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MONTHLY REPORT

HANFORD ATOMIC PRODUCTS OPERATION

60915

FOR

OCTOBER 1955

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By Authority of

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Compiled By
DEPARTMENT MANAGERS

By

DS Lewis 5/28/92
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PM Eck 7-1-92

November 30, 1955

RICHLAND, WASHINGTON

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by the
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Route To

W. B. Lewis

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MONTHLY REPORT
HANFORD ATOMIC PRODUCTS OPERATION

OCTOBER 1955

GENERAL SUMMARY

PRODUCTION OPERATION

A net production of 423 tons of acceptable slugs, or 101 percent of the official forecast, were produced during the month. The composite canning yield was 77 percent, representing a two percent increase over the September yield.

Established maximum reactor operating levels, excluding enrichment burnout, were increased a total of 1171 megawatts during October, 80 at DR Reactor, five at H Reactor, 575 at KE Reactor and 511 at KW Reactor. At DR Reactor, the increase resulted from lower inlet water temperature and improved flattening; at H Reactor, from lower inlet water temperature; and at both KE and KW Reactors, from revision of tube power limits following the replacement of front fact connectors.

An operating rate of 11 tons per day was maintained at Redox until October 18 when a planned capacity test resulted in achieving a rate of 12.5 tons per day for a 32-hour period.

The Manufacturing Department assumed responsibility for the Purex facility on October 16. Flushing of canyon equipment was started on October 19 and completed on October 23. On October 24, 62 tons of depleted uranium were received and dissolving was started on October 28.

ENGINEERING TECHNOLOGY

The Lattice Testing Reactor was made critical for the first time on October 25. The initial critical configuration had a mass of 9.1 kg. of U-235. The control, safety, and instrumentation systems performed satisfactorily.

Re-evaluation of the condition of the pile process tubes at the old reactors based on internal corrosion alone revealed that about 1800 process tubes must be replaced in the next 12 months. Since this is a minimum number of tubes to be replaced and does not compensate for external galvanic corrosion, any excess tube replacement capacity should be utilized in removing additional tubes at D and F reactors.

The examination of twelve slug corrosion ruptures which have occurred since August indicate that they were caused by reduced process tube rib heights.

Reactor design development studies included feasibility of various new reactor plant alternates to obtain increased production at HAPO, preliminary scope for a small experimental reactor, pressurization-recirculation application to existing reactors and reactor continuous charge-discharge.

The first instance of breakthrough of a long-lived fission product, specifically Cs¹³⁷, to the ground water table has been recorded.

GENERAL

On October 7, 1955, security regulations were revised to permit privately owned vehicles to enter limited areas under emergency conditions at times when regular bus transportation is not available.

In accordance with the new procedure recently adopted, a letter requesting \$200,000 to cover engineering studies necessary for budget preparation was sent to the Manager, Hanford Operations Office.

STAFF

General Manager, Atomic Products Division F. K. McCune

General Manager, Hanford Atomic Products Operation W. E. Johnson

Counsel E. T. Maher

Manager, Finance D. M. Johnson

Manager, Employee and Public Relations L. L. German

Director, Radiological Sciences H. M. Parker

Manager, Engineering A. B. Greninger

Manager, Manufacturing W. K. MacCready

Operations Research Study B. F. Butler

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AREA PERSONNEL DISTRIBUTION

OCTOBER 31, 1955

	100-B	100-D	100-F	100-H	100-K	200-E	200-W	300	700-1100 Area and Plant General	Other Areas*	Total
<u>ENGINEERING DEPARTMENT</u>											
Exempt	24	48	-	3	32	54	64	259	298	-	782
Other	12	28	2	87	16	18	33	225	204	-	625
Total	<u>36</u>	<u>76</u>	<u>2</u>	<u>90</u>	<u>48</u>	<u>72</u>	<u>97</u>	<u>484</u>	<u>502</u>	<u>-</u>	<u>1 407</u>
<u>MANUFACTURING DEPARTMENT</u>											
Exempt	63	54	74	75	65	90	229	113	120	-	883
Other	284	313	317	294	252	441	1 210	570	686	-	4 367
Total	<u>347</u>	<u>367</u>	<u>391</u>	<u>369</u>	<u>317</u>	<u>531</u>	<u>1 439</u>	<u>683</u>	<u>806</u>	<u>-</u>	<u>5 250</u>
<u>FINANCIAL DEPARTMENT</u>											
Exempt	-	-	-	1	-	-	5	6	117	-	129
Other	-	-	-	5	-	-	22	10	327	-	364
Total	<u>-</u>	<u>-</u>	<u>-</u>	<u>6</u>	<u>-</u>	<u>-</u>	<u>27</u>	<u>16</u>	<u>444</u>	<u>-</u>	<u>493</u>
<u>EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT</u>											
Exempt	22	6	6	7	9	7	14	11	210	-	292
Other	70	48	40	45	51	40	119	111	867	54	1 445
Total	<u>92</u>	<u>54</u>	<u>46</u>	<u>52</u>	<u>60</u>	<u>47</u>	<u>133</u>	<u>122</u>	<u>1 077</u>	<u>54</u>	<u>1 737</u>
<u>RADIOLOGICAL SCIENCES DEPARTMENT</u>											
Exempt	1	-	35	-	-	4	19	65	7	-	131
Other	6	-	47	-	3	18	18	177	22	-	291
Total	<u>7</u>	<u>-</u>	<u>82</u>	<u>-</u>	<u>3</u>	<u>22</u>	<u>37</u>	<u>242</u>	<u>29</u>	<u>-</u>	<u>422</u>
<u>GENERAL</u>											
Exempt	-	-	-	-	-	-	-	-	9	-	9
Other	-	-	-	-	-	-	-	-	3	-	3
Total	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>12</u>	<u>-</u>	<u>12</u>
Total Exempt	110	108	115	86	106	155	331	454	761	-	2 226
Total Other	372	389	406	431	322	517	1 402	1 093	2 109	54	7 095
GRAND TOTAL	<u>482</u>	<u>497</u>	<u>521</u>	<u>517</u>	<u>428</u>	<u>672</u>	<u>1 733</u>	<u>1 547</u>	<u>2 870</u>	<u>54</u>	<u>9 321</u>

* Includes White Bluffs and B-Y Exchange.

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HANFORD ATOMIC PRODUCTS OPERATION
NUMBER OF EMPLOYEES
OCTOBER 31, 1955

<u>DEPARTMENT</u>	<u>EXEMPT</u>		<u>OTHER</u>		<u>TOTAL</u>	
	<u>10-31-55</u>	<u>9-30-55</u>	<u>10-31-55</u>	<u>9-30-55</u>	<u>10-31-55</u>	<u>9-30-55</u>
<u>COUNSEL</u>	3	3	2	2	5	5
<u>OPERATIONS RESEARCH STUDY</u>	6	6	1	1	7	7
<u>EMPLOYEE & PUBLIC RELATIONS DEPARTMENT</u>						
General	8	8	8	8	16	16
Salary & Wage Administration	11	11	10	10	21	21
Personnel Practices	14	16	38	39	52	55
Education & Training	5	6	69	89	74	95
Emp. Comm. & Pub. Rel.	11	11	43	40	54	51
Union Relations	5	5	1	1	6	6
Aux. Oper. & Plant Prot.	115	115	785	797	900	912
Community	77	76	317	314	394	390
Health & Safety	46	47	174	169	220	216
<u>ENGINEERING DEPARTMENT</u>						
Engineering Administration	29	30	86	85	115	115
Advance Engineering	6	8	1	1	7	9
Design	170	166	111	114	281	280
Project	179	178	164	163	343	341
Pile Technology	232	231	165	152	397	383
Separations Technology	166	170	98	94	264	264
<u>MANUFACTURING DEPARTMENT</u>						
General	22	23	9	9	31	32
Reactor	330	326	1 450	1 422	1 780	1 748
Separations	300	303	1 602	1 576	1 902	1 879
Metal Preparation	112	108	572	568	684	676
Transportation	44	44	447	444	491	488
Purchasing & Stores	59	61	213	220	272	281
Electrical Utility	16	16	74	73	90	89
<u>FINANCIAL DEPARTMENT</u>						
General	9	9	5	7	14	16
Budgets & Measurements	7	7	8	6	15	13
Contract Cost	24	24	102	101	126	125
General Accounting	11	10	59	59	70	69
Property Accounting	17	16	53	51	70	67
Auditing	14	14	2	2	16	16
SS Accountability	10	10	33	34	43	44
Personnel Accounting	8	8	54	53	62	61
Procedures & Computing	29	29	48	47	77	76
<u>RADIOLOGICAL SCIENCES DEPARTMENT</u>						
General	6	6	-	-	6	6
Records & Standards	30	30	174	175	204	205
Biophysics	55	54	69	65	124	119
Biology	33	32	42	42	75	74
Engineering	5	6	1	1	6	7
Adm. and Comm.	2	2	5	5	7	7
GRAND TOTAL	<u>2 226</u>	<u>2 225</u>	<u>7 095</u>	<u>7 039</u>	<u>9 321</u>	<u>9 264</u>

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MANUFACTURING DEPARTMENT

OCTOBER, 1955

METAL PREPARATION SECTION

A net production of 423 tons of acceptable slugs, or 101 percent of the official forecast, were produced during the month. Of the total, 17 tons were of the cored slug material and four tons of the 4-inch type.

The composite canning yield was 77 percent, representing a 2 percent increase over the September yield. Although the inclusion reject rate remained relatively the same as last month, significant improvement was noted in the bonding layer void category.

Bare slug inventory, excluding slugs in process, varied from three days to nothing. However, inventory of acceptable canned slugs increased to approximately 4.5 weeks due to revision of Commission requirements. On October 12 the canning of regular production metal was halted due to lack of bare slugs. Normal operations were resumed on October 14. During this two-day period operations were diverted to canning depleted uranium slugs for Purex.

No autoclave failures occurred during the month.

REACTOR SECTION

The plutonium input production for the month was two percent over the official forecast and was the result of higher than forecast levels.

The overall reactor time operating efficiency was 67.5 percent. The low efficiency resulted principally from outages for process tube replacement at F and D, panellit gauge replacement at D and DR, and replacement of front face connectors at KE and KW.

Established maximum reactor operating levels, excluding enrichment burnout, were increased a total of 1171 megawatts during October, 80 at DR Reactor, five at H Reactor, 575 at KE Reactor and 511 at KW Reactor. At DR Reactor, the increase resulted from lower inlet water temperature and improved flattening; at H Reactor, from lower inlet water temperature; and at both KE and KW Reactors, from revision of tube power limits following the replacement of front face connectors.

The plutonium megawatt day output production was 22 percent below the official forecast due partially to discontinuing the discharge of low concentration material from H Reactor and partially to schedule variations. The discharge tonnages of high and low concentration material was 255 and 38 respectively.

A total of 20 slugs failed during the month; 12 regular uranium slugs, four production test slugs, three enrichment slugs, and one Mint piece. The total reactor outage time for rupture removal was 278 hours. Of this total, 163 hours were required for removal of slugs trapped among the rear face pigtails.

Twenty-eight reactor scrams occurred, 15 of which were caused by normal Panellit system variables. The total outage time resulting from all scrams was 106 hours.

Process tube leak testing programs were conducted at D, F, and H Reactors as the result of excessive water collection rates. At D early in the month, all tubes were tested with five leaking tubes found. Later, when collection remained high, by testing rear crossheaders two additional tube leaks were located. At H, three tubes and one flange leak were found. F shut down on the last day of the month for a tube testing program. The total outage time required for leak testing was 180 hours.

Process tube replacement programs were continued at D and F Reactors, with 104 tubes replaced at F and with the replacement of 81 tubes at D in progress at month end in conjunction with the Project CG-558 Panellit gauge replacement outage.

KE Reactor was shut down from October 2 to 13 for the replacement of the front face connectors, and replacement of all (except for eight rows) of the tube temperature elements with new interim elements.

DR Reactor continued until October 8, an outage which began September 28, for the replacement of the Panellit gauges.

The U-233 program was concluded during the month and all tubes containing J-Q material at C and H Reactors were discharged.

The second off-site shipment of irradiated Mint pieces was made during the month.

SEPARATIONS SECTION

The total production of low ngs plutonium from the Redox and T Plants was 124 percent of the official forecast with each facility contributing 139 and 93 percent respectively. The production of the Redox Plant is attributed to higher than forecast operating rate and efficiency; while the T Plant production was slightly curtailed due to a change in the Commission requirements for ngs product.

An operating rate of 11 tons per day was maintained at Redox until October 18 when a planned capacity test resulted in achieving a rate of 12.5 tons per day for a 32-hour period. On October 20, the extraction columns were shut down for a water flush. During this outage, replacements of an agitator in the waste neutralizer tank and a column feed pump were made. Following startup on October 22, another period of the 12.5 ton production rate was held for 27 hours. On October 25, a leak occurred in the oxidizer tube bundle which necessitated a plant shutdown. This equipment was replaced and operations were resumed on October 28. Failure of an extraction column feed pump on October 30 caused rates to be reduced to 6 tons/day. Pump was being replaced at month end. Total outage time for the month was 105 hours.

T Plant operation was normal with production slightly lowered as specified by Commission requirements.

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Emission of I^{131} continued from Redox and T Plant with minimum cooling age of metal processed at 85 and 87 days respectively.

The TRP production was 74 percent of the official forecast with output being curtailed during the first half of the month by a lack of feed due to waste metal removal problems. The total outage time for awaiting feed for the first and second cycles was 144 and 187 hours respectively.

The production of the UO_3 plant exceeded the forecast by 24 percent due principally to the high operating efficiency of Redox Facility.

The Manufacturing Department assumed responsibility for the Purex facility on October 16 (contingent upon formal acceptance). Flushing of canyon equipment was started on October 19 and completed on October 23. On October 24, 62 tons of depleted uranium were received and dissolving was started on October 28.

The Isolation Plant continued to process low g/t material during the month. Fabrication forecast was met with production confined to one type model. A new monthly record for total number of units processed was established.

Waste metal removal rates were limited during the first half of the month through tank cleanout processes and a series of equipment failures. Starting on October 19 blend concentrations increased and satisfactory removal continued the rest of the month.

GENERAL

Personnel

On Roll October 1, 1955	5193
Net Increase	57
On Roll October 31, 1955	5250

W.K. Mac Cready
W.K. MAC CREADY, MANAGER
MANUFACTURING DEPARTMENT

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MANUFACTURING DEPARTMENTPATENT REPORT SUMMARY
FOR
MONTH OF OCTOBER, 1955

All persons engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during the period covered by this report except as listed below. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

INVENTOR

NONE

TITLE W.K. MAC CREADY, MANAGER
MANUFACTURING DEPARTMENT**DECLASSIFIED**

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MONTHLY OPERATING REPORT - OCTOBER 1955

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November 7, 1955

MANUFACTURING DEPARTMENT
METAL PREPARATION SECTION

October, 1955

I. RESPONSIBILITY

There was no change in responsibility during this period.

ACHIEVEMENTA. Operating Experience

1. <u>Statistics</u>	<u>October</u>	<u>September</u>	<u>Year to date</u>
Total Acceptable Slugs Canned (Tons)	423	447	4003
Composite Canning Yield (%)	77	75	76
Efficiency (%) (Canning Throughput)	94	96	94
Forecast Achievement (Current Commitment)	101	102	102
Net Acceptable Solid Slugs (Tons)	406	333	3642
Slugs Returned From Reactor (Tons)	0	.42	41.39
Canning Yield (%)	76	76	76
Net Acceptable Cored Slugs (Tons)	17	114	361
Slugs Returned from Reactor (Tons)	0	.74	1.57
Canning Yield (%)	81	74	73
Autoclave Failure - Solid (No./M)	.00	.001	.001
Autoclave Failure - Cored (No./M)	.00	.00	.00
Acceptable C-4 Slugs Canned (Pieces)	0	0	5898
Acceptable Pb-Cd Slugs Canned (Pieces)	0	0	8863
Acceptable 10-66 Slugs Canned (Pieces)	0	1253	3366
Average Steam Generated (M lbs/hr)	40.5	31.9	
Maximum Steam Generated (M lbs/hr)	63.0	68.0	
Total Steam Generated (M lbs)	30,192	23,005	
Coal Consumed (Tons)	2,000	1,559	
Sanitary Water from 3000 Area (Million Gals.)	76.5	78.2	
Average Rate - GPM	1,714	1,810	

2. Activities

A net production of 423 tons of acceptable finished slugs, achieved in 21 working days, was essentially 101 percent of forecast. Of the 423-ton total, 17 tons were cored slugs and four tons were four-inch solid slugs. Seven canning line-shifts per day were operated through October 14. Production activity was reduced to six canning line-shifts per day on October 17 due to revised reactor slug requirements which reduced the Metal Preparation Section's production commitment for October from 458 tons to 419 tons.

A composite yield of 77% was experienced in October. This is an increase of 2% over last month's yield. The major causes for rejection were: marred surfaces, frost test, bad welds, poor bonds, and inclusions. The bonding layer void reject rate decreased to 0.7% from the previous month's 2.0%. The inclusion reject rate remained relatively the same as experienced during the previous month. A program has been started to reduce marred surface rejects through operator education and studies to improve handling methods and basket equipment.

On the 4-12 shift October 12, the canning of regular production material was shut down for lack of bare slugs. The bare slug inventory was depleted due to a two-day delay in the arrival of a regular railroad shipment from Fernald. Effectively, three-line shifts of regular production were lost before normal operations were resumed on the 4-12 shift October 14. Most of the operating personnel were utilized by canning twelve tons of depleted uranium slugs for Purex start-up during this period.

Due to reduced reactor consumption of canned slugs during October, the combined Metal Preparation and Reactor canned slug inventory increased to about a four and one-half weeks' supply at month-end. Since forecasted Reactor consumption of canned slugs is comparatively low, a high inventory will probably exist for several months.

Bare slug inventory in 300 Area, excluding slugs in process, fluctuated during the month from a three days' supply to nothing. Every effort is being made to keep metal in process, particularly in slug recovery, to an absolute minimum. All railroad metal shipments from the National Lead Company, Fernald, Ohio are being traced to expedite prompt delivery to HAPO.

On October 25, a new Metal Preparation Section Official Production Forecast (HW-39642 RD) was issued on the basis of a revised Reactor Section Goal Forecast. The new forecast, which reduced Metal Preparation productivity approximately 100 tons per month, covers the 12-month period October, 1955 through September, 1956 and was used as the basis for the fiscal year 1956 mid-year budget review.

No autoclave failures occurred during the month.

Difficulty has been experienced with condensed moisture and oil in the plant compressed air supply system during winter months. A cyclone separator has been added to the air supply system just ahead of the receiver in an attempt to control this problem.

The development of additional aluminum component vendors has continued. An order has been placed with Hunter-Douglas Corporation for the fabrication of 100,000 caps and approval for delivery of the first 4,000 has been given. Aluminum samples from Reynolds Metals have been evaluated and approval given to fabricate an initial 4,000 aluminum cans.

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2. Activities - continued

With the exception of one minor piece of equipment, the Metallographic Laboratory is now completely set up and functioning. This laboratory is now performing the routine metallographic and X-ray diffraction work associated with the uranium slug acceptance inspection and quality control program. This work had previously been done by Metallurgy Research.

Contact Engineering work is being performed on a number of items for the Stores Sub-Section. These include work on the main warehouse roof, parking lot at Central Stores, lighting in the automobile warehousing area, general automation at Central Stores, and relocation of warehouses and yard.

The entire canned slug historical quality record is now obtained from station report. Quality information formerly recorded on the truck cards are no longer required for the compilation of quality records. The quality record at present is accurate within two percent of the figures previously obtained from the truck cards. This accuracy is well within the five percent maximum error established as a limit. The station reports used for the quality record are: braze inspection, weld inspection, frost test, penetration test, core test, etch inspection and final inspection. Further improvement in methods for gathering quality data will be made when the conveyors are used and when electronic counters are installed.

A large number of transformation rejects were detected during the month. A sludged build-up in heat treating tanks at Fernald is believed to have been the cause and this condition has since been corrected. As a result of the occurrence of these rejects a more critical transformation test standard was issued which increased the over-all percentage of transformation rejects from less than 0.5 percent to approximately 1.5%. Should this higher reject experience continue, it will be necessary to request additional metal receipts or re-activate the salt bath heat treating operation. Bare uranium slug quality has remained high with less than one percent of the new slugs received from Fernald being rejected for metal defects.

3. Special Operations

Eight hundred fifty-six small diameter uranium enriched aluminum alloy "C" slugs were canned by the hot press process during the month.

Approximately 800 special aluminum-silicon dummy slugs were fabricated for the Engineering Department to be used for corrosion tests in reactors. The dummy slugs were made by processing the cap, can and sleeve through the regular canning cycle, allowing the can to remain full of AlSi in place of the uranium slug.

A total of 2225 uranium "dingot" slugs were outgassed in the salt bath heat treating facilities during the month.

Several aluminum dummy slugs were canned by the hot press method to be used for bond test standards. A known unbonded area was built into the slugs by coating a definite area with graphite prior to the hot press canning operation.

4. Schedule Variance

Acceptable canned slug production was 101 percent of forecast, based on the final October production commitment of 419 tons.

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E6-3

B. Equipment Experience**1. Operating Continuity**

A fuse on the primary side of one of the 115-KV transformers supplying power to the area failed at 3:48 p.m. October 31 causing single phase supply to all connected load until switching could be completed at 3:52 p.m., restoring normal service. The only difficulty experienced was the failure of four acid fume exhaust motors on the penetration etch machines in the 313 Building. These motors are loaded to capacity and have had their overload protection set up to the point they would not trip under these conditions. The emergency generator at the power house did not start as its actuating relay was connected to that phase of the circuit that remained energized. A complete study of this failure and its effects is under way.

2. Inspection, Maintenance and Replacements

The inclusion reject rate, as high as 22% early in July, has gradually dwindled to about 3%. During the intervening period, many experiments and tests were performed to attempt to find an answer. Since the defect appeared to develop in the autoclaves, operation of that facility was scrutinized. Various cleaning methods were tried, the best of which resulted in reducing the reject rate by only about 15% of its former value. Modified start-up procedures were initiated, with results no more positive than those attained by cleaning. Early in the course of the problem it was discovered that steam autoclaves produced fewer inclusion rejects than did those operated on water; hence, all but one line (retained for control purposes) were changed to steam. As time went on, and the reject rate slowly dwindled, the difference between water and steam diminished, until the water autoclaves were finally producing consistently fewer inclusions than were the steam vessels. As a result, the autoclaves are now being converted back to water.

It has been suggested that the inclusion rate may be related to the condition of the 300 Area water supply. Investigation shows that the increase and decrease of the inclusion reject rate coincided quite closely with the seasonal rise and fall of the level of the Columbia and Yakima rivers. During high water, the amount of total solids, as organic and inorganic matter, increases considerably, much of it in solution or colloidal suspension. When the suspended solids or dissolved chemicals are heated, they may coagulate as boiler scale, iron oxide, and solid protein on autoclave walls. These could be a potential source of inclusions. A program is being initiated to make periodic analyses of the 300 Area water supply to provide a background of data against which to correlate any large scale recurrence of the inclusion problem.

All but one of the original steam heaters installed in the slug recovery caustic and treater tanks have been replaced with one and one-half inch pipe steam coils fabricated on-site. The original heaters developed steam leaks so rapidly that they were primarily responsible for 14 individual slug recovery shutdowns during the three-month period of August through October.

C. Improvement Experience**1. Production Tests**

PT-313-47MT "Cored Slugs from Extruded Blanks and Rolled Rods" HW-33189
A total of 17 tons of finished cored slugs were produced with an 81% yield. Cored slug production is currently being scheduled consistent with the receipt of drilled slugs from Fernald. Future schedules are based on a rate of 25 tons per month.

DECLASSIFIED

HW-39751

DEL

1. Production Tests - continued

Minor difficulty has been experienced with the quality of aluminum plugs and the major cause for rejection has resulted from the plugs falling below the minimum specified diameter. The vendor has been supplied the necessary information to resolve this problem.

PT-105-613-A-54MT "Determination of the Effect of a Modified Beta Heat Treating Cycle on In-Pile Dimensional Stability of Solid Slugs" HW-39128

A production test was issued authorizing the preparation of eight-inch slugs fabricated from approximately 15 tons of rods beta heat-treated using a delayed quench. About equal quantities of this material were heat treated using 35-, 50-, and 80-second delay times prior to quenching. The slugs were received and processing by the lead dip process was started at month-end.

