Depth	-	0'-7-1/2"	0'-10"	2'-3"	2'-1"	2'-4"	-	0'-8"	1'-0"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-EX is the current salt water receiver tank.

NOTE: Daily monitoring of the 107-EX internal bearing 8-68" - 15" has indicated a rise from 80,000 e/m on 5-1-64 to 138,000 e/m on 5-28-64. The highest reading is located approximately 15 feet under the west side of the tank. No activity has been found in the other two laterals or in the vertical walls.

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80202
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88-00202
No. 636

-93-

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 5-31-64 TO 2400 6-6-64

I. PRODUCTION

U Shipped 34.72 IAF Processed 32.70 Charged 24.84

Pu Loaded 22,450

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu (ppb)	Uranium		Fe (ppm)	Na (ppm)
	Microcuries/gram	U (ppm)			E-13 G-ratio			
Minimum	<u>6.3</u>	<u>6.75³</u>	<u>138</u>	<u>71</u>	<u>1.30</u>		<u>12</u>	<u>9</u>
Average	<u>11.4</u>	<u>1.51³</u>	<u>325</u>	<u>71</u>	<u>26</u>		<u>16.6</u>	<u>16.5</u>
Maximum	<u>17.1</u>	<u>2.33³</u>	<u>618</u>	<u>71</u>	<u>186</u>		<u>22</u>	<u>43</u>

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>0.01</u> %	U <u>85</u> Lbs.	<u>0.13</u> %	U <u>84</u> Lbs.	<u>0.17</u> %
Pu	<u>0.04</u> %	Pu <u>42</u> Gms.	<u>0.21</u> %	Pu <u>24</u> Gms.	<u>0.17</u>
		Gallons	<u>32,625</u>	Gallons	<u>4087</u>

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.3</u>	<u>1.3</u>
Partition Cycle	<u>2.3</u>	<u>2.3</u>
Third U	<u>1.0</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.8</u>
Third Pu	<u>-</u>	<u>1.0</u>
Tail End	<u>1.1</u>	<u>-</u>
Total	<u>5.7</u>	<u>7.4</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>807</u>	<u>805</u>	<u>805</u>
Cooling Time	<u>155</u>	<u>150</u>	<u>152</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>858</u>	<u>5</u>	<u>0.02</u>	<u>8</u>	<u>0.01</u>	<u>17</u>
HE	Sump Waste	<u>4823</u>	<u>33</u>	<u>0.14</u>	<u>106</u>	<u>0.15</u>	<u>382</u>
HE	204-3				<u>4142</u>	<u>5.82</u>	
LS Column		<u>19,723</u>	<u>485</u>	<u>2.02</u>	<u>1498</u>	<u>2.10</u>	<u>576</u>
204-3 E-1	Out of spec PR		<u>1939</u>	<u>8.06</u>			
HE	E-7 Pu		<u>1317</u>	<u>5.47</u>			

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HW-80202
No. 636

-94-

a. Flowsheet and Stream Compositions

The flowsheet and stream compositions were the same as stated on pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 5-31-64	1415 6-2-64	8	1A
1415 6-2-64	1015 6-4-64	0	Waste rework (1A & 1S); 1A 10% HNO ₃ acid flush, and hexone washing
1015 6-4-64	1915 6-5-64	9	1A; 1S on rework
1915 6-5-64	1915 6-6-64	0	F-7 pump replacement, 10% acid flush (1A) and hexone washing.
1915 6-6-64	2400 6-6-64	8	1A

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
6-1-64	145-241	2.38	0.23
6-2-64	150	3.64	0.070
6-3-64	151	2.98	0.10
6-4-64	No dissolving	-	0.14
6-5-64	153	0.74	0.071

The 293-B Building recovered 24,974 pounds of 100 percent nitric acid during the report period with an average concentration of 41.4 percent.

d. Solvent Extraction

Virgin feed was processed only 60 percent of the operating period due to continued poor column operation and equipment failures. Poor acid control and 1A Column flooding resulted in high neptunium losses to waste. Poor quality hexone was believed responsible for poor gamma decontamination of the UNH product. The columns were shut down, the waste reworked and the 1A Column flushed with 10 percent nitric acid.

DECLASSIFIED

NW-80202
No. 636

-95-

Startup on 6-4-64 again gave high neptunium loss due to poor acid control in the backcycle salt stream (IARS). The columns were again shut down when the F-7 pump failed. During the pump replacement, two batches of organic were caustic washed and the 1A Column was again flushed with 10 percent HNO₃. The failed H-1 pump was also replaced.

e. Equipment

The F-7 pump began leaking on 6-5-64 and was replaced after 994 hours of operation. The H-1 pump, installed on 11-24-62 failed and was replaced on 6-5-64.

f. 233-S Building

The 233-S Building ductwork tie-in to the new filter building was completed and the new 233-S Building ventilation facility activated on 6-3-64.

A new L-16 recycle tank sampler was installed on 5-25-64. The block valve on the L-16 recycle recirculation jet was replaced on 6-4-64.

g. 276-S Building

Following completion of the hexone wash on 6-3-64, water was found overflowing to the 276-S sump from the vent seal pots. A considerable volume of water and organic had overflowed to the sump. The seal pot water drain was unplugged on 6-5-64. Additional hexone was overflowed to the sump at the start of a hexone wash on 6-5-64 due to instrument trouble. The 276-S sump was jetted to O-2 on 6-6-64, approximately 1722 gallons.

h. 205-S Building

UHM produced during the week was processed through the silica gel facility but was not decontaminated to gamma specifications on the initial pass.

Following are the waste storage tank data for the report period.

	<u>105-EX</u>	<u>107-EX</u>	<u>108-EX</u>	<u>109-EX</u>	<u>110-EX</u>	<u>111-EX</u>	<u>112-EX</u>	<u>114-EX**</u>	<u>115-EX</u>
Liquid Level	15'11-1/4"	17'6-1/2"	20'5-1/4"	22'5-1/4"	21'10"	10'3"	20'9"	9'10"	21'2-3/4"
Bulb 1" Sludge Temperature	107 F	283 F	283 F	279 F	239 F	203 F	218 F	225 F	208 F
Scanner 1" Sludge Temperature	-	289 F	309 F	288 F	284 F	164 F	221 F	193 F	223 F
2-Ft. Supernatant Temperature	-	237 F	246 F	242 F	206 F	221 F	221 F	192 F	195 F
Supernatant Temp. Gradient*	-	1 F	4 F	17 F	4 F	2 F	3 F	4 F	3 F
No. of Circulators Operating	0	3	4	3	2	2	4	2	1
Specific Gravity	1.28	1.44	1.61	1.58	1.53	1.28	1.61	1.12	1.60
Apparent Sludge Depth	-	0'6-1/2"	0'10"	2'4"	2'2-1/2"	2'4"	-	0'8-1/2"	1'0"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-EX is the current salt waste receiver tank.

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SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 6-7-64 TO 2400 6-13-64

I. PRODUCTION

U Shipped 45.12 LAF Processed 39.30 Charged 44.91
Pu Loaded 26,590

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe(ppm)	Na(ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>6.6</u>	<u>1.18³</u>	<u>1.71²</u>	<u>1</u>	<u>2.42</u>	<u>9</u>	<u>8</u>	
Average	<u>9.9</u>	<u>1.89³</u>	<u>4.26²</u>	<u>1.13</u>	<u>36.4</u>	<u>13.5</u>	<u>20</u>	
Maximum	<u>15.3</u>	<u>2.71³</u>	<u>8.49²</u>	<u>1.7</u>	<u>200</u>	<u>28</u>	<u>64</u>	

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>4.01</u> %	U	<u>73</u> Lbs. <u>0.09</u> %	U	<u>112</u> Lbs. <u>0.15</u> %
Pu	<u>.02</u> %	Pu	<u>41</u> Gms. <u>0.18</u> %	Pu	<u>32</u> Gms. <u>0.15</u> %
		Gallons	<u>31,706</u>	Gallons	<u>5717</u>

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.5</u>	<u>1.5</u>
Partition Cycle	<u>1.9</u>	<u>2.2</u>
Third U	<u>1.0</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.6</u>
Third Pu	<u>-</u>	<u>1.1</u>
Tail End	<u>1.1</u>	<u>-</u>
Total	<u>5.5</u>	<u>7.4</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>916</u>	<u>916</u>	<u>916</u>
Cooling Time	<u>164</u>	<u>159</u>	<u>161</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium Grams
			Grams	%	Lbs.	%	
HE	Salt Waste						
HE	Sump Waste	<u>1728</u>	<u>367</u>	<u>1.20</u>	<u>1013</u>	<u>1.11</u>	<u>26</u>
HE	Recycle to H-4		<u>736</u>	<u>2.40</u>			
LS Column		<u>11,290</u>	<u>67</u>	<u>0.22</u>	<u>84</u>	<u>0.09</u>	<u>170</u>
202001 E-1	Out of spec FR		<u>2908</u>	<u>9.48</u>			

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HW-80202
No. 637

a. Flowsheet and Stream Compositions

The flowsheet and stream compositions were the same as stated on pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 6-7-64	0245 6-7-64	8	1A;
0245 6-7-64	0815 6-10-64	9	1A;
0815 6-10-64	1700 6-10-64	8 0	1A; Processing high sodium nitrate feed
1700 6-10-64	0500 6-11-64	8.5	1A;
0500 6-11-64	0030 6-12-64	9.0	
0030 6-12-64	2400 6-13-64	0	Waste rework through 1B, hexone washing, 1A 10% HNO ₃ flush

c. Dissolvers

Following are the radioiodine data for the report period.

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
6-8-64 (3 days)	155-159	3.56	0.36
6-9-64	160	0.26	0.30
6-10-64	161	1.27	0.14
6-11-64	162	1.67	0.16
6-12-64	163	1.72	0.12

The 293-S Building recovered 33,938 pounds of 100 percent nitric acid during the report period with an average concentration of 41.8 percent.

The heels were removed from the A-2 and B-2 dissolvers prior to charging E-metal from Key 7037-H. Dissolver procedures were changed to permit sampling of each dissolution cut from this key. Samples will be composited and analyzed to provide IPD with conversion and isotopic data.

-99- **DECLASSIFIED** Ref: 80202
No. 637

d. Solvent Extraction

E-metal was processed 57 percent of the time during the week. The 1A Column was shut down at 0300 on 6-12-64 when neptunium losses occurred. The inability to control the acid in the D-14 backcycle salt was presumed to be the cause. Rework operations of the first of five batches was started on 6-10-64 at 0200 through 1S Column. 1A Column processing was discontinued at 0300 on 6-14-64 in order to perform a 10 percent acid flush. During this period 1S completed the rework processing which recovered the neptunium product and produced waste within throwaway limits.

Poor decontamination was experienced continually across the 3D Column. Raising the interface of the 3D Column did not improve the decontamination factor. UHM was produced out of gamma specification. Hexone, acid, dichromate, and iron control were all poor. The rates of build-up of nitroso compounds in hexone was found to be excessive. The over-all results have been little decontamination in the 3D Column, out of specification UHM, neptunium product in the waste, nitroso compounds in hexone, and inability to maintain flowsheet.

e. 276 Building

A summary of the hexone washes to date is listed below.

<u>Wash No.</u>	<u>Date</u>	<u>Sample</u>	<u>Spec. Reading</u>	<u>D.F.</u>	<u>Method</u>
1	6-2	Prewash	6.77		blender
1	6-3	Afterwash	5.90	1.15	
2	6-3	Afterwash	4.11	~1.5	blender
3	6-5	Prewash	4.5		
	"	Afterwash	4.0	1.13	blender
4	6-6	Afterwash	1.3	3.3	Recirculation - old method
5	6-7	Prewash	1.5	1.36	Decant method
		Afterwash	1.1		
6	6-8	Afterwash	0.4	~ 2.75	Decant method
7	6-9	Prewash	3.1	2.06	Decant method
		Afterwash	1.5		
8	6-11	Prewash	6.75	3.46	New method
		Afterwash	1.92		recirculation
9	6-13	Afterwash	0.30	-	Recirculation
10	6-13	Prewash	2.35	1.96	Recirculation
	6-14	Afterwash	1.2		

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PL-80202
No. 637

f. Equipment

A new pH probe was installed in the 2DW to D-14 line on 6-12-64 in an effort to better control the acidity of the D-14 backcycle salt stream.

g. 233-B Building

High gamma plutonium rework via L-16 to E-1 was completed on 6-9-64. Valving was changed to route the L-16 tank to E-4.

The remaining resin was removed from the L-18 Contactor into 4-liter plastic bottles. The contactor was blanked at the bottom spool piece flange and approximately 2-gallon shots of 0.6M HNO_3 added to L-18 via the KCK line connected to the IAS entry point below the "C" valve. The resin drained to the bottle via the resin sampler. The acid overflowed the bottle via a screened overflow line to the IS-1 sump. Eleven 4-liter bottles of resin were removed and it is believed that all resin has now been removed. In summary, 13 4-liter bottles were discarded to the burial garden containing 32 grams plutonium; two 4-liter bottles containing 20 grams were sent to 234-5 for plutonium recovery.

Following are the waste storage tank data for the report period:

	105-EX	107-EX	108-EX	109-EX	110-EX	111-EX	112-EX	114-EX**	115-EX
Liquid Level	15'9-3/4"	16'10-3/4"	20'5-1/4"	22'3"	21'9-1/2"	10'3"	20'8-1/2"	11'-1/2"	21'2-1/2"
Bulk 1" Sludge Temp.	106 F	282 F	283 F	280 F	239 F	188 F	217 F	226 F	208 F
Scanner 1" Sludge Temp.	-	290 F	311 F	289 F	283 F	202 F	222 F	202 F	223 F
2-Ft. Supernatant Temp.	-	238 F	246 F	244 F	206 F	165 F	222 F	201 F	196 F
Supernatant Temp. Gradient*	-	2 F	4 F	18 F	4 F	3 F	3 F	4 F	3 F
No. of Cirs. Operating	0	3	4	3	2	2	4	2	1
Specific Gravity	1.28	1.43	1.59	1.58	1.53	1.29	1.61	-	1.61
Apparent Sludge Depth	-	0'6-1/2"	0'10"	2'4"	2'1"	2'4"	-	1'1-1/2"	1'0"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-EX is the current salt waste receiver tank.

NW-80202
No. 637

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-101-

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-102-

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SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 6-14-64 TO 2400 6-20-64

I. PRODUCTION

U Shipped 9.39 LAF Processed 8.07 Charged 8.41 E-metal

Pu Loaded None; 16,492 for rework, high U.

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe(ppm)	Na(ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>20.3</u>	<u>2.14⁴</u>	<u>780</u>	<u>1</u>	<u>28.1</u>		<u>17</u>	<u>10</u>
Average	<u>51.8</u>	<u>2.78⁴</u>	<u>2100</u>	<u>1.6</u>	<u>113</u>		<u>54</u>	<u>21.2</u>
Maximum	<u>92.0</u>	<u>3.88⁴</u>	<u>3500</u>	<u>2</u>	<u>324</u>		<u>101</u>	<u>35</u>

III. WASTE

Extraction Losses			To Underground Storage			Coating Waste Losses		
U	<u>0.03</u>	%	U	<u>41</u>	Lbs. <u>0.25</u> %	U	<u>56</u>	Lbs. <u>0.17</u> %
Pu	<u>0.03</u>	%	Pu	<u>38</u>	Gms. <u>0.71</u> %	Pu	<u>16</u>	Gms. <u>0.17</u>
			Gallons	<u>30,749</u>		Gallons	<u>2686</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.3</u>	<u>1.3</u>
Partition Cycle	<u>1.7</u>	<u>2.3</u>
Third U	<u>0.8</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.4</u>
Third Pu	<u>-</u>	<u>0.7</u>
Tail End	<u>1.3</u>	<u>-</u>
Total	<u>5.1</u>	<u>6.7</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>916</u>	<u>916</u>	<u>916</u>
Cooling Time	<u>165</u>	<u>165</u>	<u>165</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>15,398</u>	<u>573</u>	<u>9.65</u>	<u>994</u>	<u>5.78</u>	<u>1458</u>
HE	Sump Waste	<u>1,268</u>	<u>7</u>	<u>0.12</u>	<u>15</u>	<u>0.09</u>	<u>1</u>
HE	Recycle						
1S Column	<u>Salt Waste</u>	<u>7,917</u>	<u>39</u>	<u>0.66</u>	<u>34</u>	<u>0.20</u>	<u>281</u>
E-3 or E-1	<u>None</u>						

DECLASSIFIED

-103-

NW-80202
No. 638a. Flowsheet and Stream Compositions

The flowsheet and stream compositions were the same as stated on pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 6-14-64	1830 6-14-64	0	1S on rework
1830 6-14-64	1015 6-15-64	8	1S; 1A down
1015 6-15-64	0100 6-17-64	0	Install 1AF, 1AW and 1ABS jumpers
0100 6-17-64	1000 6-17-64	8	1A; 1S on rework
1000 6-17-64	2400 6-20-64	0	1A and 1S on rework

c. Dissolvers

Following are the radiiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stack</u>
6-15-64 (3 days)	164	0.56	0.50
6-16-64	No dissolving	None	0.32
6-17-64	" "	"	0.16
6-18-64	" "	"	0.19
6-19-64	" "	"	0.16

d. Solvent Extraction

Virgin E-metal was processed only 16 percent of the report period due to process problems and jumper failures. When the 1ABS, 1AF and 1AW to D-14 jumpers developed leaks during rework processing, virgin feed was routed to the 1S Column on startup, 6-14-64. The 1S Column was shut down on 6-15-64 when high neptunium loss to waste continued. Acid in the back-cycle salt stream (D-14) remained out of control in spite of the recently installed 2DW to D-14 pH probe.

Since the process was not producing specification UME or low waste losses it was decided to shut down for the quarterly 57 percent HNO₃ flush of the columns and process vessels two weeks earlier than originally planned.

DECLASSIFIED

-104-

EW-80202
No. 638

Process problems involved were, 1) inability to process virgin feed or rework without excessive neptunium losses to waste; 2) failure of the 3D Column to adequately decontaminate the third cycle uranium stream (3DFS); 3) rapid degradation of hexone; and 4) inability to maintain the acid in flowsheet specifications.

During the shutdown for the 57 percent acid flush it is planned to caustic wash and transfer the present hexone inventory to the underground storage tanks (141 and 142) and to decontaminate and flush the hexone tanks (G-1, O-1, O-2 and O-3). New hexone will be used, together with a proposed acid deficient precycle flowsheet, on startup following the acid flush in an attempt to correct the processing difficulties.

The IARS, IAF and IAW jumpers were replaced on 6-16-64 and the virgin feed inventory processed through 1A on 6-17-64. Rework processing was nearly complete by the end of the report period. Failure of the D-14 pot to D-9 jet delayed completion of the rework and concentration of the neptunium inventory for storage in G-5.

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Following are the waste storage tank data for the report period.

	<u>105-EX</u>	<u>107-EX</u>	<u>108-EX</u>	<u>109-EX</u>	<u>110-EX</u>	<u>111-EX</u>	<u>112-EX</u>	<u>114-EX**</u>	<u>115-EX</u>
Liquid Level	21'10-1/2"	16'5"	20'5-1/4"	22'2"	21'9"	4'1-3/4"	20'7-1/2"	12'-3/4"	21'2-1/2"
Bolt 1" Sludge Temperature	107 F	291 F	285 F	276 F	235 F	187 F	217 F	232 F	207 F
Scanner 1" Sludge Temp.	-	294 F	310 F	289 F	284 F	202 F	221 F	205 F	223 F
2-Ft. Supernatant Temp.	-	240 F	246 F	232 F	206 F	168 F	222 F	203 F	197 F
Supernatant Temp. Gradient*	-	4 F	6 F	6 F	4 F	-	3 F	7 F	4 F
No. of Circulators Operating	0	3	4	3	2	0	4	2	1
Specific Gravity	-	1.50	1.58	1.58	1.53	1.30	1.61	1.15	1.61
Apparent Sludge Depth	-	0'7-1/2"	0'10-1/2"	2'4"	2'1"	2'4"	-	1'2"	1'0"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-EX is the current salt waste receiver tank.

NOTE: 201,828 gallons of dissolved sodium nitrate solution was pumped from the 111-EX tank to the 105-EX tank on 6-18 and 6-19.

Approximately 33,000 gallons of water was added to the 114-EX tank via the air lines to the circulators on 6-18 and 6-19. The sludge level reading increased by approximately 5 inches between 6-6 - 6-10-64.

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-135-

DECLASSIFIED

No. 639

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 6-21-64 TO 2400 6-27-64

I. PRODUCTION

U Shipped None LAF Processed None Charged None

Pu Loaded None (348 flush material for rework)

II. PRODUCT PURITY

	Plutonium			Uranium			
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum							
Average							
Maximum							

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	• %	U 17	Lbs. %	U	• Lbs. • %
Pu	• %	Pu 9	Gms. %	Pu	• Gms. •
		Gallons	13,470	Gallons	None

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle		
Partition Cycle		
Third U		
Second Pu		
Third Pu		
Tail End		

Total

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	•	•	•
Cooling Time	•	•	•

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium Grams
			Grams	%	Lbs.	%	
HE	Salt Waste						
HE	Sump Waste						
HE	Recycle						
LS Column							
E-3 or E-1							

EW-80202
No. 639

a. Flowsheet and Stream Compositions

Fifty-Seven percent acid flush of columns and process vessels.

b. Dissolvers

Following are the radioiodine data for the report period.

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stack</u>
6-22-64 (3 days)	No dissolving	None	0.35
6-23-64	" "	"	0.08
6-24-64	" "	"	0.074
6-25-64	" "	"	0.070
6-26-64	" "	"	0.057

c. Solvent Extraction

Water flushes prior to the 57 percent acid flush were completed 6-22. The flushing of the 202-S process equipment with 57 percent HNO_3 -1% boric acid was completed 6-28. Approximately 375 units of plutonium were transferred to the waste receiver from the acid flushes. The process equipment was water flushed after the acid flush with the exception of the final velocity flushes of the columns. D-14 contents (backcycle salt containing neptunium) were transferred to D-9 on 6-27 after a jet jumper installation in D-14. The salt solution was transferred to H-4 and combined with the contents of G-5 which also contained neptunium from rework of waste. Approximately 1250 units of neptunium were stored in G-5.

d. 233-S Building

The L-3 concentrator and the L-4 receiver were emptied and flushed with acid to LS-1 sump. Recycle batches with 1974 units of plutonium were made from this material and transferred to H-4. L-3 and L-4 with acid solution contents will be sent to H-4 via the sump. The L-12 concentrator and the L-6 product sampling tank were flushed with water from E-3 until less than 0.001% boric acid was present in the flush water. The L-12 concentrator, the L-6 product tank and the L-14 vacuum tank were given a 57% acid flush on 6-28. The first flush sample had 3 units of plutonium. The acid flushes have a milky appearance thought to be titanium and silica.

DECLASSIFIED

-108-

HW-80202
No. 639

e. 276-S Building

The hexone inventory in the 276-S building was washed with 8 percent NaOH and pumped to the underground storage tanks (141 and 142). After-wash samples analyzed 0.3 to 0.8 for nitroso compounds. The 0-1 tank in the 202-S Building and the 0-1, 0-2 and 0-3 tanks in the 276-S Building were flushed with 0.6 percent KMnO_4 -5.0 percent NaOH, then water flushed, and finally flushed with 1 percent HNO_3 . When all the KMnO_4 used in the first flush was reduced, a second 0.6 percent KMnO_4 -5 percent NaOH flush of the 0-1, 0-2 and 0-3 tanks was made. Several water flushes were required to remove the MnO_4 . The flush solutions removed considerable gamma activity and contained an iron hydroxide precipitate.

f. Equipment

The D-14 to D-9 jet assembly was installed with a new discharge jumper from the jet jumper. The new pump discharge jumper for D-14 for acid deficient precycle was installed incorporating a recirculation line back to the cooler. D-1 to D-7 and E-5 to E-6 jet jumpers were installed. In the silo the leaking jumpers, 10-L-15, 10W to sampler, and 2A - L-15, E-5 to 2AF were replaced. The four new jumpers required for testing the acid deficient precycle flowsheet were also installed.