PT-313-56-MT "Canning of Dingo Uranium for Pile Irradiation" HW-37695

Fifteen tons of eight-inch dingo uranium slugs were prepared by the lead dip process during this period. These slugs will be irradiated to low goal exposure. The production phase of this test will be gradually increased to 33 tons per month in January, 1956.

PT-313-60-MT "Evaluation of the Irradiation Characteristics of Vertically Heat Treated Uranium" HW-38092

A total of 1502 eight-inch slugs machined from rods vertically heat treated in chloride salt, followed by a delayed quench, were canned by the lead dip process. The finished slugs will be irradiated to compare the performance with standard slugs machined from rods horizontally heat-treated in carbonate salt. There is some evidence that standard slugs may be warping during irradiation because of non-uniform stresses or grain orientation induced by horizontal rod heat treatment followed by cold straightening.

2. Process Tests and Revisions

Scrap aluminum and AlSi generated by the Acme-Gridley cut off machines and within the canning operation are being recovered by remelting with elemental silicon. Both the normal 12 percent AlSi and the enriched 25 percent AlSi have been successfully prepared by coverage personnel during preliminary tests. Approximately \$7,000.00 net savings were realized during the three-month period of July through September as a result of this recovery operation which will be continued as a standard procedure.

The consumption of nitric acid at the metal wash machines due to losses through the exhaust system has been reduced by lowering exhaust fan speeds. In addition, stainless steel mesh screens have been installed in the exhaust ducts which tend to collect acid droplets.

The installation of an indexing switch on the number two Acme-Gridley cut-off machine and the use of a gauging block to position slugs in the lathe collet have eliminated the former trial and error method of determining cap thickness lathe settings. Initial tests have indicated that fewer thin cap rejects can be expected. Installation of like equipment on the other cut-off machines is planned.

3. Inventions and Discoveries

Personnel in the Metal Preparation Section engaged in work which might be expected to result in inventions or discoveries have reported that no inventions or discoveries were made during the period covered by this report.

D. Events Influencing Costs**1. Labor Variance**

No change is anticipated in the unit cost of direct labor.

2. Material Variance

Direct material is expected to decrease approximately .01 per unit under September costs as a result of a return to normal consumption of new steel sleeves.

In running inventory balances for SS accountability at the end of September, an unusually low C-6 oxide account was noted. Investigation revealed that approximately 2629 pounds of uranium were lost to the process sewer in the slug recovery operation. The loss was the result of tank heels which were not completely removed when the treater solutions were pumped to the filter press. The remaining heels were then diluted with other solutions and pumped to the sewer. Corrective procedures were initiated immediately to preclude any further losses of this type.

3. Other Costs

Unit costs of I.M.E. are expected to decrease .025 below September costs. Reductions in freight costs for returning bare slugs to Fernald, decreased maintenance cost of debugging new equipment and return to normal usage of shop supplies account for this variance.

E. Plant Development and Expansion**1. Project Status**

CA-514 - "Expansion of 300 Area Production Facilities" - Minor Construction will complete all major work orders by November 1, 1955, except for a few punch list items. The majority of the work orders issued to Maintenance should be completed by December 1, 1955, with no schedule completion dates later than December 23, 1955.

All work has been completed on the finishing area conveyors. The #1 finishing line conveyor has been run for approximately two hours, and further operations will continue to discover any difficulties until the new accountability system for the conveyor operation is developed.

The acid drain line and the float switches for the penetration etch machines were installed. The acid resistant conduit installation was completed on both penetration etch machines.

Fabrication of the slug welder brushers has commenced for one finishing line. It is expected that this work will be completed by November 30, 1955.

The radiography conveyors have been completed for both lines.

The component parts preparation area conveyors were completed and acceptance tests were conducted. Maintenance is continuing work on the ventilation and safety aspects of the component parts preparation machines. Minor Construction has completed work on cap and can machines and the acceptance tests have been conducted. A vapor wall is being installed on the east side of the cap and can machines to meet fire and safety code regulations.

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DECLASSIFIED1. Project Status - continued

A work order was issued for temporary measures of alleviating the roof fume conditio caused by the slug pickle machines. The exhaust scrubber fan on the pickle machines has been slowed. Stainless steel mesh will be installed in the scrubber ducts.

Work on the tank farm has been completed.

The manometers in the slug recovery storage tanks were modified by placing vol chambers in the lines to prevent the loss of the indicating liquids. A new stack and drip pan was installed on the process exhauster to prevent damage to the roof.

Minor Construction forces have installed a slab and trench on the east side of the 313 Building for the stripper caustic waste station. Work is in progress for piping the stripper caustic to the load luggers to be located on the slab.

A meeting of interested parties was held to discuss the slug recovery problems. It was agreed to operate as originally designed. It is believed desirable to move solutions instead of material from a safety and convenience standpoint if the accountability problems can be solved. Members of Projects & Personnel Development and Design are performing the design work necessary for these modifications.

Minor Construction were completing the balancing of the ventilation system at month-end. All Minor Construction equipment in the shop area has been removed from the 313 Building.

CA-590 - "Fly Ash Collection Equipment - 384 Building" - A work authority was issued on October 13 which authorizes the Engineering Department to prepare scope plans and engineering specifications, and to perform field engineering and inspection Design and installation will be performed on a fixed price contract, expected to be let in January. Scope completion date is June 30, 1956.

CA-601 - "General Grounds Improvement - 300 Area" - A work authority was issued on October 20, which authorizes the Engineering Department to provide design assistance and field engineering. The AEC will secure the services of an architect-engineer for design. Construction will be performed on a fixed price contract, expected to be let by March 1, 1956. Completion is estimated at June 1, 1956.

Project CG-614 - "Hanford 4X Program - 30C Area"

<u>Authorized Cost</u>	<u>Estimated Cost</u>	<u>Cost to 10-24-55</u>
\$313,000* (New figure)	\$313,000	\$136,592

* The Commission withdrew \$27,000 to cover the lump sum contract for Change House modifications pending further study of program needs. The bid package has been transmitted to the AEC for awarding the Contract.

The project, excluding the lump sum portion, is 24% complete.

In the finishing area, work has commenced on the installation of the welding booths, welders, and material take-offs have been made for piping for the argon system.

Minor Construction forces are fabricating the furnace induction coil exhaust and furnace supply duct for the canning area. The vendor has promised the furnace exhaust duct on November 1, 1955. Maintenance forces will install this duct and this phase of the project will be complete. Electrical controls for the furnaces were completed this month.

SECRET
ED-7

1. Project Status - continued

Project CA-627 - "Replacement of 300 Area Fence" - This project was completed and accepted on October 14, 1955.

IR-194 - "Centralized Quality Reporting System" - AEC approval on extension of the completion date to March 1, 1956 has been received. Design of the system is complete and all work orders issued. Purchased materials are being received on schedule. All materials needed from stores have been ordered and are being stocked ready for use. Fabrication of the control panels has been initiated.

ER-A-3122 - "Steam Plant Deaerator Replacement - 3rd Building" - Investigation is continuing on the performance of the deaerator and auxiliary equipment at various loads. December steam loads are expected to be sufficiently high to provide the necessary data to define the capacity of the present equipment. It is anticipated that 60,000 pounds per hour of additional deaerating capacity will be required to meet future steam demands.

CG-646 - "Modification to Pickle Machines - 313 Building" - Authorized funds - \$12,500. The project proposal was approved by the AEC Project Review Board on October 20. The vendor is being contacted for design of the immersion tank and supplemental modifications. The proposal for physical performance of the work is expected to be submitted and approved by December 1.

"Noise Reduction - 300 Area" - Estimated Cost - \$45,000 - The project proposal was transmitted to the Commission on October 19. Review by the AEC Project Board was scheduled for October 27.

Work Orders CC-8188 and CC-8189 - "Installation of Dip Slug Pickle Equipment" - The installation was completed on October 7, 1955, and immediate operation of the equipment began.

2. Plant Engineering

The manual immersion pickling facilities have been completed. These facilities will be used for pickling "dingot" material heat treated on-site and will also serve as a back-up for the two metal wash pickle machines.

F. Significant Reports Issued1. Routine

<u>Number</u>	<u>Title</u>	<u>Author</u>	<u>Date</u>
HW-39324	Monthly Report, Process Sub-Section, Metal Preparation Section, September, 1955	K.V. Stave	10-5-55
HW-39325	Monthly Report, New Fuel Element Production Program, September, 1955	W.A. Blanton	10-5-55
HW-39456	Statistical Quality Report, 300 Area, January through September, 1955	G.X. Beard	10-13-55
HW-39342	Monthly Report - Operation Sub-Section September, 1955	W W Windsheimer	10-5-55
HW-39420 RD	Production Report - Metal Preparation Section, Operation Sub-Section September, 1955	F.E. Berg	10-7-55

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DECLASSIFIED2. Non-Routine

HW-39336	Canned Slug Stamping	R.E. Olson	10-5-55
HW-39445	Investigation of the Causes of Weld Rejects	G.L. Otterbein	10-11-55
Secret RD	Production Summary, First Quarter, FY 1956	H.E. Berg	10-20-55
HW-39642-RD	Official Production Forecast, Metal Preparation Section, October 1955 - September 1956	H.E. Berg	10-25-55

III. PERSONNELA. Organization

No change.

B. Force Summary

	Start of Month		End of Month		Net Change	
	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Exempt</u>	<u>Non-Exempt</u>	<u>E.</u>	<u>N.E.</u>
Section General	1	1	1	1	0	0
Operations	22	177	22	178	0	+1
Power & Maintenance	34	318	36	320	+2	+2
Process	36	64	40	66	+4	+2
Projects & Personnel	15	5	15	5	0	0
Totals	108	565 (673)	114	570 (684)	+6	+5

C. Safety

There were no major injuries during the month. One sub-major injury occurred October 7 when an employee, trying to free a stuck sleeve in the automatic quench machine, suffered a minute chip fracture of the middle finger.

A near-serious incident occurred during a repair operation to a caustic pump in slug recovery. An eruption of hot caustic occurred and an employee working nearby received minor injuries from the solution.

D. Radiation

One exposure in excess of 300 mrad was reported. In this case the total exposure for the week did not result in an over-exposure. Four exposures in excess of 200 mrad/week and 34 exposures in excess of 100 mrad/week were reported.

E. Personnel Activities1. Visits and Visitors

S.M. Gill attended a General Electric Quality Control Managers' Conference at Electronics Park, Syracuse, New York.

W.A. Blanton attended the Metal Quality Advisory Committee Meeting in Cincinnati, Ohio.

W.W. Porter attended a Manufacturing Engineering Conference in Louisville, Kentucky.

The following persons visited members of the Section during October: J.C. Mead and S.F. Audia of the National Lead Company of Ohio; R.S. Dalrymple of Reynolds Metals Company; K.L. Flanders of E.I. duPont de Nemours; and J.C. Finley of the Aluminum Company of America.

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2. Meetings

Fifty-five round-table, 39 information, and 18 staff meetings were held for members of the Section.

Ninety-six safety and security meetings were held.

Three training programs and one training film were presented to exempt personnel.

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Richland, Washington
November 7, 1955

MANUFACTURING DEPARTMENT
REACTOR SECTION
MONTHLY REPORT
OCTOBER, 1955

I. RESPONSIBILITY

Responsibility for the maintenance of the 100 Area blueprint files in Building 1704-F was transferred from the Engineering Department to the Reactor Section and assigned to the Manufacturing Engineering Unit of the Process Sub-Section.

II. ACHIEVEMENT

A. Operating Experience

Reactor time operated efficiency was 67.5. essentially the same as in September. This continued low efficiency resulted in October from a combination of factors including extensive process tube replacement at F and D Reactors, Panellit gauge replacement at D and DR Reactors, dropping of 3X system balls at H Reactor, front face connector replacement at KE and KW Reactors, process tube leak testing at D, and H Reactors, and currently normal amounts of outage time for charge-discharge and slug failure removal.

Total and plutonium input productions were approximately two percent above forecast as the result of higher than forecast levels.

Thorium input was 66 percent of forecast due to discontinuing the program prior to schedule. Production charged to thorium irradiation at C and H Reactors was 2.5 and 1.2 percent, respectively.

Plutonium megawatt day output production was 22 percent below forecast due partially to discontinuing the discharge of low concentration material from H Reactor, and partially to schedule variations.

DECLASSIFIEDA. Operating Experience (Continued)

The goal concentrations for low and production material remained unchanged in October. Goal concentration of the D Reactor pilot program material was reduced from base goal plus 400 megawatt days per ton to production concentration due to an increased slug failure frequency. Tons discharged at the low and production concentrations were 255 and 38, respectively.

Established maximum reactor operating levels, excluding enrichment burnout, were increased a total of 1171 megawatts during October, 80 at DR Reactor, five at H Reactor, 575 at KE Reactor and 511 at KW Reactor. At DR Reactor, the increase resulted from lower inlet water temperature and improved flattening; at H Reactor, from lower inlet water temperature; and at both KE and KW Reactors, from relaxation of tube power limits following the replacement of front face connectors.

Twenty slug failures occurred in October as compared to 17 in September.

	<u>B</u>	<u>C</u>	<u>D</u>	<u>DR</u>	<u>F</u>	<u>H</u>	<u>KE</u>	<u>KW</u>	<u>Total</u>
Eight-inch regular		4	5		3				12
Production Test			1(1)		2(2)	1(3)			4
"C" Material		3(4)							3
Mint			1						1
	0	7	7	0	5	1	0	0	20

(1) Production Test 105-588-A, "Irradiation of Extruded Cored Slugs"

(2) Production Test 105-570-A, "Irradiation of Cored Uranium Slugs"

(3) Production Test 105-506-E, "Recirculation Studies"

(4) Two of the three failures occurred in one tube.

Reactor outage time for the removal of these slug failures was 278 hours, of which 163 hours were involved in the removal of one failure from D Reactor as the result of irradiated metal becoming trapped among rear face pigtails.

On the basis of recent experience which indicates that outage time can generally be profitably used, and to present a more realistic picture, the procedure for charging outage time to slug failure removal was revised in October. Only outage time required for actual removal of the failures will be charged in contrast to the former policy of charging at least minimum outage time (24 to 30 hours) to failures which could not be removed within scram recovery time.

1. Statistics

Operating statistics are summarized in the table on page 3.

1. Statistics

	<u>B</u>	<u>C</u>	<u>D</u>	<u>DR</u>	<u>F</u>	<u>H</u>	<u>KE</u>	<u>KW</u>	<u>Total or Average</u>
Reactor Time Operated	96.4	72.9	42.7	74.4	45.8	63.5	63.8	80.2	67.5
Efficiency (%)									
Reactor Outage Time (Hrs)	26.1	200.6	262.7	190.3	338.6	252.9	269.4	147.2	1687.8
Plutonium Production	0.4	1.0	163.3	-	64.3	18.9	-	-	247.9
Special Irradiations and Tests	26.5	201.6	426.0	190.3	402.9	271.8	269.4	147.2	1935.7
Total Outage Time	0.6	150.4	346.0	1.0	131.7	271.8	69.9	47.9	1019.3
Reactor Unscheduled Outage Time (Hrs)	7.1	152.6	4.9	15.3	20.2	2.9	2.4	92.6	298
Metal Discharged (Tons)	4	3	3	3	4	1	4	4	
Water Quality (ppm Turbidity)	11	9	8	8	5	5	12	12	
Raw Water - Average	.004	.004	.005	.005	.004	.003	.002	.004	
Raw Water - Maximum	.007	.006	.008	.006	.006	.005	.003	.006	
Process Water - Average	2094	3000	1638	1906	1263	1911	5134	5169	22115
Process Water - Maximum	569	6391	-	4134	1562	2205	5415	5335	569
Water Pumped (MM Gals)									25042
Bldg. 190 to reactor									
Bldg. 182 to 200 Areas									
Bldg. 181									
Steam Generated (MM Lbs)									598
Coal Consumed (Tons)		171	186	99	20	101	21	35514	470
Oil Consumed (M Gals)		11122	11831	6831	5730	237	233		

HW-39751

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Ec-3

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A. Operating Experience2. Activities

DR Reactor continued until October 8, an outage which began September 28, for the replacement of Panellit gauges in connection with Project CG-558 (Reactor Plant Modification for Increased Production). Other work accomplished during this outage included installation of gamma monitoring facilities, reliability tests of Ball 3X system, and installation of a 30-tube poison column control facility, completed except for ball valve pigtails on 21 tubes.

D Reactor was shut down for removal of a slug failure on October 21. The outage was continued through month end to replace Panellit gauges in connection with Project CG-558. Process tube removal was the principal work scheduled in conjunction with gauge replacement.

KE Reactor was shut down from October 2 to 13, for the replacement of aluminum front face connectors with teflon-stainless steel braid reinforced connectors, and replacement of aluminum adaptors with stainless steel adaptors. Also during this outage, all except eight rows of tube temperature elements were replaced with new, interim elements.

The major thorium irradiation program was concluded with the discharging of all remaining J-Q tubes under this program, 57 at C Reactor and 51 at H Reactor.

The second shipment of Mint pieces from DR Reactor to Savannah Works was made. Five casks containing approximately 4,500 pieces were shipped.

The following table indicates activities during October associated with special irradiations other than the programs noted above:

	<u>Tubes</u> <u>Charged</u>	<u>Tubes</u> <u>Discharged</u>	<u>Casks</u> <u>Shipped</u>
Production Tests	16	17	1
"B" Material	3	3	5
Mint (flattening)	5	5	0
Thorium (flattening)	<u>2</u>	<u>0</u>	<u>0</u>
Totals	26	25	6

B. Equipment Experience

Twenty-eight reactor scrams occurred, 15 of which were caused by normal Panellit system variables. Eight scrams, as listed below, resulted in connection with flux monitoring instrumentation:

ReactorReason

KE

Beckman surge during start-up when range change was not coordinated with by-passing.

B. Equipment Experience

<u>Reactor</u>	<u>Reason</u>
KW	Scrammed through inter-tie by KE Reactor Beckman surge, above.
KW	Beckman surge following rapid control rod shift during non-equilibrium operation.
KE	Scrammed through inter-tie by KW Reactor Beckman surge, above.
C	Tube failure in Beckman
B	Tube failure in Beckman
H	Blown fuse in Beckman
F	Beckman surge attributed to arcing in horizontal rod switches.

In addition, the following scrams occurred:

<u>Reactor</u>	<u>Reason</u>
C	Manual scram to control high exit water temperature.
KE	Panellit trip due to momentary plugging of the air operated pressure regulating valve on the Building 1706 KER facility tube.
KW	Manual scram for indicated high horizontal rod water pressure.
DR	Manual scram due to low pressure noted on tube as the result of partially closed Hoke valve.
B	Manual scram as result of annunciator alarm when alarm was not by-passed during ball valve operation on Production Test tube.

Total outage time resulting from all of the above scrams was 106 hours.

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DECLASSIFIED**B. Equipment Experience**

Process tube leak testing programs were conducted at D and H Reactors in October as the result of high water collection rates. Early in the month, all tubes at D Reactor were tested with five tube leaks found. Later, when collection rates remained high, all rear crossheaders were tested using the helium detection system with two tube leaks found. Insufficient subsequent operation has precluded determination of the water collection rate trend.

Testing of all H Reactor tubes, half the crossheaders with the helium detection system, and half the tubes by conventional means, revealed three tube and one flange leak. Water collection rates had returned to normal at month end.

Decreasing collection rates reported for C Reactor in September returned to normal by mid-October. F Reactor was shut down shortly before month end on the basis of high collection rates. Approximately 180 outage hours were required by leak testing.

Borescopic inspection of vertical channel No. 24 at D Reactor, following failure of the vertical rod to enter, showed that a graphite block at approximately horizontal row 35 had entered the channel. Repair measures are being planned.

Severe effluent line leakage at D Reactor near the 107 Basin was corrected by pouring concrete around the line.

At H Reactor, 3X system balls were dropped into 29 channels when power to hopper holding coils was cut off during lock bar removal. Removal of balls required approximately 140 outage hours.

Process tube replacement programs were continued at D and F Reactors, with 104 tubes replaced at F Reactor, and with the replacement of 81 tubes at D Reactor in progress at month end in conjunction with the Project CG-558 Panellit gauge replacement outage.

Inspection of the K Reactors effluent lines by a diver indicated that there had been no significant change in the river portion of the lines since repairs were made in May, 1955.

New fluid drive assemblies were installed in Building 190-C process water pump units Nos. 1, 3, 8, 9 and 12. The new assemblies include primarily a new design impeller machined from S.A.E. 2330 steel, with a dampening ring supporting the impeller vanes, and incorporating enlarged radii, relieved hub sections, and finer machining.

B. Equipment Experience (Continued)

Number 9 Building 190-F process pump motor failed during a routine start when worn motor windings permitted arcing.

During October, continued trouble was experienced with Buildings 190-KE and KW liquid rheostats. Factory repaired cells as well as originally installed cells proved unsatisfactory as the result of rupturing of the rubber linings. A lack of spare cells has prevented inspection and repair of all rheostats, and currently all units are operating continuously to avoid additional startups. Enlarging the openings around the circulation pipes appears to be a promising solution.

C. Improvement Experience

The most significant Production and Process Tests are reported below, together with other items of "Improvement" significance.

- PT-105-579-A (Quantity Irradiation of J-Q Columns)
Discharge during October of 51 J-Q tubes at H Reactor and 57 J-Q tubes at C Reactor completed irradiation aspects of this test.
- PT-105-354-E (KAPL-120 Recirculation Loop)
The fuel element for this test was charged at H Reactor during the outage of September 29. During the month, the loop operated at approximately normal riser pressure because of a water leak in a thermocouple well. At month end, the leak had been repaired, and high pressure operation was scheduled to be resumed during the next outage.
- PT-105-506-E (Recirculation Studies)
H Reactor was shut down immediately prior to month end for the removal of a slug failure from the test tube, a zirconium tube charged with 24 regular aluminum jacketed slugs. Removal operations were in progress at month end.
- PT-105-570-A (Irradiation of Cored Uranium Slugs)
At F Reactor, solid four-inch slugs failures were removed from two run-till-rupture control tubes for this test. At time of failure, the tubes had reached exposures of 1547 and 1484 megawatt days per ton, respectively.

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C. Improvement Experience (Continued)

Five revised Process Standards-Reactor were approved and issued. These were Standards titled "Process Water Pressure Trip Settings", "Thermal and Biological Shield Cooling Water", "Number of Inoperable Rods and Ball 3X Hoppers During Reactor Operation", "Ruptured Slug Detection", and "Properties of Process Tubes". The most significant changes accomplished by these revisions included; a reduction in the number of vertical rods and 3X system ball hoppers permitted out of service at all reactors except the K Reactors (where present requirements are considered adequate) to provide an increased margin of safety in case any of the individual controls fail to operate when tripped; and authorization to use unclad 2S aluminum process tubes because of difficulty of procuring 63S tubes or 72S clad tubes, and because of comparable corrosion rates for the 2S tubes.

Evaluation of the one-piece molded natural rubber footwear has been concluded. The footwear was found to be equivalent or superior in every respect to present neoprene items, particularly with regard to stretching quality which permits easier donning and removing. As reported previously, a 25 percent reduction in costs can be realized through use of the natural rubber footwear.

A method of detecting process tube leaks by means of a helium detector has been developed by the Engineering Department and effectively used. Entrapped gasses in the reactor effluent (one crossheader at a time) are drawn off by a vacuum pump and passed through a helium detector. Where tube leaks exist, helium from the reactor atmosphere enters the effluent water, permitting the leak to be traced to a specific header. Pressure testing of the individual process tubes further establishes the leaking tube. This system of leak testing has resulted in significant savings in manpower and in radiation exposure time.

Personnel in the Reactor Section engaged in work which might be expected to result in inventions or discoveries have reported that no inventions or discoveries were made during the period covered by this report.

D. Events Influencing Costs

Reactor Section cost increased approximately \$70,000 in October. Primary factor contributing to the continued high cost was the large scale tube replacement program at D and F Reactors. Other factors adversely affecting cost included the continued relatively high slug failure rate, process tube leak testing programs at D, and H Reactors, dropping of 3X system balls at H Reactor, and increased cost of fuel and chemicals amounting to approximately \$16,700. This amount included an approximate \$15,400 increase in coal and fuel oil cost as the result of a 2.7 percent increase in steam generation, and \$1,300 increased chemical cost as the result of a 7.9 percent increase in total water flow as compared to September. There were no significant factors beneficially affecting cost.

DECLASSIFIED**D. Events Influencing Costs (Continued)**

Although Reactor Section cost increased approximately \$70,000 in October, an 18 percent increase in production in October as compared to September is expected, on the basis of preliminary analyses, to result in a decrease of approximately 13 percent in both total and plutonium irradiation unit cost.

E. Plant Development and Expansion**1. Project Status**

The most significant Reactor Section project activity is reported below. Further details concerning projects may be found in the report, "Status of Reactor Section Projects, Informal Requests and Budget Items," F. A. R. Stainken to R. S. Bell, dated 10-20-55.

CA-431

(100-C Area)

The Operations Sub-Section requested that only five of the 15 replacement horizontal control rods be installed at this time. Revision at the project scope is under study. The 107-C east basin was released to Minor Construction for baffle repairs. Preliminary work has been hampered by high radiation levels.

CA-512

(100-K Plant)

Replacement of front face connectors, adaptors and interim temperature monitor bulbs (except for eight rows) was completed at KE Reactor as described under "Activities", approximately 40,000 pounds of boron steel balls have been received, with the remaining 35,000 pounds expected early in December. Four hundred water pressure monitor test switches have been received, and 350 are being installed in K Reactor type Panellit gauges. Fifty switches are being subjected to extensive physical testing to determine the possible long-range deficiencies.

CG-558

(Reactor Plant Modification for Increased Production)

Replacement of Panellit gauges at DR Reactor was completed during the September 28 outage which ended October 8. Replacement of Panellit gauges at D Reactor was completed during the outage which began October 21, and continued through month end. A re-examination of the economics involved in replacement of front face nozzles, connectors and venturi assemblies is under way. Construction in the water plant and reactor facilities is progressing according to schedule.

CG-578

(Effluent Water Monitoring Improvements - 100-B, D, DR, F and H Areas)

Installation at DR Reactor was completed on schedule during the Panellit gauge replacement outage. Fabrication of B and D Reactor equipment has progressed satisfactorily.

E. Plant Development and Expansion (Continued)

2. Plant Engineering

A number of engineering and development studies were active in the Section during October. The studies are, in general, aimed at decreasing costs and/or increasing production. Details are given in Document HW-39694. Several items of interest are reported below.

A study is in progress to determine the best material for use in the construction of stay-bolts to tie together the front and rear reactor biological shields following installation of process tubes without Van Stone flanges. Aspects of the problem being considered include; maximum usable size of bolt, stay-bolt cooling, stay-bolt strength and methods for periodic testing, and reactivity, radiation and production effects of various installations.

Testing of a noise reducing motor shroud on No. 12 800 HP pump motor in Building 190-F resulted in a noise reduction 30 to 40 percent greater than the nine decibel reduction required, and showed the shroud to be a satisfactory approach to quieting the subject motors.

General assistance was provided to General Engineering Laboratory consultants during the analysis of torsional and lineal vibration studies of pumping units and other equipment in Building 190-C as part of the investigation of recent fluid drive failures.

F. Significant Reports

1. Routine

Monthly operating reports issued for September were:

HW-39260-A	Reactor Section	R. S. Bell	10-7-55
HW-39329	Operations Sub-Section	A. R. Maguire	10-1-55
HW-39326	Process Sub-Section	O. C. Schroeder	10-1-55
HW-39293	Projects and Personnel Development	F.A.R. Stainken	10-3-55
HW-39285	Radiation Monitoring Sub-Section	P. C. Jerman	10-3-55
-	Maintenance Sub-Section	E. E. Weyerts	10-4-55
HW-39331	Power Sub-Section	J. C. McLaughlin	10-5-55

Other routine reports issued during October included:

HW-39611	"Monthly Progress Report, Reactor Section Expansion, October, 1955"	J. P. Langan	10-24-55
-	"Status of Reactor Section Projects, Informal Requests, and Budget Items"	F.A.R. Stainken	10-20-55
HW-39553-RD	"Reactor Section Savings and Improvement Report July to September, 1955"	R. S. Bell	10-12-55
HW-39301	"Reactivity Balance and Associated Data - Period September, 1955"	A. P. Vinther	10-3-55

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DECLASSIFIED**F. Significant Reports (Continued)****2. Non-Routine**

HW-38959	"KW Reactor Operation Subsequent to Replacement of Front Face Connectors"	D. S. Lewis	10-5-55
HW-39409	"Operation of 105-KE Reactor Subsequent to the Replacement of Front Face Connectors"	H. T. Wells	10-7-55
HW-39643	"K Reactor Power Level Limit Based on Emergency Water Flow"	R. E. Hall	10-28-55
HW-39475	"Estimated Loss Experienced at 105-H as a Result of Rupture Outbreak During October, 1954"	K. W. Hess J. D. Floyd J. W. Ballowe	10-13-55
HW-39524	"Outage Time Economy"	A. P. Vinther	10-14-55
HW-39574	"Zone Temperature Monitoring"	R. E. McGrath	10-18-55
HW-39339	"Measurement of the Sensitivities of Reactor Neutron Flux Monitors at D Reactor"	M. W. Eulin	10-5-55
HW-33831	"Production Test 105-10-MR, The Effects of Charging During Reactor Operation on Cored Uranium Slugs"	D. F. Bolender	10-26-55
HW-39262	"Process Water Trip-Out Tests - 100-D and 100-DR Areas"	R. L. Turner	9-30-55
-	"Field Test of the Landsverk Self-Reading Pencils"	R. T. Woolsey	10-5-55

III. PERSONNEL**A. Organization**

There were no appointments in the Reactor Section during October.

	<u>Beginning of Month</u>	<u>End of Month</u>	<u>Net Change</u>
Section General	2	2	0
Operations	379	382	+3
Maintenance	666	694	+28
Projects and Personnel	49	51	+2
Power	486	488	+2
Process	78	77	-1
Radiation Monitoring	92	96	+4
Section Total	1752	1790	+38

Changes during October included 28 transfers into the Section, nine transfers out of the Section, 22 new hires, two terminations, four reactivations, and five deactivations.

C. Safety Experience

No Major Injuries occurred in the Reactor Section in October. One Sub-Major Injury, No. 289, occurred in Building 1717-F on October 11, and involved a Maintenance Sub-Section craftsman who received a broken toe when his foot was struck by a spacer block which fell from a power hacksaw.

D. Radiation Experience

There were no Class II and two Class I Radiation Incidents during October. Class I Incident No. 522-R occurred at C Reactor on October 5, and involved a Maintenance Sub-Section craftsman who was exposed to potentially high dose rates when he drained chromic acid flushing solution from a horizontal rod without required monitoring.

Class I Incident No. 531-C occurred at D Reactor on October 10, and involved the potential over-exposure of Maintenance Sub-Section personnel due to an unmonitored change in radiation conditions at their work location resulting from the opening of a discharge area drain riser. Complete details of these two incidents can be found in documents HW-39563 and HW-39564, respectively.

Some improvement in the control of radiation hazards associated with the tube replacement program was noted during October. Problems associated with the burial of tubes present the greatest challenge. In view of the magnitude of this program, considerable effort in improving conditions is being expended.

Average dose rates to personnel working on top of H Reactor have been increased by a factor of 20 as the result of ball recovery operations.

Water plant filter beds at B and C Water Plants were surveyed and found to be free of contamination. Contamination was found on floating scum in 100-K Area settling basins. Since contamination has been found in all water plants except those in 100-B Area, it appears that the source of the contamination is upstream effluent discharge.

E. Personnel Activities

At month end, 26 employees are receiving on-the-job training for engineering or supervisory assignments in the Section; 12 of these are on assignment under the rotational training program.

The Radiation Monitoring Sub-Section training program for Radiation Monitor Trainees has been intensified. A supervisor has been placed in specific charge of the program, and a series of training lectures has been outlined with numerous training aids to be utilized.

DECLASSIFIED**E. Personnel Activities (Continued)**

As of October 25, approximately 1,100 100 Area people had attended the orientation discussions on the revised pension and insurance plans as presented by Employee Services Unit representatives in all Areas during the period October 17 to November 4.

A buffet luncheon was held at 100-F Area on October 21 for the General Manager, with approximately 30 members of Reactor Section supervision present.

Richland, Washington
November 7, 1955

MANUFACTURING DEPARTMENT
SEPARATIONS SECTION
OCTOBER, 1955

I. RESPONSIBILITY

Manufacturing assumed responsibility for the 202-A Building on October 16, contingent upon formal acceptance.

II. ACHIEVEMENT

A. Operating Experience

1. Statistics

a. Bismuth Phosphate Operations

	<u>October</u>		<u>September</u>	
	<u>Normal</u>	<u>Acid Wash</u>	<u>Normal</u>	<u>Acid Wash</u>
Charges started in Canyon Bldgs.	70	2	106	2
Charges completed in Conc. Bldgs.	75	2	106	2
Special charges - Conc. Bldgs.		17		14
Charges completed-Isolation Bldg.	88	2	119	2
Average Waste Losses, %		3.0		3.3
Special charges - Isolation Bldg.		13		15
Material balance, %		102.5		101.8
Yield through Process, %		99.5		98.5
Average cooling time (days)		103		102
Minimum cooling time (days)		92		87

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b. Redox OperationsDECLASSIFIED
WITH DELETIONS

	<u>October</u>	<u>September</u>
Equivalent charges started	198.6	209.2
Charges completed	178.1	219.7
Tons Uranium delivered to storage	283.1	310.1
Average Production Rate per Operating day, Tons	10.6	10.9
Average Daily Operating Rate for the month, Tons	9.1	10.3
Average yield, %		
Uranium	99.0	100.0
Plutonium	97.3	100.9
Total Waste Loss, %		
Uranium	0.43	0.43
Plutonium	0.88	0.76
Average cooling time, days	100	100
Minimum cooling time, days	87	85
Percent down time	14.2	5.2

c. 231

	<u>October</u>	<u>September</u>
Batches started	97	132
Batches completed	100	136
Batches awaiting processing	5	1

d. 234-5 Operations

	<u>October</u>	<u>September</u>
Batches completed through Task I	159	159
Batches completed through Task II	217	226
Runs completed through Task III	85	85
Waste Disposal (Units)	20.72	86.61

e. UO₃ Operations

	<u>October</u>	<u>September</u>	<u>To Date</u>
Uranium drummed, Tons	422.79	422.62	11,458.78
Uranium shipped, Tons	394.38	428.89	11,424.56
Average cooling time, days	106	106	
Minimum cooling time, days	93	70	
Waste Loss, %	0.02 est.	0.02 est.	

f. TBP Operations

	<u>October</u>	<u>September</u>	<u>To Date</u>
Tons received from Metal Removal	111.19	137.98	6,051.69

f. TBP Operations (Continued)

	<u>October</u>	<u>September</u>	<u>To Date</u>
Tons shipped to UO ₃ Plant	102.23	132.62	5,842.91
Average Production Rate per Operating day, Tons	4.41	5.08	
Average Daily Operating Rate for the Month, Tons	3.30	4.42	
Average yield, %	92.78	94.60	
Total Waste Loss, %	3.62	5.21	
Ratio Actual Waste Volume returned to Theoretical Volume	0.86	0.82	
Percent Down Time	25.19	12.92	

g. Power

	<u>200 East</u>	<u>200 West</u>
Raw water pumped, gpm	5 169	7 567
Filtered water pumped, gpm	346	1 075
Steam generated, lbs/hr	46 123	158 615
Maximum steam generated, lbs/hr	120 000	214 000
Total steam generated, M Lbs.	34 315	118 010
Coal consumed, tons (Est.)	1 262	8 270

h. Waste Storage

	<u>Equivalent Tons U</u>	
	<u>Oct.</u>	<u>Sept.</u>
Metal Waste reserve storage capacity-T Plant	214	293
1st Cycle reserve storage capacity-T Plant	260	337
Metal Waste reserve storage capacity-B Plant	685	685
1st Cycle reserve storage capacity-B Plant	74	74
Redox Waste reserve storage capacity	623	415

2. Activities

a. Redox Processing

The rate of 9 tons uranium/day was held at the beginning of the month while uranium decontamination returned to normal, after which it was raised to 11 tons uranium/day on October 3. This rate was maintained until October 18 when a planned capacity test resulted in achieving (in increments) a maximum rate of 12.5 tons uranium/day over a 32 hour period on October 20.

The 1A column had to be shutdown on October 20 for a water flush and both 1A and 1S shut down on October 21 to replace the waste neutralizer (D-8) agitator and the 3A column feed pump (E-1) which failed in service. Following startup on October 22,

DECLASSIFIED**a. Redox Processing (Continued)**

another period of 12.5 ton/day production was held for 27 hours. A reduction to 9 tons/day was necessary when a leak, which caused dilution of the feed, developed in the oxidizer (H-4) tube bundle. On October 25, the leak in the tube bundle became too serious to permit further economical operation and the plant was shut down. The tube bundle was replaced and the columns started up on October 28 at a rate of 10 tons of uranium/day. This was held until October 30 when failure of the 1S column feed pump (F-8) forced a shutdown of the 1S column and limited rates to the capacity of the 1A column. This rate was dropped from 8 tons/day to 6 tons/day by month end due to flooding in the column. The F-8 pump was being replaced at month end.

b. Metal Recovery**1) TBP Processing**

TBP Plant production was curtailed in the first half of the period by a lack of feed due to waste removal problems in the Tank Farms. The difficulties were the result of 1) working in a combination of tanks which yielded less than expected amounts of uranium and, 2) several pump failures. At mid-month removal rates had resumed a normal rate which continued through month end.

During the first two weeks of low operation, minimum rates in TBP were maintained and some shutdown time experienced to allow feed build-up. In this period waste losses were high due to the improper salt ratio in the feed material which was composed mainly of supernate.

2) UO₃ Processing

Production was limited by the amount of feed available; however, production of 422.79 tons displaced last month's second highest monthly production on record. The average building production rate continued from last month at approximately 15 tons per day. The presence of niobium and zirconium in building feeds from both feed sources resulted in higher than normal product gamma values.

3) Waste Metal Removal

Tank clean-outs in both the UR and TX farms in the first two weeks of the month resulted in limited quantities of dilute feeds to TBP Plant. Good removal rates, in which blend concentrations increased, were obtained the latter half of the month.

The gamma activity of the TBP Plant feed (RAF) increased by approximately 50 percent over last month; however, satisfactory

3) Waste Metal Removal (Continued)

decontamination is being achieved with blends up to 90 percent 14 month minimum material. From 25-60 percent of the fission product activity is niobium and zirconium. As the waste removed gets younger in age it can be expected that these elements may become limiting in the UO_3 product.

c. T Plant Processing

Production schedules for T Plant were met in spite of minor mechanical difficulties and the high product content of recycle material from the Isolation Building requiring the processing of 16 master recycle runs in the Concentration Building. I^{131} emissions continued as a significant problem, even though all metal dissolved during the period was cooled more than 87 days. The average I^{131} emission for the period September 28 through October 25 was 0.69 curies per day.

d. Isolation and Metal Fabrication

The Isolation facility continued to process low MWD/T material from the T Plant on the day shift only. Processing was limited to filter boat production for further processing of the Pu oxalate in the RM Line of the Fabrication Facility.

Fabrication in the RMA facility was confined to model 110 production from low MWD/T material originating in both the Redox and T Plant facilities. The previous all time high record for total units of material processed through the RMA equipment was exceeded by 60% during the month and production commitments were met.

e. Purex

Manufacturing assumed responsibility for the 202-A Building on October 16, contingent upon formal acceptance. An organic flush of the continuous portion of the canyon equipment was initiated on October 19 and completed on October 23. Over-all results were quite satisfactory with little operating difficulty encountered. Numerous minor equipment deficiencies were noted such as shorting out of column capacitance probes and a leak on the organic G-4 centrifuge case flange.

On 10-24-55 61.27 tons of depleted uranium were received in the building. Ten tons were charged in B-3 dissolver and the jackets were removed on 10-28. The second charge of 10 tons was made on 10-29 and dissolving was completed at month end.

3. Special Operations

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Separations Section
DECLASSIFIEDa. Pu Recovery - Metal Fabrication

During the month Hood 41 was employed in the dissolution of low MWD/T skulls and burned turnings for feed back into the RMA Line. The other recovery facility in Hood 40 was used for the dissolution of various types of high MWD/T scrap metal to provide concentrated feed for the Recuplex facility.

4. Schedule Variance

S Plant production exceeded forecast by 29%. A maximum operating rate of 12.5 tons of uranium per day was achieved for two short periods (32 and 27 hours) during the month.

TBP production was 24 percent under commitment while the UO₂ Plant exceeded commitment by 32 percent. Ten carloads of UO₃ were shipped.

T Plant met its production commitment.

All production commitments in both the Isolation and Fabrication buildings were met.

B. Equipment Experience1. Operating Continuity

The Redox Plant was down a total of 105 hours giving a mechanical efficiency of 86%. Replacing two feed pumps, an agitator, and the oxidizer (H-4) leaking tube bundle accounted for the majority of the lost time.

In TBP Plant, first cycle was down 144 hours waiting for feed. Second cycle lost 187.5 hours for lack of feed. UO₃ schedules were adjusted as feed became available. No lost time occurred as the result of direct building equipment or operational difficulties. Thirty hours lost time was encountered in pump replacement at 241-UR Tank Farm.

Significant time loss of 8 days was encountered in T Plant in the removal of a bucket of high MWD slugs from the 3-5-L dissolver. Three days were required to replace the 9-1A scale tank. A total of 120 hours were spent on repairing or replacing other miscellaneous items of equipment.

Equipment difficulties in Z Plant were much less severe during the month than in the preceding months and no appreciable interferences with production activities were attributed to inoperating equipment.

2. Inspection, Maintenance and Replacementa. Cell Equipment Replacement - Redox

The D-8 agitator failed on October 21 after one year service, from either a shaft seizure or reduction gear breakdown. The

a. Cell Equipment Replacement - Redox (Continued)

E-1 pump failed on October 22, and was replaced with a spare. The failed pump was original equipment. The replacement of the pump and jumpers required unusual manipulation of the crane since westward movement of the crane is limited at this end of E Cell.

Failure of the H-4 tube bundle was first suspected on October 21 when the weight factor instrument showed a rise during cooling. The leak rate increased from one and one-half gallons/minute to twelve gallons/minute during the next three days. The replacement was made on October 25. The leak appeared to come mainly from the center of the tube bundle although one leak about a quarter of an inch in diameter could be seen on the side of the steam chest.

The F-8 pump failed on October 30 after only three months service. Replacement was in progress at month end.

The D-5 temperature element failed during this period. A new jumper, with double elements, was fabricated and installed.

b. 60 Ton Crane - Redox

The brake drum on the 60 ton hoist was repositioned on October 27. The socket fell off of the right hand cell wrench on October 25, and again on October 31, and had to be replaced. The cable slipped out of position on the 60 ton sheave block on October 31. Riggers were able to repair the hoist shortly after month end. The installation of the hinged crane bridge ladder was completed.

c. Equipment Maintenance - Metal Fabrication

Major items of maintenance in the Z Plant included the hydraulic ram of the cell 3 boat station in the Isolation Building and the mechanical vacuum pump of unit #4 in Task VII on the fabrication line. Thirteen air operated valves were replaced in Recuplex facility because of ruptured diaphragms. The 100 h.p. motor on the #1 ventilation supply fan in the Fabrication facility also required replacement.

C. Improvement Experience

1. Process Tests and Revisions

a. Iodine Emission

Redox

Iodine emission averaged from 0.82 to 1.57 curies/day over the month with a maximum of 2.50 curies per day being experienced. The only corrective action taken over the period consisted of

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a. Iodine EmissionRedox (Continued)

two reactor regenerations in A cell, one each in B and C cells, and raising the inlet temperature of B-3 from 375° F to 400° F during the dissolution step.

T Plant

Although there were no significant emissions a slight increase in the daily I^{131} emission during the first part of the month was noted. This increase was attributed to the 4-5-L silver reactor which was losing its efficiency. On 10-6-55 the unit was regenerated after processing the off-gases from 62.774 tons of dissolved uranium. This was the first regeneration since a new reactor packed with intaloxs was installed on 8-30-55. The average daily I^{131} emission for the period September 28 through October 25 was 0.69 curies. All metal dissolved during this same period was cooled more than 87 days, the arithmetic average being 101 days. Minor mechanical difficulties which have hampered the continuous operation of the new gamma scintillation iodine monitor were overcome this month and the new unit is now operating satisfactorily. Although the instrument has not been calibrated and does not show quantitative I^{131} emissions, it has shown I^{131} emissions occurring at the start of metal dissolution periods. A test is currently being conducted in an effort to control this initial emission.

b. Waste Scavenging

Treatment of TBP waste with sodium ferrocyanide, nickel sulfate and calcium nitrate continued. A sixteenth tank (16-107-BY) filled from September 3 to September 25 (591,250 gallons) was routed to the BY-4 crib.

A seventeenth tank (17-108-BY) was filled October 15. Studies are being made to determine if this material can be combined with tank 11-106-BY for discharge to the BY-6 crib. The latter tank was low in phosphate and soil column tests indicate that caesium and strontium break-through to ground water would occur. The waste volume for the month averaged 8,840 gallons per ton of uranium production. A volume reduction of 21 percent was achieved in Section 9.

2. Inventions and Discoveries

Personnel in the Separations Section engaged in work which might be expected to result in inventions or discoveries have reported that no inventions or discoveries were made during the period covered by this report.

D. Events Influencing Costs

The Separations Section manufacturing cost for the month of October is expected to reflect a decrease of approximately 6% from the September level due to the low production from TBP, scheduled curtailment of T Plant production and the slight decrease in Redox production, as a result of preparation for switching this facility to "high" material. The decrease in cost will be primarily due to the lower essential material consumption associated with the decreased production.

Production from the 234-5 facility is expected to establish a new high while unit cost will drop to a new low.

E. Plant Development and Expansion

1. Project Status

a. CA-513-A - Purex

Minor Construction forces completed their major assignment in the 202-A Building and are currently engaged in alteration of operational spare equipment in the mock up shop and fabrication of auxiliary periscopes for the main remote crane. Construction of the railroad tunnel extension is 75 percent complete.

b. CA-513-E - Purex Expansion

Scope design and specifications have been approved for the 241-A tank circulators and the new industrial burial ground. Detail design of in-line continuous sampling equipment is essentially complete. Procurement of iodine monitoring equipment is scheduled for March 1, 1956. Construction of the new ALO process condensate crib is 95 percent complete. Scoping of a project revision for an additional main remote crane estimated at \$1,500,000 is in progress.

c. CG-598 - Vacuum Acid Fractionator - Purex

On-site work has been suspended for lack of funds. A revised project proposal requesting an additional \$300,000 was submitted. The scheduled completion date was extended from December, 1955 to August, 1956. The delay in completion of this project may require additional sparing of the canyon unit which has an expected life of only one year, when operated as a 60 percent fractionator.

d. CG-539 - Additional Waste Storage, 241-SX

The circulator installation in tanks 107, 108, 111, and 112 is complete and completion of the last six tanks by late

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d. CG-539 - Additional Waste Storage, 241-SX (Continued)

November appears realistic. The water tie-in to the condenser house loop was completed by utilizing the emergency tanks and pumps. One tie-in to the 20" raw water main is being held up until the December building shutdown. Instrumentation of tanks 108 and 109 is scheduled to be completed by November 1.

e. CG-603 - 4X Program

The B Plant portion of project CG-603 is estimated to be 93% complete. All work items in the 224-B Building have been completed; acceptance tests in the 221-B Building are estimated to be 65% complete with work continuing on a two-shift basis. The crane periscope installation is complete except for minor adjustments. Testing of outside waste lines is essentially complete.

f. CG-613 - UO₂ Expansion

A re-estimate of the total project cost has been prepared, and a revision to the project proposal circulated for signatures. An additional \$1,000,000 is requested. Total funds authorized to date have been committed. Failure to receive the additional appropriation by November 15, 1955, will result in a project delay.

Difficulty has occurred in receiving corrosion passed stainless steel for fabricating the continuous calciners. The Atomic Energy Commission, having control of the calciner contract, has requested the General Electric Company to relax the corrosion specifications and to review from a production standpoint the need of a March 1, 1956, beneficial use date for the project. The Engineering Department has relaxed the corrosion specifications and changed the beneficial use date to May 1, 1956.

The Phase I contract is complete, but it has been necessary for the Henly Company to return to make corrections on some of their work that was affecting the Phase II contract.