Following are the waste storage tank data for the report period:

	<u>105-6X</u>	<u>107-6X</u>	<u>108-6X</u>	<u>109-6X</u>	<u>110-6X</u>	<u>111-6X</u>	<u>112-6X</u>	<u>114-6X**</u>	<u>115-6X</u>
Liquid Level	21'10-1/2"	15'10-1/4"	20'5"	22'-1/2"	21'8-3/4"	4'2"	21'7-1/2"	12'6"	3'10"
Bulb 1" Sludge Temperature	105 F	287 F	285 F	280 F	237 F	187 F	227 F	235 F	207 F
Scanner 1" Sludge Temp.	-	284 F	307 F	287 F	281 F	197 F	228 F	206 F	221 F
2-Ft. Supernatant Temp.	-	239 F	242 F	230 F	202 F	166 F	216 F	205 F	194 F
Supernatant Temp. Gradient*	-	1 F	4 F	7 F	4 F	-	2 F	3 F	-
No. of Circulators Operating	-	3	4	3	2	0	4	2	0
Specific Gravity	-	1.54	1.59	-	1.54	1.30	1.61	1.16	1.61
Apparent Sludge Depth	-	0'7"	0'10-1/2"	2'6"	2'1"	2'3-1/2"	2'0"	1'2-1/2"	1'0"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-6X is the current salt waste receiver tank.

NOTE: During the period 6-23 to 6-25, 579,490 gallons of non-boiling salt waste were transferred from the 115-6X tank to the 102-6X tank. In addition, 92,300 gallons of water were incrementally added to the pump suction, for dilution, to prevent freezing in the transfer line. The dilution volume was 16 percent of the volume transferred.

HW-82202
No. 639

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No. 640

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-110-

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 6-28-64 TO 2400 7-4-64

I. PRODUCTION

U Shipped 1.11 IAF Processed 5.70 Charged None
Pu Loaded None

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe(ppm)	Na(ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	-	-	31	8.7	1.3	53	24	
Average	-	-	31	8.7	1.3	53	24	
Maximum	-	-	31	8.7	1.3	53	24	

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>0.03</u> %	U	<u>1</u> Lbs. <u>0.01</u> %	U	Lbs. %
Pu	<u>0.09</u> %	Pu	<u>5</u> Gms. <u>0.14</u> %	Pu	Gms. %
		Gallons	<u>3129</u>	Gallons	<u>None</u>

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.5</u>	<u>1.5</u>
Partition Cycle	<u>2.1</u>	<u>2.8</u>
Third U	<u>2.0</u>	-
Second Pu	-	<u>No production beyond partition</u>
Third Pu	-	-
Tail End	<u>1.4</u>	-
Total	<u>7.0</u>	

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	-	-	-
Cooling Time	-	-	-

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>1620</u>	<u>84</u>	<u>1.31</u>	<u>262</u>	<u>1.17</u>	<u>12</u>
HE	Sump Waste	<u>1468</u>	<u>409</u>	<u>6.40</u>	<u>757</u>	<u>3.38</u>	<u>156</u>
HE	Recycle L-16	-	<u>2284</u>	<u>35.73</u>	-	-	-
HE	XXXXXXXXXX E-12, E-13	-	-	-	<u>9986</u>	<u>44.55</u>	-
HE	XXXXXXXXXX E-7	<u>132</u>	<u>18</u>	<u>0.28</u>	-	-	-

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HW-80202
No. 640

a. Stream Compositions for Acid Deficient Precycle

<u>Stream</u>	<u>Solvent</u>	<u>UHM</u>	<u>AMH</u>	<u>HNO₃</u>	<u>Na₂Cr₂O₇</u>	<u>NaNO₃</u>	<u>Fe(NH₃SO₃)₄</u>
1AF	H ₂ O	2.0	-	-0.20	0.07	0.4	-
1AA	H ₂ O	-	1.20	0.26	0.0036	-	-
1AP	Hexone	0.44	-	0.016	-	-	-
1ABS	H ₂ O	0.03	1.70	-0.350	-	1.90	-
1AW	H ₂ O	-	1.12	-0.28	-	1.25	-
1SF	H ₂ O	0.03	1.66	0.20	-	1.85	-
1SP	Hexone	0.015	-	0.18	-	-	-
1SW	H ₂ O	-	1.66	0.04	-	1.85	-
1SX	Hexone	-	-	0.1	-	-	-
2DA	H ₂ O	-	1.3	0.48	-	-	-
2DO	Hexone	-	-	0.20	-	-	-
2DFS	H ₂ O	1.38	1.00	-0.58	-	1.28	-
2DP	Hexone	0.51	-	0.038	-	-	-
2DW	H ₂ O	-	1.22	-0.62	-	1.35	-
2DX	Hexone	-	-	-	-	-	-

b. Flowsheet for Acid Deficient Precycle

1AF: 1AA: 1ABS: 1AX =
100: 28: 140: 436

1SF: 1SX: 1SP HNO₃ =
80: 156: 0.1M

2DFS: 2DA: 2DX: 2DO: 2DW: 2DWR =
173: 20: 400: 40: 163: 86

2EX: 2EX Butt =
110: 20

DECLASSIFIED

NW-80202
No. 640

-112-

c. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 6-28-64	1915 7-1-64	0	Acid flushing
1915 7-1-64	0210 7-2-64	6	1A; flowsheet test
0210 7-2-64	0715 7-3-64	0	1A Column leak
0715 7-3-64	1530 7-3-64	8	1S; 1A down
1530 7-3-64	0330 7-4-64	6	1S; Rate reduced because of low feed inventory.
0330 7-4-64	2400 7-4-64	0	Waste rework

d. Dissolvers

Following are the radioiodine data for the report period.

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
6-29-64	No dissolving	None	0.10
6-30-64	" "	"	0.024
7-1-64	" "	"	0.028
7-2-64	183	"	0.022
7-3-64	184	"	0.029
7-4-64	185	"	0.027

The 293-B Building recovered 5,879 pounds of 100 percent nitric acid during the report period with an average concentration of 42.5 percent.

An attempt was made to regenerate the A-3 silver reactor while holding a charge in cold HNO_3 . When the dissolver lid was removed evolution of nitrogen gases from the dissolver was of such magnitude that the reactor regeneration was canceled.

e. Solvent Extraction

Following completion of acid and water flushes of the columns and process vessels, acid deficient feed was started to the 1A Column at 1915, 7-1-64. The column was shut down at 0210, 7-2-64 when a leak in the 1AF feed line, integral to the 1A Column, was discovered. The test of the acid deficient flowsheet was terminated. Acid deficient feed solution was butted into acid flowsheet specifications, and feed was started to the 1S Column at

DECLASSIFIED

-113-

EW-80202
No. 640

0715, 7-3-64. Feed processing was halted at 0330, 7-4-64 when it became necessary to rework high wastes. The acid flowsheet and stream compositions for processing were the same as stated on pages 3 and 4 of this document.

The test of the acid deficient flowsheet routed all the feed into the 1A Column; all 1AW routed to D-14; part of D-14 backcycled to 1A as 1A88 and the remaining D-14 pumped to F-8, acidified, and processed through the 18 Column. The 18W was routed to D-13, concentrated in D-12 and routed to underground storage after sampling, analyses, and neutralization. The 18P could be routed to 2E or the 10 Column as desired.

When the 18 Column was used for feed processing, after termination of the acid deficient flowsheet test, a considerable portion of the 18P stream was found going to the 10 Column rather than to the 2E Column. The U, Pu and Np from this stream could not be stripped from the organic in the 10 Column. High product in the G-3 and G-4 tanks resulted. The 18P to 10 routing was blanked and the high waste solutions were being reworked at the end of the report period.

f. 233-B Building

The acid flushes of the plutonium concentrator and load-out facilities were completed. Ten 57 percent acid flushes of L-12 concentrator and the L-6 sampler were made. Acid flushes were made until they were free of titanium and silica residue. The first greenhouse entries were made since the fire to clean up trash and residue and complete minor maintenance jobs.

g. 276 Building

The manhole covers were removed from the O-1, O-2, and O-3 tanks and the tanks were water flushed. Some mercury was found in the bottom of the O-2 tank, during the flushing, apparently from a mercury manometer, rather than from processing feed solution from mercury-catalyzed PHTER dissolutions. The in-line blender was removed from service on 6-30-64.

h. Equipment

The D-12 west tube bundle was installed 6-30-64, after straightening the bent reboiler flange.

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NY-80202
No. 640

Following are the waste storage tank data for the report period:

	<u>105-SX</u>	<u>107-SX</u>	<u>108-SX</u>	<u>109-SX</u>	<u>110-SX</u>	<u>111-SX</u>	<u>112-SX</u>	<u>114-SX</u>	<u>115-SX</u>
Liquid Level	21'10-1/4"	15'5"	20'5-1/4"	21'11-1/4"	21'8-1/4"	4'2-1/4"	21'7"	12'2-1/4"	7'-11-1/4"
Bulk 1" Sludge Temperature	115 F	209 F	204 F	277 F	237 F	188 F	240 F	234 F	217 F
Summer 1" Sludge Temp.	-	208 F	307 F	267 F	280 F	200 F	222 F	206 F	232 F
2-Ft. Superantent Temp.	-	240 F	242 F	225 F	203 F	170 F	220 F	205 F	191 F
Superantent Temp. Gradient*	-	3 F	3 F	1 F	3 F	-	1 F	3 F	-
No. of Circulators Operating	-	3 F	4 F	3 F	2 F	0 F	4	2	0
Specific Gravity	-	1.56	1.59	1.60	1.53	1.30	1.61	1.16	-
Apparent Sludge Depth	-	0'6-1/2"	0'10-1/2"	2'4"	2'1"	2'3-1/2"	2'0"	1'2-1/2"	1'0"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-SX is the current salt waste receiver tank.

NOTE: Currently, the 115-SX tank is being filled to approximately 10 feet with tank farm condensate for sodium nitrate removal.

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HW-80202
No. 641

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SUMMARY OF 202-S BIDG. OPERATION

FROM 0000 7-5-64 TO 2400 7-11-64

I. PRODUCTION

U Shipped 25.71 LAF Processed 23.23 Charged 25.23 E-metal

Pu Loaded 6729 including 4209 out of specification which will be reworked.

II. PRODUCT PURITY

	Plutonium		Uranium				
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum	<u>10.2</u>	<u>1.22³</u>	<u>89.0</u>	<u>1.0</u>	<u>0.70</u>	<u>11.0</u>	<u>35.0</u>
Average	<u>28.7</u>	<u>3.05³</u>	<u>169.1</u>	<u>4.1</u>	<u>16.45</u>	<u>29.4</u>	<u>79.9</u>
Maximum	<u>50.9</u>	<u>4.99³</u>	<u>322.0</u>	<u>11.0</u>	<u>90.0</u>	<u>48.0</u>	<u>173.0</u>

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>0.02</u> %	U <u>142</u> Lbs.	<u>0.31</u> %	U <u>84</u> Lbs.	<u>0.17</u> %
Pu	<u>0.03</u> %	Pu <u>66</u> Gms.	<u>0.44</u> %	Pu <u>24</u> Gms.	<u>0.17</u>
		Gallons	<u>27583</u>	Gallons	<u>4326</u>

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.3</u>	<u>1.3</u>
Partition Cycle	<u>2.0</u>	<u>2.2</u>
Third U	<u>1.5</u>	<u>-</u>
Second Pu	<u>-</u>	<u>1.9</u>
Third Pu	<u>-</u>	<u>1.5</u>
Tail End	<u>1.0</u>	<u>-</u>
Total	<u>5.8</u>	<u>6.9</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>916</u>	<u>916</u>	<u>916</u>
Cooling Time	<u>192</u>	<u>186</u>	<u>190</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>5089</u>	<u>419</u>	<u>2.39</u>	<u>83</u>	<u>0.16</u>	<u>9</u>
HE	Sump Waste	<u>1769</u>	<u>131</u>	<u>0.75</u>	<u>1429</u>	<u>2.77</u>	<u>63</u>
HE	Recycle	<u>-</u>	<u>420</u>	<u>2.39</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column	<u>Salt Waste</u>	<u>9669</u>	<u>1492</u>	<u>8.50</u>	<u>3656</u>	<u>7.08</u>	<u>245</u>
E-3 or E-1	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>

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HW-80202
No. 641

a. Stream Compositions and Flowsheet

See pages 3 and 4 of this report.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 7-5-64	0300 7-7-64	0	Rework
0340 7-7-64	0515 7-7-64	6	E-metal feed 1S; 1A down
0515 7-7-64	2215 7-7-64	0	Failed 3DF rotameter; 1S 10% acid flush
2215 7-7-64	0300 7-8-64	8	E-metal feed, 1S; 1A down
0300 7-8-64	1200 7-8-64	5	1S flooded at 8 due to dilute unsalted feed batch.
1200 7-8-64	0330 7-9-64	7	E-metal diluted feed batch
0330 7-9-64	0630 7-9-64	0	Crashed down because of J-6 vacuum loss.
0630 7-9-64	1130 7-9-64	5	Normal E-metal feed; 1S; 1A down
1130 7-9-64	1800 7-10-64	7	Lost inert gas to K-panel instruments; columns not shut down.
1800 7-10-64	2400 7-11-64	5	G-3 unable to distill total volume of hexone with 3EW routed to G-3.

c. Dissolvers

Following are the radioiodine data for the report period.

<u>Period Ending at 1000</u>	<u>Metal Dissolved Age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stack</u>
7-5-64	No dissolving	None	0.024
7-6-64	" "	"	0.031
7-7-64	" "	"	0.053
7-8-64	" "	"	0.036
7-9-64	190	"	0.028
7-10-64	191	"	0.011
7-11-64	192	"	0.009

The 293-S Building recovered 9980 pounds of 100 percent nitric acid during the report period with an average concentration of 43.7 percent.

DECLASSIFIED

EW-80202
No. 642

-117-

d. Solvent Extraction

The 10 line was blanked in the 1S-2E-10 jumper which corrected the jumper design and stopped product from being sent to 10 Column hence to G-3. Rework of high waste from 18P overflowing to the 10 Column was completed at 0300 on 7-7-64. Regular feed processing was started on 7-7-64 at 0340. Processing was discontinued at 0515 on 7-7-64 when the rotameter flange on the 3DF line began leaking. During the shutdown 1S Column was acid flushed to increase the column's efficiency and the 3EW organic routing was changed from G-1 to the 10 Column and G-3, to distill the 3EW organic. After replacement of the 3DF rotameter the extraction battery was started at 2215 on 7-7-64.

The rates were reduced from 8 to 7 briefly to process a dilute feed batch on 7-8-64 which produced a flooding effect in the 1S Column and upset 1S. On 7-9-64 at 0330, the columns were crashed down when the J-6 tank filled up into the tower and sealed off the vacuum to the condenser vent system. The vacuum was restored by by-passing the cut-off switch to the pump and pumping the excess water out of J-6 pot.

Processing was resumed at a 5 rate at 0630 on 7-9-64 after restoring the condenser vent system vacuum. Rates were increased to 7 at 1000 on 7-9-64 but had to be reduced to 5 on 7-10-64 because G-3 hexone stripper had lost its capacity to distill. The addition of 3EW overextended the capacity of the G-3 tower to strip hexone and allowed hexone to reach the G-3 pot, contaminating the heating coils. Rates remained at 5 for the remainder of the week because of the loss of heat transfer in the G-3 coils. Product quality was good with both uranium and plutonium coming into specifications.

e. Equipment

A blowback on the G-3 weight factor line occurred concurrently with the loss of vacuum to the condenser vent system (J-6 tower flood). Readings up to 40 r/hr were found in the south operating gallery in the vicinity of the G-3 weight factor lines.

The G-3 pot was given a 5% and 8% acid flush to clean the heating coils but there was no noticeable effect in the rate of heat transfer at the end of the report period.

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NW-80202
No. 641

Following are the waste storage tank data for the report period.

	<u>105-6X</u>	<u>107-6X</u>	<u>108-6X</u>	<u>109-6X</u>	<u>110-6X</u>	<u>111-6X</u>	<u>112-6X</u>	<u>114-6X**</u>	<u>115-6X</u>
Liquid Level	21'9-1/4"	15'-1/4"	20'6-1/2"	21'9-1/4"	21'7-1/2"	4'2-1/4"	21'6"	12'4-1/2"	10'5-3/4"
Bulk 1" Sludge Temperature	109 F	289 F	285 F	278 F	238 F	190 F	248 F	237 F	200 F
Scumner 1" Sludge Temp.	-	292 F	308 F	286 F	278 F	197 F	220 F	205 F	216 F
2-Ft. Supernatant Temp.	-	240 F	241 F	223 F	202 F	168 F	214 F	204 F	175 F
Supernatant Temp.-Gradient*	-	2 F	4 F	2 F	4 F	-	2 F	3 F	3 F
No. of Circulators Operating	-	3	4	3	2	0	4	2	2
Specific Gravity	-	1.56	1.58	1.59	1.54	-	1.61	1.17	-
Apparent Sludge Depth	-	0'5"	0'10-1/2"	2'6"	2'1"	2'3-1/2"	2'1"	1'2-1/2"	0'11-1/2"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-6X is the current salt waste receiver tank.

NOTE: Continuous water addition to the 107-6X tank was started on 7-8-64 when the liquid level reached 14'11-3/4". It is desired to keep the liquid level in this tank at approximately 15' so that all air circulators will operate efficiently.

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EW-80202

No. 642

R. E. Isaacson
R. A. Yoder
F. Beaulieu
R. E. Tomlinson

-119-

SUMMARY OF 202-S BIDG. OPERATION

FROM 0000 7-12-64 TO 2400 7-18-64

I. PRODUCTION

U Shipped 50.91 IAF Processed 50.90 Charged 42.05 E-metal

Pu Loaded 31,550

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe(ppm)	Na(ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>3.3</u>	<u>1.46²</u>	<u>46.1</u>	<u>/ 1</u>	<u>0.34</u>		<u>4.0</u>	<u>1.0</u>
Average	<u>5.3</u>	<u>5.34²</u>	<u>83.2</u>	<u>/ 1</u>	<u>0.86</u>		<u>11.7</u>	<u>16.8</u>
Maximum	<u>8.4</u>	<u>1.29³</u>	<u>122.0</u>	<u>/ 1</u>	<u>2.00</u>		<u>24.0</u>	<u>45.0</u>

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>0.01</u> %	U <u>106</u> lbs.	<u>0.10</u> %	U <u>140</u> lbs.	<u>0.17</u> %
Pu	<u>0.03</u> %	Pu <u>55</u> Gms.	<u>0.17</u> %	Pu <u>40</u> Gms.	<u>0.17</u> %
		Gallons	<u>54,545</u>	Gallons	<u>6599</u>

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.1</u>	<u>1.1</u>
Partition Cycle	<u>2.7</u>	<u>2.4</u>
Third U	<u>1.3</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.7</u>
Third Pu	<u>-</u>	<u>1.5</u>
Tail End	<u>2.0</u>	<u>-</u>
Total	<u>7.1</u>	<u>7.7</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>916</u>	<u>916</u>	<u>916</u>
Cooling Time	<u>197</u>	<u>193</u>	<u>195</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>1377</u>	<u>11</u>	<u>0.03</u>	<u>17</u>	<u>0.02</u>	<u>11</u>
HE	Sump Waste	<u>9614</u>	<u>312</u>	<u>0.93</u>	<u>917</u>	<u>0.89</u>	<u>85</u>
HE	Recycle	<u>-</u>	<u>443</u>	<u>1.33</u>	<u>-</u>	<u>-</u>	<u>-</u>
IS Column		<u>None</u>					
E-3 or E-1		<u>None</u>					

DECLASSIFIED

4-80202
6. 642

-120-

a. Flowsheet and Stream Compositions

See pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 7-12-64	0700 7-13-64	5	G-3 Still limiting 1S; 1A down
0700 7-13-64	2400 7-18-64	7	2D Column limiting; 1S; 1A down

c. Dissolvers

Following are the radioiodine data for the report period.

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stack</u>
7-13-64	193-194		0.030
7-14-64	195		0.013
7-15-64	196		0.008
7-16-64	197		0.0059
7-17-64	198		0.011

The 293-B Building recovered 50,683 pounds of 100 percent nitric acid during the report period with an average concentration of 43.4 percent.

The final charge from Key 7037-E (XFD production test) was completed during the report period. Dissolver heels were removed and dissolver procedures modified to eliminate sampling of each cut.

d. Solvent Extraction

E-metal was processed 89.2 percent of the available time during the week. The G-3 Still limited the capacity of the columns to a 5 rate during the first of the week. The G-3 heating coils were finally cleaned by an 8 percent acid flush after several 5% acid flushes had failed because of dilution of the acid by the Still contents. Rates were accordingly raised from 5 T/D to 7 T/D on 7-13-64 with a 2 T/D rate uranium recycle from 204-3 to F-5 concentrator until the end of the report period.

Several problems were encountered in operating the columns. The 1S Column operation was erratic on 7-13-64 and 7-14-64 because of dilute LBS stream and poor acid control. The dilute LBS was caused by the D-14 specific gravity leg being corroded away, giving erroneous readings. Poor acid control in part has been due to non-representative samples and corrective action, based on sample results, which over compensated.

DECLASSIFIED

-121-

HW-80202
No. 642

The 1B Column showed a reflux on 7-14. The 2D Column instrumentation indicated a flooding condition on 7-17. The column stabilized in the flooding condition with D-14 samples showing the expected increase in plutonium from the flood. At the end of this report period the 2D Column flood was progressively getting worse and the plant was being readied for a 10 percent acid flush. The F-2 concentrator contents were rapidly approaching the always safe U/Pu ratio.

Good uranium and plutonium product was made during the week with the exception of two batches of UHM which were blended into specifications.

e. Equipment

The D-14 sampler pressurized during routine sampling activities from added pressure in the cooler section from the newly installed D-14 pump by-pass return line. Pressurization has been eliminated by interrupting the by-pass flow during sampling.

Flushing of the column carrier and silo floor has been started in preparation for replacement of the 1A Column. No significant reduction in radiation levels has been noted.

The inert gas system at K-Panel has caused the instruments at K-Panel to give erratic readings. The copper instrument tubing is corroding and forming a copper nitrate solid which in turn plugs the lines and causes instrument trouble.

Following are the waste storage tank data for the report period:

	<u>105-EX</u>	<u>107-EX</u>	<u>108-EX</u>	<u>109-EX</u>	<u>110-EX</u>	<u>111-EX</u>	<u>112-EX</u>	<u>114-EX**</u>	<u>115-EX</u>
Liquid Level	21'7"	15'2"	20'7"	22'-3/4"	21'7"	4'2-1/4"	21'10-1/2"	13'4-1/2"	10'5-1/2"
Bulk 1" Sludge Temperature	109 F	291 F	285 F	280 F	237 F	192 F	247 F	240 F	181 F
Scanner 1" Sludge Temperature	-	289 F	305 F	287 F	280 F	198 F	226 F	207 F	199 F
2-Ft. Supernatant Temperature	-	241 F	241 F	221 F	203 F	170 F	212 F	206 F	174 F
Supernatant Temp-Gradients	-	2 F	3 F	3 F	4 F	-	3 F	3 F	3 F
No. of Circulators Operating	-	3	4	3	2	0	4	2	2
Specific Gravity	-	1.57	1.58	1.58	1.53	-	1.61	1.18	1.22
Apparent Sludge Depth	-	0'5-1/2"	0'10-1/2"	2'6"	2'-1/4"	2'3"	2'1"	1'2-1/2"	0'5-1/2"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-EX is the current salt waste receiver tank.