The Phase II work is on schedule. The structural and miscellaneous steel work is in place. The building siding has been received and the installation work has started.

g. CG-621 - Redox

The E-13 ozone contactor tank, tower and jumpers are ready for installation, and most of the cold side work is completed. Instrument work (piping) is the main item not completed. Also, it appears that substitution will have to be made for three instruments that will not be delivered by the scheduled ready-for-use date of December 15. The spray nozzle test unit for

g. CG-621 - Redox (Continued)

the Canyon Wash Down Facility, is ready for testing. The design of piping and instrumentation is nearing completion. The scheduled beneficial-use-date of July 1, 1956 still appears realistic.

h. CA-625 - 241-SY Tank Farm

Final approval of design drawings has been withheld pending slight design revisions, and is now scheduled for December. Bid packages for this construction will probably be forwarded to contractors in February, 1956. The Manufacturing Planning and Scheduling Unit indicates that storage tanks for 20 million gallons will be required.

i. CG-643 - Redox Capacity Increase, Phase III

The preliminary project proposal which requested \$500,000 for design and procurement of critical materials, was approved by the AEC on October 13, and the Directive was issued on October 18. Design and procurement of critical material for the 2E column and 15 jumpers, which are to be installed during the December shutdown, are being expedited. Revision 1 of the project proposal, authorizing fabrication and installation of this equipment, is being circulated for comments.

2. Plant Engineering

a. Work Simplification

The conferees of all four Work Simplification groups are analyzing selected operations from their work areas by means of the Flow Process Chart to develop improved methods.

b. Preventive Maintenance

Establishment of the Equipment History files in Purex for Preventive Maintenance was continued. The canyon equipment history files were completed and preparation of history cards for the cold side equipment files has been initiated.

c. Cost Reduction, 200-W Laundry

A work sampling program was initiated in the 200-W Laundry to obtain information on the present operations, particularly those which relate to materials-handling problems. The objective of this study is to develop methods which can effect a reduction in operating costs and will consolidate the present space requirements.

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d. Maintenance of Standards

An essential materials standard for the Purex operation was developed from Chemical Flowsheet HW No. 3 as presented in the Purex Technical Manual (HW-31000). The chemical flowsheet changes for the Redox, TBP, and T Plants were reviewed and revised standards were published. An analytical standard for the tank farm was developed to include the sampling requirements for in-farm scavenging.

e. Engineering Assistance(1) Cask Car Study

Gear operated lids, installed on test car 3643, required excessive manual effort to operate. To overcome this, the lid material will be changed from steel to aluminum.

(2) Design and Drafting

Progress continued on the over-all as-built drafting program. Items completed during the month include: 211-T tank farm general, 221-U agitator, 221-U concentrators, and cell sump screens 202-A.

Design is progressing on 211-A car spot alterations, 277-U shop proposed alterations and switch gear handling equipment for 202-A.

(3) 309 SCb Stainless Steel

309 SCb stainless steel is becoming unobtainable commercially, except on special runs of a size and tonnage beyond our needs. Steps have been taken to gather all available plant stock into a controlled area to be used only for necessary service in the 224 and 234-5 installations until a suitable substitute can be found.

F. Reports Issued1. Routine

<u>Number</u>	<u>Subject</u>	<u>Author</u>
HW-39800	Separations Section Redox Plant Sub-Section Monthly Report - Oct., 1955	R.T. Jessen
HW-39814	Separations Section Metal Recovery Sub-Section Monthly Report - Oct., 1955	T. Prudich
HW-39804	Separations Section T Plant Sub-Section Monthly Report - October, 1955	C.T. Groswith
HW-39697	Separations Section Z Plant Sub-Section Monthly Report - October, 1955	W.N. Mobley

1. Routine (Continued)

<u>Number</u>	<u>Subject</u>	<u>Author</u>
HW-39802	Separations Section Radiation Monitoring Sub-Section Monthly Report - October, 1955	A.R. Keene
HW-39808	Separations Section Analytical Control Sub-Section Monthly Report - Oct., 1955	L.M. Knights
HW-39750	Separations Section Projects & Personnel Development Sub-Section Monthly Report October, 1955	O.V. Smiset
Official Use Only	Separations Section Power & Maintenance Sub-Section Monthly Report - Oct., 1955	C.P. Cabell
HW-39782	Separations Section Purex Sub-Section Monthly Report - October, 1955	V.R. Chapman
None	Status of Projects, Informal Request, and Budget Items - October, 1955	V.D. Rouse
HW-39279	Essential Materials Consumption for T Plant, September 1955	M.A. Thress
HW-39280	Essential Materials Consumption for TBP Plant, September 1955	M.A. Thress
HW-39281	Essential Materials Consumption for Redox, September 1955	M.A. Thress
HW-39282	Essential Materials Planning, Oct. 1 - Oct. 31, 1955	D.E. Peterson
HW-39283	Essential Material Area Report to Cost and Purchasing, September 1 through September 30, 1955	M.A. Thress
HW-39216	Separations Section Waste Status for September, 1955	D.E. Peterson
HW-39413	Nine-Months' Goal Forecast Separations Section, October, 1955	B.F. Campbell
HW-39639 RD	Budget Review Forecast, FY 1956	B.F. Campbell
HW-39200	Official Forecast, Separations Section, September 1955 through June 1965	B.F. Campbell
HW-39315 RD	202-S Building Production Schedule for month of October, 1955	B.F. Campbell
HW-39316 RD	221, 224-T Buildings Production Schedule for month of October, 1955	B.F. Campbell
HW-39317 RD	TBP, UO ₃ Buildings Production Schedule for month of October, 1955	B.F. Campbell
HW-39318 RD	Z Plant Production Schedule for Month of October, 1955	B.F. Campbell
HW-39673	Separations Section Process Council	E.G. Pierick
HW-39346	Analytical Control Quality Report	D.T. Crawley, Jr.

2. Non-Routine

HW-39531 RD	Essential Material Standard for TBP Series Operation	R.H. Silletto
HW-39579 RD	Essential Material Standard for Redox	R.H. Silletto
HW-39580 RD	Essential Material Standard for T Plant	R.H. Silletto

DECLASSIFIED**2. Non-Routine**

<u>Number</u>	<u>Subject</u>	<u>Author</u>
None	Analytical Service Standard for the Tank Farms	R.H. Silletto
HW-39480	Radiation Incident, Class I, No. 426-C	G.E. Backman
HW-39780	Radiation Incident, Class I, No. 533-C	F.E. Owen
HW-39311	Essential Material Flow Sheet of Precipitation Separations Process	W.G. Browne
HW-39485	IL31 Control by Two Silver Reactor Units in Series	W.G. Browne By H.P. Maffei
HW-39408	RC-FR Can Study	J.G. Attanas
HW-39463	Proposed Dual Pass Silver Reactor Design	C.R. Anderson By C.F. Yuenger

III. PERSONNEL**A. Force Summary**

	<u>Start of Month</u>	<u>End of Month</u>	<u>Net Change</u>
Section General	1	1	0
Redox Plant Sub-Section	224	222	-2
Metal Recovery Plant Sub-Section	249	247	-2
Z Plant Sub-Section	176	176	0
T Plant Sub-Section	214	213	-1
Purex Plant Sub-Section	278	285	+7
Power and Maintenance Sub-Section	319	320	+1
Projects & Personnel Development	58	60	+2
Analytical Control Sub-Section	208	218	+10
Radiation Monitoring Sub-Section	159	160	+1
Section Total	1886	1902	+16

B. Safety Experience

There were no major or sub-major injuries in the Separations Section in October. At the close of the month, both 200 Areas had operated 733 days without a lost time injury, an outstanding achievement since it involves approximately 8,900,000 exposure man hours.

C. Radiation Experience

Two radiation incidents were formally investigated and documented as Class I incidents. Both incidents occurred in the 234-5 analytical laboratory and included: (1) spread of plutonium contamination from an analysis room through several rooms and corridors and into the women's locker room (No. 526-C); and (2) potential internal deposition of plutonium resulting from improper handling of process samples with subsequent floor contamination involving milligram amounts of plutonium (No. 533-C).

C. Radiation Experience (Continued)

Iodine I31 emission for all plants totalled 50.9 curies. T Plant discharged one-third of the total and Redox accounted for the balance.

D. Personnel Activities

1. Personnel Programs and Training

During the month the training program activities were as follows:

<u>Program</u>	<u>Attendance</u>
For Exempt Roll:	
Accident Prevention	19
Job Relations Development	19
For Non-Exempt Roll:	
GE Selection Program	7 (4 Anal., 3 Oper.)
Nine-Week Instrument Training	4
New Employee Orientation	15
Secretary-Steno-Typist Program	26
Revised Insurance and Pension Plan	1550 (Approx.)
Work Simplification	170 Manhours

2. Guide for Transfer of Personnel

A proposed guide pertaining to a transfer of personnel within the Section was drawn up and two meetings were held with the Sub-Section Maintenance Superintendents discussing the proposed guide. Additional meetings are scheduled in order to complete preparation of an acceptable Section transfer guide.

3. Visitations

V. R. Chapman and D. E. Braden visited Savannah River Works, DuPont Company.

L. M. Knights visited A.E.C. Division of Inspection, Washington, D.C., on October 5 and 6 to confer on SSN accountability procedures.

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HW-39751 EL

November 7, 1955

ELECTRICAL UTILITY SECTION

MONTHLY REPORT

October, 1955

I. RESPONSIBILITY

There were no changes in Section responsibility.

II. ACHIEVEMENT

A. Operating Experience

Power Statistics (See last page for details)

Plant Contract

Probable time of October Peak . . . 3:00 - 3:30 a.m., October 10
Telemetered peak for October 182,000 KW
Probable Billing Demand for October 184,000 KW
Probable energy consumption for October 110,430 MWH

Actual BPA Metered demand for September 177,709 KW
Actual Billing Demand for September 181,000 KW
Actual energy consumption for September 101,421 MWH
Average monthly energy consumption - 3 months -
FY-'56 106,290 MWH
Cost of purchased electricity for September . . . \$263,362
Actual cost of purchased electricity for 3 months
of Fiscal Year '56 \$782,321

* * * *

The October peak demand of 182,000 KW establishes a new all-time record for power use at Hanford operations.

* * * *

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HW-39751 DEL

One of two 37½ KVA station service transformers in the 100-D substation failed on October 28 and all station load was carried by the other transformer. The faulty transformer was replaced and brought in for examination and repair of the shorted primary and secondary windings.

* * * *

With the exception of a momentary single phase power condition at the 300 Area, there was no loss of production power during the month.

* * * *

B. Equipment Experience

At approximately 3:30 p.m., October 31, 300 Area personnel reported an arcing on a fuse to primary transformer bank No. 2. The dispatcher requested the transfer of load to isolate the trouble, but prior to accomplishment of switching, the fuse disintegrated resulting in a momentary single phase condition for one-half of the area load. The fuse holder was inspected and re-fused and the area system was returned to normal.

A similar incident occurred on like equipment a few years ago and this manufacturer's fuse and holder are being investigated for the possibility of an inherent weakness.

* * * *

October voltage checks on circuit breakers A-323 and A-325 bushings were found to be normal. Because of recent bushing insulation deterioration, monthly routine tests are made.

D. Events Influencing Costs

Overtime hours expended were approximately 2.1% of the total regular hours worked.

Attendance for the month was 98.57%.

E. Plant Development and Expansion

CG-558 100-B: Two cubicles for new lines to the 190-B Building were permanently connected to the 13.8 KV bus in the 151-B-C substation; two of the remaining six cubicles are awaiting an outage for connection.

CG-558 100-F: The scheduled relocation of three 13.8 KV feeders was completed the week of October 17 by Minor Construction forces to clear the site for the contractor at the 190-F annex.

* * * *

CA-586 (Third 230 KV Line): Two AEC-BPA contractual agreements were reviewed by this Section and comments were submitted to the AEC. One concerned the leasing of BPA transmission line to AEC and the other referred to work which the AEC will ask BPA to perform at their Midway substation and in the vicinity of Hanford.

November 1, 1955, is the tentative effective date of the BPA-AEC agreement leasing to HAPO some 16 miles of BPA 230 KV transmission line. Maintenance and control of this line will become this Section's responsibility upon the effective date.

Lump sum contract bids for new construction on this project were opened October 26, but no contract has been awarded to date. Construction includes a four mile tap from the leased line to the 230 KV loop at the K Areas, the terminal station at this intersection, and a switching station at the intersection of the leased line and the 230 KV loop near Gable Mountain.

* * * *

III. ORGANIZATION AND PERSONNEL

A. Organization

No changes in structure or nomenclature.

B. Force Summary

	Beginning	Ending	Net Change
Exempt Personnel	17	17	0
Dispatchers	5	5	0
Electricians	11	11	0
Linemen	21	22	1
Substation Operators	32	32	0
Secretary	1	1	0
Stenographer	1	1	0
Clerk	1	1	0
Draftsman	<u>1</u>	<u>1</u>	<u>0</u>
	90	91	1

There was one transfer to Reactor Section and two hire-ins in the Lineman craft this month.

C. Safety Experience

Two minor injuries were reported.

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HW-39751 DEL

D. Radiation Experience

No incidents were reported during the month.

E. Personnel Activities

Non-exempt employee annual ratings were completed and forms were submitted on October 7.

* * * *

The final two training films of a series of five on the use of hot line tools were viewed by Section linemen during October.

* * * *

W. L. McKeown, Benefit Plans Accounting Unit, presented and discussed the improved Pension and Insurance plans to Section employees at the monthly informative meeting.

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ELECTRICAL UTILITY SECTION

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POWER STATISTICS
ELECTRICAL UTILITY SECTION
FOR MONTH ENDING OCTOBER 31, 1955

	ENERGY - MW HRS.		MAXIMUM DEMAND-KW		LOAD FACTOR-%	
	Last Month	This Month	Last Month	This Month	Last Month	This Month
230 KV System						
A-2 Out (100-B)	26200	30290	46800	48700	77.8	83.6
A-4 Out (100-D)	15010	13390	27600	25600	75.5	70.3
A-5 Out (100-E)	8800	8960	15300	15600	79.9	77.2
A-6 Out (100-F)	5690	5980	13400	13100	59.0	61.4
A-7 Out (100-KW)	15648	20112	42000	32500	51.7	83.2
A-8 Out (200 Area)	6140	6600	10000	10650	85.3	83.3
A-9 Out (100-KE)	20340	21168	33000	48000	85.6	59.3
TOTAL OUT	97828	106500	188100*	194150*	--	--
MIDWAY IN	99167	107701	174400	179200	78.9	80.7
115 KV System (300 Area)						
BB3-S4 Out	2320	2488	4400	4480	73.2	74.6
115-66 KV System						
B7-S10 Out (W. Bluffs)	123	207	495	675	34.5	41.2
Hanford Out (7200 V.)	29	42	--	--	--	--
Hanford In	137	247	700	900	27.2	36.0
Project Total In	101624	110430	179500*	184580*	--	--

* Denotes Non-Coincidental Demand

Average Power Factor - 230 KV System 86.5

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MANUFACTURING DEPARTMENT
PURCHASING AND STORES SECTION
MONTHLY REPORT OCTOBER, 1955

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I Responsibility - No Change

II Achievement

STATISTICS

	<u>August</u>	<u>September</u>	<u>October</u>	<u>FY 1956 Average</u>
<u>Purchasing Sub-Section</u>				
Emergency requisitions rec'd				
Employee & Public Relations	6	13	32	14
Engineering	48	56	77	53
Manufacturing	81	55	120	75
Medical	5	4	6	5
Minor Construction	144	159	78	137
Radiological Sciences	5	8	2	5
Stores	92	93	130	105
Total	381	388	445	394
Average per day	16.6	18.5	21.2	18.3
<u>Total requisitions*</u>				
On hand start of month	1,056	844	1,016	1,002
Received	2,673	2,509	2,624	2,650
Placed	2,885	2,337	2,678	2,683
On hand end of month	844	1,016	962	969
*Do not include those assigned to AEC, Viz:				
	320	471	508	403
<u>Number of purchase orders placed</u>				
General Supplies Unit	1,970	1,434	1,537	1,682
Process Equipment Unit	583	455	561	531
Essential Material Unit	26	26	30	28
Local Purchase	86	77	95	78
Total	2,665	1,992	2,223	2,319
<u>Value of purchase orders placed</u>				
General Supplies Unit	\$ 591,257	\$ 474,788	\$ 812,753	\$ 593,823
Process Equipment Unit	1,139,566	469,513	947,709	864,693
Essential Material Unit	562,409	569,690	1,091,574	707,293
Local Purchase	668	578	532	550
Total	\$2,293,900	\$1,514,569	\$2,852,568	\$2,166,359
<u>Purchase order alterations</u>				
Number	297	231	266	249
Gross value	\$ 211,160	\$ 590,229	\$ 359,188	\$ 314,768

II Purchasing Sub-Section (Cont.)

	<u>August</u>	<u>September</u>	<u>October</u>	<u>FY 1956 Average</u>
<u>Expediting</u>				
Orders on hand start of month	2,846	2,731	2,728	2,777
Orders received	2,569	2,002	2,154	2,280
Orders completed	2,684	2,005	2,164	2,302
Orders on hand end of month	2,731	2,728	2,718	2,755

Stores Sub-Section

<u>General Supplies</u>				
Store orders processed	25,277	26,912	29,485	27,183
Value of issues	\$280,241	\$321,779	\$317,803	\$301,355
Line items in account	30,164	30,195	29,439	29,960
Back orders on hand	355	275	534	367
Out of stock items	181	148	249	183
Percent of line items out of stock	.6	.4	.8	.6

<u>Spare Parts</u>				
Store orders processed	1,489	1,536	1,826	1,516
Value of issues	\$102,148	\$110,953	\$174,151	\$112,392
Line items in account	29,803	29,988	30,004	29,831
Back orders on hand	306	356	383	316
Out of stock items	231	273	264	275
Percent of line items out of stock	.8	.9	.9	.9

<u>Receiving</u>				
Shipments received	7,174	6,138	6,508	6,410
Receiving reports issued	6,965	5,740	6,313	6,273

<u>Excess Material & Equipment</u>				
Received	\$201,070	\$315,751	\$232,564	\$219,507
Issues to Project	2,779	17,841	7,302	7,782
Shipped off-Project	13,847	24,000	68,335	53,997

Revenue from scrap and surplus sales	\$ -	\$ 63,354	\$ 55,566	\$ 30,921
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Requisitions screened	2,611	2,566	2,439	2,522
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Items screened	7,634	7,230	6,575	7,143
Items furnished	808	905	880	882

Traffic

<u>Savings</u>				
Rate reductions	\$ 4,394	\$ 1,972	\$ 4,574	\$ 3,650
Freight bill audit	664	744	4,654	2,361

Savings since - September 1, 1946 to date \$1,976,200

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II Achievement. - (Cont.)

Traffic (Cont.)

	<u>August</u>	<u>September</u>	<u>October</u>	<u>FY 1956 Average</u>
<u>Money recovered - Claims</u>				
Loss, damage & overcharge	\$ 200	\$ 316	\$ 2,229	\$ 1,152
Ticket refunds	1,592	264	1,094	,818
Household goods	-	39	59	24

Money recovered - September 1, 1946 to date \$217,314

<u>Work volume</u>				
Travel requests	136	178	146	139
Reservations made	417	602	522	448
Expense accounts checked	165	229	182	190
Shipments traced	119	166	143	128
Quotations furnished				
rates and routes	677	553	662	615
Freight bills approved	1,797	1,346	1,591	1,476
Amounts	\$311,758	\$292,478	\$303,257	\$273,690
Carload shipments received	941	829	948	805

<u>Tonnage Report</u>				
Tons received by common carrier	59,832	54,508	59,582	51,433
Total cost	\$338,327	\$301,055	\$342,388	\$297,680
Average cost per ton	\$ 5.655	\$ 5.523	5.746	5.788

Activity in Excess-Surplus operations showed a marked increase in October when compared with the previous three months as indicated below.

	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Oct.</u>
Declaration of Excess	93	197	141	114
Line Items Received	766	754	764	3676
P.D.R.s Received	18	49	58	183
Shipping Documents	69	39	47	226

The number of emergency requisitions received in October totaled 445 which represented an increase of 68 or 18% over the average received for the previous three months. As indicated in the above statistics Manufacturing, Employee and Public Relations, Engineering and Stores contributed most heavily to this increase while Minor Construction showed a marked decrease.

As a result of contacts made with the Milwaukee Railroad, as reported last month, they are inspecting their equipment for delivering coal more closely. Reports from the field indicate that this condition has improved.

Pre-inventory meetings were held during the month with Financial personnel to lay the ground work for taking the annual physical inventory of spare parts and equipment which is scheduled for November 28, 29, and 30, 1955.

II Achievement - (Cont.)

The following items were physically transferred from the Spare Parts Inventory to the General Supplies Inventory as a further step in putting general maintenance type items in their proper inventory accounts.

Bearings	519	\$11,850
Furnace Parts	171	7,106
Refrigerator Parts	92	2,670
Range Parts	143	7,869
Total	925	\$29,495

The 700 Area Store located in the 722 Hangar, was closed October 26, 1955, with all material formerly stored at this location consolidated with like materials in Central Stores. One warehouseman, responsible for medical supplies in Kadlec Hospital, will assume responsibility of receiving and disbursing supplies from the four remaining storage locations in the 700 Area.

The preparation by Stores of IBM cards for all disbursements, except Automotive Parts, from the General Supplies inventory began on October 29, 1955. This is the first phase in the planned conversion of record control from a manual to an IBM operation.

The new shelving required at the 200-E, Spare Parts Warehouse was received 10-11-55 and installation completed 10-19-55. A service counter was also installed thus completing the current order for additional equipment.

Of the two surplus sales held during the month the largest was a "Spot Bid Sale" for 196 pieces of automotive equipment. This "Spot Bid Sale", the first of this type by project forces, realized \$51,717 or about 18% of the acquisition value of the equipment.

Status of Contracts

Chlorine - Requirements Contract RO-23 has been awarded to Hooker Electrochemical Company and is in process of being written.

Caustic Soda - Procurement for the period 1-1-56 through 12-31-56, will be from Pennsylvania Salt Manufacturing Company and Hooker Electrochemical Company. Both contracts are now being written.

RO-21 - For one year's requirements of Safety Shoes, manufactured by International Shoe Company. Record of purchase has been approved and the contract is in the hands of the vendor for signature.

RO-22 - For one year's requirements of Safety Shoes, manufactured by Lehigh Safety Shoe Company. Record of purchase has been approved, the contract signed by the vendor, and is awaiting signatures by General Electric.

MRO-1, - Supplement No. 1 - To extend the original RAC Electron Microscope repair and maintenance contract for an additional year. Record of purchase has been approved, the contract has been signed by the vendor, and is being routed for General Electric Co. signatures.

G-50, Supplement No. 1 - To extend the term of the Works Telephone Directory Contract to December 31, 1955, has been fully executed and is now operative.

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II Achievement - (Cont.)

Status of Contracts (Cont.)

G-107 Supplement No. 6 - For the interpretation by the Swedish Hospital in Seattle for a 1-year period, of the effects of radiation. Record of purchase is being prepared for AEC approval.

SA-1 - For Motion Picture editing, processing, and finishing for 1-year period. Requests for quotation are presently being mailed.

Two proposed contracts with the Aluminum Company of America covering the fabrication of special aluminum process tubes are being worked on. The prime difference in the two contracts is the aluminum alloy to be used in fabrication. Contract SO-7 has been presented to the A.E.C. for signature. Contract SO-8 has been sent over on Record of Purchase.

A request to two carloading companies resulted in the establishment of through rates on automobiles between the Tri-City area and Eastern points. Automobiles belonging to personnel transferring to or from this Project will be able to move with improved service and at a reduced cost of up to \$300 per car.

Order HWC-7077, held by De Laval Steam Turbine Company, has been mentioned previously as requiring close attention and high cost effort. Progress has been made on this order, inasmuch as the vendor's latest schedule is being adhered to almost without exception. The technical problems posed by this order from the start have been overcome but there remains a need for very careful expediting to maintain the schedule.

Project CG-613, because of its early completion date and the necessity for accelerated procurement, continues to demand premium effort including overtime and visits to vendors' plants.

Union negotiations with coal producers has resulted in an increase in prices from each of our three suppliers. Kemmerer Coal Company has submitted a price increase of 6¢ per ton, Republic Coal Company has asked for 20¢ per ton and North West Improvement Company has stated that they may request an increase if necessary, which will probably be about 32¢ per ton. Preliminary discussions have been held with the Commission on the possible impact of these changes.

All trucking firms were advised that effective October 31, 1955 the practice of furnishing plant forces to assist commercial carriers' drivers in unloading routine incoming shipments at Central Stores Receiving would be discontinued. This change will take advantage of the carriers' services normally provided in unloading freight and will result in reduced costs for the Receiving Unit.

Udylite Corporation has corrected or agreed to correct all deficiencies in equipment purchased on orders HWC-3890, 3891, and 3892. The vendor has also agreed to accept back-charges of some \$6600 for work on the equipment which was done by plant forces.

III Organization And Personnel

Force Summary

Component	9-30-55			10-31-55			Change		
	Ex.	N.Ex.	T	Ex.	N.Ex.	T	Ex.	N.Ex.	T.
General	3	3	6	3	3	6	-	-	-
Traffic	3	6	9	3	6	9	-	-	-
Purchasing Sub-Section	43	53	96	41	51	92	(2)	(2)	(4)
Stores Sub-Section	12	157	169	12	153	165	-	(4)	(4)
Total	61	219	280	59	213	272	(2)	(6)	(8)

Safety experience

One minor injury was reported.

Eight safety and security meetings were held with a total of 208 employees attending.

Personnel Activities

On October 25 and 26, 1955, six representatives of Purchasing and Stores visited the General Services Administration facilities in Seattle, Washington. The purpose of this trip was to observe and discuss methods and procedures employed at this installation with members of G.S.A. supervision.

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**TRANSPORTATION SECTION
MONTHLY REPORT
October 1955**

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Transportation Section personnel forces increased from 488 to 489 by eight transfers in, three reactivations - personal illness, eight transfers out, and two deactivations - personal illness. In addition, two employees in inactive status were terminated.

Transportation Section expenditures totaled \$1,006,134 for the first quarter of FY 1956 which is an increase of \$2,492 or 0.25% over the same period in FY 1955. Actual costs for the first quarter were below the bogey by \$69,432 or 6.46%. The bogey provided for a greater number of employees than was required plus a 3.6% increase whereas the higher salary rates were not applied until September. The following indicates comparative costs by major service functions:

<u>Function</u>	<u>FY 1956 1st Qtr.</u>	<u>FY 1955 1st Qtr.</u>	<u>% of Variance</u>
Railroad	\$ 183,826	\$ 193,089	- 4.80 %
Plant Bus	349,212	330,563	+ 5.64 %
Heavy Equipment Maintenance	142,838	146,152	- 2.27 %
Light Equipment Maintenance	150,046	176,267	- 14.88 %
Road Maintenance	52,600	45,261	+ 16.21 %

Listed below are unit cost statistics for the first quarter compared with the performance bogeys for FY 1956 and FY 1955 actual:

	<u>FY 1956 1st Qtr.</u>	<u>FY 1956 Bogey</u>	<u>FY 1955 Actual</u>
<u>Railroad</u>			
Cost per car handled - Commercial	\$ 32.12	\$ 29.73	\$ 31.46
Process	234.67	232.40	241.89
Average	54.13	52.34	52.97
<u>Plant Bus</u>			
Cost per mile - Operating	.3976	.4173	.4043
Maintenance	.1335	.1281	.1268
Total	.5311	.5454	.5311
<u>Light Equipment Maintenance</u>			
Cost per mile - Maintenance	.0623	.0689	.0614
<u>Road Maintenance</u>			
Cost per mile - Yearly (Primary roads based on 20' roadway - seal coating not included)	192.72	317.74	250.67
Seal Coating - per square yard for surfaced areas	.0905	.1108	.1134
<u>Track Maintenance</u>			
Cost per mile - Yearly	2,494.82	2,577.18	2,698.82

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Transportation Section

Preparation of the various phases of the FY1956 Midyear Budget Review is progressing satisfactorily. Major items of interest are as follows:

- a. Equipment requirements have been revised to \$925,125 to meet the reduction of \$136,470 or 12.5% imposed by the FY 1956 Financial Plan.
- b. Over-all inventory requirements will not exceed those indicated by the FY 1956 Financial Plan. Transportation inventories may be slightly above the \$120,000 at 6-30-56 due to road and track maintenance materials which will not be applied until FY 1957. This will be more than offset by the planned reduction in heavy equipment parts under the custody of the Purchasing and Stores Section. This reduction is not included in the \$268,000 recently indicated by R. J. Gandy.
- c. Personnel requirements have been reduced below the bogey and do not exceed the established ceiling. For example, the revised estimates provide for an average of 498 employees compared to the ceiling of 500 and the bogey of 508.

Annual physical inventories of antifreeze, automotive and heavy equipment parts, and railway equipment parts were performed in cooperation with the Inventory Accounting Unit on October 24, 25, and 26 as scheduled.

Furnished additional information on October 10 to complete the State's audit of fuel consumption and off-plant mileage by HO equipment. This audit disclosed that more than 1% of the total gasoline consumption is off-plant which means that the Commission will continue to receive a tax refund on 99% of the gasoline consumed. This is at 6½ cents per gallon which amounts to approximately \$75,000 annually on the disbursements by the Transportation Section.

The Commission's Washington office has directed that evacuation buses are to be reported as mileage equipment. Standby units have been historically treated as hourly equipment to avoid any distortion of utilization and cost per mile data on the regular operating fleet. Segregated information will be maintained by IBM for local usage; however, annual reports by the Commission and the General Services Administration are expected to be adversely affected and will be less favorable from a comparative standpoint.

The overhaul of three units of construction equipment was completed on October 5. No other units are scheduled for repairs at this time. The future of this program is not known.

The Commission has requested the General Electric Company to prepare the AEC Annual Motor Vehicle Report and maintain associated records. Reporting requirements have been under discussion for some time. Representatives from the Manufacturing Cost Unit, Procedures and Computing Section, and the Transportation Section met with the Commission's Financial and Property Management personnel on October 26 and reached some basic understandings relative to the change-over. The report covers property management activities pertaining to inventory, utilization, and costs.

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Transportation Section

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Established a revised procedure for the preparation of time distribution cards to facilitate processing through IBM and to overcome difficulties caused by the similarity of numbers for certain codes, work orders, and HO equipment.

Furnished information and made records available to the Auditing Section on overtime administration by the Transportation Section; reports and services of the Manufacturing Cost Section for the Transportation Section.

Continued to furnish information and make records available for the property management appraisal by the Commission in compliance with the letter dated August 1, 1955. Other information was supplied to the Commission's representatives on bus operation and road maintenance activities.

Completed the reconciliation of equipment records between the Plant Accounting Unit and the Transportation Section. This involved approximately 2400 units and only minor adjustments were required.

Civil Defense evacuation plans for Richland schools and Kadlec Hospital have been completed after being suspended during the summer. This program has been developed in cooperation with school administration officials. All personnel have been thoroughly instructed toward an expeditious evacuation if such an emergency should arise.

Participated in Fire Protection Week with an exhibit of the bus which recently sustained fire damages of about \$2,250 in the 100-H Area, and a special clean-up program.

Section employees attended the series of informational meetings held on the revised pension and the new insurance plans.

Completed a study on the restrictive use of assigned vehicles for regular transportation between Richland and the outer areas. This encompassed a comparative review of the mileage for the 118 vehicles formerly authorized for such travel. Based on the average mileage for FY 1955 there was a reduction of 32% in July, 46% in August, and 28% in September. This reduction is commendable; although, it is considerably less than had been expected. Moreover, it appears that there is a reversal of trend in September and October.

Facilities in the 1171 Building were made available for a demonstration of a Bendix, aviation, ultrasonic, cleaning machine. This showing was arranged by Plant Engineering Services and was attended by interested groups throughout the Plant.

Two new well cars (procured with construction funds) required modification by the manufacturer due to incorrect specifications by the Engineering Department. The cars have been returned to the Plant and will be held at Riverland until their use is required by production schedules.

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Transportation Section

Commercial rail traffic during October increased by 13% over September due to higher coal receipts. The following recapitulation indicates the distribution of commercial cars handled:

<u>Carload Movement</u>	<u>- Loads In</u>	<u>Empties In</u>	<u>Loads Out</u>	<u>Empties Out</u>
General Electric Company	1007	12	21	987
Atomic Energy Commission	6	0	0	2
L. H. Hoffman Company	7	0	0	7
U. S. Army	<u>58</u>	<u>0</u>	<u>0</u>	<u>54</u>
	1078	12	21	1050

Railroad process service during October decreased by nearly 20% over September due to production difficulties.

Railroad car movements consisting of process, commercial, and special service totaled 2580 in October compared to 2282 in September, 2424 in August, 1631 in July, 2673 in June, 2843 in May, 2463 in April, 2106 in March, 2354 in February, and 2288 in January.

Routine maintenance of Plant railroad trackage during October required 7,165 man-hours. Received and distributed three carloads of excess rail from Portsmouth, Ohio. This material was acquired at a reduced cost and will be utilized in the programmed relays for FY 1956 and FY 1957. A portion of the rail was found to be unusable and is being excessed. The loss of approximately \$1200 will be borne by the inventory reserve account due to economic and other considerations regarding the transaction.

Decontamination of locomotive 39-3726 and other work preparatory to excessing has been completed. A larger and later model locomotive was acquired by upgrade as a replacement in May.

The Plant Bus System transported 4.38% more passengers in October than in September. The following recapitulation indicates the volume of service rendered:

Passenger Volume	172,636
Revenue - Bus Fares	\$ 8,631.82
Earnings - Transit Advertising (September)	\$ 173.56
Bus Trips	7,256
Bus Miles - Passenger Carrying	203,549
Passenger Miles	5,619,689

The Richland Bus System transported 25.29% more passengers in October than in September due to the seasonal increase in student patronage and the greater number of school days in the reporting period. The following statistics indicate the volume of service rendered.

Total Passengers - Including Transfers	11,270
Revenue - Bus Fares	\$ 616.66
Earnings - Transit Advertising (September)	\$ 7.89
Bus Trips	984
Bus Miles - Passenger Carrying	5,215
Passenger Miles	28,044

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Transportation Section

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Off Plant chauffeured automobile trips (Company business and/or official visitors) totaled 294 which were rendered to the following locations:

AEC Airport	1
Benton City, Washington	31
Grandview, Washington	6
Hinkle, Oregon	6
Kennewick, Washington	98
Kiona, Washington	1
Mabton, Washington	1
Pasco, Washington	72
Pendleton, Oregon	9
Prosser, Washington	4
Richland Y, Washington	2
Spokane, Washington	2
Sunnyside, Washington	21
West Richland, Washington	18
Yakima, Washington	22

The following tabulation indicates in gallons the volume of fuel distribution during October:

	<u>Gasoline</u>	<u>Diesel Fuel</u>	<u>50 Cetane</u>	<u>Kerosene</u>	<u>White Gas</u>
Stock at Start of Month	72,072	16,265	9,900	2,967	352
Received During Month	85,517	18,300	33,824	1,215	0
Disbursed During Month	86,469	16,905	31,174	1,922	95
Stock at End of Month	71,120	17,660	12,550	2,260	257

The following tabulation indicates the volume of equipment maintenance activities during October by types of service and number of jobs:

Motor Overhauls	51
Class A Inspections and Repairs	94
Class B Inspections and Lubrications	1024
Weekly Inspections - Fuel Trucks and Off Plant Vehicles	147
Semimonthly Inspections - Buses	196
Monthly Inspections - Railroad Rolling Stock	10
Front End Alignment and Wheel Balance	91
Routine Maintenance Repairs and Service Calls	1652
Accident Repairs and Paint Jobs	37
Tire Repairs	488
Wash Jobs	402
	4,192

Completed the winterizing of all water cooled HO equipment. This program was begun in September to minimize the effect on other equipment maintenance activities.

Fourteen units of contaminated HO equipment were cleaned during the month at the 269-W Building, 200-West Area.

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Transportation Section

Equipment in the AEC contingency pool has been placed in storage status. This work was performed on a work order from the Commission.

The following tabulation indicates the number of HO mileage vehicles in service during September and the utilization of each type:

<u>Code</u>	<u>Type</u>	<u>No. of Units</u>	<u>Total Mileage</u>
1A	Sedans	377	542,134
1B	Buses	92	266,188
1C	Pickups	520	263,082
1D	Panel, Carryall, Sta. Wagon	167	136,635
1G	Jeeps	3	1,298
1H	Power Wagons	50	23,665
68 Series	Trucks	<u>223</u>	<u>104,725</u>
		1,432	1,337,727

Returned Bonneville Power Administration electrical testing equipment from the 100-K Area to the Ross Substation, Vancouver, Washington.

Completed the erection of civil defense route markers in Richland as requested by the Commission.

Maintenance of Plant roads and the production of road aggregate materials required 1,294 man-hours.

The following tabulation indicates in tons the volume of asphaltic material handled during October for road maintenance:

	<u>MC 3</u>	<u>MC 5</u>
Stock at Start of Month	41.15	55.95
Received During Month	0	0
Used During Month	41.15	18.40
Stock at End of Month	0	37.55

The following tabulation indicates the volume of mineral aggregate and pre-mix material handled in October for road maintenance:

	<u>3/4" to 0</u>	<u>1/4" to 0</u>	<u>5/8"</u>	<u>1/4"</u>	<u>3/4"</u>
	<u>Pre-mix</u>	<u>Pre-mix</u>	<u>Chips</u>	<u>Crushed</u>	<u>Crushed</u>
	<u>Tons</u>	<u>Tons</u>	<u>Cu.Yd.</u>	<u>Rock</u>	<u>Rock</u>
	<u>Tons</u>	<u>Tons</u>	<u>Cu.Yd.</u>	<u>Cu.Yd.</u>	<u>Cu.Yd.</u>
Stock at Start of Month	537	1,116	1,635	499	2,938
Made During Month	346	282	0	0	0
Used During Month	280	772	236	180	470
Stock at End of Month	603	626	1,399	319	2,468

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PILE TECHNOLOGY SECTION

Evaluation of the flexible connectors being installed on the front face of KE and KW reactors shows that the stainless steel braided sheath is highly susceptible to stress corrosion cracking.

Experience with cored slugs indicates: (1) Overall failure rate for cored slugs is about the same as for solid slugs; (2) at higher tube powers, cored slugs may be better; and (3) expansion of welded uranium end plugs does not initiate longitudinal cleavage of the uranium.

The intergranular corrosion, which is characteristic of the low exposure failures, was not duplicated in out-of-pile studies with liquid water at pressures expected in the pile, but was produced by steam, particularly above 375 C. Alloys containing one percent nickel were able to withstand a 75 C higher temperature than can stock.

The Lattice Testing Reactor was made critical for the first time on October 25. The initial critical configuration had a mass of 9.1 kg. of U-235. The control, safety, and instrumentation systems performed satisfactorily.

A preliminary study of a method of tritium production has been made. In this method, the lithium is to be introduced into the interior of a U-235 pipe which is then to be placed in the process tube. The method promised a high conversion efficiency and safety of pile operation.

A study of ways to improve the method of drying the pile gas is underway. It appears that some type of refrigerated condensers upstream from the silica gel driers would be desirable.

A preliminary draft has been prepared summarizing an investigation of the economic and technical factors involved in converting an existing pile to recirculation cooling.

The lump sum bids for the completion of the KER facility have been received. The schedules for completion call for a beneficial use date of 7/15/56 and a physical completion of 9/1/56.

The examination of twelve slug corrosion ruptures which have occurred since August indicate that they were caused by reduced process tube rib heights.

Re-evaluation of the condition of the pile process tubes at the old reactors based on internal corrosion alone revealed that about 1800 process tubes must be replaced in the next 12 months. Since this is a minimum number of tubes to be replaced and does not compensate for external galvanic corrosion, any excess tube replacement capacity should be utilized in removing additional tubes at D and F reactors.

The KAPL-120 loop charged with corrosion and fuel test assemblies has significantly less power generation than was anticipated. An investigation demonstrates that the test assemblies are properly charged and that the 305 pile tests are not in error. The best value for the fission heat from the test assemblies is 17 kilowatts, compared to a value of 35 kilowatts calculated from the 305 pile tests. No explanation is available for the discrepancy in power level.

SEPARATIONS TECHNOLOGY SECTION

The revised Redox flowsheet has been tested in the plant and gave a capacity increase from 11 to 12.5 t/d with performance on a sustained basis. The Redox silica gel facility has been in service and operates up to 150 percent of nominal design capacity. The Recuplex operation has been turned over to Manufacturing Department with Engineering Department in control of process planning and evaluation.

Studies are in progress to determine the reasons for difference in reactivity of continuously produced UO_3 from that produced by the pot method.

DESIGN SECTION

The Design Section effort on design development programs showed a significant drop during October. Design project activity increased a corresponding amount as a result of design effort on Redox Contamination Control Facilities and the Plutonium Fabrication Laboratory. Distribution of effort was as follows:

	<u>Percent of Total Effort</u>
Design Development	33.0
4-X Program	6.3
Reactor Plant Modifications for Increased Production	10.0
Purex Modifications	8.0
Other Design Projects	18.2
Process Technology	1.0
Other Work and Miscellaneous	<u>23.5</u>
	100.0

Total design for Project CG-558, Reactor Plant Modifications for Increased Production, advanced to 93.5% complete.

Work is in progress on CA-512-R, Revision 4 which includes the modification, correction and installation of various systems for satisfactory completion of the 100-K Area Facilities. Major items include Gamma Monitoring System - 105-K, Acid Addition Facilities - 183-K, Ventilation System Corrections - 1720 and 1704-K, and Retention Basin Foundations - 107-K.

A study was completed and a joint report was issued by Engineering and Manufacturing Departments on "Continuity of Water Flow Assurance for the K Water Plants."

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Reactor design development studies included feasibility of various new reactor plant alternates to obtain increased production at HAP0, preliminary scope for a small experimental reactor, pressurization-recirculation application to existing reactors and reactor continuous charge-discharge.

Preliminary design scope studies have been started for new integrated plutonium separations facilities utilizing a Redox flowsheet. Other major separations design development studies included Redox Phase III capacity increase and additional plutonium purification facilities.

PROJECT SECTION

Work on the Reactor Plant Modification Program has been delayed by a jurisdictional dispute between millwrights and electricians which was joined by the carpenters. Some piping and electrical work progressed at 100-B, but concrete and structural work at 190-D and DR was hindered.

Manpower of the labor service contractor decreased about 8% to a total force of about 1,008 at the end of the month.

The Manufacturing Department assumed responsibility for the Purex canyon on October 17.

ADVANCE ENGINEERING SECTION

Studies have been initiated on three advanced concepts for graphite moderated, water-cooled reactor design. These are high power density types which appear to have substantial potential for unit cost reduction.

ORGANIZATION AND PERSONNEL

Total on Roll, October 1, 1955	1,401
Net Change	13
Total on Roll, October 31, 1955	1,414

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MANAGER, ENGINEERING

ENGINEERING ADMINISTRATION SECTIONOCTOBER 1955

The local AEC has been requested to add HAPO to the original distribution list of a number of internal Westinghouse reports which will be of value in the HAPO Pressurized Loop Program.

During the month the following major contract activities were handled:

1. Consultant Agreement No. 128 between General Electric and Richard G. Tyler providing for Consultant Services to study the Ricaland Sewerage System and to make recommendations relative to the elimination of obnoxious odors.
2. Special Agreement No. G-72 between General Electric and Battelle Memorial Institute covering research work to be done by Battelle was forwarded to AEC for approval.

Manager - Engineering Administration
ENGINEERING DEPARTMENT

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PILE TECHNOLOGY SECTION

MONTHLY REPORT

October 1955

VISITORS & TRIPS

C. L. Angerman from SRP-Augusta, R. F. Dickerson from BMI-Columbus, A. E. Guay from NLO-Cincinnati, also H. C. Kloepper and A. E. Ruehle from MCW-St. Louis, attended Metallography Sub-Committee Meeting at HAPO, Oct. 3-6.

S. F. Audia, National Lead, Fernald, Ohio, spent Oct. 28 at HAPO discussing broaching development and inspecting broaching machine.

The following KAPL personnel visited HAPO to discuss KAPL-120 loop: E. Auditori on Oct. 6, R. H. Simon, Oct. 7-14, A. A. Sugalski, Oct. 27-28, and R. E. Larson arrived Oct. 19 planning to stay through December.

J. Farr, National Lead, Fernald, Ohio, visited HAPO to work on broaching machine, Oct. 31.

J. Finley, Alcoa, Seattle, visited HAPO on Oct. 27 to discuss schedule of procurement of aluminum components for fuel elements.

R. B. Gunia from U.S. Steel, Pittsburgh, and N. R. Hart from Columbia Geneva, Seattle, visited HAPO on Oct. 18 for consultation on materials of construction.

G. Henry, North American Aviation, Downey, Calif. visited HAPO on Oct. 31 for fuel element assembly works and metallurgy research.

J. S. Kane, University of California, Livermore, visited HAPO for graphite discussions, Oct. 20-21.

W. J. Koshuba, GE-ANP, Cincinnati, and C. E. Weber, KAPL, attended Intra-Company Fuel Element meeting at HAPO, Oct. 26-27.

S. McLain, ANL, visited HAPO, Oct. 5-7, for discussions regarding Reactor Handbook, reactor technology, laboratory design and plutonium handling problems.

R. J. Anicetti was official HAPC representative on Oxide Committee at WAPD, Pittsburgh, Oct. 18-19 and visited BMI on Oct. 20 to discuss oxide fuel material fabrication.

L. P. Bupp and J. M. Atwood visited AEC-Pittsburgh Operations Office on Oct. 19 to discuss zirconium availability and technology, and they exchanged information on high pressure water cooling at WAPD-Bettis Field, Pittsburgh, Oct. 20-21.

S. H. Bush spent Oct. 18 at Michigan State, E. Lansing, and Oct. 19-21 at the University of Michigan, Ann Arbor, recruiting PhD's.

V. R. Cooper attended Metal Development Advisory Committee Meeting at National Lead, Fernald, Ohio, Oct. 19-20, and visited AEC-Washington, D.C. on Oct. 21 for exploratory discussion on ETR program.

D. E. Davenport visited WAPD-Pittsburgh, Philbrick Company-Boston, and GEL-Schenectady, to discuss analog computing equipment, Oct. 12-14.

R. L. Dickeman spent Oct. 27-28 at the University of Seattle recruiting technical personnel.

R. L. Dillon discussed problems on aluminum corrosion and high temperature water at KAPL, Oct. 13-14.

E. A. Evans visited Phillips Petroleum, Arco, Oct. 31, to examine irradiated fuel elements.

T. W. Evans attended meeting of the ASM Metal Exposition and Congress, Philadelphia, Oct. 14-17, and visited KAPL, Oct. 20-21 and ANL, Oct. 24 for metallurgical technical consultations.

J. E. Faulkner recruited PhD's at Yale University, New Haven, Conn. and Princeton University, Princeton, N.J., Oct. 17-21. He visited MIT, Cambridge, Mass. on Oct. 24 to discuss reactor physics.

J. E. Faulkner and R. E. Heineman attended Reactor Physics Conference at WAPD-Pittsburgh, Oct. 27-29.

O. H. Greager visited KAPL, Oct. 17-18, to discuss Assistance to Hanford program and National Lead, Cincinnati, Oct. 19-20, to attend meetings of the Metallurgical Development Advisory Committee.

R. E. Heineman visited ANL, Lemont, Ill. on Oct. 31 to discuss reactivity gains - exponential physics.

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H. L. Henry, D. E. Davenport, D. J. Donahue and D. D. Lanning, attended a Critical Experimental Conference at GE-ANP, Cincinnati, Oct. 10-11.

D. C. Kaulitz and R. S. Kemper discussed the GEH programs at Phillips Petroleum, Idaho Falls, Oct. 19-20; also discussed and inspected remote handling equipment at GE-ANP, Idaho Falls, Oct. 20.

M. Lewis consulted with Alcoa, Pittsburgh, on 63S process tubes, Oct. 25, and recruited technical personnel at Pennsylvania State University, State College, Oct. 26-28.

J. W. Lingafelter and J. T. Mommsen visited ANL, BMI, ORNL, SRP, WAPD and KAPL for welding consultations, Oct. 3-13. They also visited Aluminum Co. of America, Pittsburgh, GE-York, Pa., GE-Schenectady, and Utica Drop Forge Co., Utica, N.Y. Mr. Mommsen also visited Aero Projects, West Chester, Pa.

N. R. Miller visited ANL, Oct. 26-28, to discuss high temperature aluminum corrosion.

W. E. Niemuth and D. C. Pound visited GE-ANPD, Cincinnati, Oct. 10-11, to discuss reactor safety and equipment for critical experiments.

D. P. O'Keefe consulted on Hot Laboratory operation at KAPL and WAPD, Oct. 12-14, and attended meeting of ASM Metal Exposition and Congress at Philadelphia, Oct. 15-20.