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NY-80202
No. 643

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R. A. Yoder
F. Beaulieu
R. E. Tomlinson

SUMMARY OF 202-S BIDG. OPERATION FROM 0000 7-19-64 TO 2400 7-25-64

I. PRODUCTION

U Shipped 44.0 IAF Processed 44.24 Charged 53.81 E-metal
Pu Loaded 30,000

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu (ppb)	Uranium		Fe (ppm)	Na (ppm)
	Microcuries/gram	U (ppm)			E-13 G-ratio			
Minimum	<u>1.6</u>	<u>7.20¹</u>	<u>35.3</u>	<u>/1</u>	<u>0.35</u>		<u>6.0</u>	<u>/ 10</u>
Average	<u>8.6</u>	<u>1.97³</u>	<u>85.9</u>	<u>/ 1.3</u>	<u>1.58</u>		<u>12.8</u>	<u>/ 18.9</u>
Maximum	<u>16.7</u>	<u>7.76³</u>	<u>169.0</u>	<u>2.1</u>	<u>8.42</u>		<u>28.0</u>	<u>48.0</u>

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>0.01</u> %	U <u>36</u> Lbs.	<u>0.04</u> %	U <u>168</u> Lbs.	<u>0.18</u> %
Pu	<u>0.08</u> %	Pu <u>18</u> Gms.	<u>0.06</u> %	Pu <u>48</u> Gms.	<u>0.18</u> %
		Gallons <u>40,914</u>		Gallons <u>7,855</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.0</u>	<u>1.0</u>
Partition Cycle	<u>2.3</u>	<u>2.3</u>
Third U	<u>1.5</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.6</u>
Third Pu	<u>-</u>	<u>1.4</u>
Tail End	<u>1.7</u>	<u>-</u>
Total	<u>6.5</u>	<u>7.3</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>1014</u>	<u>699</u>	<u>891</u>
Cooling Time	<u>374</u>	<u>188</u>	<u>294</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>4372</u>	<u>47</u>	<u>0.15</u>	<u>9</u>	<u>0.01</u>	<u>22</u>
HE	Sump Waste	<u>2508</u>	<u>249</u>	<u>0.79</u>	<u>968</u>	<u>1.08</u>	<u>43</u>
HE	Recycle	<u>-</u>	<u>1686</u>	<u>5.34</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column		<u>None</u>					
E-3 or E-1		<u>None</u>					

DECLASSIFIED

-124-

EW-80202
No. 643

a. Flowsheet and Stream Compositions

See pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 7-19-64	0200 7-19-64	7	2D Column flooding; 1S, 1A down
0200 7-19-64	1800 7-19-64	0	1S, 2D acid flush
1800 7-19-64	2200 7-19-64	7	1S; 1A down
2200 7-19-64	0600 7-20-64	5	1S flooding
0600 7-20-64	1245 7-20-64	0	F-1 Cr ⁺⁶ non-detectable; Pu loss to 2DW stream; Low Pu 1SW concentration.
1245 7-20-64	1900 7-24-64	8	1S slowly brought to rate and sensitive to new feed batches; 1A down.
1900 7-24-64	2100 7-24-64	0	Tried to install 1AX to 1SX line
2100 7-24-64	2400 7-25-64	8	1S; 1A down

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved avg. days</u>	<u>Curies of I-131 Available</u>	<u>To Stack</u>
7-17-64 (3 days)	198-370	None	0.093
7-21-64	354-371	"	0.019
7-22-64	355-372	"	0.0062
7-23-64	356-373	"	0.0019
7-24-64	188-374	"	0.0016

The 293-B Building recovered 37,281 pounds of 100 percent nitric acid during the report period with an average concentration of 43.0 percent.

d. Solvent Extraction

E-metal was processed 94.6 percent of the available time during the week. Seven hours of down time were sustained on 7-20 when the F-1, F-2 tanks were low in Cr⁺⁶ and plutonium was lost to the 2DW stream. The g/t ratio

DECLASSIFIED

HW-80202
No. 643

in F-1 was high from the previous week and additional plutonium could not be tolerated. Two hours of down time on 7-24 were sustained in an attempt to route organic from 1AX rotameter to the 18 Column, by-passing the badly worn 18X rotameter. The line didn't fit so the routing via the 18X rotameter was restored.

The 2E Column lost 2100 gallons of hexone to D-13 on 7-25, apparently by the interface control instrument bubblers being turned on wide open. Hexone was overflowed into the vent header to D-13.

Out-of-specification UMI was recycled from 204-3 to F-5 during startup on 7-19 until early 7-22 when salted feed batches were being processed through 18 Column.

The pressure on the raw water supply dropped for one hour (0915) on 7-23. This resulted in E-2 and E-4 oxonators being pressurized but no product loss resulted.

e. Equipment

The weight factor and specific gravity for D-14 pot were lost at 0800 on 7-23. A new jumper was installed on 7-24. During the installation of the new jumper a large spray leak was discovered in the D-14 pot.

D-8 pump was replaced on 7-25 because of a leak. The D-8 had approximately 2,500 hours of service (3.5 years on-line). The new D-8 pump siphoned D-8 contents to 241 tank farm.

f. 276-B Building

Hexone was washed a second time and has a reading of 1.95 in the O-2 tank. Some difficulty was experienced in getting circulation through the pump. The first wash did not have any circulation because the pump was not primed.

g. 233-B Building

The automatic fire alarm system has been malfunctioning because of spiders tripping the detector heads. Bug screens are planned to eliminate the problem.

DECLASSIFIED

EW-80202
No. 643

Following are the waste storage tank data for the report period:

	<u>105-EX</u>	<u>107-EX</u>	<u>108-EX</u>	<u>109-EX</u>	<u>110-EX</u>	<u>111-EX</u>	<u>112-EX</u>	<u>114-EX**</u>	<u>115-EX</u>
Liquid Level	21'5"	15'2-1/4"	20'7"	21'11-1/2"	21'6-3/4"	4'2-1/4"	21'9-1/2"	14'2-1/4"	10'5"
Bullb 1" Sludge Temp.	108 F	293 F	285 F	277 F	234 F	192 F	243 F	242 F	179 F
Seawater 1" Sludge Temp.	-	294 F	307 F	286 F	277 F	197 F	227 F	208 F	196 F
2-Ft. Supermatant Temp.	-	238 F	241 F	221 F	203 F	170 F	210 F	206 F	171 F
Supermatant Temp.Gradient*	-	2 F	4 F	3 F	2 F	0 F	5 F	3 F	3 F
No. of Circulators Oper.	-	3	4	3	2	0	4	2	2
Specific Gravity	-	1.57	1.58	1.58	1.53	-	1.61	1.18	1.23
Apparent Sludge Depth	-	0'5"	0'8-1/2"	2'6"	2'1"	2'3"	1'7-1/2"	1'2-1/2"	0'4-1/2"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-EX is the current salt waste receiver tank.

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HW-80202
No. 644

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 7-26-64 TO 2400 8-1-64

I. PRODUCTION

U Shipped 24.70 LAF Processed 18.06 Charged 7.67 E-metal

Pu Loaded 25,099 including 248 acid flush material which will be reworked.

II. PRODUCT PURITY

	Plutonium			Uranium			
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum	<u>0.8</u>	<u>72</u>	<u>24.7</u>	<u>1</u>	<u>0.11</u>	<u>7.0</u>	<u>7.0</u>
Average	<u>2.5</u>	<u>215</u>	<u>41.6</u>	<u>1</u>	<u>0.58</u>	<u>11.2</u>	<u>24.6</u>
Maximum	<u>5.1</u>	<u>582</u>	<u>72.0</u>	<u>1</u>	<u>1.19</u>	<u>16.0</u>	<u>87.0</u>

III. WASTE

Extraction Losses			To Underground Storage			Coating Waste Losses		
U	<u>0.01</u>	%	U	<u>44</u>	Lbs. <u>0.12</u> %	U	<u>56</u>	Lbs. <u>0.18</u> %
Pu	<u>0.04</u>	%	Pu	<u>19</u>	Gms. <u>0.16</u> %	Pu	<u>16</u>	Gms. <u>0.18</u>
			Gallons	<u>40,484</u>		Gallons	<u>2640</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.2</u>	<u>1.2</u>
Partition Cycle	<u>2.4</u>	<u>2.3</u>
Third U	<u>1.7</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.9</u>
Third Pu	<u>-</u>	<u>1.6</u>
Tail End	<u>1.8</u>	<u>-</u>
Total	<u>7.1</u>	<u>8.0</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>923</u>	<u>701</u>	<u>743</u>
Cooling Time	<u>217</u>	<u>184</u>	<u>199</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>4597</u>	<u>72</u>	<u>0.56</u>	<u>474</u>	<u>1.24</u>	<u>55</u>
HE	Sump Waste	<u>13265</u>	<u>761</u>	<u>5.89</u>	<u>1571</u>	<u>4.12</u>	<u>801</u>
HE	Recycle	<u>-</u>	<u>324</u>	<u>4.06</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column	<u>None</u>						
E-3 or E-1	<u>None</u>						

DECLASSIFIED

-128-

NW-80202
No. 644

a. Flowheet and Stream Compositions

The flowheet and stream compositions were the same as reported on pages 3 and 4 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 7-26-64	2315 7-26-64	8	2D Column flooding; 1B, 1A down
2315 7-26-64	0100 7-27-64	7	" " " " "
0100 7-27-64	0930 7-27-64	6	" " " " "
0930 7-27-64	1020 7-27-64	0	Lost J-6 vacuum
1020 7-27-64	0530 7-28-64	7	1B; 1A down
0530 7-28-64	0700 7-28-64	6	1B; 1A down; 2D Column flooding
0700 7-28-64	1500 7-28-64	5	" " " "
1500 7-28-64	2100 7-28-64	6	1B; 1A down
2100 7-28-64	0115 7-29-64	0	2D Column flood; 2D H ₂ O flushed
0115 7-29-64	0315 7-29-64	6	
0315 7-29-64	2400 8-1-64	0	Running out process inventory and rework preparatory for 1A Column and D-14 pot replacement.

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved avg. days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
7-27-64 (3 days)	185-218	None	0.0092
7-28-64	No dissolving	"	0.0033
7-29-64	" "	"	0.0038
7-30-64	" "	"	0.0031
7-31-64	" "	"	0.0015
8-1-64	" "	"	0.009

The 293-B Building recovered 17,555 pounds of 100 percent nitric acid during the report period with an average concentration of 42.6 percent.

The dissolvers were shut down on 7-27-64 and the heels covered with water in preparation for the building shutdown for 1A Column and D-14 concentrator replacement.

d. Solvent Extraction

The process was crashed down one hour on 7-27 at 0920 because of the loss of the J-6 scrubber vent system vacuum. The cause of the vacuum loss was found to be an overload of organic to the J-6 due to the G-2 condenser cooling water being shut off to replace a faulty valve.

The 2D Column flood increasingly restricted flow rates as the week progressed. Concurrent with the flood, the D-14 pot leak became excessive and the E-2 oscillator vent jet flow had a restriction. Based on these operating problems and the need for the 1A Column replacement, a decision was made to run out the in-process inventory and replace and flush equipment. However, the 2D Column flooding shut down the plant on 7-28. Water flushing of the 2D Column allowed the process inventory of E-metal to be completed on 7-29 at 0900 and the high waste and accumulated sump wastes to be started through. The total waste rework continued through the report period until 0245 on 8-2 during which 22,500 gallons of rework were successfully processed.

e. Equipment

The D-8 siphoning through the pump, reported last week, cleared up with additional use of the pump.

Plans are being firmed up for 1A Column and D-14 replacement.

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NY-80202
644

Following are the waste storage tank data for the report period:

	<u>105-EX</u>	<u>107-EX</u>	<u>108-EX</u>	<u>109-EX</u>	<u>110-EX</u>	<u>111-EX</u>	<u>112-EX</u>	<u>114-EX**</u>	<u>115-EX</u>
Liquid Level	21'2-3/8"	15'3-3/4"	20'6-3/4"	21'10-1/4"	21'6-1/2"	4'2-1/4"	21'9"	14'9-1/2"	10'5"
Bulb 1" Sludge Temp.	107 F	292 F	285 F	276 F	233 F	193 F	245 F	245 F	177 F
Seamur 1" Sludge Temp.	-	299 F	308 F	286 F	279 F	202 F	232 F	214 F	199 F
2-Ft. Supernatant Temp.	-	238 F	242 F	221 F	202 F	175 F	215 F	212 F	174 F
Supernatant Temp.Gradient*	-	4 F	4 F	3 F	4 F	-	3 F	4 F	2 F
No. of Circ. Operating	0	3	4	3	2	0	4	2	2
Specific Gravity	-	1.57	1.61	1.58	1.53	-	1.61	1.20	1.23
Apparent Sludge Depth	-	0'6-1/2"	0'8-1/2"	2'6"	2'1"	2'3"	2'1"	1'3-1/2"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-EX is the current salt waste receiver tank.

NOTE: Readings in the north lateral (shielded probe) increased from 360,000 c/m to 1,200,000 c/m by 7-31. No activity was found in the center or south lateral or in the 75-foot dry wells surrounding the tank.

The sludge level of the 115-EX tank was reduced from 13 inches to 4 inches by 7-31-64. Sodium nitrate dissolution from this tank is nearly complete.

DECLASSIFIED
-131-

EW-80202
No. 645

R. E. Isaacson
R. A. Yoder
F. Beaulieu
R. E. Tomlinson

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 8-2-64 TO 2400 8-8-64

I. PRODUCTION

U Shipped None IAF Processed None Charged None
Pu Loaded None

II. PRODUCT PURITY

	Plutonium			Uranium		
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm) Na(ppm)
Minimum						
Average						
Maximum						

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	%	U <u>38</u>	Lbs. %	U	Lbs. %
Pu	%	Pu <u>45</u>	Gms. %	Pu	Gms.
		Gallons <u>23,464</u>		Gallons <u>None</u>	

SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle		
Partition Cycle		
Third U		
Second Pu		
Third Pu		
Tail End		
Total		

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T			
Cooling Time			

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste						
HE	Sump Waste	<u>9295</u>	<u>638</u>	<u>-</u>	<u>2656</u>	<u>-</u>	<u>132.6</u>
HE	Recycle						
1S Column							
E-3 or E-1							

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EW-80202
No. 645

a. Flowsheet and Stream Compositions

See pages 3 and 4 of this report.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 8-2-64	0245 8-2-64	0	1S on rework
0245 8-2-64	0000 8-8-64	0	57% acid flushing, 1A Column decontamination and D-14 replacement

c. Dissolvers

Following are the radiiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stack</u>
8-3-64 (2 days)	No dissolving	None	0.0068
8-4-64	" "	"	0.0039
8-5-64	" "	"	0.0003
8-6-64	" "	"	0.00029
8-7-64	" "	"	0.0012
8-8-64	" "	"	0.00058

No dissolving was done during the report period.

d. Solvent Extraction

In final preparation for D-14 concentrator and the 1A Column changeout, the last of the sump waste and high waste from shutdown operations was processed through the 1S Column on 8-2-64. A total of 22,500 gallons of waste rework was reprocessed with satisfactory product recovery.

The 1S, 2E, 1B, 2A and 2B Columns and associated vessels were flushed with 57% acid. Flushing of the 2D Column was not completed. Normally the 2D Column flushes are drained to the F-2, F-1 tanks; however, when the 2D to 1B overflow flush contained 703 units, draining of the 2D Column to F-2, F-1 was deemed inadvisable due to nuclear safety considerations. The 2D Column flush will be completed and drained to D-14 when the new D-14 pot is available.

The following units of plutonium were picked up in the flushes:

DECLASSIFIED

-133-

HW-80202
No. 645Combined FlushesGrams Pu

1B, D-14	17
1A	4
1B, D-14	1
Total	22 (discarded as waste)

1B, E-6, E-7	225.7
E-5, 2A, 2B, E-2, E-1	~ 20.0
2D (1) overflow flush	703.0
(2)	323.7
(3)	271.0
(4)	27.9
2D combined drain	376.5
H ₂ O flushes to D-14	16.0
Total	1964.0 (recovered)

Accidental 2A overflow to D-13	47
Discard from precycle	22
Grand total	2033

D-7 analysis	1964 grams
--------------	------------

e. Equipment

D-14 - The new D-14 pot was installed on 8-6-64 and calibrated in position in the D-Cell. The old D-14 pot had a life of approximately 16 months.

1A Column - The leak in the feed tee at the bottom of the 1A Column could not be stopped either by a patch or by a plug. The plug effectively reduced the flow so that the column could be flushed with reasonable retention time in the column. The following decontamination flushes were processed through the 1A Column to the D-13 waste receiver:

<u>Series</u>	<u>Flush No.*</u>	<u>Solution</u>	<u>Third level highest reading</u> <u>Ending reading</u>
1	0	0	360 rad
	1	57% HNO ₃	-
	2	5% NaOH	0.75% K ₂ Cr ₂ O ₇
	3	10% HNO ₃	2.25% Cr(NO ₃) ₃
	4	57% HNO ₃	-
2	5	5% NaOH	0.75% K ₂ Cr ₂ O ₇
	6	10% HNO ₃	2.25% Cr(NO ₃) ₃
	7	57% HNO ₃	-

DECLASSIFIED

-134-

HW-80202

No. 645

<u>Series Flush No.*</u>		<u>Solution</u>	<u>Third level highest reading</u> <u>Ending reading</u>	
3	8	20% HNO ₃	6.0% NH ₄ F	
	9	20% HNO ₃	6.0% NH ₄ F	160
4	10	40% HNO ₃	-	160
	11	5% NaOH	0.75% KMnO ₄	
	12	10% HNO ₃	2.25% Cr(NO ₃) ₃	
	13	40% HNO ₃		200
	14	Final H ₂ O		80

* Small volume velocity water flushes were used between chemical flushes.

** New probe installed

Background reading of the silo varied between 80 and 90 rads at the second level of the silo.

Typical readings taken of 1A Column:

Series 0 (before flushed)

<u>Location</u>	<u>Distance from column</u>	<u>Reading, rads</u>
Deck	-	4.5
15' down	-	25.0
25' down	-	50.0
35' down	-	230.0
4th level (top)	-	280.0
3rd level (top)	-	340.0
3rd level (bottom)	-	360.0
Opposite plug	-	320.0
Base of column	-	130.0
Below base	-	160.0

Series 3 (after HF flushes)

Deck	1'	3
Top column	2'	4
4th level (top lights)		15
3rd level (top lights)		120
3rd level (bottom lights)		150
2nd level (top lights)		150
2nd level (middle lights)		120
Bottom column (east)		110
Rotation of probe (north)		300
" " " (west)		230
" " " (South)		32

DECLASSIFIED

-135-

HW-80202
No. 645

Series 4 (after last 40% HNO₃ flush)

<u>Location</u>	<u>Distance from column</u>	<u>Reading, rads</u>
Top of column	3'	6
4th level (top)	3'	30
3rd level (upper)	3'	140
3rd level (upper)	2'	100
3rd level (lower)	3'	200
3rd level (lower)	against column	60
1/2-way to 2nd level	3'	150
Bottom Column		100

Series 0 (after final waster flush)

Top of column	2" - 3"	6
Bottom of disengaging section	contact	12
5th level (top lights)	8"	12
5th level (bottom)	8"	10
4th level (top lights)	4"	9
4th level (bottom lights)	1'	17
3rd level (top lights)	1'	80
3rd level (bottom lights)	1'	80
2nd level (top lights)	8"	80
Bottom of column	8"	40
Below base	-	90

Based on the above results it was decided that most of the radiation was due to the silo background and accordingly the 1A Column jumpers were being removed at the end of the report period.

Following are the waste storage tank data for the report period:

	105-SX	107-SX	108-SX	109-SX	110-SX	111-SX	112-SX	114-SX**	115-SX
Liquid Level	21'3-1/2"	15'4-1/4"	20'5-1/2"	21'8-3/4"	21'6"	4'2-1/4"	21'8-1/4"	15'2-1/2"	10'4-3/4"
Bulb 1" Sludge Temp.	110 F	294 F	285 F	277 F	231 F	193 F	246 F	246 F	175 F
Scanner 1" Sludge Temp.	-	296 F	306 F	285 F	278 F	-	231 F	210 F	193 F
2-Ft. Supernatant Temp.	-	238 F	241 F	221 F	202 F	-	210 F	208 F	169 F
Supernatant Temp.Gradient*	-	3 F	3 F	2 F	4 F	-	4 F	3 F	3 F
No. of Circ. Operating	0	3	4	3	2	0	4	2	2
Specific Gravity	-	1.53	1.58	1.58	1.52	-	1.62	1.20	1.25
Apparent Sludge Depth	-	0'7-3/4"	0'8-1/2"	2'6"	2'2-1/2"	2'3"	2'0"	1'3"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-SX is the current salt waste receiver tank.

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NY-80202
No. 645

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[REDACTED]
-137-

EW-80202
No. 646

R. E. Isaacson
R. A. Yoder
F. Beaulieu
R. E. Tomlinson

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 8-9-64 TO 2400 8-15-64

[REDACTED]

I. PRODUCTION

U Shipped None IAF Processed None Charged None
Pu Loaded None

II. PRODUCT PURITY

Plutonium			Uranium			
Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum						
Average						
Maximum						

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	%	U <u>11</u>	Lbs. %	U	Lbs. %
Pu	%	Pu <u>18</u>	Gms. %	Pu	Gms.
		Gallons <u>14,999</u>		Gallons	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle		
Partition Cycle		
Third U		
Second Pu		
Third Pu		
Tail End		
Total		

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T			
Cooling Time			

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste						
HE	Sump Waste						
HE	Recycle						
LS Column							
E-3 or E-1							

[REDACTED]

DECLASSIFIED

-138-

HW-80202
No. 646

a. Flowheet and Stream Compositions

Calibration of D-14 pot and 1A Column decontamination and changeout.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 8-9-64	2400 8-15-64	0	Replacement of 1A Column

c. Solvent Extraction

The D-14 pot was recalibrated on 8-10 because of instrument difficulties. (Reference to the pot weight factor was attached to one of the cooler dip tubes.) The 2D Column contents were drained to D-14 and after sampling, the F-1 contents were also moved to D-14 with UHM being added from E-13 via 2D and F-1 to keep a safe Pu/U ratio in D-14. The 2D Column was given a 57% acid flush which was drained to D-14 on 8-12. The excess acid was boiled off in D-14. A sample of D-14 contents could not be obtained because the sampler jumper was made incorrectly through a mix-up in the three leads. A new jumper was installed which allowed representative samples to be obtained and the 2D Column flush procedure was started again on 8-15.

d. Equipment

1A Column - The last caustic-nitric flush of 1A Column was completed on 8-9 and the decision to change out the column was made when a traverse of the column gave a maximum reading of 80 rad/hr.

In preparation for the 1A Column replacement, the old jumpers and debris in the bottom of the silo was removed in a burial box through the column trench with a maximum radiation level of 1.5 rad/hr contact. A second burial box was filled with jumpers and removed from the silo on 8-12, with a maximum radiation level of 3.5 rad/hr, contact. A 2.5-ton window shield was also removed and placed in a metal box on 8-12 with a maximum reading of 2 rad/hr at a distance of 1 foot.

The new 1A Column contained in a metal capsule was moved into the silo trench and raised to an upright position in the silo. The old 1A Column was moved to the wing wall hangers in front of the 1B Column; however, the hanger design did not allow sufficient clearance between the top of the column and the underside of the silo bridge crane. Therefore the old 1A Column was stored by leaning it against the wing wall which is south of the 1B Column. The new 1A was removed from the capsule and installed in position. The old 1A was inserted into the capsule, lowered and pulled from the silo for burial on 8-13. The maximum radiation level was 2 rad/hr, contact, at the top of the column and at the 1AF entry point with the rest of the capsule in the 1 rad/hr range.

DECLASSIFIED

[REDACTED]
-139-

HW-80202
No. 646

All the burials were completed without loss of contamination control.

Jumper installation was begun immediately after the old 1A Column removal. At the end of the report period a majority of the jumpers had been installed.

K-Fuel Console - The integrated control console was modified to incorporate the 3A, 1B, and 1A Columns into the console. The console can control 1AX, 1AF, 1SF, 1SA, 1SX, 3AS, 3AF, 3AX, and 3EX rates with the new modification.

F-Cell - The new Lawrence pump was installed in the F-7 precycle feed tank on 8-14. However, a new lube jumper will have to be fabricated and installed because of interference of the old lube jumper with installation.

F-2 east tube bundle was found to have a leak and at the end of the report period the leak had not been repaired.

[REDACTED]

Following are the waste storage tank data for the report period.

	<u>105-6X</u>	<u>107-6X</u>	<u>108-6X</u>	<u>109-6X</u>	<u>110-6X</u>	<u>111-6X</u>	<u>112-6X</u>	<u>114-6X**</u>	<u>115-6X</u>
Liquid Level	21'3-1/4"	15'3-1/2"	20'4-1/4"	21'8-1/4"	21'5-1/2"	4'2-1/2"	21'7-1/2"	15'4"	10'4-1/2"
Bulb 1" Sludge Temp.	111 F	295 F	285 F	279 F	226 F	193 F	246 F	245 F	173 F
Scanner 1" Sludge Temp. -		299 F	307 F	286 F	276 F	199 F	210 F	212 F	192 F
2-Ft. Supernatant Temp. -		240 F	241 F	242 F	203 F	174 F	211 F	207 F	169 F
Supernatant Temp.Gradient* -		2 F	5 F	18 F	4 F	-	5 F	3 F	3 F
No. of Circ. Operating -		3	4	3	2	0	4	2	2
Specific Gravity -		1.52	1.58	1.58	1.53	-	1.60	1.25	1.25
Apparent Sludge Depth -		0'8"	0'8-1/2"	2'6"	2'0"	2'3"	2'0"	1'3"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-6X is the current salt waste receiver tank.

NOTE: Monitoring of the laterals under the 241-6X tanks during July indicated no significant change in readings except under the 108-6X tank. The reading in the north lateral (S 77°15'E) increased from 22,000 c/m on 7-1-64 to 52,000 c/m on 7-30-64. The increase in activity is at a point approximately 5 feet from the west side of the 108-6X tank.

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IN-80202
No. 646

DECLASSIFIED

-141-

NW-80202
No. 647R. E. Isaacson
R. A. Yoder
F. Beaulieu
E. TomlinsonSUMMARY OF 202-S BLDG. OPERATION
FROM 0000 8-16-64 TO 2400 8-22-64I. PRODUCTIONU Shipped 18.78 LAF Processed 27.36 Charged 32.02Pu Loaded 5250II. PRODUCT PURITY

	Plutonium			Uranium			
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum	<u>3.4</u>	<u>223</u>	<u>7.4</u>	<u>1</u>	<u>0.15</u>	<u>8.0</u>	<u>4.0</u>
Average	<u>3.4</u>	<u>223</u>	<u>17.2</u>	<u>1.1</u>	<u>0.70</u>	<u>13.8</u>	<u>32.3</u>
Maximum	<u>3.4</u>	<u>223</u>	<u>25.6</u>	<u>1.4</u>	<u>1.51</u>	<u>32.0</u>	<u>115.0</u>

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>0.002</u> %	U <u>68</u> Lbs.	<u>0.12</u> %	U <u>140</u> Lbs.	<u>0.22</u> %
Pu	<u>0.02</u> %	Pu <u>38</u> Gms.	<u>0.23</u> %	Pu <u>40</u> Gms.	<u>0.22</u> %
		Gallons <u>15,930</u>		Gallons <u>6253</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.6</u>	<u>1.6</u>
Partition Cycle	<u>2.5</u>	<u>2.1</u>
Third U	<u>1.5</u>	<u>-</u>
Second Pu	<u>-</u>	<u>1.4</u>
Third Pu	<u>-</u>	<u>2.1</u>
Tail End	<u>1.4</u>	<u>-</u>
Total	<u>7.0</u>	<u>7.2</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>908</u>	<u>743</u>	<u>834</u>
Cooling Time	<u>562</u>	<u>193</u>	<u>219</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium Grams
			Grams	%	Lbs.	%	
HE	Salt Waste	<u>None</u>					
HE	Sump Waste	<u>1246</u>	<u>62</u>	<u>0.34</u>	<u>398</u>	<u>0.74</u>	<u>1</u>
HE	Recycle	<u>-</u>	<u>492</u>	<u>2.91</u>	<u>-</u>	<u>-</u>	<u>-</u>
LS Column	<u>Salt Waste</u>	<u>8763</u>	<u>93</u>	<u>0.55</u>	<u>119</u>	<u>0.22</u>	<u>338</u>
<u>204-3 out of spec. UNK</u>			<u>-</u>	<u>-</u>	<u>3400</u>	<u>6.34</u>	<u>-</u>

DECLASSIFIED

-142-

EW-80202
No. 647

a. Flowsheet and Stream Compositions

See page 111 of this document.

b. Extraction Rates

<u>Date</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 8-16-64	1200 8-18-64	0	Final flush of columns and E-Cell. Final checking of instruments and equipment.
1200 8-18-64	2210 8-18-64	7	Acid deficient precycle 1A Column, E-metal feed (1A Column neptunium recovery acid cycle)
2210 8-18-64	0300 8-19-64	0	B-1A to F-8 line plugged.
0300 8-19-64	2230 8-22-64	7	
2230 8-22-64	2400 8-22-64	0	DOW in the F-8 pump discharge failed. 1A Column, E-metal feed.

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved gms. days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
8-17-64 (3 days)	No dissolving	None	∠ 0.00093
8-18-64	" "	"	∠ 0.00030
8-19-64	207-221	"	∠ 0.00029
8-20-64	208-562	"	∠ 0.00026
8-21-64	209-562	"	0.0014

The 293-B Building recovered 33,180 pounds of 100 percent nitric acid during the report period with an average concentration of 42.2 percent.

The dissolver heels were removed in preparation for dissolution of an unclassified metal campaign. A special charge of 0.57 ton natural metal was completely dissolved in the C-2 dissolver and sampled to provide data for the IFD overseas program.

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EW-80202
No. 647

d. Solvent Extraction

On 8-18, the final water velocity flushes of the columns and the water flushes of the E-Cell tanks were completed in preparation for startup on an acid deficient process flowchart. The 1A Column was given an acid soak on 8-17 to clean the packing. The F-2 to F-1 overflow jumper was checked and found to overflow at 26 gpm. The D-14 instruments and a new D-14 pump discharge jumper to replace a leaking discharge jumper delayed startup until 1200 on 8-18. Feed to the 1A Column was stopped on 8-18 because D-14 would not pump to F-8 because of a plugged line. Feed was started again at 0300 on 8-19 and continued until 8-22 when the DOW in the F-8 pump discharge jumper failed shutting the 1S feed off. Feed was run to the 1A Column 66 percent of time during the report period.

It was found that the 2E Column aspirates into D-13 via the vent header when the organic is routed from the 1S Column to the 10 Column via the new 1S, 1C to 10 jumper because the 1S, 1C to 10 jumper does not have a vent and carries air over into the organic header. The entrained air in the header encounters the 2E to 10 organic line downstream and vents back up the 2E organic line causing the 2E Column to burp or aspirate carrying organic over into D-13 via the inert gas vent header.

High waste was generated through the week because of the following two problems:

1. The 10 Column did not strip the neptunium out of the organic and it went to D-13 via G-3 and G-4. To remedy the situation, the new routing from 1S to 10 was changed back to the 2E Column on 8-20. Neptunium in the G-4 was dropped to an acceptable level at the end of the week.
2. The pH probe controlling the acid addition to F-8 via D-14 line to F-8 malfunctioned allowing the acid addition valve in the G-3-B tank to fully open. Acid from G-3-B was added to F-8 tank at a rate of approximately 480 pounds per hour for nine hours. The acid slowly built up in F-8 tank until the feed stream from F-8 to the 1S Column was acid enough to mildly react with the hexone in the 1S Column. The reaction produced off-gases that entrained neptunium-bearing hexone over into the vent header and produced an emulsion which upset the 2E and 10 Columns and the G-3 hexone still. The situation was recognized at about 1000 on 8-22-64 and corrected by cutting off the G-3-B addition and doubling the organic flow to the 1S Column which decreased the acid composition in the organic to non-reacting concentration. All acid to the F-8 tank is now being added from the 701-A tank with G-3-B tank and the controlling pH probe out of service.

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EW-80202
No. 647

•. Equipment

A new F-8 pump was installed with a by-pass back to the F-8 tank. The old F-8 pump had a service life of 1229 hours. (F-8 pump did not fail so it was hung on a rack for use when the new F-8 pump fails.)

Following are the waste storage tank data for the report period.

	<u>105-EX</u>	<u>107-EX</u>	<u>108-EX</u>	<u>109-EX</u>	<u>110-EX</u>	<u>111-EX</u>	<u>112-EX</u>	<u>114-EX**</u>	<u>115-EX</u>
Liquid Level	21'2"	15'1-1/4"	20'2-1/4"	21'7-1/2"	21'4-3/4"	4'2-3/4"	21'6-1/2"	14'11-3/4"	10'4-1/4"
Bulk 1" Sludge Temp.	110 F	298 F	286 F	279 F	225 F	194 F	247 F	249 F	172 F
Scanner 1" Sludge Temp.	-	300 F	308 F	286 F	276 F	199 F	208 F	216 F	189 F
2-Ft. Supernatant Temp.	-	241 F	242 F	239 F	202 F	173 F	209 F	208 F	167 F
Supernatant Temp.Gradient*	-	2 F	4 F	15 F	4 F	-	5 F	3 F	3 F
No. of Circ. operating	-	3	4	3	2	0	4	2	2
Specific Gravity	-	1.52	1.58	1.58	1.53	-	1.60	1.24	1.25
Apparent Sludge Depth	-	0'8-1/2"	0'10-1/2"	2'6"	2'0"	2'0"	2'6"	1'3"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-EX is the current salt waste receiver tank.

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-145-

IN-80202
No. 647

R. E. Isaacson
R. A. Yoder
F. Beaulieu
E. Tomlinson

-146-

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EW-80202
No. 648

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 8-23-64 TO 2400 8-29-64

I. PRODUCTION

U Shipped 29.57 IAF Processed 29.11 Charged 44.85 E-metal

Pu Loaded 20880

II. PRODUCT PURITY

	Plutonium		Uranium				
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum	<u>2.3</u>	<u>1.96²</u>	<u>12.1</u>	<u>/ 1</u>	<u>0.37</u>	<u>8.0</u>	<u>10.0</u>
Average	<u>3.8</u>	<u>9.41³</u>	<u>78.9</u>	<u>4.5</u>	<u>2.91</u>	<u>18.1</u>	<u>28.4</u>
Maximum	<u>5.4</u>	<u>1.92⁴</u>	<u>160.0</u>	<u>15.0</u>	<u>14.3</u>	<u>57.0</u>	<u>52.0</u>

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>0.01</u> %	U <u>92</u> lbs.	<u>0.16</u> %	U <u>196</u> lbs.	<u>0.27</u> %
Pu	<u>0.01</u> %	Pu <u>37</u> Gms.	<u>0.19</u> %	Pu <u>56</u> Gms.	<u>0.27</u> %
		Gallons	<u>39254</u>	Gallons	<u>7700</u>

SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.3</u>	<u>1.3</u>
Partition Cycle	<u>1.9</u>	<u>1.8</u>
Third U	<u>1.8</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.8</u>
Third Pu	<u>-</u>	<u>1.6</u>
Tail End	<u>1.4</u>	<u>-</u>
Total	<u>6.4</u>	<u>7.5</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>1253</u>	<u>711</u>	<u>1208</u>
Cooling Time	<u>391</u>	<u>234</u>	<u>259</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>653</u>	<u>4</u>	<u>0.02</u>	<u>8</u>	<u>0.01</u>	<u>11</u>
HE	Sump Waste	<u>1700</u>	<u>512</u>	<u>2.39</u>	<u>2907</u>	<u>4.67</u>	<u>89</u>
HE	Recycle	<u>-</u>	<u>1327</u>	<u>6.20</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column	<u>Salt Waste</u>	<u>15167</u>	<u>347</u>	<u>1.62</u>	<u>1041</u>	<u>1.67</u>	<u>84</u>
1S Column	Sump Waste	<u>1354</u>	<u>7</u>	<u>0.03</u>	<u>49</u>	<u>0.08</u>	<u>71</u>

a. Flowsheet and Stream Compositions

See page 111 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 8-23-64	1500 8-23-64	0	Replacing the F-8 pump
1500 8-23-64	1700 8-24-64	7	1A Column on feed; 1B neptunium recovery.
1700 8-24-64	0245 8-25-64	0	Preparing to rework
0245 8-25-64	1700 8-25-64	0	Rework on 1A and 1B
1700 8-25-64	0500 8-26-64	0	2D acid flush
0500 8-26-64	1530 8-26-64	7	1AW to D-14 restriction
1530 8-26-64	0600 8-27-64	6	
0600 8-27-64	0900 8-27-64	7	1AW restriction
0900 8-27-64	2400 8-29-64	6	

c. Dissolvers

Following are the radioiodine data for the report period.

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stack</u>
8-24-64 (3 days)	194-565	None	0.0062
8-25-64	236-387	"	0.0032
8-26-64	237-388	"	0.0018
8-27-64	238-389	"	0.0025
8-28-64	239	"	0.00031

The 293-S Building recovered 33,180 pounds of 100 percent nitric acid during the report period with an average concentration of 41.9 percent.

Two special charges of 0.93 ton (each) E-metal were dissolved and sampled in the C-2 dissolver.

-148-

DECLASSIFIED

HW-80202
No. 648

d. Solvent Extraction

During the week the 1A Column operated at a 6 rate for 64.9 percent of the available time and at a 7 rate for 10.4 percent of the time. Feed was shut off at 1700 on 8-24 because of high waste. The waste was a result of overflow of the F-1 tank which allowed product to enter D-13 via the inert gas header. Processing E-metal feed continued after reworking the high waste but rates had to be reduced to 6 because the 1AW to D-14 routing was restricted.

e. 276-S Building

The nitroso factor in the hexone built up to a prewash reading of 8.27. A 5 percent caustic wash brought the nitroso factor down to 1.00.

Following are the waste storage tank data for the report period.

	<u>105-SX</u>	<u>107-SX</u>	<u>108-SX</u>	<u>109-SX</u>	<u>110-SX</u>	<u>111-SX</u>	<u>112-SX</u>	<u>114-SX**</u>	<u>115-SX</u>
Liquid Level	21'0"	15'2"	20'1-1/2"	21'6-1/4"	21'4-1/2"	4'2-3/4"	21'6"	15'5-1/2"	10'4-1/4"
Bulb 1" Sludge Temperature	112 F	290 F	295 F	277 F	226 F	194 F	223 F	250 F	172 F
Scanner 1" Sludge Temperature	-	293 F	308 F	288 F	280 F	204 F	213 F	216 F	192 F
2-Ft. Supernatant Temperature	-	241 F	242 F	230 F	204 F	179 F	214 F	214 F	172 F
Supernatant Temp.Gradient*	-	3 F	4 F	6 F	3 F	-	4 F	3 F	3 F
No. of Circulators Operating	-	3	4	3	2	0	4	2	2
Specific Gravity	-	1.52	1.59	1.58	1.52	-	1.62	1.26	1.25
Apparent Sludge Depth	-	0'8"	0'10-1/2"	2'6"	2'1"	2'0"	1'10-1/2"	1'3"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-SX is the current salt waste receiver tank.

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NW-80202
No. 648

-149-

-150

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NW-80202
No. 649R. E. Isaacson
R. A. Yoder
F. Beaulieu
R. E. TomlinsonSUMMARY OF 202-S BIDG. OPERATION
FROM 0000 8-30-64 TO 2400 9-5-64

I. PRODUCTION

U Shipped 40.0 IAF Processed 40.13 Charged 42.10 E-metalPu Loaded 33710

II. PRODUCT PURITY

	Plutonium			Uranium			
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum	<u>1.3</u>	<u>168</u>	<u>19.2</u>	<u>1</u>	<u>0.20</u>	<u>8.0</u>	<u>10.0</u>
Average	<u>3.7</u>	<u>413</u>	<u>29.6</u>	<u>4.5</u>	<u>0.60</u>	<u>15.1</u>	<u>17.3</u>
Maximum	<u>7.9</u>	<u>877</u>	<u>55.0</u>	<u>12.9</u>	<u>1.15</u>	<u>39.0</u>	<u>39.0</u>

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>0.01</u> %	U <u>66</u> Lbs.	<u>0.08</u> %	U <u>140</u> Lbs.	<u>0.17</u> %
Pu	<u>0.07</u> %	Pu <u>55</u> Gms.	<u>0.18</u> %	Pu <u>40</u> Gms.	<u>0.17</u> %
		Gallons <u>38540</u>		Gallons <u>6757</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.2</u>	<u>1.2</u>
Partition Cycle	<u>1.9</u>	<u>2.1</u>
Third U	<u>2.0</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.4</u>
Third Pu	<u>-</u>	<u>1.5</u>
Tail End	<u>1.7</u>	<u>-</u>
Total	<u>6.8</u>	<u>7.2</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>1195</u>	<u>1195</u>	<u>1195</u>
Cooling Time	<u>355</u>	<u>349</u>	<u>353</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>None</u>					
HE	Sump Waste	<u>7754</u>	<u>279</u>	<u>0.85</u>	<u>2239</u>	<u>2.58</u>	<u>87</u>
HE	Recycle	<u>None</u>					
1S Column	Salt Waste	<u>4763</u>	<u>50</u>	<u>0.15</u>	<u>55</u>	<u>0.06</u>	<u>49</u>
1S Column	Sump Waste	<u>1366</u>	<u>1393</u>	<u>4.25</u>	<u>4262</u>	<u>4.91</u>	<u>384</u>

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HW-80202

No. 649

-151-

a. Flowheet and Stream Compositions

See page 111 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 8-30-64	1830 8-30-64	6	Rate limited because of LAW to D-14 letdown valve
1830 8-30-64	0100 8-31-64	0	LAW to D-14 line water flush
0100 8-31-64	0135 8-31-64	6	LAW to D-14 restricting
0135 8-31-64	0735 9-1-64	0	1A, 1B, 2D 10% acid flush
0735 9-1-64	0750 9-1-64	8	LABS jumper leaking; LABS connector head not made up.
0750 9-1-64	0900 9-1-64	0	
0900 9-1-64	2400 9-5-64	8	1A Column on e-metal feed

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stack</u>
8-31-64 (3 days)	240-392	None	∠ 0.0016
9-1-64	No dissolving	"	0.00036
9-2-64	244-352	"	∠ 0.00035
9-3-64	245-353	"	0.00052
9-4-64	354	"	0.00028
9-5-64	355	"	0.00022

The 293-B Building recovered 37,050 pounds of 100 percent nitric acid during the report period with an average concentration of 41.9 percent.

A third special charge of E-metal (0.93 ton) from the KW Reactor was dissolved and sampled in the C-2 dissolver. This completed dissolution of the E-W test material from Key 6887-KW.

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HW-80202

No. 649

d. Solvent Extraction

The 1A Column operated at an 8 rate for 80.4 percent of the available time during the week.

On 8-31 an attempt was made to start up following a brief water flush of the 1A Column to remove the restriction in the 1AW letdown valve. The water flush was unsuccessful so the building was shut down to do a 10 percent acid flush of the 1A, 1B and 2D Columns.

A newly designed 1AW to D-14 jumper was installed on 9-1 with a pot for a specific gravity reading and a larger old 1AW to D-14 jumper valve had too small of trim and restricted the flow. (1/4" trim on one valve changed in new jumper to 3/8" trim all 1" valves involved).

Feed was started again on 9-1 at 0735 but a leak was discovered on the 1AB jumper due to a connector head which had not been made up. Processing was resumed on 9-1 at 0900 and continued on through the remainder of the week producing good product.

Shortly after startup on 9-1 at 0920, a blowback of hot (radioactive) solution from the F-8 tank occurred. The blowback was a result of the rapid addition (approximately one minute) of 500 pounds of 57% nitric acid from G-3-B tank into the D-14 to F-8 line. There was hexone in the F-8 tank from 1B Column drain back which reacted violently with acid and pressurized the tank. Solution was blown out of the F-8 tank into the vent header, through the F-8 weight factor reference line into the F-8 magnehelic and through the nitric acid line into the acid addition seal pot in the south pipe gallery. Readings of 400 rad and 300 R were obtained on the magnehelic at F-Board and on the acid addition seal pot, respectively.

e. Equipment

The magnehelic panel at F-Board and the F-8 weight factor instrument with tubing, valves, and fittings were replaced. Flushing the seal pot reduced the radiation level to one rad. There was very little contamination spread from this incident.

f. 276-B Building

The hexone was washed to remove nitroso compounds. The nitroso compounds in hexone dropped from 6.4 to 0.95 on spectrophotometer following the wash.

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EX-80802
No. 649

253-

Following are the waste storage tank data for the report period.

	<u>105-EX</u>	<u>107-EX</u>	<u>108-EX</u>	<u>109-EX</u>	<u>110-EX</u>	<u>111-EX</u>	<u>112-EX</u>	<u>114-EX**</u>	<u>115-EX</u>
Liquid Level	20'10-1/4"	15'2-1/4"	20'9"	21'5"	21'4-1/4"	4'2-3/4"	21'5-1/4"	16'1-1/4"	10'4"
Bulb 1" Sludge Temp.	111 F	295 F	301 F	278 F	226 F	194 F	225 F	252 F	175 F
Scanner 1" Sludge Temp.	-	290 F	314 F	288 F	280 F	201 F	211 F	215 F	191 F
2-Ft. Supernatant Temp.	-	243 F	239 F	228 F	203 F	174 F	211 F	210 F	168 F
Supernatant Temp.Gradient*	-	3 F	4 F	4 F	3 F	-	4 F	4 F	2 F
No. of circulators operating	-	3	4	3	2	0	4	2	2
Specific Gravity	-	1.57	-	1.59	-	-	1.63	-	1.25
Apparent Sludge Depth	-	0'8"	0'10-1/2"	2'6"	2'1"	2'0"	1'10-1/2"	1'3-1/2"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-EX is the current salt waste receiver tank.

NOTE: Activity in the north lateral under the 107-EX tank increased from 1,200,000 e/m to 1,600,000 e/m during August. No readings were detected in the center or south laterals, or in the 75' deep dry wells surrounding the tank.

Activity in the north lateral under the 108-EX tank increased from 52,000 e/m on 7-30-64 to 158,000 e/m on 8-31-64. Activity in the center lateral increased slightly to 27,000 e/m. The reading in dry well No. 29, near the 108-EX tank held steady at 5000 e/m. A line routed from the 151-8-1 catch tank to the 109-EX tank, which passes near this well could be the source of this reading. A hydrostatic test of this line detected no leaks. The vapor header from the 101-EX tank was closed to prevent condensate drainage to the 101-EX tank.

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EW-80202
No. 650

R. E. Isaacson
R. A. Yoder
F. Beaulieu
R. E. Tomlinson

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 9-6-64 TO 2400 9-12-64

I. PRODUCTION

U Shipped 61.31 1AF Processed 56.40 Charged 50.46 E-metal

Pu Loaded 41820

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe(ppm)	Na(ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>0.8</u>	<u>2.15²</u>	<u>10.2</u>	<u>1</u>	<u>0.09</u>		<u>8.0</u>	<u>10.0</u>
Average	<u>1.6</u>	<u>5.10²</u>	<u>17.9</u>	<u>1.4</u>	<u>0.28</u>		<u>10.9</u>	<u>17.0</u>
Maximum	<u>2.2</u>	<u>1.64³</u>	<u>25.2</u>	<u>4.4</u>	<u>1.05</u>		<u>21.0</u>	<u>43.0</u>

III. WASTE

<u>Extraction Losses</u>		<u>To Underground Storage</u>		<u>Coating Waste Losses</u>	
U	<u>0.005</u> %	U <u>49</u> lbs.	<u>0.04</u> %	U <u>168</u> lbs.	<u>0.17</u> %
Pu	<u>0.03</u> %	Pu <u>51</u> Gms.	<u>0.12</u> %	Pu <u>48</u> Gms.	<u>0.17</u>
		Gallons	<u>58298</u>	Gallons	<u>8251</u>

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	<u>U</u>	<u>Pu</u>
Precycle	<u>1.2</u>	<u>1.2</u>
Partition Cycle	<u>2.2</u>	<u>2.2</u>
Third U	<u>1.8</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.4</u>
Third Pu	<u>-</u>	<u>1.6</u>
Tail End	<u>1.8</u>	<u>-</u>
Total	<u>7.0</u>	<u>7.4</u>

V. METAL HISTORY

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
MWD/T	<u>1196</u>	<u>1143</u>	<u>1194</u>
Cooling Time	<u>362</u>	<u>356</u>	<u>359</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>None</u>					
HE	Sump Waste	<u>None</u>					
HE	Recycle	<u>None</u>					
1S Column		<u>None</u>					
E-3 or E-1		<u>None</u>

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EW-80202
No. 650

-155-

a. Flowheet and Stream Compositions

See page 111 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 9-6-64	2400 9-12-64	8	1A Column on E-metal feed

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved gms. days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
9-8-64 (3 days)	355-358	None	✓ 0.00094
9-9-64	359	"	✓ 0.00083
9-10-64	360	"	✓ 0.00083
9-11-64	361	"	✓ 0.00023

The 293-B Building recovered 48,693 pounds of 100 percent nitric acid during the report period with an average concentration of 42.3 percent.

d. Solvent Extraction

The columns operated 100 percent of the available time during the week. Toward the end of the report period 1A and 2D Columns were periodically flooding although D-14 samples have not shown any excessive product losses.