W. J. Ozeroff, D. E. Davenport and D. D. Lanning attended an Industrial Criticality meeting at Rocky Flats Plant-Dow Chemical, Denver, Oct. 6-7.

P. G. Pallmer, Jr. attended X-ray Diffraction School at North American Phillips Chicago, Oct. 10-14, and visited ANL, Oct. 13-15, to discuss x-ray diffraction techniques.

R. S. Paul spent Oct. 20-21 at the University of Oregon and Oregon State College recruiting technical personnel.

J. H. Rector visited KAPL on Oct. 21 to discuss control rod developments of SIR and SAR. He also attended ASME meeting in Philadelphia, Oct. 17-20.

J. W. Riches, H. H. Burley and H. A. Gardner visited Iowa State College, Ames, Iowa, Oct. 10-11, BMI, Oct. 12-13, and KAPL on Oct. 14, for consultations on uranium metallurgy.

M. J. Sanderson discussed fuel element development and fuel materials at GE-ANP, Cincinnati, Oct. 24, and recruited technical personnel at Ohio State, Columbus, Oct. 25-27.

W. R. Smith presented a paper at the ASM Regional Meeting held at Seattle on Oct. 12, and visited Boeing Aircraft, Seattle, on Oct. 13, regarding welding equipment, processes, techniques and applications.

J. T. Stringer and O. W. Rathbun visited Mallinckrodt Chemical, St. Louis, on Oct. 31 regarding process inspection for uranium fabrication techniques.

W. P. Wallace visited ANL on Oct. 27 and Sylvania Electric, Bayside, N. Y., on Oct. 28 for discussions on fuel elements development.

E. C. Wood visited ANL, Oct. 10-11, regarding non-destructive testing methods; BMI on Oct. 12 regarding internal friction measurements and non-destructive testing; Hammond Metallurgical Lab., Yale University, on Oct. 13 regarding internal friction; Aluminum Company of America, Edgewater, N. J., on Oct. 14.

D. C. Worlton inspected ultrasonic testing equipment at National Lead, Fernald, Ohio, Oct. 17-21.

ORGANIZATION & PERSONNEL

Personnel totals are as follow:

	<u>September 30</u>	<u>October 31</u>
Administrative	2	2
Pile Engineering	94	97
Pile Materials	58	60
Fuel Technology	119	126
Physics Research	40	39
Metallurgy Research	79	80
Contact Engineering	2	2
Technical Administration	<u>10</u>	<u>8</u>
Totals	404	414

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File Engineering: T. J. Oakes, Physicist, was hired Oct. 13; L. R. Ferrill, Engineering Assistant, transferred in from Fuel Technology on Oct. 24; W. L. Carlson and J. L. McElroy, Technician Trainees, transferred in from Education & Training, Oct. 11 and 13, respectively; R. V. Dulin, Engineer II, terminated Oct. 7.

File Materials: Robert Harrington, Engineer I, and S. W. Smith, Engineering Assistant, were hired Oct. 3 and 17, respectively; R. L. Moore and R. D. Percy, Technician Trainees, transferred in from Education & Training, Oct. 6 and 21, respectively; Ruth D. Mullin, Secretary C, transferred in from Office Auxiliaries Oct. 24; C. M. Spalaris, Engineer II, was deactivated Oct. 17; E. L. Etheridge, Engineer II, and D. B. Lovett, Engineer I, transferred to Process Engineering, Oct. 17 and 31, respectively.

Fuel Technology: W. C. Roberts, Engineering Assistant, was hired Oct. 7; C. L. Bennett, Technician Trainee, transferred in from Education & Training, Oct. 10; G. H. Hansen, Technician Trainee, transferred in from Design Planning, Oct. 14; L. A. Pennick and D. H. Warf, Engineering Assistants, transferred in from Metal Preparation, Oct. 31; C. A. Kremer, Secretary B, transferred in from Process Engineering, Oct. 10; L. B. Hildreth, Secretary C, transferred in from Reactor Section, Oct. 17; M. D. Munro, Steno-typist, transferred in from Technical Administration, Oct. 10; T. H. King, Steno-typist, transferred in from Office Auxiliaries, Oct. 31; B. F. McCulley, Secretary B, terminated Oct. 28; L. R. Ferrill, Engineering Assistant, transferred to File Engineering, Oct. 24; C. P. Teter, Steno-typist, transferred to Technical Administration, Oct. 10.

Physics Research: W. T. Vestal, Engineering Assistant, terminated Oct. 7.

Metallurgy Research: G. L. Minetti, Technician Trainee, was hired Oct. 3 and terminated Oct. 28; R. J. Anicetui, Senior Engineer, transferred in from Plant Processes, Oct. 15; K. M. Haws, Engineer II, transferred in from Wage Rates, Oct. 1; D. N. Barrett, Secretary B, transferred in from Process Engineering, Oct. 24; F. E. Johnson, Engineer II, was transferred from weekly to monthly, Oct. 1.

Technical Administration: J. W. Hall, Unit Head, transferred to Engineering Services, Schenectady, Oct. 25; C. P. Teter, Steno-typist, transferred in from Fuel Technology, Oct. 10 and terminated Oct. 28. M. D. Munro, Steno-typist, transferred to Fuel Technology, Oct. 10.

PILE ENGINEERING SUB-SECTIONPROCESS TECHNOLOGYPower Level Limitations

The maximum operating power level, during October 1955, was limited by 105 C tube outlet temperatures at B, C, D, DR, F, and H Piles. At C Pile, control problems caused 600 C graphite temperatures, but at less than maximum helium concentration. At KE and KW Piles power levels are being increased, subsequent to front pigtail replacement.

Process Specification Changes

Specification 26.00 - "Slug Rupture Limits": This specification has been deleted and is to be replaced by a Process Guide which is yet to be issued. Reference documents will serve as an interim guide.

Specification 12.00 - "Properties of Process Tube": A revision has been made to allow the use of unclad 2S aluminum process tubes.

Pile Operation

Large scale tube replacement is continuing with 106 tubes replaced at F Pile during the month.

Operating efficiency has been lower than normal during the month because of water leaks at D, F, and H Piles, a ball drop at H Pile, tube replacement at F Pile, lodged slugs on the rear face at D Pile, front pigtail replacement at KE Pile and ruptured slugs at C (6), F (5), and D (7) Piles.

Process Tube Leaks

Two pile shutdowns were required due to process tube leaks during October, 1955.

<u>Date</u>	<u>Pile</u>	<u>No. Leaking Tubes</u>
10-3-55	D	5
10-10-55	H	3

Limitations Imposed by Rupture Rates

The following rupture rates have prevailed for lead-dip metal during the last eight months:

CURRENT RUPTURE RATES CALCULATED FOR 600 MW/D/T
GOAL EXPOSURE

	<u>Cleavage Failure R. Rate</u>	<u>Total Failure Rate</u>
C Pile	.00216	.0295
B, D, F, H Piles	.00024	.0032

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Present maximum tube powers are approximately 700 KW at the old piles and 1000 KW at C Pile. Several significant facts can be gained from the above data:

1. A power relationship stated previously - the rupture rate increases exponentially, a factor of two for every 100 KW increase in tube power - fits both the cleavage failure rate and the total failure rate.
2. The proportionate number of cleavage failures have declined in favor of side failures and inter-granular corrosion failures.

The rupture situation has changed appreciably within the last year. Where cleavage failures were the major problem one year ago, today they comprise only 10 per cent of the failures. Probably the largest portion of the remaining 90 per cent are due to various corrosion phenomena. It should be emphasized, however, that they are not associated with uniform corrosion since jacket temperatures at the old piles are calculated to be higher than at C Pile. This type of failure, as can be seen from the tabulation, is closely related to specific power and many of them can be concluded due to unusual heat transfer conditions, i.e.

1. Tube examination data would indicate that an unusually high incidence of failure occurred in tubes that show evidence of slug cocking. (The data is difficult to interpret, however, since more than 30 per cent of all tubes examined showed evidence of slug cocking.)
2. Some failures have occurred which suggest that where the process tube ribs become highly corroded, the reduced annular flow in this area will have a dis-proportionate temperature increase that ultimately causes the slug to fail by jacket corrosion.
3. Inter-granular corrosion may be initiated by poor heat transfer conditions. The examination of unbonded fuel elements irradiated to low exposure under a recent production test revealed that many had "hot spots" areas that have by now become associated with inter-granular corrosion failures. This type of slug marking is only seldom observed with normally irradiated production metal. The nature of an unbonded slug might result in non-uniform heat transfer and temperature differences in the peripheral jacket area. By implication, those normal production slugs that fail by inter-granular corrosion may also be associated with "unusual" heat transfer conditions.

The tabulated rupture rates can be extrapolated to Post CG-558 conditions by use of the formula:

$$\text{Rupture Rate} = k e^{.115x} + .0092y$$

where x = maximum specific power in KW/ft. of U and y = discharge exposure in MWD/T.

The formula does not represent a change from formerly calculated relations.

1. Rupture rate increases exponentially by a factor of 2.5 for every 100 MWD/T increase in goal exposure.
2. Rupture rate increases by a factor of two for every 100 KW increase in tube power.

By extrapolating the rates it becomes obvious that further improvement in metal performance must be achieved to reach the production goals set for Post CG-558 operation. Since the majority of the failures are due to "unusual" conditions, these conditions may be more easily corrected than the development of a new fuel element. A ten-fold improvement in fuel element stability will be required to operate the piles at projected power levels and 500-600 MWD/T exposure.

Ruptured Slugs

Eighteen slug failures occurred during the month. These consisted of 14 failures of solid, normal uranium slugs, two of which were being irradiated as controls under a "to rupture test", one failure of a regular production cored piece which was being irradiated under a development test, one failure of a "mint" piece in a poison column, and failures in two "C" metal enrichment columns. The rupture experience for the month of October is summarized in Table I. Included in this tabulation are data for three September failures which occurred too late to be included in the monthly report for September.

SLUG RUPTURE EXPERIENCE - OCTOBER 1955

<u>Type of Metal</u>	<u>Tube No.</u>	<u>Failure Date</u>	<u>Exposure</u>	<u>Failure Type</u>
Al-U-235 Alloy - "J" Metal	2462-C	9-26-55	152 MWD/tube	Jacket split
8" Normal U - "L" Lot	3170-F	9-28-55	829 MWD/T	Cap
Al-U-235 Alloy - "C" Metal	0579-H	9-30-55	173 MWD/tube	Cap
8" Normal U - "L" Lot	1081-D	10-3-55	393 MWD/T	Side
8" Normal U - "Z" Lot	0369-C	10-4-55	171 MWD/T	Side
8" Normal U - "K" Lot	0873-C	10-7-55	200 MWD/T	Cap
8" Normal U - "A" Lot	1872-F	10-7-55	865 MWD/T	Unclassified
8" Normal U - "L" Lot	3173-F	10-7-55	886 MWD/T	Side
8" Normal U - "L" Lot*	1079-D	10-10-55	411 MWD/T	Side
8" Normal U - "K" Lot	1268-D	10-10-55	478 MWD/T	Side
8" Normal U - "A" Lot	2271-F	10-12-55	888 MWD/T	Split
8" Normal U - "K" Lot	2768-D	10-12-55	574 MWD/T	Split
4" Normal U - Control for PT 105-570-A	2079-F	10-13-55	1547 MWD/T	Split
4" Normal U - Control for PT 105-570-A	2180-F	10-14-55	1484 MWD/T	Unexamined
8" Normal U	2886-C	10-14-55	255 MWD/T	Side
Al-U-235 Alloy - "C" Metal	0470-C	10-14-55	144 MWD/tube	Side (Chattering)
8" Normal U - "L" Lot*	1076-D	10-17-55	435 MWD/T	Side
8" Cored U	2368-D	10-21-55	772 MWD/T	Unexamined
Al-U-235 Alloy - "C" Metal	0657-C	10-22-55	153 MWD/tube	Unexamined
Mint	3378-D	10-21-55		Unexamined
8" Normal U - "M" Lot	1471-C	10-22-55	153 MWD/T	Side

*These pieces were normal production material in every respect with the exception that the uranium had been cooled in air between the beta-transforming and water quench steps for a period longer than normal.

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Two of the failures this month occurred in solid slugs being irradiated at F Pile under PT 105-570-A. This is a run-to-rupture test planned to show any differences in the rupture resistances of cored and solid slugs. At the present time the columns of cored slugs have attained exposures in excess of those at which the solid pieces failed. However, the exposure difference is, as yet, insufficient to statistically demonstrate any difference in the performance of the two slug types.

Three of the side failures this month occurred in highly corroded areas between the rib marks. A postulated mechanism for failures of this type was discussed in the September 1955 Monthly Report.

Production Tests

(See following pages.)

Test No.	Type Metal	No. of Tubes	Pile	Goal Exposure	Present Exposure	Remarks
105-570-A	Cored-Lead Dip	4	2-C	2 ruptures	Discharged 1720-1780	Ruptured at 1115 and 1173 MWD/T
	Control	4	2-F	"	1 discharged at 1046	1 ruptured at 1128 MWD/T
			2-C	"		
			2-F	"		Ruptured at 1524 and 1547 MWD/T
105-586-A	U-S1 Ingots	1	B	900	Discharged at 1007 MWD/T	
	U-S1 Dingots	4		2 ruptures		Not yet charged
	U-S1 Cored	3		900		Not yet charged
	Control	4		2 ruptures		Not yet charged
105-588-A	Development Test of Extruded and Drilled Cored Slugs	3 tubes per mo.	1-C	900	Discharged 760-790	Ruptured at 797 MWD/T
			3-C	1100	740-760	
			3-D	900	580-650	Charged 3-7-55. 1 ruptured at 772 MWD/T
			5-D	900	300-330	Charged 3-30-55
			3-D	900	90-100	Charged 7-10-55
			12-D	900		Charged 9-28-55

105-590-A	Extruded Cored	4	C	Ruptures	Not yet Charged	Compares performance of extruded and drilled cored slugs
105-591-A	Cored	App 300	KE	900		Authorizes irradiation of production quantities of cored slug. 1 ruptured at 505 MWD/T.
		428	D			
		18	C			
		662	F			
		545	B			

105-593-A	Cored Al. End Plugs	4	C	1-200 1-600 2-900	Discharged at 213 Discharged at 640 690-710	
105-596-A	Dingot Slugs	9	F	2-300 2-600 5-900	Discharged 316 & 342 400-650	Slugs charged alternately with control slugs from rod-transformed and slug-transformed metal.
105-597-A	Mg-U Matrix 4 Slugs	1 1	B or D B or D	3000 6000	Not yet loaded Not yet loaded	2 Matrix slugs plus 31 reg. slugs 10 Enriched matrix and 12 normal Matrix Slugs.

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105-601-A53-MT	Solid	12	D	6-600 6-900	90-100	Delay of 30, 43, 50, and 80 seconds between salt bath and water quench.
105-603-A47-MT	Cored-Crimped U-End Plugs	4	C	1-300 1-600 2-900	290-310	
105-607-A57-MT	Cored-Enriched Welded U and Aluminum End Plugs 3/8" & 5/8" core diameters	6	C	Ruptures		Compares performance of welded U and aluminum end plugs and a larger core diameter. Charged 10-15-55.
105-608-A56-MT	Dingot Slugs	16		7-600 9-900	Approved	Compares various mechanical and heat treatments of Dingot U.
105-608-A56-MT Sup. A	Dingot Slugs			Both low and high goal	Approved	Authorizes irradiation of production quantities of Dingot Slugs.
105-608-A56-MT Sup. B	Dingot Slugs	8	C	Ruptures	Approved	Compares performance of dingot and ingot U slugs.
105-610-A60-MT	Vertically Heat Treated U.	12		2-400 5-600 5-900	Circulating for Approval	Rod heat treated in vertical position.
105-611-A	Reg. Produc.	33		500 900 1100	Approved	Investigates the effects of pile variables upon slug stability.
105-613-A54-MT	Solid	20		4-400 8-600 8-900	Circulating for Approval	Delays 35, 50, and 80 seconds between salt bath transformation and water quench. Heat treated in rod form.

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HEAT TRANSFERTransient Response Tests

Response of the individual process tube system to severe and sudden cone screen plugging was studied experimentally. Two tests were run in which flow was suddenly cut to 60 per cent of normal in a BDF mock-up tube operating at 1000 KW with outlet temperature of 147 C. A simulated high trip signal was applied when flow reached 45 per cent of normal, and after three more seconds of 1000 KW heat input, power was decayed to simulate the scram transient. High outlet temperatures and low flow rates persisted for about 30 seconds until liquid phase flow was re-established. Silver solder plugs (melting point 630 C) on the surface of the cupro-nickel heater tube showed no evidence of thermal damage. The interior of the process tube is coated with a resin to provide electrical insulation between heater tube and process tube. Lack of failure of this material is additional evidence that heater tube surface temperatures adjacent to process tube ribs did not rise to extreme values.

These tests represent a continuation of the program to study the characteristics of Panellit high pressure trips as protection against severe cone screen plugging.

Revision of Trip-Before-Instability Limits

Heretofore the minimum point of process tube boiling curves has been characterized by tube inlet pressure, and this pressure used to determine desirable trip settings. This was known to be technically incorrect since the boiling curve "seen" by the Panellit pressure sensing line is of slightly different shape than that characterized by tube inlet pressure, being different for each of the several orifice and venturi zones. The correction factor for the dual-orifice and venturi zones was assumed to be small. As observed by K.W. Hess of the Process Sub-Section, the correction factor is significant for zones other than single orifice zones. The correction tends to increase limits in the dual orifice zones, has little or no effect in the single orifice zones, and decreases limits in the venturi zones.

Appropriate interim corrections were issued where these amounted to downward revision. Reductions in limits amounted to as much as 8 C. The operational effect is to bring allowable outlet temperatures based on trip-before-instability limits down to near the currently observed 105 C tube corrosion limit.

K Pile Boiling Curves

Steady-state boiling curves for the K geometry were determined experimentally using the hydraulics and electrically heated mock-ups. In addition to securing data in the region of interest for equilibrium operation, test runs were made at powers lower than 100 KW to determine boiling curve peaks during shutdown transients.

Cooling-by-Boiling Equipment Development

One cold flow and one boiling flow test runs were made. While the system worked well in general, the tests showed considerable "de-bugging" to be required before accurate experimentation will be possible. A number of minor leaks were repaired, although a large leak in the recycle pump bearings could not be. In addition, modifications and additions to control instrumentation and apparatus were found to be necessary. The time required for necessary changes will depend largely on the availability of craft manpower.

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Hydraulic Studies

Transient response of oil-filled Project CG-558 Panellit gages was studied to indicate the effect of throttling. It was found that if the throttling valve is at least 60° open a gage containing 20 cc. of light oil will give only a slightly slower response and greatly reduced fluctuations compared with gages containing no oil.

Sizing studies were started to determine desired venturi throat diameters for post CG-558 operation with low venturi throat pressures. Operating data from the C Pile I and E slug irradiation were analyzed and a draft report written. Study was initiated to determine optimum I and E slug geometries for various operating conditions.

Shutdown Cooling Studies

In conjunction with W.J. Love of the Design Section, a table was prepared of allowable K Pile power levels for different shutdown water flow situations. Studies were initiated to calculate by machine methods the heat output from a slug charge following pile shutdown, and to determine precise methods for experimental determination of same.

Other Studies

Service was rendered Fuel Technology in providing basic heat transfer information for inclusion in a 300 Area Technical Manual. Assistance was rendered to Advance Engineering in studies pertaining to methods of increasing production.

PILE PHYSICS

KE Graphite Temperature Coefficient Measurements - PT 105-600-A

In the fifth measurement under this production test October 2-3 an apparent loss of 135 ih resulted from a reduction in CO₂ concentration in the He-CO₂ pile atmosphere from 58 to 30 per cent. Higher graphite coefficient values continue to be observed with each succeeding test. The weighted pile exposure during this last test was approximately 335 MWD/T.

Pile Safety Studies

An effort to assemble current "best values" for the various reactivity components entering into nuclear safety studies and to organize the information in a consistent and understandable form was completed during the month. Much of the information was presented in a talk given early in the month at a Manufacturing Department reactor safety review.

Process Specification Studies

A document is to be issued shortly proposing certain modifications of the hot startup specifications. A reduced initial rod-withdrawal procedure is proposed for the case of poison column discharge during a scram. Other proposals applicable to all hot startups include permitting slightly faster rod withdrawal rates following the initial rod withdrawal and switching Beckman ranges in order to effectively lower the trip level a factor of ten.

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Cold startup rod withdrawal specifications are currently being re-examined for adequacy as operating transient predictions continue to become more complex.

Process Physics Assistance

Three widely varied plant assistance problems were investigated during the month: (1) a substantial discrepancy between the actual and the predicted critical configuration of the DR Pile, (2) graphite temperature cycling at the KW Pile, and (3) inconsistencies in evaluation of the C Pile cold clean reactivity status.

The prediction discrepancy appears explainable on the basis of the plutonium component of the graphite temperature coefficient. A study will be made to provide Process Physics personnel with appropriate standard calculational methods to include this effect.

The second problem possibly indicates an inherent instability due to the larger pile volume and to the graphite coring pattern. Observations will continue until determination can be made whether the solution is to provide more careful flux distribution control, greater excess in the rods, or a change in the pile atmosphere.

The third problem is longer range in nature. It is felt that a careful evaluation of the various pile reactivity components is required; such evaluations must be fundamental in nature rather than inter-dependent upon the action of the other variables. The pile period calibration of a horizontal rod system as proposed in a production test currently circulating for signature and the measurement of coefficient values by the atmosphere-switching method in use at the KE Pile are considered to be first steps in obtaining such basic pile operating data.

Long Term Gains - PT 105-553-A

The task for transferring slugs irradiated under this production test to the Test Pile for subsequent reactivity determinations has been completed. It is expected that post-irradiation measurements may be started by the Physics Development Unit next month on the available slugs irradiated over the range from 50 to 2000 MWD/T.

Effect of Plutonium on the Inhour Equation

The effect of different distributions and quantities of delayed neutrons in Pu-239 fissions than in U-235 fissions raises questions concerning the reliability of rod calibrations based on pile period measurements taken under varying pile exposure conditions. Calculations summarized in HW-39669 indicate, however, that this effect is of secondary importance over the exposure ranges currently encountered at Hanford.

PCTR Auditing

The Pile Physics Unit was given and began carrying out during the month an assignment of "outside party" review of procedures and practices employed by the Physics Research Sub-Section in PCTR operation.

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K Pile Shield Effectiveness

The foils placed in the inner rod room at the KW Pile have been removed and are being counted. Indications are that most of the reactivity observed is due to scattered radiation leaking from control rod entryways, and that the leakage through the imperforate shield section is of the order of a few mrem at most.

MECHANICAL EQUIPMENT DEVELOPMENT

Charging and Discharging Studies

The flush charging tests have been completed and a letter report has been forwarded to Design Section. It was noted that anodized slugs could be flush charged with less flow than regular slugs which reduced the seating impact and damage to the cans.

Consideration is being given to the discharging of a process tube without release of back pressure on the tube. An arrangement capable of effecting such a discharge may be desirable for high pressure-high temperature tubes to prevent boiling during discharge.

One-Header-at-a-Time Leak Detector

Continued use of this equipment in several areas has confirmed the satisfactory results obtained in earlier applications. Permanent installations are to be made at F, D, and H Areas. Under favorable conditions it appears possible to leak check all tubes in a pile in four hours.

Vertical Rod Studies

Modifications are being made to the temporary mock-up in the 186-D Building. Tests will begin when this work is finished.

Process Tube Assembly and Piping

Three aluminum process tubes were installed in the 1706 K out-of-pile loop for creep measurement. It is planned to collect data at two week intervals until conclusion of the test.

Bursting and flexure tests were conducted on some proposed CG-558 replacement pigtails. These were similar in construction to the replacement front face pigtails at K Area. The results were erratic from the three samples available.

Physical Constants Testing Reactor

Fuel was loaded and the reactor has gone critical. All testing of mechanical components was completed and document HW-37949, "Physical Constants Testing Reactor, Mechanical Component Test Data," was issued.

Sub-Critical Counter

During pressure testing of the mechanical components of this assembly, the pressure was inadvertently increased above the safe operating pressure and the probe housing collapsed. Another tube with heavier walls is being installed.

Graphite Miner

A shorter length cutter head was fabricated and assembly is in process. Results with the long cutter head indicated that it will be possible to overbore a channel in a step pattern or to elongate the hole in a downward direction.

High Pressure-High Temperature Loop

The loop has been reinstalled in 189-D Building. Preliminary work is in progress and normal operation will resume shortly.