On 9-10, an acid deficient cut was made in B-2 because of a malfunctioning specific gravity instrument. As a result, polymer was encountered in H-7 which resulted in high plutonium waste loss from the third head-end batch that was made from the H-7 contents. The high waste loss was reworked through 18 successfully.

Excellent plutonium and uranium product was made during the week. At the end of the report period all the previously out-of-specifications UHM had been blended into specifications.

e. Equipment

The F-2 east steam chest continued to leak into F-2 through the tube bundle. The leak is slowly growing in magnitude although it does not present too great a problem to continued column operation.

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NW-80202
No. 650

Following are the waste storage tank data for the report period.

	<u>105-GX</u>	<u>107-GX</u>	<u>108-GX</u>	<u>109-GX</u>	<u>110-GX</u>	<u>111-GX</u>	<u>112-GX</u>	<u>114-GX</u>	<u>115-GX</u>
Liquid Level	20'8"	15'2"	20'9-1/4"	21'4"	21'3-3/4"	4'2-3/4"	21'4-1/4"	16'11-1/2"	10'4"
Bull 1" Sludge Temperature	112 F	297 F	302 F	279 F	225 F	194 F	228 F	257 F	179 F
Scanner 1" Sludge Temp.	-	298 F	316 F	267 F	276 F	201 F	214 F	223 F	192 F
2-Ft. Supernatant Temp.	-	240 F	238 F	228 F	204 F	177 F	213 F	211 F	172 F
Supernatant Temp.-Gradient*	-	2 F	3 F	3 F	3 F	-	2 F	4 F	2 F
No. of circulators operating	0	3	4	3	2	0	4	2	2
Specific Gravity	-	1.52	1.57	1.58	1.53	-	1.62	1.26	1.25
Apparent Sludge Depth	-	0'7"	0'10-1/2"	2'6"	2'1"	1'11"	2'0"	1'3-1/2"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-GX is the current salt waste receiver tank.

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EW-80202
No. 651

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 9-13-64 TO 2400 9-19-64

I. PRODUCTION

U Shipped 50.95 IAF Processed 46.64 Charged 46.68 E-metal

Pu Loaded 42060

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe(ppm)	Na(ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>0.3</u>	<u>128</u>	<u>12.2</u>	<u>1.0</u>	<u>0.15</u>	<u>8</u>	<u>10</u>	
Average	<u>1.4</u>	<u>194</u>	<u>17.5</u>	<u>1.6</u>	<u>0.37</u>	<u>12</u>	<u>29.5</u>	
Maximum	<u>1.6</u>	<u>252</u>	<u>29.5</u>	<u>3.0</u>	<u>1.96</u>	<u>22</u>	<u>56</u>	

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>0.01 %</u>	U	<u>70 lbs. 0.08 %</u>	U	<u>196 lbs. 0.18 %</u>
Pu	<u>0.09 %</u>	Pu	<u>119 Gms. 0.34 %</u>	Pu	<u>56 Gms. 0.18</u>
		Gallons	<u>43783</u>	Gallons	<u>15349</u>

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.1</u>	<u>1.1</u>
Partition Cycle	<u>2.3</u>	<u>2.3</u>
Third U	<u>1.7</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.5</u>
Third Pu	<u>-</u>	<u>1.4</u>
Tail End	<u>1.7</u>	<u>-</u>
Total	<u>6.8</u>	<u>7.3</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>1403</u>	<u>1072</u>	<u>1096</u>
Cooling Time	<u>425</u>	<u>287</u>	<u>412</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium Grams
			Grams	%	Lbs.	%	
HE	Salt Waste	<u>None</u>					
HE	Sump Waste	<u>1408</u>	<u>144</u>	<u>0.40</u>	<u>2262</u>	<u>2.37</u>	<u>88</u>
HE	Recycle	<u>None</u>					
1S Column	<u>Salt Waste</u>	<u>2569</u>	<u>31</u>	<u>0.09</u>	<u>12</u>	<u>0.01</u>	<u>2</u>
E-3 or E-1	<u>None</u>						

DECLASSIFIED

NW-80202

No. 651

-158-

a. Flowsheet and Stream Compositions

See page 111 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 9-13-64	1430 9-18-64	8	1A, 2D Columns flooding; loss of organic from 1AW.
1430 9-18-64	0300 9-19-64	0	1A Column flood; 1AW line to D-14 partially plugged.
0300 9-19-64	2145 9-19-64	0	1A, 1B, 2D 10% acid flush.
2145 9-19-64	2400 9-19-64		

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved gms, days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
9-14-64 (3 days)	361-423	None	∠ 0.00026
9-15-64	424	"	∠ 0.00083
9-16-64	425	"	0.00079
9-17-64	426	"	∠ 0.00077

The 293-B Building recovered 46,235 pounds of 100 percent nitric acid during the report period with an average concentration of 42.8 percent.

The heel was removed from the B-2 dissolver on 9-19 in preparation for dissolving Key 7134-N-E.

d. Solvent Extraction

During the first part of the week the 2D Column flooded at frequent intervals but the flood was controlled by lowering the rate and cutting back the 2D organic flow. Later in the week (9-17) the 1A Column flooded and it also was controlled by temporarily cutting the rate.

No excessive product losses resulted from the flooding nor was high product content found in D-14 from organic being lost through the 1AW stream. The 1A and 2D L/V were raised on 9-16 to lower the throughput

DECLASSIFIED

NW-80202
No. 651

in the columns to 0.65 and 0.52 respectively.

Several column instrument purges were plugged in the silo gallery by oil and condensate when the inert high pressure tank was put out of service for repairs.

On 9-19 the 1A flooded, causing the shutdown of the extraction battery after operating for 427 hours for a 10% acid flush. The columns had operated 89 percent of the available time during the week. Upon completion of the flush the columns were started up satisfactorily.

A plutonium waste problem was present at the first of the week because of polymer formation in sump waste batches. The extraction battery had no high waste except the polymer. Gradually plutonium waste was worked down until all waste was within throwaway limits at the end of the week.

e. Equipment

The F-2 east tube bundle gasket was replaced during shutdown to stop the leak with negative results. Therefore the F-2 concentrator is being operated using the west tube bundle only.

The H-4 coil has developed a leak causing the radiation level to rise in the steam condensate system and the concentration of the H-4 contents to take longer through dilution by steam condensate.

Following are the waste storage tank data for the report period.

	<u>105-EX</u>	<u>107-EX</u>	<u>108-EX</u>	<u>109-EX</u>	<u>110-EX</u>	<u>111-EX</u>	<u>112-EX</u>	<u>114-EX**</u>	<u>115-EX</u>
Liquid Level	20'5-1/2"	15'2-1/4"	20'9"	21'3"	21'3-1/2"	4'2-3/4"	21'3-1/4"	18'1-3/4"	10'4"
Ball 1" Sludge Temperature	112 F	288 F	302 F	278 F	221 F	193 F	219 F	260 F	180 F
Scanner 1" Sludge Temperature	-	280 F	317 F	287 F	275 F	200 F	210 F	218 F	199 F
2-Ft. Supernatant Temp.	-	239 F	238 F	228 F	204 F	177 F	212 F	212 F	178 F
Supernatant Temp. Gradient*	-	3 F	4 F	3 F	4 F	-	3 F	3 F	3 F
No. of Circulators Operating	0	3	4	3	2	0	4	2	2
Specific Gravity	-	1.54	1.56	1.60	1.53	-	1.62	1.26	1.25
Apparent Sludge Depth	-	0'8-1/2"	0'10-1/2"	2'8"	2'3"	1'10-1/2"	2'8"	1'4-3/4"	0'11"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-EX is the current salt waste receiver tank.

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HW-80202
No. 651

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-161-

DECLASSIFIED

NW-80202
652

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 9-20-64 TO 2400 9-26-64

I. PRODUCTION

U Shipped 49.98 LAF Processed 55.02 Charged 41.97 E-metal

Pu Loaded 40160

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe(ppm)	Na(ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>1.7</u>	<u>1.87²</u>	<u>12.8</u>	<u>1</u>	<u>0.08</u>	<u>8.0</u>	<u>2</u>	
Average	<u>1.9</u>	<u>7.28³</u>	<u>24.8</u>	<u>2.2</u>	<u>0.37</u>	<u>11.5</u>	<u>20.8</u>	
Maximum	<u>2.3</u>	<u>2.63⁴</u>	<u>42.9</u>	<u>8</u>	<u>1.19</u>	<u>21.0</u>	<u>58.0</u>	

III. WASTE

<u>Extraction Losses</u>		<u>To Underground Storage</u>		<u>Coating Waste Losses</u>	
U	<u>0.01 %</u>	U <u>66</u>	Lbs. <u>0.06 %</u>	U <u>107</u>	Lbs. <u>0.13 %</u>
Pu	<u>0.03 %</u>	Pu <u>95</u>	Gms. <u>0.27 %</u>	Pu <u>30</u>	Gms. <u>0.13</u>
		Gallons <u>41579</u>		Gallons <u>5969</u>	

SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.5</u>	<u>1.5</u>
Partition Cycle	<u>2.3</u>	<u>2.3</u>
Third U	<u>1.6</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.6</u>
Third Pu	<u>-</u>	<u>1.4</u>
Tail End	<u>1.8</u>	<u>-</u>
Total	<u>7.2</u>	<u>7.8</u>

V. METAL HISTORY

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
MWD/T	<u>782</u>	<u>773</u>	<u>781</u>
Cooling Time	<u>171</u>	<u>166</u>	<u>169</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>290</u>	<u>11</u>	<u>0.03</u>	<u>3</u>	<u>0.003</u>	<u>17</u>
HE	Sump Waste	<u>1245</u>	<u>15</u>	<u>0.04</u>	<u>680</u>	<u>0.58</u>	<u>29</u>
HE	Recycle	<u>-</u>	<u>1367</u>	<u>3.60</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column	<u>Salt Waste</u>	<u>7402</u>	<u>75</u>	<u>0.20</u>	<u>25</u>	<u>0.02</u>	<u>443</u>
1S Column	<u>Sump Waste</u>	<u>6251</u>	<u>1633</u>	<u>4.30</u>	<u>5527</u>	<u>4.75</u>	<u>582</u>

DECLASSIFIED

EW-80202
No. 652

a. Flowheet and Stream Compositions

See page 111 of this document.

Change in 1A, 1B and 2D Streams: 1AX: 1BX: 2DX
 375: 3.36 gpm: 325

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 9-20-64	1130 9-20-64	8	
1130 9-20-64	1430 9-21-64	9	
1430 9-21-64	0100 9-22-64	8	
0100 9-22-64	1830 9-22-64	0	H-4 coil leak excessive; installed new H-4 coil. Con- firmed D-14 cooler coil leak; G-3 acid flush
1830 9-22-64	0600 9-23-64	8	
0600 9-23-64	2230 9-23-64	7	Feed shortage
2230 9-23-64	0600 9-24-64	8	
0600 9-24-64	0630 9-25-64	8.5	
0630 9-25-64	2130 9-26-64	8.0	
2130 9-26-64	2400 9-26-64	8.5	

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved avg. days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
9-21-64 (3 days)	167-430	0.30	0.00096
9-22-64	No dissolving	None	0.0046
9-23-64	169	1.30	0.014
9-24-64	170	0.64	0.025
9-25-64	171	1.01	0.033

The 293-B Building recovered 37,223 pounds of 100 percent nitric acid during the report period with an average concentration of 42.6 percent.

The A-2 dissolver heel was removed and metal from Hry 7134-H-E was dissolved and each cut sampled during the report period. A check of

DECLASSIFIED

HW-80202
No. 652

the standard coating waste loss was initiated with charges H-A-10 and H-B-10. Commercial sodium nitrate is used for coating removal and the Cs-137 analysis of the coating waste used to determine plutonium and uranium losses. A minimum of six charges will be decayed with commercial NaNO_3 .

d. Solvent Extraction

At the start of the week the columns were smoothing out from startup. High neptunium was found in a D-9 sample shortly after startup. The neptunium loss was caused by a leak in the 1A to D-13 routing. Approximately 7000 gallons of high neptunium waste were generated before the routing was blanked. Part of the waste was being readied for processing in D-7 when the H-4 steam coil failed. The battery was shut down on 9-22 to replace the H-4 coil and to flush the G-3 steam coils, which had become fouled with organic solids, with 8 percent acid. Although a leak was confirmed in the D-14 cooler coil the decision was made to start up and operate without it. However, since a warmer 1A Column will accelerate the formation of plutonium polymer in an acid deficient column, a minimum flow of 1.3M ANH with 2.0M HNO_3 was introduced in the scrub section of the 1A Column to prevent the deposition of plutonium.

After 17.5 hours of down time the columns were started up on 9-22, and continued to operate the remainder of the report period or 90 percent of the available time during the week. The 1A Column lost increasingly larger quantities of organic via 1A as the week progressed. As a result the uranium and plutonium were above normal in the waste. The inability to measure the 1A flow, which results in poor salting of the 1A Column, is thought to significantly contribute to the above normal waste loss.

Following are the waste storage tank data for the report period:

	<u>105-EX</u>	<u>107-EX</u>	<u>108-EX</u>	<u>109-EX</u>	<u>110-EX</u>	<u>111-EX</u>	<u>112-EX</u>	<u>114-EX**</u>	<u>115-EX</u>
Liquid Level	24'9-1/2"	15'2-3/4"	20'9-3/4"	21'2"	21'2-3/4"	4'2-3/4"	21'2-1/2"	18'10-3/4"	6'-1/2"
Bulb 1" Sludge Temp.	112 F	294 F	294 F	273 F	219 F	194 F	218 F	260 F	182 F
Scanner 1" Sludge Temp.	-	298 F	316 F	286 F	274 F	202 F	213 F	215 F	197 F
2-ft. Supernatant Temp.	-	238 F	237 F	233 F	202 F	179 F	213 F	214 F	177 F
Supernatant Temp.Gradient*	-	4 F	3 F	3 F	3 F	-	4 F	4 F	0
No. of circulators oper.	0	3	4	3	2	0	4	2	0
Specific Gravity	-	1.54	1.56	1.60	1.53	-	1.62	1.26	1.25
Apparent Sludge Depth	-	0'8"	0'10-1/2"	2'6"	2'1-1/2"	1'10-1/2"	2'8"	1'4"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-EX is the current salt waste receiver tank.

-154-

EW-80202
No. 652

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EW-80202
No. 653

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 9-27-64 TO 2400 10-3-64

I. PRODUCTION

U Shipped 49.25 IAF Processed 42.41 Charged 58.87 E-metal

Pu Loaded 34200

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe(ppm)	Na(ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>1.6</u>	<u>2.06²</u>	<u>41.7</u>	<u>1</u>	<u>0.43</u>	<u>5.0</u>	<u>10</u>	
Average	<u>2.4</u>	<u>8.10²</u>	<u>67.1</u>	<u>1</u>	<u>0.91</u>	<u>11.3</u>	<u>13.2</u>	
Maximum	<u>3.9</u>	<u>1.99³</u>	<u>92.0</u>	<u>1</u>	<u>1.47</u>	<u>39.0</u>	<u>29.0</u>	

III. WASTE

<u>Extraction Losses</u>		<u>To Underground Storage</u>		<u>Coating Waste Losses</u>	
U	<u>0.004</u> %	U <u>51</u>	Lbs. <u>0.06</u> %	U <u>182</u>	Lbs. <u>0.15</u> %
Pu	<u>0.08</u> %	Pu <u>31</u>	Gms. <u>0.14</u> %	Pu <u>51</u>	Gms. <u>0.15</u>
		Gallons	<u>39750</u>	Gallons	<u>8972</u>

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.2</u>	<u>1.2</u>
Partition Cycle	<u>2.2</u>	<u>2.4</u>
Third U	<u>1.8</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.5</u>
Third Pu	<u>-</u>	<u>1.7</u>
Tail End	<u>1.9</u>	<u>-</u>
Total	<u>7.1</u>	<u>7.8</u>

V. METAL HISTORY

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
MWD/T	<u>785</u>	<u>771</u>	<u>780</u>
Cooling Time	<u>177</u>	<u>172</u>	<u>175</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>None</u>					
HE	Sump Waste	<u>3153</u>	<u>1158</u>	<u>4.21</u>	<u>5229</u>	<u>5.71</u>	<u>145</u>
HE	Recycle	<u>-</u>	<u>3639</u>	<u>13.24</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column	<u>Salt Waste</u>	<u>1674</u>	<u>72</u>	<u>0.26</u>	<u>35</u>	<u>0.04</u>	<u>5</u>
1S Column	Sump Waste	<u>1492</u>	<u>343</u>	<u>1.25</u>	<u>1422</u>	<u>1.55</u>	<u>201</u>

DECLASSIFIED

-166-

HW-80202
No. 653

a. Flowchart and Stream Compositions

See pages 111 and 162 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 9-27-64	0910 9-27-64	8.5	
0910 9-27-64	1045 9-28-64	9.0	
1045 9-28-64	2300 9-30-64	10.0	
2300 9-30-64	0150 10-1-64	8	Partial plug in 1AW to D-14
0150 10-1-64	1110 10-2-64	0	2D, 1A & 1S 10% acid flush
1110 10-2-64	2130 10-3-64	8	
2130 10-3-64	2400 10-3-64	9	

c. Dissolvers

Following are the radiiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved Age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
9-28-64 (3 days)	171-174	3.01	0.16
9-29-64	175	0.60	0.045
9-30-64	176	0.77	0.042
10-1-64	177	0.72	0.040
10-2-64	178	0.42	0.050

The 293-B Building recovered 55,996 pounds of 100 percent nitric acid during the report period with an average concentration of 42.7 percent.

d. Solvent Extraction

The extraction battery was operated 80.2 percent of the report period although the 1A Column continued to flood. In addition to the flooding problem, solids in the 1AW stream, first reported on 9-29-64, finally restricted flow of the 1AW to the D-14 backcycle concentrator. The columns were shut down for flushing on 10-1-64. The 1A, 1S and 2D Columns were flushed with 10 percent HNO₃ on 10-1.

The 1A Column could only be given velocity flushes since the 1AW to D-13 valve would not close. The 1AW to D-13 jumper was removed and the routing blanked following the flush.

DECLASSIFIED

-157-

HW-80202
No. 653

During the shutdown the LAW to D-14 and the LAHS routings plugged. The solids causing the pluggage are believed to be a complex salt of chromium, aluminum and iron which have been seen before in the D-14 backcycle concentrator. It is also believed that the solids formed in the lower section of the 1A Column which was acid deficient and low in AWH (undersalted). The solids were removed by disconnecting the jumpers on both sides of the valve, allowing the jumpers to drain, then reconnecting, pumping solution from D-14 to the column, alternately, until the routings were cleared.

The G-3 organic still was boiled up in 8 percent nitric acid to remove the film from the coil which was restricting organic distillation capacity.

e. Equipment

During the shutdown a new airlift jumper from D-4 to D-2 was installed. The new jumper operated successfully on startup giving higher flow rates.

In order to prevent buildup of the chromium, aluminum, iron complex on the D-14 pump, the D-14 backcycle stream is maintained above 0.05 lb/gal uranium by allowing a uranium loss to the 10W stream. The uranium is then removed from the 10 Column and routed to D-14 in the 10W stream. A new system for UWH addition to D-14 was put in operation on 10-2-64. UWH is pumped from E-12 to a new tank installed in the sample gallery, D-14-S. UWH is now pumped from the D-14-S tank to the D-14 backcycle concentrator, using the previously installed L-10-t to D-14 pump. This system should provide a better control of UWH concentration in D-14.

Following are the waste storage tank data for the report period:

	<u>105-EX</u>	<u>107-EX</u>	<u>108-EX</u>	<u>109-EX</u>	<u>110-EX</u>	<u>111-EX</u>	<u>112-EX</u>	<u>114-EX**</u>	<u>115-EX</u>
Liquid Level	26'11-1/2"	15'4-1/4"	20'9-1/4"	21'1"	21'2-1/4"	4'2-3/4"	21'1-3/4"	19'5-3/4"	3'10-3/4"
Bulb 1" Sludge Temp.	114 F	295 F	302 F	276 F	213 F	194 F	221 F	266 F	180 F
Scanner 1" Sludge Temp.	-	298 F	316 F	287 F	272 F	204 F	216 F	218 F	199 F
2-Ft. Supernatant Temp.	-	298 F	296 F	243 F	203 F	182 F	215 F	216 F	181 F
Supernatant Temp. Gradient*		3 F	5 F	19 F	4 F	-	2 F	4 F	-
No. of circulators op.	0	3	4	3	2	0	4	4	0
Specific Gravity	-	1.55	1.59	1.60	1.53	-	1.62	1.29	1.25
Apparent Sludge Depth	-	0'8"	0'10-1/2"	2'6"	2'3"	1'10-1/2"	2'6-1/2"	1'4-1/2"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-EX is the current salt water receiver tank.

NOTE: 231,448 gallons of dissolved sodium nitrate (sp-gr. 1.25) was pumped from the 115-EX tank to the 105-EX tank during the period 9-23 - 9-25-64.

DECLASSIFIED

NY-80202
No. 653

R. E. Isaacson
R. A. Yoder
C. F. Beaulieu
R. E. Tomlinson

DECLASSIFIED

EW-80202
No. 654

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 10-4-64 TO 2400 10-10-64

I. PRODUCTION

U Shipped 21.51 1AF Processed 28.24 Charged 23.36 E-metal

Pu Loaded 15740

II. PRODUCT PURITY

	Plutonium			Uranium			
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum	<u>1.6</u>	<u>638</u>	<u>38.9</u>	<u>1</u>	<u>0.52</u>	<u>5.0</u>	<u>10</u>
Average	<u>2.5</u>	<u>805</u>	<u>66.2</u>	<u>1</u>	<u>0.84</u>	<u>9.1</u>	<u>12.8</u>
Maximum	<u>3.8</u>	<u>950</u>	<u>105.0</u>	<u>1</u>	<u>1.48</u>	<u>15.0</u>	<u>26.0</u>

III. WASTE

<u>Extraction Losses</u>		<u>To Underground Storage</u>		<u>Coating Waste Losses</u>	
U	<u>0.004 %</u>	U <u>7</u>	Lbs. <u>0.01 %</u>	U <u>72</u>	Lbs. <u>0.15 %</u>
Pu	<u>0.05 %</u>	Pu <u>12</u>	Gms. <u>0.08 %</u>	Pu <u>21</u>	Gms. <u>0.15</u>
		Gallons	<u>25568</u>	Gallons	<u>3980</u>

SOLENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.7</u>	<u>1.7</u>
Partition Cycle	<u>2.0</u>	<u>2.2</u>
Third U	<u>1.4</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.5</u>
Third Pu	<u>-</u>	<u>1.6</u>
Tail End	<u>1.9</u>	<u>-</u>
Total	<u>7.0</u>	<u>8.0</u>

V. METAL HISTORY

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
MWD/T	<u>781</u>	<u>780</u>	<u>781</u>
Cooling Time	<u>181</u>	<u>179</u>	<u>180</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>None</u>					
HE	Sump Waste	<u>None</u>					
HE	Recycle	<u>-</u>	<u>2434</u>	<u>14.34</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column	<u>Salt Waste</u>	<u>1798</u>	<u>35</u>	<u>0.21</u>	<u>119</u>	<u>0.21</u>	<u>22</u>
E-3 or E-1		<u>None</u>					

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HW-80202
No. 654

a. Flowsheet and Stream Compositions

See pages 111 and 162 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 10-4-64	0130 10-4-64	9	
0130 10-4-64	1630 10-4-64	10	
1630 10-4-64	1930 10-4-64	9	
1930 10-4-64	0400 10-6-64	8	
0400 10-6-64	1200 10-10-64	0	D-14 cooler replacement and LBP routing to D-14.
1200 10-10-64	2400 10-10-64	8	

c. Dissolvers

Following are the radiiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stack</u>
10-5-64 (3 days)	178-181	1.11	0.14
10-6-64	182	.25	0.025
10-7-64	183	None	0.04
10-8-64	No dissolving	"	0.048
10-9-64	" "	"	0.019

The 293-B Building recovered 16,019 pounds of 100 percent nitric acid during the report period with an average concentration of 42.4 percent.

The heel was removed from the A-2 dissolver at the completion of charge HA-2 of May 7134-HE.

Coating waste from ten charges, 5 from A-2 and 5 from B-2, which used commercial sodium nitrate, were analyzed for Cs-137 to determine plutonium and uranium losses. Based on an average Cs-137 of 3.69×10^7 uc per batch, the standard batch coating waste losses were adjusted to 7 units plutonium and 25 units uranium.

-171-

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EW-80202
No. 654

d. Solvent Extraction

The solvent extraction battery was shut down on 10-6-64 for planned maintenance and process routing modifications. The 1A and 1B Columns were flushed with 10 percent HNO₃ during the shutdown. The columns were started up on 10-10-64 with the LSP stream routed to the D-14 tower vice the 2E Column. The new system, which allows LSP to be routed to the 2E Column or the D-14 tower, is expected to decrease the load on the F-2 concentrator and permit higher precycle production capacity.

With the LSP routed to D-14, neptunium will now accumulate in the D-14 backcycle concentrator and the F-8 tank. Neptunium will no longer be present in the 2DVS stream unless the LSP is again routed to the 2E Column.

e. Equipment

During the scheduled shutdown the failed D-14 cooler insert was replaced and a new D-14 pump was installed. Sile and canyon jumpers required for routing the LSP stream to the third plate of the D-14 tower were also installed. In addition, the east F-2 tube bundle was replaced, and a 3-inch F-2 to F-1 overflow jumper was installed, (on the existing 2-inch flanges). A new D-14 to F-8 control valve jumper incorporating additional functions of flow and pH measurement was also installed, however the pH probe functioned properly for about 4 hours; acid addition to F-8 was returned to the 701-A tank metering system shortly after column startup.

During the handling of wastes during the shutdown, the F-8 pump failed and was replaced on 10-9.

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Following are the waste storage tank data for the report period.

	<u>105-SX</u>	<u>107-SX</u>	<u>108-SX</u>	<u>109-SX</u>	<u>110-SX</u>	<u>111-SX</u>	<u>112-SX</u>	<u>114-SX**</u>	<u>115-SX</u>
Liquid Level	26'9-3/4"	15'5"	20'10-1/2"	21'0"	21'2"	4'2-3/4"	21'1-1/4"	19'7"	3'10-3/4"
Bulb 1" Sludge Temperature	115 F	292 F	301 F	275 F	212 F	194 F	227 F	267 F	181 F
Scanner 1" Sludge Temperature	-	301 F	316 F	286 F	272 F	206 F	219 F	225 F	200 F
2-Ft. Supernatant Temperature	-	236 F	237 F	229 F	202 F	184 F	215 F	220 F	184 F
Supernatant Temp.Gradient*	-	2 F	4 F	5 F	3 F	-	4 F	4 F	-
No. of Circulators Operating	0	3	4	3	2	0	4	4	0
Specific Gravity	-	1.55	1.60	1.60	1.53	-	1.62	1.30	-
Apparent Sludge Depth	-	0'8-1/2"	0'6"	2'6"	2'3"	1'10"	2'6-1/2"	1'4-1/2"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-SX is the current salt waste receiver tank.

R. E. Isaacson
R. A. Yoder
F. Beaulieu
E. Tomlinson

DECLASSIFIED

EW-80202
No. 655

SUMMARY OF 202-S BLDG. OPERATION
FROM 0000 10-11-64 TO 2400 10-17-64

I. PRODUCTION

U Shipped 33.52 IAF Processed 29.74 Charged 25.18
Pu Loaded 19460

II. PRODUCT PURITY

	Plutonium		Uranium				
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum	<u>1.2</u>	<u>295</u>	<u>26.0</u>	<u>1.0</u>	<u>0.50</u>	<u>10.0</u>	<u>13.0</u>
Average	<u>1.4</u>	<u>580</u>	<u>41.9</u>	<u>1.3</u>	<u>3.46</u>	<u>11.3</u>	<u>33.5</u>
Maximum	<u>1.6</u>	<u>994</u>	<u>68.0</u>	<u>3.0</u>	<u>19.0</u>	<u>17.0</u>	<u>62.0</u>

III. WASTE

<u>Extraction Losses</u>		<u>To Underground Storage</u>		<u>Coating Waste Losses</u>	
U	<u>0.01 %</u>	U	<u>11 Lbs. 0.02 %</u>	U	<u>72 Lbs. 0.14 %</u>
Pu	<u>0.11 %</u>	Pu	<u>40 Gms. 0.25 %</u>	Pu	<u>21 Gms. 0.14</u>
		Gallons	<u>25812</u>	Gallons	<u>3707</u>

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>2.2</u>	<u>2.2</u>
Partition Cycle	<u>2.0</u>	<u>2.1</u>
Third U	<u>1.1</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.6</u>
Third Pu	<u>-</u>	<u>0.9</u>
Tail End	<u>1.1</u>	<u>-</u>
Total	<u>6.4</u>	<u>7.8</u>

V. METAL HISTORY

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
MWD/T	<u>916</u>	<u>663</u>	<u>784</u>
Cooling Time	<u>281</u>	<u>191</u>	<u>236</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>2203</u>	<u>956</u>	<u>4.45</u>	<u>2223</u>	<u>3.23</u>	<u>48</u>
HE	Sump Waste	<u>5104</u>	<u>1359</u>	<u>6.32</u>	<u>7129</u>	<u>10.35</u>	<u>145</u>
HE	Recycle	<u>-</u>	<u>2951</u>	<u>13.73</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column	<u>Salt Waste</u>	<u>11241</u>	<u>86</u>	<u>0.40</u>	<u>8</u>	<u>0.01</u>	<u>601</u>
E-3 or E-1	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>

DECLASSIFIED

EW-80202
No. 655

-174-

a. Flowsheet and Stream Compositions

See pages 111 and 162 of this document, except that the IAF HNO_3 is -0.1 vice -0.2M.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 10-11-64	0400 10-13-64	8	
0400 10-13-64	0630 10-14-64	0	2EP to F-2 jumper replacement.
0630 10-14-64	2200 10-15-64	8	
2200 10-15-64	2315 10-17-64	0	High H ₂ in waste
2315 10-17-64	2400 10-17-64	8	

c. Dissolvers

Following are the radiiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
10-12-64 (3 days)	186-283	None	/.062
10-13-64	239-279	"	.015
10-14-64	No dissolving	"	.011
10-15-64	241-281	"	.0062
10-16-64	242-282	"	.014

The 293-S Building recovered 33,409 pounds of 100 percent nitric acid during the report period with an average concentration of 42.3 percent. The Specific Gravity controller for 293-S acid recovery was increased from a setting of 1.25 to 1.26 in order to increase recovered nitric acid concentration. The concentration was increased to 44.2 percent by the end of the report period.

The heel was removed from the A-2 dissolver in preparation for the quarterly cleanout and acid flush.

d. Solvent Extraction

The solvent extraction battery was shut down on 10-13 when it was found that the 2EP to F-2 jumper had failed. The 18 Column was used to rework one high waste batch and material from the leak during the shutdown for jumper replacement.

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-175-

HW-80202
No. 655

Neptunium-bearing solution, which had been segregated in G-5, was moved into feed batches 9, 10 and 11. With the total neptunium inventory in D-14 and F-8, losses of neptunium to the LSW became excessive. The columns were again shut down on 10-15 for rework of high neptunium wastes and segregation of part of the neptunium inventory in G-5. The columns were again operating at the end of the report period.

It appears that acid control in the LS Column is not reliable or the flowsheet for neptunium accumulation is not capable of efficient recovery of neptunium from a feed stream containing 0.5 to 1.5 gms/gal neptunium.

e. Equipment

The leaking 2EP to F-2 jumper was replaced on 10-4.

f. Neptunium Removal

DIBAN has been used for acid adjustment in several previous neptunium removal campaigns. When the DIBAN stored in the G01 tank was found to contain solids, an attempt was made to heat and agitate to bring the solids into solution; however, in so doing the solution was over-concentrated and the entire tank contents solidified. The DIBAN inventory was slurried up with water and discarded. Acid adjustment will be done using NaOH.

[REDACTED]

-170-

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Following are the waste storage tank data for the report period:

	<u>105-EX</u>	<u>107-EX</u>	<u>108-EX</u>	<u>109-EX</u>	<u>110-EX</u>	<u>111-EX</u>	<u>112-EX</u>	<u>114-EX**</u>	<u>115-EX</u>
Liquid Level	26'8-1/2"	15'5-1/2"	20'10-1/2"	20'11"	21'1-1/2"	4'2-3/4"	21'-1/2"	19'3-1/2"	3'11"
Bull 1" Sludge Temperature	115-F	292 F	301 F	275 F	210 F	193 F	233 F	260 F	182 F
Scanner 15 Sludge Temperature	-	298 F	316 F	286 F	272 F	203 F	223 F	219 F	196 F
2-Ft. Supernatant Temperature	-	238 F	238 F	230 F	204 F	180 F	212 F	217 F	181 F
Supernatant Temp. Gradient*	-	3 F	4 F	6 F	3 F	-	4 F	3 F	-
No. of Circulators Operating	0	3	4	3	2	0	4	4	0
Specific Gravity	-	1.55	1.57	1.60	1.53	-	1.65	1.31	-
Apparent Sludge Depth	-	0'10"	0'7"	2'6"	1'11-1/2"	1'10"	2'6-1/2"	1'4-1/2"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-EX is the current salt waste receiver tank.

NOTE: No change in activity was detected in the laterals under the 107-EX tank during September. Activity in the north lateral under the 108-EX tank increased from 158,500 c/m on 8-31 to 260,000 c/m on 9-30-64. Activity in the center lateral increased from 27,000 c/m to 52,000 c/m during the same period. Also during September a routing was provided to allow transfer of coating waste from the 107-EX tank to the 241-F waste storage area.

~~SECRET~~
DECLASSIFIED

EW-80202
No. 656

R. E. Isaacson *RLH*
R. A. Yoder
F. Beaulieu
E. Tomlinson
R.E. Isaacson

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 10-18-64 TO 2400 10-24-64

I. PRODUCTION

U Shipped 21.99 IAF Processed 18.51 Charged 3.09 E-metal

Pu Loaded 19100

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe(ppm)	Na(ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>1.7</u>	<u>3.48²</u>	<u>28.1</u>	<u>1</u>	<u>1.21</u>		<u>8.0</u>	<u>22.0</u>
Average	<u>2.37</u>	<u>1.44³</u>	<u>42.1</u>	<u>4.2</u>	<u>3.64</u>		<u>12.2</u>	<u>47.6</u>
Maximum	<u>3.8</u>	<u>2.19³</u>	<u>53.0</u>	<u>8.5</u>	<u>6.58</u>		<u>29.0</u>	<u>65.0</u>

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>0.01</u> %	U <u>10</u> Lbs.	<u>0.03</u> %	U <u>100</u> Lbs.	<u>1.62</u> %
Pu	<u>0.22</u> %	Pu <u>25</u> Gms.	<u>0.25</u> %	Pu <u>28</u> Gms.	<u>1.62</u>
		Gallons	<u>29452</u>	Gallons	<u>2764</u>

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.9</u>	<u>1.9</u>
Partition Cycle	<u>2.0</u>	<u>1.6</u>
Third U	<u>1.2</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.9</u>
Third Pu	<u>-</u>	<u>0.9</u>
Tail End	<u>1.1</u>	<u>-</u>
Total	<u>6.2</u>	<u>7.3</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>400</u>	<u>307</u>	<u>339</u>
Cooling Time	<u>189</u>	<u>187</u>	<u>188</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium Grams
			Grams	%	Lbs.	%	
HE	Salt Waste	<u>None</u>					
HE	Sump Waste	<u>2602</u>	<u>673</u>	<u>5.64</u>	<u>3482</u>	<u>8.59</u>	<u>171</u>
HE	Recycle	<u>-</u>	<u>1286</u>	<u>10.78</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column	<u>Salt Waste</u>	<u>3959</u>	<u>8</u>	<u>0.07</u>	<u>9</u>	<u>0.02</u>	<u>123</u>
E-3 or E-1	<u>None</u>

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EW-80202
No. 656

a. Flowsheet and Stream Compositions

See pages 111 and 162 of this document, except that the 1AF HNO_3 is -0.1 vice -0.2M.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 10-18-64	1130 10-18-64	8	
1130 10-18-64	0700 10-21-64	7	D-14 steam flow limiting
0700 10-21-64	2400 10-24-64	0	Rework of waste and H ₂ O feed preparation

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Material Dissolved age, days</u>	<u>Curies of I-131 Available To Stack</u>	
10-19-64 (3 days)	243-283	None	0.052
10-20-64	No dissolving	"	0.0068
10-21-64	187	"	0.0048
10-22-64	188	"	0.0065
10-23-64	No dissolving	"	

The 293-B Building recovered 2,882 pounds of 100 percent nitric acid during the report period with an average concentration of 43.4 percent.

Four one-bucket charges from Key 7144-F were made to the dissolvers (two to A-2, two to B-2) during the report period for complete dissolution and sampling. No further IFD test programs are scheduled for dissolution in the near future.

d. Solvent Extraction

Processing of virgin feed was completed on 10-21. Depletion of the process inventory was delayed until sump and process wastes were re-worked. A neptunium recovery run was in progress by the end of the report period.

Solvent extraction rates during the week were limited by the D-14 backcycle concentrator capacity. The D-14 problem may be steam trap trouble or poor heat transfer similar to that seen in G-3 from a film buildup on the coil.

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-179-

EW-80202
No. 656

e. Equipment

The E-2 to E-1 pogo pump failed during the processing of the final plutonium product inventory. The pump was removed, a new foot-valve installed, and returned to service.

f. Sludge Sampling

A remotely operated sludge sampler was used to sample solids from the E-8 metal solution storage tank on 10-21. A sample of solids was obtained. Visual inspection of the tank through the agitator flange showed approximately 1 inch of black granular solids present. Preliminary analysis found the solids contained uranium and silicon.

Following are the waste storage tank data for the report period.

	<u>105-SX</u>	<u>107-SX</u>	<u>108-SX</u>	<u>109-SX</u>	<u>110-SX</u>	<u>111-SX</u>	<u>112-SX</u>	<u>114-SX**</u>	<u>115-SX</u>
Liquid Level		15'6-3/4"	20'9-3/4"	21'4-1/4"	21'1"	4'2-3/4"	20'11-1/2"	19'6-3/4"	3'11"
Bulb 1" Sludge Temperature		295 F	299 F	276 F	210 F	194 F	233 F	269 F	182 F
Scanner 1" Sludge Temp.	-	296 F	314 F	286 F	270 F	200 F	220 F	217 F	198 F
2-Ft. Supernatant Temp.	-	236 F	237 F	234 F	202 F	178 F	209 F	215 F	182 F
Supernatant Temp.Gradient*	-	3 F	4 F	12 F	3 F	-	3 F	3 F	-
No. of Circulators Operating	-	3	4	3	2	0	4	4	0
Specific Gravity	-	1.54	1.57	1.60	1.53	-	1.65	1.34	-
Apparent Sludge Depth	-	0'10"	0'7"	2'1-1/2"	2'1"	1'10"	2'2"	1'4-1/2"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-SX is the current salt waste receiver tank.

DECLASSIFIED

MM-80202
No. 656

R. E. Isaacson
R. A. Yoder
O. F. Beaulieu
R. E. Tomlinson

DECLASSIFIED

EW-80202
No. 657

SUMMARY OF 202-S BIDG. OPERATION

FROM 0000 10-25-64 TO 2400 10-31-64

I. PRODUCTION **No processing**

U Shipped 3.01 IAF Processed None Charged None

Pu Loaded 3270 Flush material which will be reworked.
1958.5 gs Np loaded out and shipped to Purex.

II. PRODUCT PURITY

Plutonium		Uranium					
Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe (ppm)	Na (ppm)	
Minimum							
Average							
Maximum							

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	%	U	Lbs. %	U	Lbs. %
Pu	%	Pu	Gms. %	Pu	Gms. %
		Gallons	17155	Gallons	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle		
Partition Cycle		
Third U		
Second Pu		
Third Pu		
Tail End		
Total		

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T			
Cooling Time			

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium Grams
			Grams	%	Lbs.	%	
HE	Salt Waste						
HE	Sump Waste						
HE	Recycle						
1S Column							
E-3 or E-1							

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SECRET

Particle Cycle - Breakdown and plutonium removal rates

Partition Case - September processing fees

Discussion Cycle

b. Stream Compositions (Nephthys Process)

SECRET 1.

	100T		N2°0		XVI
N20°0		N100°0	N2°0	N5°1	XV
		N40°0	N2°0	N2	XIV
<u>N082°0</u>	<u>N000°0</u>	<u>N72°0</u>	<u>N000°0</u>	<u>N00°0</u>	<u>N000°0</u>

2. Nettles Cycle (Transition and Position removal)

20ms	1.3M	-0.8M	0.02M
20A (not used)			
20X		0.2M	
10X			
10A			

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Stream Compositions - Continued

3. Partition Cycle (Neptunium Processing Pass)

<u>Stream</u>	<u>H₂O</u>	<u>ANH</u>	<u>HNO₃</u>	<u>Na₂Cr₂O₇</u>	<u>Hexone</u>	<u>NH₂SO₃H</u>
2DFB		1.3M	0.3M	0.02M		
2DA		1.3M	0.2M	0.001M		0.02M
2HX			0.2M		100%	
1HX	Demin.					
1CX	Demin.					

4. Decontamination Cycles

2AF		1.3M	0.2M	0.04M		
2AS		1.3M	0.2M	0.001M		0.02M
2AX			0.2M		100%	
2HX	Demin.					
3AF		1.3M	0.2M	0.04M		
3AS		2.0M	0.2M	0.04M		
3AX			0.2M		100%	
3HX	Demin.					

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stack</u>
10-23 -			
10-26-64 (3 days)	189-190	None	.018
10-27-64	No dissolving	"	.0015
10-28-64	" "	"	.00075
10-29-64	" "	"	.00086
10-30-64	" "	"	.00074

The 293-S Building recovered 541 pounds of 100 percent nitric acid during the report period with an average concentration of 44.2 percent.

Dissolution and sampling of the one-bucket charges was completed on 10-25-64. The dissolvers were flushed and held empty.

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NW-80202
No. 657

d. Neptunium Recovery

The neptunium-bearing solution was concentrated into two batches, oxidized, and processed through the 1A Column using an acid flow-sheet with the 1AW routed to D-14. The neptunium lost via the 1AW to D-14 was reworked via the 1B Column. The neptunium product solution was collected into one batch in the 2DF8 Feed Concentrator (F-2), and made acid deficient by acid boil-off. The acid deficient neptunium solution was then processed through the partition cycle to remove associated uranium and plutonium. The separated uranium, plutonium, together with 50 grams of neptunium was collected in E-7 and returned to the accumulation cycle via F-8. The neptunium product stream was returned to the F-2 concentrator via the 2DW stream and butted into specifications for an acid neptunium recovery pass through the partition cycle. The neptunium product stream was collected in E-6, E-7 and butted into specifications for a decontamination pass through the 2A-2B Columns.

The neptunium product solution from the 2B Column was ozone sparged and butted into specifications for a decontamination pass through the 3A, 3B Columns. Following ozone sparging in the E-4 tank the product solution was transferred to the E-3 tank, then to L-12 for concentration, and finally to L-6 for sampling and loadout. The normal routing from E-4 to L-2 to L-21 was not used since it was expected that the stainless steel L-2 concentrator would contaminate the product with iron. The first batch transferred to L-12 had to be loaded out and recycled back to E-1 because of titanium-silicon solids in this system. Three batches of neptunium product solution were loaded out by the end of the report period.

Following are the waste storage tank data for the report period.

	<u>107-GX</u>	<u>107-GX</u>	<u>108-GX</u>	<u>109-GX</u>	<u>110-GX</u>	<u>111-GX</u>	<u>112-GX</u>	<u>114-GX</u>	<u>115-GX</u>
Liquid Level	26'7-1/2"	15'8"	20'8-3/4"	21'7-1/2"	21'-3/4"	4'2-3/4"	21'2-1/4"	19'-1/2"	3'11-1/2"
Bulb 1" Sludge Temperature	115 F	292 F	298 F	279 F	210 F	194 F	229 F	268 F	163 F
Seawater 1" Sludge Temp.	-	294 F	314 F	287 F	268 F	203 F	214 F	222 F	199 F
2-Ft. Superstrant Temp.	-	235 F	237 F	225 F	202 F	161 F	210 F	218 F	164 F
Superstrant Temp.Gradient*	-	3 F	4 F	6 F	4 F	-	4 F	4 F	-
No. of Circulators Operating	0	3	4	3	2	0	4	4	0
Specific Gravity	-	1.53	1.57	1.62	1.54	-	1.67	1.34	-
Apparent Sludge Depth	-	0'8-1/2"	0'10-1/2"	2'6"	2'2-1/2"	1'10-1/2"	2'2"	1'5-1/2"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-GX is the current salt water receiver tank.

NOTE: Activity in the north lateral under the 108-GX tank increased from 260,000 c/m to 340,000 c/m during the month of October. The activity in the center lateral increased from 52,000 to 114,000 c/m during the month. The 108-GX tank vapor header tie-in was excavated (this is located above where activity is seen in the laterals) but no indication of a condensate leak was found.

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EW-80202
No. 657

-185-

R. E. Isaacson
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R. E. Isaacson

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EW-80202
No. 658

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 11-1-64 TO 2400 11-7-64

I. PRODUCTION

U Shipped 4.19 IAF Processed 12.81 Charged 38.09 E-metal
Pu Loaded None

II. PRODUCT PURITY

Plutonium		Uranium				
Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe (ppm)	Na (ppm)
Minimum	No loadouts	27.2	3	11.6	14	33
Average		30.8	3	11.6	14	33
Maximum		29.0	3	11.6	14	33

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	0.005 %	U	30 lbs. 0.12 %	U	125 lbs. 0.16 %
Pu	0.024 %	Pu	12 Gms. 0.13 %	Pu	35 Gms. 0.16
		Gallons	4046	Gallons	6744

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	1.5	1.5
Partition Cycle	2.1	2.0
Third U	1.7	-
Second Pu	-	2.4
Third Pu	-	1.1
Tail End	0.4	-
Total	5.7	7.0

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	986	636	833
Cooling Time	479	192	295

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium Grams
			Grams	%	Lbs.	%	
HE	Salt Waste	None					
HE	Sump Waste	None					
HE	Recycle	-	288	2.77	-		-
1S Column	Salt Waste	8070	1074	10.34	5493	17.6	827
E-3 or E-1		-	-	-	-	-	-

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NW-80202
No. 658

a. Flowheet and Stream Compositions

See pages 111 and 162 of this document, except that the 1A7 HNO₃ is 0.0M vice -0.2M.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 11-1-64	1700 11-5-64	0	Column flushing
1700 11-5-64	1920 11-6-64	8	
1920 11-6-64	2400 11-7-64	0	2E to F-2 jumper leak and D-13 pump failed.

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved avg. days</u>	<u>Curies of I-131 Available</u>	<u>To Stock</u>
11-2-64 (3 days)	No dissolving	None	.0011
11-3-64	" "	"	.00059
11-5-64 (2 days)	192-478	"	.00085
11-6-64	193-479	"	.0022

The 293-B Building recovered a total of 25,965 pounds of 100 percent nitric acid at an average concentration of 43.4 percent during the report period.

d. Solvent Extraction

The neptunium removal run was completed on 11-2. A total of 1958 units which met Purex process specifications was recovered and loaded out. The 57 percent acid flush of columns and process vessels was completed on 11-5. No abnormal product holdup in columns or vessels was found. A total of 451 units of plutonium was picked up in the flushes.

The solvent extraction battery was started up on 11-5 with the 1SP routed to the 2E Column vice D-14. A shutdown was required on 11-6 when the 2E Column to F-2 jumper leaked. The jumper was inspected and finally held, however the E-13 pump had also failed and required replacement.

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HW-80202
No. 658

e. Equipment

The D-14 pump discharge jumper failed during the acid flush and was replaced on 11-4. During preparations for startup on 11-5, the 3RW valve would not close. A replacement jumper was made and installed allowing column startup. The failed E-13 pump was removed and a new pump installed on 11-7, however the power jumper did not make up properly.