Flanging of Zircaloy-2 Tubing

Annealing of the tube ends with a high frequency induction heater has proven successful with regard to the forming of Van Stone flanges. Analysis will be made to determine the gas pick up involved with this method as compared to salt bath annealing.

Increasing the rate of forming a Van Stone flange has resulted in some successful flanges on "as received" tubing. Attempts are being made to develop this procedure to produce a more reliable result.

SPECIAL IRRADIATIONSKAPL-120 Loop

Following the startup of the KAPL-120 loop with corrosion and fuel test assemblies on September 29, it was determined shortly that the power generation from the fissionable material in the loop was significantly less than had been anticipated. Several investigations were made to determine that the test assemblies were charged properly and that previous studies in the 305 test pile aimed at predicting the power generation were not in error. At the conclusion of this work, the best value for the fission heat from the test assemblies as determined from the loop operation and instrumentation was 17 kilowatts as compared with a value of 35 kilowatts calculated from the 305 pile tests. At this time there is no explanation for this discrepancy.

No loop operation was logged from October 10 to October 20 due to an extended shutdown at H Pile. Also, due to a leak in the loop, there was no operation logged from October 24 to October 27.

Equipment for a gamma monitoring system has been procured and will be installed on the loop at forthcoming shutdowns.

H-Pile Irradiation Studies

A study has been made to determine the feasibility of recharging slugs containing Be_3N_2 (ORNL-184) used in the production of C-14. To avoid inflexible flattening in the piles, it has been requested that a given charge of this material maintain residence in a given tube for no more than six months or a year. The study has shown that these slugs can be recharged and high concentrations of carbon 14 can be attained as a result of recharging. A production test has been prepared to authorize such a procedure.

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Two experimental assemblies for studying the reactions between zirconium and pile gas impurities (HAPO-105) were charged into F Pile on September 30. Satisfactory operation with the gamma heaters in these assemblies has been achieved; however, all auxiliary electrical heaters have become inoperable. An explanation for their failure has not been obtained. To assist in the interpretation of data obtained from other zirconium samples irradiated in the "X" hole at H Pile in the pile gas atmosphere, thermocouples will be installed in the irradiation region to obtain sample temperatures. Equipment for this installation is being fabricated, and an out-of-pile mock-up will be made in the 189-D Building.

Two groups of uranium samples for studying the effects of pile radiations on crystal structures at low temperatures (HAPO-108 and 145) were irradiated at B Pile in the poison column control facility. Failure to by-pass the Panellit system caused a manual scram of the pile at the end of the second irradiation.

The preparation of recording equipment and other experimental components for the irradiation of graphite samples at elevated temperatures (HAPO-124) has been completed and are in a standby condition awaiting developments from the customer.

Additional experimental assemblies for measuring the core and coolant temperatures of cored slugs in-pile (HAPO-159) are being prepared. A tentative schedule calls for at least five tubes of cored slugs to be charged by the middle of November.

Instrumentation for the NAA pile safety fuse (HAPO-162) has been completed. Word has been received from NAA that the assembly of the in-pile experimental trains will begin within two weeks.

To obtain more information on the progressive development of faults leading to ruptures, it is desired that a group of uranium slugs be discharged from the pile periodically and inspected. The design of equipment recharging slugs in support of such procedure is complete.

Gamma Irradiation Studies

A study to determine a satisfactory procedure for the exposure of sheep to gamma irradiation from spent fuel elements has been made and a cost estimate for such an irradiation has been submitted to the Biology Section. This information is desired by that organization to assist the Atomic Energy Commission in evaluating the claims of damage to livestock in atomic bomb test areas.

The effects of gamma ray on asphalt covering for steel pipes is being studied by measuring the change in electrical resistance of the asphalt as a function of exposure. To date the material has received an integrated dosage of 4.4×10^6 r with no significant electrical breakdown of the asphalt being observed.

Two calorimeters for the measurement of gamma intensities have been designed, constructed, and are in the process of being tested. Data obtained to date from these tests gave considerable optimism that a satisfactory calorimeter can be developed for the measurement of gamma intensities and dosages.

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Facilities

The design of a high intensity gamma source has been completed and cobalt slugs for the source are being prepared for irradiation in one of the K Piles.

Following a thorough investigation of potential rabbit materials for the pneumatic facility, the conclusion has been reached that there is no material available for rabbits that has the appropriate mechanical strength, exhibits negligible radioactivity upon discharge, and does not suffer significant radiation damage. The failure to find satisfactory material necessitates that the pneumatic facility be provided an elaborate discharge system before it can be used.

Borescoping

The No. 24 VSR channel at D Pile was borescoped on 10-3-55 to a depth of 24 feet. It was observed that the vertical channel liner block was broken 16'6" from the top of the pile hopper and broken pieces of graphite were wedged in the channel at approximately 17'6". These pieces were approximately 7" to 8" in length and prevented total rod entry into the channel.

PHYSICS DEVELOPMENT

Ruptured Fuel Element Detection

The gamma spectrometer units were installed at DR Pile as replacements for the beta ionization chamber systems in the slug rupture detection application. These improved systems, now on H and DR Piles, have operated satisfactorily.

Some improved circuitry is under development for use in the gamma systems to be installed at K Pile. An attempt will be made to purchase specific circuitry rather than submitting functional specifications and relying upon the vendor for specific component designs.

Development Test 105-612-A, "Test of the Gammascan Units," was approved, authorizing an on-pile installation of a gammascan unit at C Pile. This system is composed of detectors distributed at lattice unit intervals across the rear face elevator and is designed to isolate rupture containing tubes remotely during shutdown and to locate "lost" uranium slugs; it may be possible to isolate some rupture containing channels during operation but the percentage of ruptures which can be located by this system will need to be determined by experiment.

The prototype gamma spectrometer unit was installed at C Pile to monitor selected tubes from which high rupture rates may be experienced. This installation will also be used for ion exchange resin studies.

Reactor Safety - Nuclear Instrumentation

The initial operation of the prototype Physical Constants Test Reactor has shown the safety circuitry and nuclear instrumentation to function as designed. Some modification of the neutron source system will be required to insure that the sub-critical flux level does not decrease sufficiently to reduce the level trip protection during the approaches to critical.

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The mechanical portion of the sub-critical neutron multiplication detector was damaged during out-of-pile testing; hence the performance test of this system at D Pile has been delayed until next month. The electronic portions of this system have been fabricated and performance tested.

The neutron sensitive ion chambers, designed for use in process tubes to provide an octant monitoring system on B, D, and F Piles, are fabricated. A test installation will be made on F Pile next month to determine the chamber characteristics in high fluxes and to observe the long term stability of the integrated system.

Lattice Neutron Economy

Measurements of the neutron distributions in internally and externally cooled slugs (1.415" O.D. - 7/16" I.D.) were made in the Test Pile lattice. These measurements, while crude, indicated a decrease in conversion efficiency of 5-10 per cent in going from the solid to the I and E type of slug. The measurements are being repeated under more favorable conditions and a joint program with Separations Technology has been developed to measure the effective in-pile conversion efficiency through semi-works separation of the plutonium from an irradiated I and E slug column. The irradiation is expected to begin next month and separations to be accomplished by May, 1956. The measured neutron distributions also indicate a power generation rate for I and E slugs which is about 12 per cent higher than for solid slugs.

Measurements have been made describing the reactivity losses associated with uranium-aluminum wafer slugs. The results indicated a rate of reactivity loss with increasing aluminum content greater than predicted, assuming simple dilution of the uranium. This discrepancy is being studied and experiments with hollow wafer slugs are being planned.

Calculations were made of the reactivity loss associated with replacing aluminum process tubes with stainless steel (type 403) possessing a 20 mil wall thickness. The steel tubes will result in a loss of 2,000 inhours per 105 pile. Uniform enrichment to 0.82 weight per cent U-235 would be required to recover this loss and would result in an 8 per cent decrease in conversion efficiency.

General Plant Assistance

Measurements were made to ascertain several technical factors describing the performance of the SAR fuel element in the KAPL-120 loop. An approximate prototype of the SAR element actually charged in H Pile was studied in the Test Pile to yield a "best value" for the expected power generation rate; this value was 35 KW on the basis of extrapolation of Test Pile results to an idealized H Pile situation. The uncertainties in the extrapolation include (1) neutron temperature, (2) effect of changes in bulk water density on neutron density within the SAR element, and (3) the local flux at H Pile in the region of the KAPL-120 loop. Measurements during the next operating period should permit a more valid extrapolation to be made.

Methods have been developed to measure the rate at which water is ejected from a process tube during a simulated reactor power excursion using the Heat Transfer electrical mockup. Initial tests are encouraging and the additional equipment required is being expedited. This work is being performed in cooperation with Heat Transfer and is basic to further refinement of predicted power excursions in water loss situations.

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Test Pile - Routine Tests

Uranium slug tests proceeded routinely. Uranium slugs produced from Fernald metal are below average; a result in line with higher TDS values the last two months. Twenty-six Fernald billet egg lots yielded TDS values ranging from 14 to 20; twelve Mallinckrodt egg lots yielded TDS values ranging from 11 to 15.

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PILE MATERIALS SUB-SECTIONGRAPHITE AND MATERIALS DEVELOPMENTEffect of Radiation on Korite Graphites

Four series of Korites coke graphites that were fabricated by Battelle Memorial Institute have been discharged from the water cooled test hole at 105-F after an exposure of 1359 MD/CT. These samples included various combinations of coke, filler and impregnants. Texas coke graphite, a pile grade graphite, was included for comparison with the other materials. All of the Korite materials expanded less than the Texas coke graphite; however, some distinctions are worth nothing.

1. The maximum expansion occurred in a pitch filler-pitch impregnated graphite which also exhibited the maximum density.
2. The minimum expansion occurred in the Korite filler-non impregnated graphite graphitized at 2570 C.
3. A greater expansion was observed in material identical to No. 2 above except for a 2800 C graphitization temperature. This material expanded more than the denser Korite impregnated graphite.

It may be that a higher graphitization temperature presents a better ordered crystallite structure which in turn is more susceptible to disordering or damage from low temperature neutron bombardment.

PT 105-1-P, Effect of Radiation on Pile Grade Graphite

Both parallel and transverse samples of CSF graphite have been discharged from a water cooled test hole in 105-F Pile. These samples reached a total exposure of 5240 MD/CT, the longest neutron exposure reported for this type of work. No perceptible change was observed in the transverse expansion rate. A slight decrease in the parallel contraction rate seems to be apparent. The dimensional changes at 5240 MD/CT are: transverse, 2.76 per cent; parallel, -0.74 per cent.

High Temperature Graphite Irradiations: GEH-9

The control equipment for the GEH-9 irradiations has been thoroughly tested and found satisfactory. This equipment and the test thimble for the first irradiation have been shipped to the Materials Testing Reactor and are awaiting insertion in accordance with MTR scheduling policies. The GEH-9 experiment is designed to study the effects on graphite of the proposed post CG-558 power level increases in the Hanford piles, and to investigate the effects of higher temperatures and higher fluxes on irradiation damage to graphite and other pile materials.

Gamma Radiation Stability of Elastomers

A heater and sample holder for use in controlled temperature, controlled atmosphere gamma irradiations of elastomers are designed for use in the existing five inch gamma facility at 105-F storage area. It will be used initially to determine

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the gamma stability of various elastomers suggested for use in O-rings and ball valve seats in the proposed new rear face water system.

A critical review of the behavior of plastics and elastomers under irradiation is being prepared from a literature survey and will be published in the near future.

Thermal Annealing of Irradiated Graphite

Isothermal annealing runs in two graphite samples which had received 233 MD/CT cooled test hole exposure have been analyzed by the Vand method. Annealing was carried out at a series of temperatures from 100 C to 1000 C. Values of ρ changed from 6.82 g to 6.74 g.

The activation energy spectrum for these samples has a maximum at about 35 kcal. This peak is not as sharp and is only 1/3 as intense as that previously found for 556 MD/CT samples. At higher activation energies the spectrum shows a gradual decrease of intensity out to 83 kcal where the intensity is 1/5 of that at 35 kcal.

Shipment of Samples to National Carbon Company

Three bars of TS-GBF production grade graphite representing high, average, and low nuclear purity have been shipped to National Carbon Company at the request of their Dr. L. M. Currie. The three bars were selected from a group of ten G-12 contract bars which were individually tested for purity in the 305 test pile. The nuclear purity of the bars selected for shipment are: high, 1.04 di; average, 0.95 di (typical production material); low, 0.66 di.

Rapid Thermal Conductivity Apparatus

The flow calorimeter and differential thermopile for the rapid thermal conductivity apparatus were re-built to obtain greater accuracy and better reproducibility. This apparatus allows faster measurement of thermal conductivity because less attention by the operator is needed. Three samples with thermal conductivities around 0.250 cgs units were measured five times each in the improved apparatus to determine its precision. Statistically the results indicate that for 95 determinations out of 100 the result will fall within five per cent of the mean. Work is being performed to extend the range of the apparatus so that thermal conductivities as low as 0.005 cgs units may be measured.

PILE GRAPHITE STUDIES

Oxygen Analyzer

The Beckman oxygen analyzer was connected into the pile gas system of 105-DR. After some initial calibrations, the instrument has functioned very well. Mass spectrograph analysis of check samples agree very well with measurements from the analyzer.

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Stability of Chromel Alumel Thermocouples in CO₂ at 1000 C

Twenty thermocouples cut from the same two spools of Hoskins' Chromel and Alumel wire have been calibrated in a helium atmosphere at 1000 C. The maximum deviation from the mean temperature was only 0.75 C (0.029 mv.) or 0.075 per cent. As a sidelight, one other couple prepared from Leeds and Northrup Chromel and Alumel wire exhibited a thermal emf 0.195 mv. (5.01 C) below the mean value for the Hoskins wire at 1000 C. Eighteen of the twenty calibrated couples will be exposed to CO₂ at 1000 C for periods of 2 to 200 hours to study the effect on the mechanical and thermoelectric stability.

PT 105-548-E, C Pile Graphite Burnout Experiment

A "follower furnace" installed in the -9 level at 105-C is designed to maintain a set of control samples in the pile gas stream at the same temperature as identical samples being irradiated in channel 2773-C. Since this furnace was started up on September 16, much difficulty has been experienced with it and its control system.

One set of end ring heaters in the furnace burned out early this month, eliminating the gas preheat at the furnace inlet and dropping the front sample temperature well below the control point. At the shutdown of October 14, the furnace was repiped to reverse the gas flow and the samples were removed and reversed in position. The remaining end ring heater is now being used for gas preheat, but is operated at low power to reduce the likelihood of burning it out. Consequently, the present temperature throughout the furnace is not as uniform as had been planned.

Overboring of Process Channels

The graphite mockup in 189-D has been distorted to the approximate configuration of Tube 4674-F and the new short mercury manometer has been used to traverse a tube in preparation for testing the overboring tool by the Equipment Development Unit. The tube will be removed, the channel bored, the tube replaced, and a new traverse made to observe how much the tube curvature is relieved by overboring.

PT 105-559-E, Effect of Nitrogen Atmosphere on Pile Reactivity

This production test, authorizing the use of nitrogen for reactivity control at six startups of D Pile, is now being circulated for approval. Some delay may be encountered in procuring nitrogen in the quantities necessary (~50,000 cu. ft.) since it is available from the normal suppliers only in small (~250 cu. ft.) cylinders.

Gas Drying Improvement

In view of the large water collection resulting from the numerous water leaks which have occurred in recent months, a review of the gas system has been initiated. A literature survey on the use of silica gel as a means of removing water from gases has been made. This review indicates that for a desired effluent gas dew point of 0 F and a gel temperature of 50 C, the amount of water absorbed in the

gel should not exceed 8 per cent of the gel weight before the gel is regenerated*. In general this study indicates that the water in the pile gas should be condensed and removed from the system before the gas passes through the drying towers. In this manner the driers would remove the last trace amounts of water instead of the major portion of the water as is now the case. The study is continuing and is now directed toward the possible use of the "in-line" condensers and removal techniques.

RECIRCULATION TECHNOLOGY

Recirculation Studies

Operation of the H Loop at 200 C and pH 5.2 continued, except during the H Pile outage. A total of 46 days at temperature has been accumulated to date. A compilation was made of H Loop and out-of-pile data on high temperature aluminum corrosion for presentation at a meeting of off-site representatives interested in this field.

A program was initiated to study solid uranium fuel element ruptures in ELMO-4. Because of current interest in pile recirculation cooling at intermediate temperatures, the range between 220 C and 150 C will be explored. The initial test was performed at 220 C using an unbonded slug. Approximately one hour was required before flow stoppage was complete. This result is compared to a five minute delay at a temperature of 240 C. Further tests are in progress to establish the time-temperature relationship for simulated pin-hole ruptures.

A preliminary draft was prepared summarizing an investigation of the economic and technical factors involved in converting an existing pile to recirculation cooling.

Semi-Works Operation

Operation of the 1706-KE Semi-Works continued. Several modifications to the in-pile systems were made to increase the reliability of operation; included in this category are installation of new rear pigtails, replacement of four air-operated control valves, installation of double panellit trips in 105, and procurement of a portable air compressor to supply back-up instrument air.

A test was performed to determine the feasibility of using steam which has not been desuperheated by Power. Temperature measurements indicate that an excessively high rate of tube replacement would be required if the steam were not desuperheated.

The mock-up of the Single Pass Boiling Facility was about 50 per cent completed. The mock-up facility is designed to prove out all components under various boiling conditions prior to in-pile installation. The demineralized water supply for the building was essentially completed and is now under test. Installation of ELMO loops 2, 5, and 9 nearing completion. Delivery of ELMO-6 loop from Babcock and Wilcox is expected in November. Installation of service facilities for this loop was initiated.

*Industrial and Engineering Chemistry, Vol. 46, pp. 356, 1954.

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KER Recirculation Test Facility

Lump sum bids for completion of the KER facility were submitted by three contractors. The current schedule calls for a beneficial use date of July 15, 1956, with a physical completion on September 1, 1956. Out-of-pile pilot tests and plans to consolidate the operating organization are being revised in view of the delayed timing.

Requisitions for short length welded zirconium tubes of KER geometry were prepared and approved. These tubes will be used for mock-up testing and for the evaluation of welded tubing for use at high temperatures and pressures.

PILE COOLANT STUDIES

Production Tests

The Zircaloy-2 tube, installed in channel 3586-D under PT 105-555-E, has operated normally during the month. Exposure of the weighed regular metal charge is about 300 MWD/T with maximum outlet temperatures approaching 100 C.

Under the provisions of PT 105-543-E and DT 105-557-E, fifteen alclad and eleven unclad 63S aluminum tubes are now installed in the old reactors. Two of these tubes, installed in F reactor in November and December, 1954, will be removed for inspection when the present charges of metal are scheduled for discharge.

Corrosion Monitoring

Eighteen process tubes were examined during the month. No new or unusual type of corrosion attack was observed. All of the F Pile tubes examined had medium to heavy galvanic corrosion on the outside of the tubes. On six D Pile tubes, removed in the retubing program, light pitting was found on the outside of only one tube and the thinnest wall measured was 23 mils. Four leaking tubes removed from D Pile had light outside corrosion in the vicinity of the leaks. This outside corrosion probably occurred immediately after the leaks penetrated the tubes. Medium outside corrosion was found on one DR Pile tube removed from the near side of the pile in the vicinity of recent tube leaks.

The examination of twelve slug corrosion ruptures which have occurred at D and F reactors since August indicates that they could have been caused by reduced process tube rib heights. Exposure at failure for these slugs varied from 390 to 940 MWD/T. In addition to these, thirty-eight slug corrosion ruptures which occurred at D and F reactors since April, 1955, have been types which could have been caused by this mechanism, although cases cannot be verified because the inspection data are incomplete with regard to location of the hole with respect to the ribs. Corrosion reduction of rib height restricts the annulus below the slugs and results in hotter water in this position. The localized hot water intensifies slug and tube corrosion. Because of this relation between slug and tube corrosion it has been recommended that whenever a rupture of this type occurs, the process tube should be removed. It was observed that over 10 per cent of the tubes that contained ruptures developed leaks within a short time.

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Re-evaluation of the condition of the pile process tubes at the old reactors based on internal corrosion alone revealed that a minimum of about 1800 process tubes must be replaced in the next twelve months. Since this is a minimum number of tubes to be replaced and does not compensate for special cases such as external galvanic corrosion, any excess tube replacement capacity should be utilized in removing additional tubes at D and F reactors where the process tube condition is most serious.

Laboratory Corrosion Tests

Minislug exposure times up to 53 days have been obtained and the following corrosion rates have been tentatively determined for 2-S aluminum in 2 ppm dichromate process water:

<u>pH</u>	<u>Corrosion Rate, Mils/Month</u>	<u>Relative Corrosion Rate</u>
6.5	$0.0096 \times 2 \frac{T-115}{12}$	.017
7.0	$0.033 \times 2 \frac{T-115}{12}$	.060
7.65	$0.55 \times 2 \frac{T-115}{12} *$	1.000

Where T = water temperature in °C.

* Previously determined.

Modification of the 1706-KE mockup has been completed so that full size slugs may be exposed to the same water that is feeding the minitube systems at pH 5.5, 6.5, and 7.0 and at water temperatures ranging from 35 C to 155 C. The tubes are now in the process of being charged with aluminum dummy slugs, anodized slugs, and Harvey aluminum slugs from Fuel Technology.

One of each of the 115, 135 and 155 C tubes were replaced with process tubes with strain gages attached so that creep measurements may be obtained on the tubes.

Use of plastic-lined steel pipe for transporting dilute activated silica solutions from 183-D to 183-DR and from 183-C to 183-B has been proposed by the Design Section. Two short lengths (about four feet) of pipe coated respectively with Teflon and Kel-F, and similar lengths of Polyvinyl chloride, glass and carbon steel pipe will be tested in a dynamic system to determine the optimum material to use for the proposed activated silica lines.

1706-KE Operation

During the extended outage at 105-KE for the replacement of front pigtails certain additions and necessary changes were made to the 1706-KE in-pile facilities. Dual panellits were installed on all of the tubes and the crossheader low pressure trips were wired into the Number 1 safety circuit. The rear temperature elements used for temperature indication on the 1706-KE panel board were moved from the special drain crossheaders to the individual tube pigtails. All of these changes were made to implement future plans to increase the tube outlet temperatures.

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Weighed metal charges were placed in six of the eight 1706-KE tubes at the pigtail outage. Three of the metal charges discharged were picked up for examination by Fuel Examination. These charges had exposures from 216 to 276 MWD/T.

The two tubes not charged with weighed metal are being supplied water by the emergency process water back-up system. The system supplying one of these tubes (2943-KE) is being renovated to permit the heating of water supplied to the tube. The remaining tube (3043-KE) is being reserved for the once-through boiling experiment.

FUEL TECHNOLOGY SUB-SECTIONFUEL ELEMENT DEVELOPMENTWafer Slugs

Approximately 5000 aluminum spacers for wafer slugs were stamped from Al-Si clad aluminum and from aluminum having an anodic coating. The wafers were 0.03" thick. The Al-Si cladding is about 0.002" thick and the anodic coating is 0.001". Uranium 0.200" thick from FMPC was rolled to 0.033", 0.063", and 0.125" sheet, beta transformed for two minutes at 720 C, and water quenched; the resulting grain size was one-half to one-fourth that of rod heat treated uranium. A two step die was fabricated and used to stamp wafers from 0.033" thick sheet.

Slugs have been satisfactorily assembled using separate cap and internal cooling tube components. A cap with a hole through the center is placed on top of the wafers previously inserted in the aluminum can and an aluminum tube closed at the bottom end is inserted through the cap and wafers. This procedure gives a slug with a more reliable closure than was obtained using an aluminum tube welded to the cap prior to canning. Improved canning tongs have been fabricated and tested.

Two hot dip wafer slugs charged into the MTR on October 8 were discharged October 24 without unusual incident during irradiation. The slugs will be examined November 1, and if satisfactory they will be recharged for further irradiation in about three weeks. In one of these slugs 1/8" uranium wafers alternate with 1/32" aluminum spacers having 0.001" of Al-Si on each side. The second slug is the same except that the aluminum spacers have a 0.001" anodic coating on each face.

About 100 slugs are being fabricated for out-of-pile tests. These slugs, containing varying amounts of aluminum spacer material, will be examined in the 305 Test Pile to estimate reactivity and conversion ratio effects.