Following are the waste storage tank data for the report period:

	<u>105-6X</u>	<u>107-6X</u>	<u>108-6X</u>	<u>109-6X</u>	<u>110-6X</u>	<u>111-6X</u>	<u>112-6X</u>	<u>114-6X**</u>	<u>115-6X</u>
Liquid Level	26'6"	15'9"	20'10"	21'6-3/4"	21'-1/4"	4'2-3/4"	21'1-1/2"	18'3-1/4"	3'11-3/4"
Bulk 1" Sludge Temperature	120 F	269 F	298 F	277 F	208 F	193 F	217 F	274 F	183 F
Scanner 1" Sludge Temp.	-	284 F	314 F	287 F	267 F	200 F	210 F	218 F	194 F
2-Ft. Supernatant Temp.	-	235 F	237 F	235 F	202 F	176 F	206 F	216 F	180 F
Supernatant Temp.Gradient*	-	3 F	4 F	15 F	3 F		3 F	4 F	-
No. of Circulators Operating	0	3	4	3	2	0	4	4	0
Specific Gravity	-	1.53	1.57	1.62	1.53		1.65	1.34	-
Apparent Sludge Depth	-	0'9"	0'10-1/2"	2'6"	2'-1/2"	1'10-1/2"	2'0"	1'5"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-6X is the current salt waste receiver tank.

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EW-80202
No. 658

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No. 659

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R-E-Fenninson RE Isaacson

-190-

SUMMARY OF 202-S BIDG. OPERATION

FROM 0000 11-8-64 TO 2400 11-14-64

I. PRODUCTION

U Shipped 32.11 IAF Processed 20.96 Charged 22.64 E-metal

Pu Loaded 11,660 including 4690 high in U which will be reworked.

II. PRODUCT PURITY

	Plutonium		Uranium		Fe (ppm)	Na (ppm)
	Microcuries/gram	U (ppm)	E-12 G-ratio	E-13 G-ratio		
Minimum	<u>3.1</u>	<u>1.58³</u>	<u>10.9</u>	<u>0.62</u>	<u>6</u>	<u>6</u>
Average	<u>15.2</u>	<u>2.1⁵</u>	<u>40.7</u>	<u>1.61</u>	<u>15.7</u>	<u>41</u>
Maximum	<u>27.4</u>	<u>4.2⁵</u>	<u>65.9</u>	<u>3.98</u>	<u>30</u>	<u>113</u>

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>0.02</u> %	U	<u>25</u> Lbs. <u>0.06</u> %	U	<u>75</u> Lbs. <u>0.17</u> %
Pu	<u>0.03</u> %	Pu	<u>23</u> Gms. <u>0.17</u> %	Pu	<u>21</u> Gms. <u>0.17</u>
		Gallons	<u>20.196</u>	Gallons	<u>4201</u>

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.3</u>	<u>1.3</u>
Partition Cycle	<u>2.0</u>	<u>2.1</u>
Third U	<u>1.8</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.4</u>
Third Pu	<u>-</u>	<u>1.1</u>
Tail End	<u>1.4</u>	<u>-</u>
Total	<u>6.5</u>	<u>6.9</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>986</u>	<u>665</u>	<u>842</u>
Cooling Time	<u>321</u>	<u>196</u>	<u>226</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>None</u>					
HE	Sump Waste	<u>3485</u>	<u>501</u>	<u>3.48</u>	<u>2160</u>	<u>4.85</u>	<u>55</u>
HE	Recycle	<u>-</u>	<u>481</u>	<u>3.35</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column	<u>Salt Waste</u>	<u>1609</u>	<u>89</u>	<u>0.62</u>	<u>423</u>	<u>0.95</u>	<u>22</u>
E-3 or E-1	<u>None</u>						

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HW-80202

No. 659

a. Flowsheet and Stream Compositions

See pages 111 and 162 of this document except that the 1AF HNO₃ is 0.0M
vice -0.2M.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 11-8-64	2315 11-8-64	0	E-13 pump replacement
2315 11-8-64	0930 11-9-64	8	
0930 11-9-64	1700 11-10-64	0	2E - F-2 jumper replaced; D-14 pump replacement
1700 11-10-64	1300 11-11-64	8	
1300 11-11-64	2345 11-12-64	0	E-1 pump replacement
2345 11-12-64	1135 11-13-64	8	
1135 11-13-64	1500 11-13-64	9	
1500 11-13-64	0600 11-14-64	9.3	
0600 11-14-64	2400 11-14-64	10.0	

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved Age, days</u>	<u>Curies of I-131 Available</u>	<u>To Stack</u>
11-9-64 (3 days)	194-480	None	0.0039
11-10-64	No dissolving	"	0.0017
11-11-64	198-467	"	0.0014
11-12-64	No dissolving	"	0.00096
11-13-64	200-261	"	0.0017

The 293-S Building recovered 20,922 pounds of 100 percent nitric acid during the report period with an average concentration of 45.2 percent.

The average 293-S acid concentration has increased approximately two percent since raising the Sp.Gr. controller from 1.24 to 1.25 on 10-7-64.

192-
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EW-80202
No. 659

d. Solvent Extraction

The columns were started up at 2315 11-8-64 following completion of the E-13 pump replacement, however, the columns were again shut down at 0930 11-9-64 when the G-3 Still heat transfer would not allow an 8 rate to be maintained. During the shutdown, 8 percent nitric acid was routed to G-3 to remove the film limiting heat transfer. The 2E to F-2 jumper, which was found leaking on 11-8 but held after re-impacting, began leaking again on 11-9. This jumper was replaced. During this shutdown additional maintenance work was done in D-Cell and the plutonium product solutions in E-2, E-1, high in uranium, were recycled to F-2, F-1 with additional uranium, for rework. However insufficient uranium was added to F-2, F-1 and the always-safe plutonium to uranium ratio was exceeded by 11 percent. The safe ratio was restored within four hours by recycling additional uranium from F-4 and recirculating the F-2, F-1 contents. A formal investigation of this incident has been made. The uranium contaminated solutions in E-4, E-3, L-12 and L-6 were loaded out for rework and these vessels were acid flushed. It is believed that the uranium entered the process via the ozone header to E-2 and/or E-4. Apparently UHM solution was pulled into the ozone header from the E-13 tank.

The columns were again started at 1700 on 11-10 but the E-1 pump failed at 1300 on 11-11 and a shutdown was required for pump replacement. The columns were again started at 2345, 11-12 and rates were gradually increased to 10. The F-2 to F-1 overflow restricted rates to 9 until a blank in the vent line was loosened, which allowed an unrestricted F-2 to F-1 overflow. All product was in specification by the end of the report period.

e. Equipment

Considerable maintenance was required. The E-13 pump replacement finally was completed on 11-8. The original rigid power jumper, which did not give continuity when installed, made up and provided power. Two other jumpers, one a new flex jumper, had failed to operate the pump. The E-12 to E-13 jet jumper, which was leaking, was taken to the Remote Shop for repair and re-installed. During the shutdown for G-3 heat transfer capacity restoration, the 2E to F-2 jumper was replaced and the D-14 pump, which had lost capacity, also was replaced.

The E-1 pump was replaced on 11-12 and the G-3 east tube bundle was re-gasketed.

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NW-80202
No. 659

Following are the waste storage tank data for the report period.

	<u>105-EX</u>	<u>107-EX</u>	<u>108-EX</u>	<u>109-EX</u>	<u>110-EX</u>	<u>111-EX</u>	<u>112-EX</u>	<u>114-EX**</u>	<u>115-EX</u>
Liquid Level	26'4-1/2"	15'9-1/2"	20'10"	21'5-3/4"	21'0"	4'2-3/4"	21'1"	17'11-1/4"	3'11-3/4"
Bulb 1" Sludge Temp.	121 F	290 F	298 F	274 F	208 F	193 F	229 F	276 F	180 F
Scanner 1" Sludge Temp.	-	296 F	313 F	287 F	268 F	202 F	214 F	221 F	195 F
2-Ft. Supernatant Temp.	-	235 F	236 F	248 F	202 F	180 F	208 F	218 F	182 F
Supernatant Temp.Gradient*	-	3 F	5 F	28 F	3 F	-	3 F	5 F	-
No. of Circulators Operating	0	3	4	3	2	0	4	4	0
Specific Gravity	-	1.53	1.56	1.61	1.53	-	1.63	1.36	-
Apparent Sludge Depth	-	0'9-1/2"	0'10-1/2"	2'6"	2'-1/2"	1'10-1/2"	2'0"	1'5-1/2"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-EX is the current salt waste receiver tank.

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-194

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RW-80202

No. 660

SUMMARY OF 202-S BLDG. OPERATION

FROM 0000 11-15-64 TO 2400 11-21-64

I. PRODUCTION

U Shipped 68.47 1AF Processed 72.0 Charged 76.74 E-metal

Pu Loaded 48230

II. PRODUCT PURITY

	Plutonium		Uranium				
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum	<u>0.9</u>	<u>183</u>	<u>14.0</u>	<u>0.59</u>	<u>0.16</u>	<u>8</u>	<u>10.0</u>
Average	<u>1.2</u>	<u>462</u>	<u>20.71</u>	<u>1.02</u>	<u>0.76</u>	<u>14.5</u>	<u>10.2</u>
Maximum	<u>1.7</u>	<u>936</u>	<u>34.0</u>	<u>1.6</u>	<u>6.3</u>	<u>22.0</u>	<u>13.0</u>

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>0.006</u> %	U	<u>58</u> Lbs. <u>0.04</u> %	U	<u>225</u> Lbs. <u>0.16</u> %
Pu	<u>0.03</u> %	Pu	<u>34</u> Gms. <u>0.07</u> %	Pu	<u>63</u> Gms. <u>0.16</u>
		Gallons	<u>65629</u>	Gallons	<u>11991</u>

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.7</u>	<u>1.7</u>
Partition Cycle	<u>2.2</u>	<u>2.3</u>
Third U	<u>1.5</u>	<u>-</u>
Second Pu	<u>-</u>	<u>1.6</u>
Third Pu	<u>-</u>	<u>1.1</u>
Tail End	<u>1.4</u>	<u>-</u>
Total	<u>6.8</u>	<u>6.7</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>986</u>	<u>662</u>	<u>894</u>
Cooling Time	<u>514</u>	<u>208</u>	<u>250</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
HE	Sump Waste	<u>3084</u>	<u>247</u>	<u>0.50</u>	<u>787</u>	<u>0.05</u>	<u>44</u>
HE	Recycle	<u>-</u>	<u>1795</u>	<u>3.62</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column	<u>Sump Waste</u>	<u>3949</u>	<u>378</u>	<u>0.76</u>	<u>948</u>	<u>0.65</u>	<u>268</u>
E-3 or E-1	<u>None</u>	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>

NY-80202
No. 660

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-195-

Flowchart and Stream Compositions

a. See pages 111 and 162 of this document except that the IAF acid is +0.2M
also -0.2M.

b. Extraction Rates

<u>From</u>		<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 11-15-64	1600 11-19-64	10		
1600 11-19-64	2145 11-20-64	8		Feed shortage; B-2 dissolver down for repair.
2145 11-20-64	2400 11-21-64	9		

c. Dissolvers

Following are the radiolabeled data for the report period:

<u>Period Ending</u> <u>at 1000</u>	<u>Netal Dissolved</u>	<u>Age, days</u>	<u>Curies of I-131</u> <u>Charged</u>	<u>To Stock</u>
11-16-64 (3 days)	201-326		None	0.0056
11-17-64	217-239		"	0.0017
11-18-64	218-226		"	0.0013
11-19-64	219-227		"	0.00066
11-20-64	220-228		"	0.00074

The 293-B Building recovered 62,601 pounds of 100 percent nitric acid during the report period at an average concentration of 45.3 percent.

When the 293-B acid concentration increased to 45.8 percent, the Sp. Gr. controller setting was reduced to 1.245 from 1.25.

During coating removal from charge H-M-7 on 11-16 in the B-2 dissolver it was found that valving had failed making it impossible to by-pass the alloy reactor. Further investigation found that this valving had possibly failed during coating removal from charge C-M-2 on 11-5-64. Two valves on the by-pass jumper, H-2-30752, had failed. The jumper was removed to the Remote Shop where the 1-inch valve was replaced and a new diaphragm installed in the 4-inch valve. The B-2 dissolver was put back in service on 11-21.

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HW-80202
No. 660

d. Solvent Extraction

Column operation was very satisfactory during the report period. Rates were reduced on 11-19 when the B-2 dissolver was shut down to repair the reactor by-pass jumper. Two problems were experienced with back-cycle salt: 1) the salt was more acid-deficient than desired, and 2) insufficient uranium was being added to the salt. The final acid concentration of the feed make-up was changed from $+0.1M$ to $0.2M$ HNO_3 on 11-18 in an effort to reduce the backcycle salt acid deficiency. The proper uranium addition to D-14 was also achieved on 11-18 after maintenance adjusted the D-14-S uranium addition pump. Some difficulty was also experienced in providing adequate backcycle flow to the 1A Column.

The waste routing from D-8 to the 114-SX tank was given a 5 percent caustic flush on 11-15.

e. Equipment

Jumper H-2-30752 was removed and the 1-inch valve replaced and a new diaphragm installed in the 4-inch valve. Jumper H-2-30753 was re-gasketed. When the jumpers were re-installed the wall head of H-2-30747 would not make. This jumper was taken to the Remote Shop and a new head installed. Since repair of the above dissolver off-gas jumpers, dissolver vacuum is maintained with about 50 percent of the previously required vent jet pressure.

Following are the waste storage tank data for the report period:

	<u>105-SX</u>	<u>107-SX</u>	<u>108-SX</u>	<u>109-SX</u>	<u>110-SX</u>	<u>111-SX</u>	<u>112-SX</u>	<u>114-SX**</u>	<u>115-SX</u>
Liquid Level	26'1-1/2"	15'10"	20'9-3/4"	21'4-3/4"	20'11-3/4"	4'3-1/4"	21'1-1/2"	18'11-1/2"	3'11-3/4"
Bulk 1" Sludge Temp.	124 F	296 F	299 F	273 F	208 F	193 F	231 F	277 F	180 F
Scumner 1" Sludge Temp. -		302 F	313 F	287 F	265 F	201 F	211 F	222 F	194 F
2-Ft. Supernatant Temp. -		235 F	236 F	222 F	202 F	180 F	207 F	219 F	182 F
Supernatant Temp.Gradient* -		2 F	4 F	18 F	4 F	-	3 F	5 F	-
No. of Cir. operating	0	3	4	3	2	0	4	4	0
Specific Gravity	-	1.52	-	1.62	1.53	-	1.62	1.37	-
Apparent Sludge Depth	-	0'10"	0'10-1/2"	2'6"	2'-1/2"	1'10-1/2"	2'4"	1'5-1/2"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-SX is the current salt waste receiver tank.

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-197-

80202
No. 660

~~R. E. Isaacson~~ GL Hanson

R. A. Yoder

O. F. Beaulieu

~~R. E. Isaacson~~ RE Isaacson

-198-

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HW-80202

No. 661

SUMMARY OF 202-S BIDG. OPERATION

FROM 0000 11-22-64 TO 2400 11-28-64

I. PRODUCTION

U Shipped 54.07 LAF Processed 52.58 Charged 54.25 E-metal

Pu Loaded 37.560

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu (ppb)	Uranium		Fe (ppm)	Na (ppm)
	Microcuries/gram	U (ppm)			E-13 G-ratio			
Minimum	1.0	3.46 ²	12.2	1.0	0.12	6.0	10.0	
Average	7.48	4.98 ²	27.0	1.0	0.75	30.0	11.2	
Maximum	12.9	8.13 ²	44.8	1.0	2.57	15.7	23.0	

III. WASTE

Extraction Losses			To Underground Storage			Coating Waste Losses		
U	0.05	%	U	63	Lbs. 0.06 %	U	175	Lbs. 0.16 %
Pu	0.02	%	Pu	21	Gms. 0.06 %	Pu	49	Gms. 0.16
			Gallons	47,586		Gallons	9333	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	1.4	1.4
Partition Cycle	2.2	2.3
Third U	1.7	-
Second Pu	-	2.3
Third Pu	-	1.3
Tail End	1.6	-
Total	6.9	7.3

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	423	191	273
Cooling Time	1039	769	895

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium Grams
			Grams	%	Lbs.	%	
HE	Salt Waste	None	-	-	-	-	-
HE	Sump Waste	540	121	0.35	154	0.15	2
HE	Recycle	None	-	-	-	-	-
LS Column	Salt Waste	1809	63	0.18	4	0.004	11
E-3 or E-1		None	-	-	-	-	-

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HW-80202
No. 661

a. Flowsheet and stream compositions

See pages 111 and 162 of this document except that the IAF acid is +0.2M
vice -0.2M.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 11-22-64	0200 11-22-64	9	
0200 11-22-64	0600 11-22-64	10	
0600 11-22-64	0455 11-23-64	0	D-14 pump replacement
0455 11-23-64	0145 11-24-64	8	
0145 11-24-64	0945 11-24-64	9	G-1 pump failed
0945 11-24-64	0500 11-25-64	0	G-1 pump replacement
0500 11-25-64	2230 11-25-64	10	
2230 11-25-64	0225 11-26-64	10.5	
0225 11-26-64	0930 11-26-64	11.0	
0930 11-26-64	1015 11-26-64	0	Lost prime into F-7 pump
1015 11-26-64	1900 11-27-64	11.0	
1900 11-27-64	2400 11-28-64	11.5	

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved age, days</u>	<u>Curies of I-131 Charged</u>	<u>To Stack</u>
11-23-64 (3 days)	209-515	None	0.0010
11-24-64	190-419	"	0.0012
11-25-64	191-420	"	0.00057
11-27-64 (2 days)	192-422	"	0.00070

The 293-B Building recovered a total of 60,520 pounds of 100 percent
nitric acid during the report period at an average concentration of
44.7 percent.

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HW-80202
No. 661

d. Solvent Extraction

The extraction battery operated 85.6 percent of the available time at an average rate of 105.3 percent. During the first of the week the IABS flow to the 1A Column gave considerable trouble. The leads to the D-14 pump were reversed in an attempt to improve the IABS flow but the pump was shorted out and had to be replaced. The IABS jumper was also replaced when it appeared the valve might be restricting the flow during tests with the new D-14 pump. The columns were started at an 8 rate but flooding occurred in the 1A Column with organic being entrained in the 1AW stream. The E-10 concentrator also pressurized indicating a 3E Column flood with organic being dropped into the E-10 tower.

On 11-24 the G-1 pump failed, shutting the process down to replace the pump. During the down time the 1A, 2D, and 1S Columns were given a 10 percent acid flush. The 2E Column after startup adversely affected the F-2 concentrator because aspiration in the column. The extraction battery operated until the prime was lost on the F-7 pump on 11-26. The process was shut down to re-establish the prime then started again. The column operation was good with the exception of a restriction in the IABS and D-14 to F-8. Apparently solids of some form built up in the IABS jumper and restricted the flow. The UMH and plutonium products were within specifications.

e. Equipment

The D-14 pump failed after reversing the electric leads after 240 hours of operation.

The G-1 pump failed after approximately 8 years of service.

The H-1 pump gave considerable trouble during the week. The lower stages of the pump have lost the ability to pump. The F-7 pump may be developing an airlock between 20 and 25 weight factor which stops 1AF flow. The only remedy is to refill F-7 tank.

The stand-by steam turbine to maintain vacuum in the building was lost when the shaft seized and the turbine ruptured. Apparently the lubrication system failed causing the shaft to seize.

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Following are the waste storage tank data for the report period:

	<u>105-SX</u>	<u>107-SX</u>	<u>108-SX</u>	<u>109-SX</u>	<u>110-SX</u>	<u>111-SX</u>	<u>112-SX</u>	<u>114-SX**</u>	<u>115-SX</u>
Liquid Level	25'11"	15'9-3/4"	20'10"	21'4"	20'11-3/8"	4'2-3/4"	21'0"	19'3"	3'11-3/4"
Bulb 1" Sludge Temperature	125 F	297 F	299 F	224 F	210 F	194 F	236 F	275 F	176 F
Scanner 1" Sludge Temperature	-	294 F	312 F	285 F	266 F	200 F	220 F	224 F	192 F
2-Ft. Supernatant Temperature	-	234 F	236 F	244 F	201 F	179 F	206 F	220 F	180 F
Supernatant Temp. Gradient*	-	2 F	3 F	2 F	3 F	-	3 F	3 F	-
No. of Circulators Operating	0	3	4	3	2	0	4	4	0
Specific Gravity	-	1.52	1.56	1.62	1.52	-	1.62	1.38	-
Apparent Sludge Depth	-	0'10-1/2"	0'10"	2'6"	2'0"	1'10-1/2"	2'8"	1'1"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-SX is the current salt waste receiver tank.

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EW-80202
No. 661

~~R. E. Isaacson~~ GL Hanson

R. A. Yoder

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~~R. E. Isaacson~~ RE Isaacson

SUMMARY OF 202-S BIDG. OPERATION

FROM 0000 11-29-64 TO 2400 12-5-64

HW-80202

No. 662

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I. PRODUCTION

U Shipped 68.68 1AF Processed 67.93 Charged 75.28 E-metal
Pu Loaded 47,870

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe(ppm)	Na(ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>2.2</u>	<u>9.07²</u>	<u>16.0</u>	<u>1.0</u>	<u>0.33</u>		<u>2.0</u>	<u>8.0</u>
Average	<u>3.5</u>	<u>9.77²</u>	<u>20.3</u>	<u>1.0</u>	<u>7.06</u>		<u>9.68</u>	<u>12.3</u>
Maximum	<u>5.9</u>	<u>1.04³</u>	<u>27.9</u>	<u>1.0</u>	<u>25.0</u>		<u>17.0</u>	<u>55.0</u>

III. WASTE

Extraction Losses			To Underground Storage			Coating Waste Losses		
U	<u>0.02</u>	%	U	<u>79</u>	Lbs. <u>0.10</u> %	U	<u>275</u>	Lbs. <u>0.18</u> %
Pu	<u>0.01</u>	%	Pu	<u>47</u>	Gms. <u>0.10</u> %	Pu	<u>77</u>	Gms. <u>0.18</u>
			Gallons	<u>65260</u>		Gallons	<u>12,027</u>	

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.5</u>	<u>1.5</u>
Partition Cycle	<u>2.3</u>	<u>2.6</u>
Third U	<u>0.6</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.3</u>
Third Pu	<u>-</u>	<u>1.3</u>
Tail End	<u>1.5</u>	<u>-</u>
Total	<u>5.9</u>	<u>7.7</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>1053</u>	<u>502</u>	<u>845</u>
Cooling Time	<u>424</u>	<u>212</u>	<u>272</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium Grams
			Grams	%	Lbs.	%	
HE	Salt Waste	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
HE	Sump Waste	<u>4157</u>	<u>23</u>	<u>0.05</u>	<u>1566</u>	<u>1.13</u>	<u>87</u>
HE	Recycle	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column		<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
E-3 or E-1		<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>

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HW-80202
No. 662

a. Flowsheet and Stream Compositions

See pages 111 and 162 of this document. The JDS flow ratio was changed from 16 to 24.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 11-29-64	1945 12-2-64	11.5	
1945 12-2-64	0915 12-3-64	10.0	
0915 12-3-64	1125 12-4-64	0	1A, 2D, 3E Column acid flush
1125 12-4-64	2300 12-4-64	10	
2300 12-4-64	2400 12-5-64	11	

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved Age, days</u>	<u>Curies of I-131 Charged</u>	<u>To Stack</u>
11-30-64 (3 days)	200-424	None	0.015
12-1-64	215-380	"	0.0048
12-2-64	216-305	"	0.0032
12-3-64	217-306	"	0.0024
12-4-4	214-307	"	0.0011

The 293-B Building recovered a total of 66,783 pounds of 100 percent nitric acid during the report period at an average concentration of 44.9 percent.

d. Solvent Extraction

Process performance was satisfactory during the report period with the exception of complete loss of decontamination across the E-13 ozonator on 11-30. The E-13 agitator was replaced on 12-1, but did not restore the ozonator decontamination efficiency. Further investigations revealed that the 3E Column was flooding sufficiently to allow hexone and hexone degradation products to reach the E-12 tank. The laboratory reported .3% hexone in E-13 tank and no hexone in an E-13 sample after ozonation. However E-13 sample had the smell of hexone degradation products. The presence of the hexone degradation products reduced the ozone prematurely with subsequent loss of ruthenium decontamination of the UHM solution. After

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

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NW-80202
No. 662

-204-

the acid flush on 12-4 coupled with an earlier reduction in the 30X flow, the E-13 ozonation operation returned to near normal at the end of the report period. An additional change in the standard flowsheet was made on 12-4 to reduce the U recycle to the F-2 Concentrator, thereby reducing the load on 3E Column. The change will allow high building rates and better ozonation but will increase the cost per unit of product by an increase in the ANN used. Broken down, the cost per unit of production is \$15 for ANN and \$10 for waste storage.

At the end of the week the extraction battery had operated 84.5 percent of the available time at an average rate of 11.17. The process was shut down on 12-3 to allow investigation of the sludge layers in H-8, H-9 and D-13 tanks. The processing outage was utilized to acid flush the 1A, 2D and 3E Columns. Both the 1A and 3E Columns had been flooding but only the 3E Column adversely affected the process operation.

e. Head-End

Measurement of the sludge depth in H-8, H-9 and D-13 tanks revealed the following:

- H-8 sludge below tank dish
- H-9 1/4 inch of sludge above center of dish
- D-13 1-1/2 inch of sludge above center of dish.

The H-8 and H-9 sludge was found to be intermetallic compounds of uranium, aluminum and silicon with a specific gravity of about 4.2. About 55 percent of the weight is uranium with the plutonium to uranium ratio approximately four times higher than normal production. These solids apparently originate at the bonding layer of the aluminum jacketed slugs.

f. Equipment

The F-8 pump (installed on 10-9-64) failed to deliver necessary flow and failed completely after being stopped for a maintenance check. A new F-8 pump was installed on 11-30-64 without shutting down the process, although it was necessary to overflow F-8 to the sump.

The D-8 to 241-8 pump failed drawing full amperage and was replaced on 12-1 without difficulty. The pump had been installed on 7-24-64 and had 250 hours operating time.

The H-1 pump was replaced on 12-1-64 because the pump could not pick up solution at a low suction head. The H-1 pump was installed 11-17-64 and had an operating life of 55 hours.

The F-7 Lawrence pump continues to lose head when the suction leg is lowered. The problem appears to be an airlock that develops as the weight factor in F-7 drops.

Following are the waste storage tank data for the report period:

	<u>105-SX</u>	<u>107-SX</u>	<u>108-SX</u>	<u>109-SX</u>	<u>110-SX</u>	<u>111-SX</u>	<u>112-SX</u>	<u>114-SX**</u>	<u>115-SX</u>
Liquid Level	25'7-1/4"	15'9"	20'10"	21'3"	20'11"	4'3-1/4"	20'11"	20'7"	3'11-3/4"
Bulb 1" Sludge Temperature	125 F	285 F	299 F	275 F	208 F	193 F	236 F	281 F	177 F
Scanner 1" Sludge Temperature	-	299 F	312 F	283 F	264 F	200 F	217 F	222 F	191 F
2-Ft. Supernatant Temperature	-	234 F	236 F	229 F	201 F	178 F	206 F	220 F	179 F
Supernatant Temp.Gradient*	-	1 F	3 F	2 F	4 F	-	3 F	3 F	-
No. of Circulators Operating	0	3	4	3	2	0	4	4	0
Specific Gravity	-	1.52	1.56	1.62	1.52	-	1.61	1.38	-
Apparent Sludge Depth	-	0'10-1/2"	0'10"	2'6"	2'0"	1'10-1/2"	2'8"	1'4-1/2"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-SX is the current salt waste receiver tank.

NOTE: 108-SX tank: Activity in the lateral S 77° 15 east increased from 340,000 c/m on 11-1 to 670,000 c/m on 11-30-64. Activity in the lateral S 59° 18 E increased from 114,000 c/m on 11-1-64 to 180,000 c/m on 11-30-64. The reading in dry well No. 29 increased from 7000 c/m to 9000 c/m by 11-30-64. Although the readings have increased, there is no indication which would suggest a leak of significant volume of high level waste.

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RM-80202
No. 662

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EW-80202
No. 663

At: E. Isaacson **GL Hanson**
R. A. Yoder
O. F. Beaulieu
At: E. Tomlinson **RE Isaacson**

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 12-6-64 TO 2400 12-12-64

I. PRODUCTION

U Shipped 85.73 LAF Processed 80.21 Charged 83.63 E-metal
Pu Loaded 42560

II. PRODUCT PURITY

	Plutonium		Uranium				
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm)	Na(ppm)
Minimum	<u>2.1</u>	<u>5.06²</u>	<u>7.0</u>	<u>1.0</u>	<u>0.19</u>	<u>3.0</u>	<u>3.0</u>
Average	<u>9.49</u>	<u>6.91²</u>	<u>16.3</u>	<u>1.16</u>	<u>0.71</u>	<u>7.78</u>	<u>11.1</u>
Maximum	<u>31.3</u>	<u>9.20²</u>	<u>20.0</u>	<u>1.9</u>	<u>2.11</u>	<u>10.0</u>	<u>60.0</u>

III. WASTE

<u>Extraction Losses</u>		<u>To Underground Storage</u>		<u>Coating Waste Losses</u>	
U	<u>0.005</u> %	U	<u>99</u> Lbs. <u>0.06</u> %	U	<u>250</u> Lbs. <u>0.15</u> %
Pu	<u>0.02</u> %	Pu	<u>31</u> Gms. <u>0.07</u> %	Pu	<u>70</u> Gms. <u>0.15</u> %
		Gallons	<u>87316</u>	Gallons	<u>13095</u>

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.5</u>	<u>1.5</u>
Partition Cycle	<u>2.3</u>	<u>3.2</u>
Third U	<u>1.7</u>	<u>-</u>
Second Pu	<u>-</u>	<u>1.2</u>
Third Pu	<u>-</u>	<u>1.1</u>
Tail End	<u>1.4</u>	<u>-</u>
Total	<u>6.9</u>	<u>7.0</u>

V. METAL HISTORY

	<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
MWD/T	<u>1014</u>	<u>406</u>	<u>761</u>
Cooling Time	<u>331</u>	<u>162</u>	<u>236</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
HE	Sump Waste	<u>2866</u>	<u>535</u>	<u>1.21</u>	<u>770</u>	<u>0.48</u>	<u>14</u>
HE	Recycle	<u>-</u>	<u>132</u>	<u>0.29</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column		<u>None</u>					
E-3 or E-1		<u>None</u>					

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-207-

HW-80202
No. 663

a. Flowsheet and Stream Compositions

LAX flow has been reduced from 325 to 300 flows.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 12-6-64	0100 12-6-64	11	
0100 12-6-64	0900 12-9-64	11.5	
0900 12-9-64	2400 12-12-64	12.0	

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved Age, days</u>	<u>Curies of I-131 Charged</u>	<u>To Stack</u>
12-7-64 (3 days)	214-349	None	0.0019
12-8-64	221-328	"	0.0011
12-9-64	222-329	"	0.00075
12-10-64	191-329	"	0.00055
12-11-64	162-246	0.41	0.0010

The 293-B Building recovered 82,090 pounds of 100 percent nitric acid at an average concentration of 43.4 percent during the report period.

d. Solvent Extraction

Column operation was excellent during the week with good products produced and all waste batches discarded. The actual UH₂ production for the week indicated a 12.41 rate had been achieved for 96 percent of the available time.

A slight increase in the gamma activity occurred on 12-11 in E-2 but more ozone and sparging steam to E-2 and E-4 ozonators brought the gamma activity back into specifications. The 1A Column at the end of the week was in a slight flood and the 1AW letdown valve appeared to plug with solids occasionally.

The uranium concentration specification for D-14 was lowered from 0.10 to 0.15 to .05 to .10 pound per gallon. Acid is now being butted to D-14 to maintain the acidity at about -0.10 to -0.15 pound per gallon. Trouble with flow through the D-14 pump and the 1AW letdown valve have been noted at greater acid deficiencies.

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-208-

HW-80202
No. 663

Organic flow to the 1A Column was changed on 12-9-64 from 325 flows to 300 flows to reduce the process demand for hexone in order to allow running at higher rates. Apparently the 276 organic pumps have reached their pumping capacity.

e. Equipment

The control console at K-Panel was changed on 12-10 to increase the control range of the console. It now controls from 0 - 14.4 rate instead of 0 - 12 rate. The dial setting is multiplied by 1.2 to get the rate.

f. 276 Building

The hexone was washed during the week with a resulting decontamination factor of 10. The spectrophotometer reading was reduced from 1.8 to 0.18.

g. 233 Building

A slow rise in the L-6 weight factor after making up a batch was noted on 12-12. A DOV in the line from L-12 to L-6 was found leaking. Closing a manual valve in the line stopped the leak.

Following are the waste storage tank data for the report period:

	<u>105-GX</u>	<u>107-GX</u>	<u>108-GX</u>	<u>109-GX</u>	<u>110-GX</u>	<u>111-GX</u>	<u>112-GX</u>	<u>114-GX**</u>	<u>115-GX</u>
Liquid Level	25'3-1/4"	15'10-1/4"	20'11"	21'1-3/4"	20'10-1/2"	4'3"	20'10-1/2"	21'10-1/4"	3'11-3/4"
Bulb 1" Sludge Temp.	124 F	291 F	298 F	273 F	206 F	192 F	293 F	292 F	176 F
Scanner 1" Sludge Temp.	-	302 F	312 F	279 F	262 F	197 F	215 F	220 F	188 F
2-Ft. Supernatant Temp.	-	234 F	235 F	238 F	200 F	176 F	204 F	218 F	176 F
Supernatant Temp.Gradient*	-	3 F	3 F	20 F	4 F	-	3 F	2 F	-
No. of circulators Oper.	0	3	4	3	2	0	4	4	0
Specific Gravity	-	1.52	1.56	1.62	1.52	-	1.61	1.40	-
Apparent Sludge Depth	-	0'11"	0'10-1/2"	2'6"	1'11"	1'10-1/2"	2'9"	1'1"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-GX is the current salt waste receiver tank.

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No. 663

~~R. E. Isaacson~~ **GL Hanson**

R. A. Yoder

O. F. Beaulieu

~~R. E. Tomlinson~~ **RE Isaacson**

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No. 664

SUMMARY OF 202-S BIDG. OPERATION
FROM 0000 **12-13-64** TO 2400 **12-19-64**

I. PRODUCTION

U Shipped 45.42 IAF Processed 47.20 Charged 47.57
Pu Loaded 26400

II. PRODUCT PURITY

	Plutonium		E-12 G-ratio	Pu(ppb)	Uranium		Fe(ppm)	Na(ppm)
	Microcuries/gram	U(ppm)			E-13 G-ratio			
Minimum	<u>7.3</u>	<u>7.21²</u>	<u>18.0</u>	<u>< 1.0</u>	<u>14.1</u>		<u>8.0</u>	<u>6.0</u>
Average	<u>15.4</u>	<u>1.32³</u>	<u>27.3</u>	<u>< 1.0</u>	<u>3.57</u>		<u>14.2</u>	<u>< 23.1</u>
Maximum	<u>42.5</u>	<u>1.43³</u>	<u>45.0</u>	<u>< 1.0</u>	<u>0.25</u>		<u>35.0</u>	<u>68.0</u>

III. WASTE

Extraction Losses		To Underground Storage		Coating Waste Losses	
U	<u>0.003</u> %	U	<u>62</u> Lbs. <u>0.07</u> %	U	<u>150</u> Lbs. <u>0.16</u> %
Pu	<u>0.02</u> %	Pu	<u>20</u> Gms. <u>0.08</u> %	Pu	<u>42</u> Gms. <u>0.16</u>
		Gallons	<u>45,904</u>	Gallons	<u>8102</u>

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.4</u>	<u>1.4</u>
Partition Cycle	<u>2.4</u>	<u>2.1</u>
Third U	<u>1.7</u>	<u>-</u>
Second Pu	<u>-</u>	<u>2.6</u>
Third Pu	<u>-</u>	<u>1.0</u>
Tail End	<u>0.9</u>	<u>-</u>
Total	<u>6.4</u>	<u>7.1</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>880</u>	<u>515</u>	<u>756</u>
Cooling Time	<u>285</u>	<u>157</u>	<u>194</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
HE	Sump Waste	<u>2578</u>	<u>1026</u>	<u>3.76</u>	<u>2265</u>	<u>2.34</u>	<u>48</u>
HE	Recycle	<u>None</u>	<u>1255</u>	<u>4.59</u>	<u>-</u>	<u>-</u>	<u>-</u>
1S Column		<u>4260</u>	<u>62</u>	<u>0.23</u>	<u>19</u>	<u>0.19</u>	<u>2</u>
E-3 or E-1		<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>

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HW-80202
No. 664

-211-

a. Flowsheet and Stream Composition

3DS flow has been reduced to 16 flows and the 2DWB increased to 86 flows to work off the extra plutonium in the F-1 and F-2 tanks.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 12-13-64	1720 12-13-64	11.3	1A flooding
1720 12-13-64	0955 12-14-64	0	Acid flush of 1A, 1B and 2D Columns
0955 12-14-64	1730 12-14-64	10.8	
1730 12-14-64	1800 12-14-64	0	1ABS flow restriction
1800 12-14-64	1920 12-14-64	10.8	
1920 12-14-64	2330 12-14-64	0	1ABS replaced
2330 12-14-64	1230 12-15-64	10.8	F-1, F-2 always safe Pu ratio exceeded
1230 12-15-64	0500 12-16-64	12.0	
0500 12-16-64	1220 12-17-64	0	D-14 pump failed - hexone line froze
1220 12-17-64	1525 12-17-64	9.6	
1525 12-17-64	1910 12-17-64	8.0	F-8 pump failed
1910 12-17-64	0645 12-18-64	0	F-8 jumpers would not make up
0645 12-18-64	0530 12-19-64	10	
0530 12-19-64	0940 12-19-64	12.0	

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved Age, Days</u>	<u>Curies of I-131 Charged</u>	<u>To Stack</u>
12-14-64 (3 days)	164-332	0.62	0.046
12-15-64	166-285	0.35	0.042
12-16-64	167-286	0.30	0.0063
12-17-64	182-287	None	0.015
12-18-64	158-288		0.0096

The 293-B Building recovered 45,535 pounds of 100 percent nitric acid during the report period at an average concentration of 43.1 percent.

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NW-80202
No. 664

d. Solvent Extraction

The columns were operated 66 percent of the time at an average rate of 11.2 percent. At the beginning of the week the 1A Column went into a flood with organic being entrained in the 1AW stream. On 12-13 the extraction battery was shut down and the 1A, 1B and 2D Columns were given a 10 percent acid flush. During the downtime the D-14 to F-8 line plugged. The plug was freed by water flushing the line but the excessive pressure forced contaminants through the pH probe conduit into the south pipe gallery. Radiation readings of 4 rads per hour were found before the contaminants were cleaned to non-measurable.

The columns were started again on 12-14 at 0955 but the backcycle flow through IABS was inconsistent and inadequate, resulting in a shutdown to replace the IABS jumper.

The columns were again started on 12-14 at 2330. The 3A Column flooded undetected about four hours during startup on 12-15 causing plutonium to return to the F-2 concentrator and to exceed by about 50 percent the maximum gram per ton ratio. To correct back to the always safe ratio, 200 gallons of UNH from E-13 were transferred to F-1; the 3DS flow was cut to 16 flow ratio; and the 2DWR was increased to 86 flows.

On 12-16, the process was shut down due to a D-14 pump bearing seizure. During the downtime the hexone line between 276 and 202-S Buildings froze. On 12-17 the extraction battery was started again but the F-8 pump lost capacity steadily until it became necessary to shut the process down again to replace the pump. The columns were again started on 12-18 at 0645 and operation was satisfactory at the end of the report period.

e. Equipment

The D-14 pump failed on 12-16 after operating 511 hours. The probable cause of failure was bearing seizure.

The F-8 pump failed on 12-17 after operating 432 hours. The pump was replaced because it lost capacity.

Following are the waste storage tank data for the period.

	<u>105-GX</u>	<u>107-GX</u>	<u>108-GX</u>	<u>109-GX</u>	<u>110-GX</u>	<u>111-GX</u>	<u>112-GX</u>	<u>114-GX**</u>	<u>115-GX</u>
Liquid Level	25'1-1/4"	15'11"	20'11-1/4"	21'-3/4"	20'10"	4'3"	20'10"	22'5"	4'0"
Bulb 1" Sludge Temperature	130 F	295 F	291 F	272 F	202 F	194 F	230 F	296 F	176 F
Scanner 1" Sludge Temperature	-	297 F	313 F	278 F	263 F	200 F	212 F	226 F	191 F
2-Ft. Supernatant Temperature	-	234 F	236 F	235 F	202 F	178 F	204 F	224 F	179 F
Supernatant Temp. Gradient*	-	4 F	3 F	15 F	3 F	-	4 F	5 F	-
Number of Circulators Operating	0	3	4	3	2	0	4	4	0
Specific Gravity	-	-	-	-	-	-	-	-	-
Apparent Sludge Depth	-	0'11"	0'10-1/2"	2'6"	1'11"	1'10-1/2"	2'9"	1'4"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 114-GX is the current salt waste receiver tank.

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EW-80202
No. 664

-214

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HW-80202
No. 665

R-E-Isaacson GL Hanson

R. A. Yoder

O. F. Beaulieu

-R-E-Tennison RE Isaacson

SUMMARY OF 202-S BIDG. OPERATION

FROM 0000 12-20-64 TO 2400 12-26-64

I. PRODUCTIONU Shipped 83.53 1AF Processed 84.62 Charged 80.44 E-metalPu Loaded 48,790II. PRODUCT PURITY

	Plutonium		Uranium			
	Microcuries/gram	U(ppm)	E-12 G-ratio	Pu(ppb)	E-13 G-ratio	Fe(ppm) Na(ppm)
Minimum	<u>4.1</u>	<u>2.97²</u>	<u>2.90¹</u>	<u>/ 1.0</u>	<u>0.17</u>	<u>7.0 7.0</u>
Average	<u>10.7</u>	<u>2.30²</u>	<u>1.44²</u>	<u>/ 1.5</u>	<u>5.6</u>	<u>10.3 / 11.2</u>
Maximum	<u>17.3</u>	<u>1.70³</u>	<u>4.56²</u>	<u>5.0</u>	<u>28.3</u>	<u>17.0 17.0</u>

III. WASTE

Extraction Losses			To Underground Storage			Coating Waste Losses		
U	<u>0.007</u>	%	U	<u>62</u>	Lbs. <u>0.04</u> %	U	<u>250</u>	Lbs. <u>0.16</u> %
Pu	<u>0.009</u>	%	Pu	<u>37</u>	Gms. <u>0.08</u> %	Pu	<u>70</u>	Gms. <u>0.16</u>
			Gallons <u>82270</u>			Gallons <u>13554</u>		

IV. SOLVENT EXTRACTION - LOG DF BY CYCLE

	U	Pu
Precycle	<u>1.5</u>	<u>1.5</u>
Partition Cycle	<u>2.3</u>	<u>2.4</u>
Third U	<u>1.1</u>	<u>-</u>
Second Pu	<u>-</u>	<u>1.4</u>
Third Pu	<u>-</u>	<u>2.0</u>
Tail End	<u>1.4</u>	<u>-</u>
Total	<u>6.3</u>	<u>7.3</u>

V. METAL HISTORY

	Maximum	Minimum	Average
MWD/T	<u>448</u>	<u>160</u>	<u>195</u>
Cooling Time	<u>993</u>	<u>472</u>	<u>789</u>

VI. REWORK

Route	Source	Gallons	Pu		U		Neptunium
			Grams	%	Lbs.	%	Grams
HE	Salt Waste	<u>None</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
HE	Sump Waste	<u>2865</u>	<u>139</u>	<u>0.28</u>	<u>252</u>	<u>1.49</u>	<u>60</u>
HE	Recycle	<u>None</u>	<u>2441</u>	<u>4.86</u>	<u>-</u>	<u>-</u>	<u>-</u>
LS Column		<u>None</u>					
E-3 or E-1		<u>None</u>					

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a. Flowsheet and Stream Compositions

See page 211 of this document.

b. Extraction Rates

<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Remarks</u>
0000 12-20-64	0400 12-23-64	12.0	
0400 12-23-64	1300 12-23-64	11.5	1A flooding
1300 12-23-64	1530 12-23-64	0	1A acid flushed
1530 12-23-64	2230 12-23-64	12	
2230 12-23-64	0030 12-24-64	10	1A letdown valve plugging
0030 12-24-64	2400 12-26-64	12	

c. Dissolvers

Following are the radioiodine data for the report period:

<u>Period Ending at 1000</u>	<u>Metal Dissolved lbs, Days</u>	<u>Curies of I-131 Charged</u>	<u>To Stack</u>
12-21-64 (3 days)	158-288	1.93	0.12
12-22-64	161-289	0.17	0.072
12-23-64	173-290	0.49	0.050
12-26-64 (3 days)	170-448	0.65	0.16

The 293-B Building recovered 80,293 pounds of 100 percent nitric acid during the report period at an average concentration of 44.7 percent. On several occasions the A-4 filter has been partially plugged during the week. The filter was water flushed and drained to the sump. Operation of the filter has improved.

d. Solvent Extraction

The columns operated 98.5 percent of the time at an average rate of 11.95. Column operation at the beginning of the week was good and all products met specifications. On 12-23 the 1A Column started to flood in the bottom section and the rates were slightly reduced to compensate. Later on 12-23, the 1AW letdown valve plugged, restricting the flow and necessitating the shutdown of the 1A Column. The 1A Column was given a quick 10 percent acid velocity flush which corrected the 1AW letdown valve pluggage and the 1A Column flooding condition. The total time consumed in the acid flush was 2-1/2 hours.

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EW-80202
No. 665

An 8 weight percent nitric acid flush was made in G-3 Still during the downtime to clean organic scale from the coils.

After startup on 12-23 some difficulty was experienced with the 1AW letdown valve restricting flow. The rates were reduced from 12 to 10 and the letdown valve was exercised to free the restriction. Flow through the D-14 to F-8 line also indicated partial pluggage. By 12-24, the 1A Column had returned to normal.

In order to eliminate the problems of solids in the D-14 solution, the practice of butting D-14 continuously with 10 percent acid was established on 12-22-64. This was detrimental to the process in that it contributed to increased hexone degradation and loss of decontamination across the solvent extraction system. The nitroso compounds in the hexone increased from 1.1 on 12-22-64, to 3.1 on 12-26-64, to 7.1 on 12-27-64. At the same time the gamma ratio in the E-12 uranium product increased from 30 on 12-22-64 to 110 on 12-23-64 to 456 on 12-26-64. A corresponding increase in the E-13 uranium product was noted (from 0.5 on 12-22-64, to 7 on 12-23-64, to 17 on 12-26-64).

Following are the waste storage tank data for the report period:

	<u>105-6X</u>	<u>107-6X</u>	<u>108-6X</u>	<u>109-6X</u>	<u>110-6X</u>	<u>111-6X**</u>	<u>112-6X</u>	<u>114-6X</u>	<u>115-6X</u>
Liquid Level	24'9-1/4"	15'10-1/2"	20'11-1/4"	21'0"	20'10"	4'3"	20'9-3/4"	23'-1/2"	4'0"
Bulb 1" Sludge Temp.	125 F	292 F	293 F	273 F	202 F	173 F	207 F	299 F	176 F
Scanner 1" Sludge Temp.	-	298 F	307 F	271 F	258 F	195 F	207 F	220 F	191 F
2-Ft. Supernatant Temp.	-	230 F	232 F	230 F	197 F	172 F	200 F	217 F	179 F
Supernatant Temp.Gradient*	-	1 F	2 F	15 F	5 F	-	4 F	4 F	-
No. of Circulators Operating	-	3	4	3	2	0	4	4	0
Specific Gravity	-	1.52	1.56	1.62	1.52	-	1.61	1.45	-
Apparent Sludge Depth	-	0'10-1/2"	0'11"	2'6"	1'11"	1'11-1/4"	2'9"	1'5"	0'4"

* These are the temperature differences between the two-foot level and the highest liquid level in the tank.

** 111-6X is the current salt waste receiver tank.

NOTE: Current salt waste was routed to the 111-6X tank, for a third filling of this tank, on 12-23-64 beginning with D-8 waste batch PW-62.

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