A slug containing 1/32" uranium wafers and only three aluminum spacers was autoclaved at 170 C after perforating the jacket in two places with 1/32" holes. The slug split nearly in two transversely at both of the holes in the jacket, but did not expand the jacket. Similar behavior was observed with a slug of the same type exposed to 110 C water flowing at about 12 ft/sec.

Self-Supporting Slugs for Use in Ribless Process Tubes

The fabrication of two types of self-supporting slugs, one having three short ribs around the periphery at each end and the other having three full length ribs, was completed. Out-of-pile testing in mock-up tubes has been undertaken by Pile Materials Sub-Section.

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Direct Cast Zircaloy Clad Slugs

To achieve good bonding in direct cast zircaloy clad fuel elements, the can pre-heat temperature must be accurately controlled. Within the range from 850 to 950 C, bonding occurs; however, the optimum range will probably be narrower.

Magnesium-Zirconium Diffusion

A survey of the literature pertaining to the diffusion of magnesium in zirconium was made. Very little information is available pertaining to this diffusion couple in the temperature range below 600 C but intergranular diffusion at 625 C was reported to proceed quite rapidly.

Grain Size of Uranium

A macroscopic technique for estimating the grain size of beta heat treated and water quenched uranium was proposed to the Metallographic Subcommittee with members from BMI, MCW, NLO, duPont, and HAPO. Although the technique was received with favor, universal acceptance must await the results of an inter-site sample exchange program.

Uranium-Chromium Alloy

A formal report, "Irradiation of the Uranium - 0.4 Atomic Percent Chromium Alloy," HW-31904, by P. D. Wright was issued.

Warp of Slugs

The thermal cycle in the woodsplitter is being adjusted in an effort to devise a test that will predict the warp of fuel cores during pile irradiation. Heating times from one to fifteen minutes have caused a maximum of 0.002" warp in metal that would be expected to warp 0.040" to 0.080" in the pile. Cycling in the woodsplitter did not increase the warp.

It has been hypothesized that a transient warp may exist due to thermal effects during irradiation, and that this warp subsides when the slug cools down. To test this hypothesis, which is supported by early studies on gamma extruded materials, a hot-warp gage has been fabricated, to be used in measuring the warp generated in selected current production slugs during heating and cooling.

Zircaloy Fabrication by Bridgeport Brass Company

Agreement was reached with the Bridgeport Brass Company for: (1) the drawing of 1000 sheet blanks into shells for uniskanning; (2) the conversion of scrap extruded tube blanks into thin walled tubing; (3) the extrusion and tube reducing of zircaloy-2 billets for KER size process tubing.

Zircaloy-2

Zircaloy-2, 65 percent cold worked and annealed 16 weeks at 360 C in vacuum, suffered a reduction in ultimate strength of 15.5 percent and in 0.2 percent

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offset yield strength of 13.2 percent. Calculations indicate that the yield strength reduction would be 20 percent at the end of five years. Similar results were obtained on material given smaller amounts of cold work.

Maximum ductility in zircaloy-2 may be achieved by salt bath annealing for very short times, producing reduction of area in tension as high as 60 percent. The same results (within the limits of experimental error) were obtained with vacuum annealing; however, vacuum annealing required much longer periods of time for the anneal. Evidence of strain-aging and over-aging was observed in both the flow stress recovery test and the annealing test. The start of recrystallization of cold worked zircaloy-2 was observed in material after four weeks at 316 C and after two weeks at 360 C.

Uniskan

All drawn shells that have been received from Bridgeport Brass Company have been uniskanned to nominal 20 mil wall cans. A total of 162 cans including 20 cans less than 8 1/2 inches long were produced.

A new type of rolls, called "Cascade" rolls, which reduce the metal in a series of small steps but in one pass has been tested. The preliminary test results indicate this method may have some advantage and additional tests are planned.

Thermenol

A study of the published properties (Navord 3700) of Thermenol, an iron-aluminum-molybdenum high-strength-at-high-temperature alloy developed by the U.S. Navy, indicates that this material shows promise as a substitute for aluminum and/or zirconium for high temperature service in fuel element jackets and pile tubes. Test-pile checks show its slow neutron absorption to be about 4 1/2 times that of aluminum. Its tensile strength at 300 C is more than ten times that of 2S aluminum and its stress-rupture strength at 500 C is about ten times that of zircaloy-2. This neutron loss may be compensated for by using thinner walls, without sacrificing strength. Autoclave tests have shown negligible corrosion on the samples after three weeks exposure to distilled water at 350 C, although some evidence of stress-corrosion cracking was apparent at highly stressed spots on unannealed samples. The principal obvious deterrents to its use for the purposes mentioned are: (1) its commercial unavailability, and (2) its brittleness which makes cold-forming impossible and renders the fabrication of drawn shapes difficult. However, it is claimed that heating to about 300 C permits forming without breaking.

FUEL ASSEMBLY

Untransformed Production Uranium

During the month of October there was a pronounced upsurge in the number of slugs rejected from production by the ultrasonic test for verification of complete beta transformation during heat treatment of the parent rods. Ultrasonic reject rates of up to 1.0 percent were recorded as compared to a normal rate of 0.1 percent or less.

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Three coincident factors appear to account for the inadequate heat treatment and subsequent shipment of the uranium: (1) a faulty transformer in the immersed electrode circuit of the heat treating bath; (2) an excessive sludge buildup in the bath; (3) an outage of the ultrasonic transformation tester at FMPC. Corrective measures were taken by FMPC on October 12. In addition, the heat treated rods are being sampled once hourly for laboratory confirmation that complete beta transformation is being effected. Investigation, by macroetching at HAPO, of the ultrasonic rejects shows that a few slugs that contain small amounts of untransformed metal were passed as acceptable by the HAPO ultrasonic transformation tester. The test level has been re-set with a new standard and the evaluation is being continued. Slugs rejected at the more rigorous test level will be re-heat treated. It has been recommended to the Process Sub-Section that the previously canned production lots from the affected FMPC shipments be charged to low goal exposures.

Delay Quenched Rods (PT 105-613-A-54-MT)

HW-39128 A, "Design of Production Test 105-613-A-54-MT, Determination of the Effect of a Modified Beta Heat Treating Cycle on In-Pile Dimensional Stability of Solid Slugs," W. C. Riley and F. W. VanWormer, was issued during the month. A summary of this document appeared in the September monthly report.

The material for use in this production test, designed to determine the effect of in-pile stability of slugs machined from rods beta heat treated and air cooled for various periods prior to quenching, has been received at HAPO. Four groups of forty rods each, were heat treated at FMPC on September 27 with delay periods of 20, 35, 50, and 80 seconds prior to water quenching. Approximately 300 slugs are being selected from each group for laboratory study and for use in the control tubes to be irradiated under PT 105-613-A-54-MT. The remaining slugs in the four groups, after selection of the pieces for testing and control tube loading, will be canned and irradiated as normal production in low goal exposure tubes.

Porosity in Al-Si Layer of Canned Slugs Due to Hydrogen

Canning reject rates at HAPO due to gas evolution from the slugs have decreased to the respectable figure of approximately 4.0 percent for the month of October. This low reject rate which is the combined total of frost test and void inspections appears to remain closely associated with the hydroxyl content of the beta heat treating salt bath at FMPC which has reportedly remained below 1.0 percent since August 1.

Induction Heat Treatment of Uranium

Induction heating and spray quenching provide a versatile system for effecting transformation without appearing to add hydrogen to the rod. A survey is being made of the equipment required to investigate heat treatment of uranium rod to produce, to the extent they are consistent, a nearly random or a balanced grain orientation, a small grain size, and a minimum of residual stresses.

Vertical Heat Treatment

The three lots of slugs (about 1500 total) machined from rods vertically heat treated by Atlas Steel, Welland, Ontario, were canned with yields slightly better than normal. The groups consisted of water quenched material with delay times of ten to thirty seconds and forty to sixty seconds, and oil quenched with a ten to thirty second delay period.

About 500 representative slugs with delay times of 14, 45, and 60 seconds, before water quenching, and 14 seconds, before oil quenching, were canned for irradiation to 200, 600, and 900 MWD/T under Production Test 105-601-A-60-MT (HW-38258). The approximately 1000 slugs, not selected for control tubes, are canned and ready for lot charging to low goal exposure. It is interesting to note that by visual inspection there were no metal quality rejects in the 1500 slugs.

Dingot Slugs

Sixteen control tubes of dingot slugs, representing eight different procedures of dingot fabrication, were shipped to 105-B for irradiation to 200, 600, and 900 MWD/T. These control tubes will follow other dingot irradiation experience; two tubes of dingot slugs were discharged at approximately 300 MWD/T during October. Examination revealed no visual evidence of dimensional instability among these slugs. Approximately seventy tubes of dingot slugs for low goal exposure irradiation under the quantity charging schedule (HW-38028, p. 9) have been shipped to the 100 Areas. This is about 70 percent of the amount of dingot material to be charged before the end of October following this schedule.

Aluminum Cans and Caps

A program is being initiated for the review of the chemical and metallurgical features of the specifications for aluminum jacketing components and for establishing the standards against which jacket components made by new vendors may be measured.

Hydrogen

The work directed toward the establishment of a hydrogen specification for uranium cores continued.

Several approaches are being used to establish the acceptable maximum value for hydrogen present in fuel cores, based upon canning experience. One is the refining of the fast hydrogen extraction test, in cooperation with the Chemical Research Sub-Section and the Process Unit of the Metal Preparation Section. National Lead is currently preparing uranium rod samples expected to yield machined slugs with a wide range of hydrogen values. Further investigations are being conducted to establish the contribution of canning variables, slug pickling, and humidity during slug storage upon evolution of hydrogen as determined by fast "analysis".

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Fuel Technology Sub-Section

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Bond Testing of Hot Press Canned "C" Slugs

The most recently modified bond test equipment will continue to be used for ultrasonic bond testing of hot press canned "C" slugs, since the new equipment is more stable than the original prototype equipment used in June. The new equipment cannot be set to distinguish between slugs with core defects and slugs with unbonded areas. Core defects, however, can be distinguished from unbonded areas by using an oscilloscope in conjunction with the ultrasonic bond tester. Since no pile failures have been attributed to core defects in either cast or extruded cores prior to the time that these defects could be detected, only slugs having core defects associated with unbond areas at the can-core junction or unbonded slugs should be rejected.

A method was developed for making standard slugs for the calibration of the ultrasonic bond test equipment (for use with both hot press and lead-dip canned slugs). This consists of hot press canning aluminum dummy slugs with known areas stenciled on the core surface with an ordinary lead pencil.

Nuclear Safety Specifications

The Nuclear Safety Specifications (HW-37952) covering the handling and storage of enriched uranium-aluminum alloy slugs in the 300 Area have been issued.

Surface Defects in Autoclaved Slugs

Examination of slugs currently rejected for surface defects following autoclaving indicates that about half of the inclusions are embedded Al-Si particles. Careful rinsing of the canned assemblies following removal from the canning sleeves reduced the inclusion reject rate by about two percent during a three-day period. It was observed, however, that re-contamination of the slug surface still occurs to some extent in the Acme-Gridley facing equipment. The feasibility of improving the cleanliness of the finishing operations will be continued.

Process Audit

Detailed appraisal of individual process steps was initiated this month. Preliminary surveys were conducted on component preparation, slug facing, and frost test operations to provide data for establishing routine audit procedures and records.

PT 313-57-MT, Cored Enriched Material

Thirty cored four-inch enriched (1.75 w/o U-235) slugs were charged into "C" pile on October 15 to provide irradiation data (at higher powers) on the effect of varying core diameter and method of core closure. The lot consists of three groups of ten slugs each, one with 3/8" diameter cores and welded uranium end plug, one with 3/8" diameter cores and pressed aluminum end plugs, and one with 5/8" diameter cores and pressed aluminum end plugs. They will be irradiated until one rupture occurs in each group.

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Dip Canned I & E Fuel Elements

Twelve internally and externally cooled fuel elements were canned by a modified "F" process (lead dip) using a three piece jacket (can, cap, and tube). The pieces are being evaluated for weldability (three closures are required), tube wall penetration, and tube wetting. Little difficulty was experienced in inserting the tube through the cap and core, but it appears that it will be necessary to extend the assembly operation from its present 20-25 seconds to about 30-35 seconds. Components are being assembled to can approximately one thousand I & E fuel elements in the Manufacturing Facility (313 Building) during November for irradiation in "C" and "K" piles.

Hot Press I & E Fuel Elements

Several hot pressed I & E fuel elements have been fabricated using the single-stroke, hot work punches for evaluation prior to canning the pieces for the one tube anodized pile charge. The anodized pile pieces will be charged into "C" pile to determine the effect of the anodized coating on the annulus and hole coolant temperature at various time intervals of irradiation.

Hot Press Solid Fuel Elements

A production test has been designed to provide an evaluation of currently produced hot pressed fuel elements. Sixteen tubes of metal (eight of hot pressed slugs and eight of regular production control slugs) will be charged. Only four tubes of each type of metal would compose the conventional to-rupture test. The additional tubes would be discharged in pairs at exposures of 200, 350, 500, and 750 MWD/T. The test would be terminated (with or without failures) for any of the following reasons:

1. Should the hot press canned slugs, from tubes discharged at the various exposure levels, show evidence of previous results on hot press canned slugs ("hot spots", intergranular corrosion, prohibitively deep rib gouges, etc.) and should this evidence be lacking in the case of the regular metal companion tube then all tubes will be discharged.
2. Should a failure occur in a hot press canned slug which can be confirmed to be caused by any of the above reasons or because of bond deterioration then all tubes will be discharged.
3. If the results from the irradiated bond tensile specimens show that the bond deteriorates with irradiation to an extent that the hot press process is not practical, the test will be terminated.

The size of the proposed test is twice that of a conventional "to-rupture" test, but the assurance provided by the additional tubes warrants their inclusion. This design provides a maximum of safety and yet is a fair test of the fuel elements.

Pre- and post-exposure measurements of weight loss, warp, length, and diameter changes, will be made. Other measurements such as breaking strength will be made if they appear desirable.

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Approximately two hundred hot press solid core fuel elements have been canned for out-of-pile evaluation prior to canning the pile pieces. One hundred of the pieces canned will be used in an evaluation of the effect of the induct-o-bond (see below) on overall fuel element quality. The remainder will be subjected to other destructive tests for quality evaluation. Upon completion of the tests, the pile pieces will be canned.

Induct-o-bond Tests

Development of the induct-o-bond bond tester (an induction heating device which causes the jacket to melt or blister where no bond exists) to test the hot press solid core production test pieces is nearly complete. Approximately 75 preliminary production test pieces have been tested using the sonobond in combination with the induct-o-bond to pick up the unbonded areas which are not readily visible. Chisel tests on the pieces which have been through the induct-o-bond show no impairment of bond integrity; metallographic examinations of the bond layer and jacket show no damage to either caused by the induct-o-bond. The induct-o-bond test which apparently results in 100 percent detection of the bond rejects involves heating the pieces to approximately 600 C within 5 to 5 1/2 seconds.

Corrosion Tests Related to Hot Press Canning

Tests were run to evaluate the effect on undercutting and bond strength of (1) room temperature aging of the plated slugs for up to 72 hours, (2) room temperature and 100 C outgassing, after plating and before canning, (3) temperature of the electrolytic etch bath which was operated at 40 C and approximately 25 C, and (4) canning temperatures which were 550 and 600 C.

Preliminary information based on "induct-o-bond" and "sonobond" as well as undercutting tests indicates that: (1) hot press canning is not satisfactory at 550 C; (2) canning immediately after plating produces a product which is equal to that which had been outgassed; (3) the aluminum-nickel bond is not good if the plated piece is allowed to age for three days or more before canning; and (4) the temperature of the etch bath has little if any effect upon the bond or undercutting quality. The cores for the pending solid core hot pressed production test will be canned within eight hours of the plating operation. The pieces will not be outgassed and the etch bath will be at ambient room temperature.

Vacuum Braze Canning

Major items of equipment for assembling the vacuum braze canning device have been received and installation is in progress. The machine should be ready for canning studies by the end of November.

Bond Test Holder

A device to be used in developing an ultrasonic bond test for the inside tubes in I & E pieces has been designed and fabricated. A water tank, containing rolls for rotating the slug, is mounted on a lathe bed, and utilizes the

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headstock to drive the rolls. The ultrasonic wave producing crystal is mounted axially in a brass tube which contains a 45 degree brass reflector to reflect the wave into the slug tube wall and reflect the echo back to the crystal. The crystal probe tube is mounted on the lathe tool holder and is moved into and out of the slug tube by means of the lathe longitudinal feed.

Can Expander

A method for expanding standard 0.045" wall thick base cans to 1.474" O.D. for use in a dip canned I & E production test has been developed. One hundred cans have been expanded to date. The standard cans are first annealed then the can wall is expanded into a 1.475" I.D. steel sleeve with a nylon expanding ring. The base of the can is then put into a 1.475" I.D. die and expanded 1.474" diameter by a 1.381" diameter steel punch with a 20 ton axial force. Some difficulty has been experienced in removing this punch from the can without scoring the inner can wall, but this has been minimized by use of drawing wax lubricant. There is a slight discontinuity in the can O.D. at the expanded base, but corrosion tests indicate this does not present a corrosion problem.

Project Activities

The roof mounted heating and ventilating units were reworked on a lump sum contract to eliminate water leaks into the building.

Lump sum bids for the construction of 306 Building offices were opened October 31, 1955.

Contract work in the chemical processing area (plating room) building (306) was eighty percent complete at the end of the month. This phase of work is scheduled for completion November 14, 1955. Minor Construction will then proceed with installation and relocation of equipment.

The General Engineering Laboratory was requested to furnish a proposal for the development and fabrication of a dilatometer for the 306 Building.

A lump sum contract is being set up for additional outside pavement at the east end of the 306 Building.

Arrangements were completed to start uranium broaching tests during the first week of November.

Specifications for a "package" unit uranium vacuum melting facility were sent out to prospective suppliers during the month. All proposals are to be in by October 31, 1955.

FUEL EVALUATION

Cored Slug Performance

A review of HAPO experience with cored slugs up to about September 30 indicates the following tentative conclusions:

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1. At present HAP0 tube powers for normal uranium (say up to 1000 KW/tube) the overall failure rate for cored slugs is about the same as for solid slugs.
2. At higher tube powers (1200 KW), where the maximum uranium temperature exceeds the alpha-beta transformation point, cored slugs may be better.
3. Expansion of the welded uranium end plugs does not initiate longitudinal cleavage of the uranium (which has been observed to occur as low as 220 MWD/T, tube average exposure, in slugs having aluminum end plugs).

These conclusions are based on results of irradiation and post-irradiation examination and testing of production test control tubes including the four enriched slugs discharged in 1954 (PT 513-SI), two tubes each of four-inch cored (drilled) and solid slugs irradiated in C pile (PT 570-A), 18 tubes of eight-inch cored (drilled) slugs having welded uranium end plugs irradiated to 900 MWD/T exposure in 105-C and one tube of eight-inch cored (drilled) slugs with aluminum end plugs irradiated to 220 MWD/T at 105-C.

The exposure of large quantities of cored slugs is too low for performance assessment at present. About 1200 tubes are now being irradiated. There have been four failures as follows:

Reactor	No. Failures	Type Failure	Exposure, MWD/T
105-C	2	Split	505 & 700*
105-D	2	Split	770
		Side	170

*16 other tubes irradiated to 900 MWD/T. Tube failure rate at 900 MWD/T calculated to be 0.3 ± 0.2 (90% confidence)

HW-39040, "Pile Behavior of Cored Slugs," was issued. Examination of two tubes of four-inch and seven tubes of eight-inch cored slugs with $3/8$ inch core diameters and uranium end plugs showed that the uranium tends to crack in both the longitudinal and transverse directions during irradiation producing the widest separation at the core with negligible separation at the slug surface. In many cases, these longitudinal splits were found to terminate at a transverse crack at the end plug counterbore. The number of slugs with cracks were found to increase with increasing exposure.

Examination of Slugs from Ingot Quality Studies 7, 8, and 9

Preliminary data on slugs discharged at a normal exposure of 800 MWD/T from Ingot Quality Studies 7, 8, and 9, Production Tests 583-A, 581-A, and 592-A, respectively, were compiled. Differences in fabrication histories are shown below.

IQS No.	Casting Site	Derby Preparation	Mold Diameter	Mold Hot Topped
7	Mallinckrodt	$\frac{1}{2}$ pickled	$5\frac{1}{2}" - 6\frac{1}{2}"$	Yes
8	Mallinckrodt	$\frac{1}{2}$ mechanically cleaned $\frac{1}{2}$ pickled	(tapered) 5"	No
9	$\frac{1}{2}$ Mallinckrodt $\frac{1}{2}$ Fernald	$\frac{1}{2}$ mechanically cleaned Pickled	7"	Yes
		Mechanically cleaned		

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All ingots were rolled to rods, heat treated, and machined at Fernald. IQS-8 material is similar to the early lead dip slugs (B lots) and IQS-9 slugs represent the present uranium fabrication process. Two tubes from each production test were visually examined, measured, and fracture tested. On this basis no significant differences were noted in the irradiation behavior of these different types of slugs. It is interesting to note that these slugs showed significantly less warp than would be expected from regular production slugs irradiated at similar conditions. Furthermore, as indicated by fracture testing, fewer slugs than expected broke transversely during irradiation.

Examination of High Exposure Slugs from PT 7 MR

Nine tubes of slugs were discharged at exposures ranging from 1300 to 1600 MWD/T from 105-H under PT 7MR. These slugs were divided into groups with and without surface defects by Zyglo and visual inspections after pickling, and into slugs with and without internal flaws by MIZ-2. The surface flaws in the X type slugs were carefully mapped prior to caming. The objective of the test was to determine the relative rupture tendencies of the different types. Ruptures occurred in two of the tubes containing slugs rated as "free from visual surface defects", one a cap failure and the other a uranium split. Preliminary results are obtained from an analyses of warp and breaking data from eight tubes of these slugs as given below.

Warp data confirm extrapolated data on the effect of exposure on slug warp.⁽¹⁾ Measurements on eight tubes of slugs (average exposure 1450 MWD/T) showed 2.3 percent of the slugs to have warped greater than 0.080 inches which is in good agreement with the expected value of 1.7 percent based on the extrapolated data compiled at lower tube exposures. Five of the eight tubes examined contained slugs warped greater than 0.080 inches. Interestingly, only one of these tubes contained a stuck charge and this tube, 0773-H, also contained a rupture. One slug in this tube warped 82 mils and visual examination showed evidence that this slug caused the charge to stick during discharge. The maximum warp measured was 0.110 inches on a slug from tube 1259-H at 1371 MWD/T. The rib marks on this slug indicated that its orientation in the tube was such that the bow was in a plane 90 degrees from the ribs. A slug could conceivably warp up to 0.160 inches when oriented in this direction and not jam the tube. The lack of film on this slug shows it was irradiated in the front quarter of the tube.

Three tubes from PT 7MR have been broken and the fractured surfaces photographed. These tubes were: (1) 2857-H at 1307 MWD/T with slugs representing the best five percent of slugs passed by MIZ-2 inspection; (2) 0773-H at 1529 MWD/T with slugs representing the middle ninety percent of slugs passed by MIZ-2; and (3) 2769-H at 1601 MWD/T with slugs representing the poorest five percent of slugs passed by MIZ-2.

The fracture photographs showed that tubes 0773-H and 2769-H contained slugs with longitudinal internal cracks. These cracks extended diametrically across

1. HW-38743, "Slug Warp as a Function of Tube Exposure and Tube Power," W. C. Riley and P. A. Carlson.

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the slug and, except for three slugs, stopped before reaching the surface of the uranium. No estimate of the length of the cracks could be made. Five slugs from 0773-H and nine slugs from 2769-H showed internal longitudinal cracks. In addition, three slugs from 0773-H had longitudinal surface cracks extending about 1/4 inch radially into the slug. Whether the freedom from internal cracking evidenced by the slugs from tube 2857-H resulted from the MIZ-2 separation or from the 300 MWD/T lower exposure received by this tube cannot be determined without more data at comparable exposures.

The compilation and analysis of the dimensional and fracture data will be completed and the slugs with mapped defects will be chemically stripped in an effort to determine the relative tendency for the slugs with surface flaws to crack.

Other Production Test Evaluations

A Fuel Evaluation Report on PT 31-M, "Irradiation of Alpha Extruded Uranium," HW-39659, was issued. The alpha extruded slugs showed significantly less warp than alpha rolled slugs irradiated under similar conditions. No other differences between this test and control slugs were observed.

Document HW-39633, "Bumping and Warping of 8-M Metal," was issued which reports the pile behavior of alpha rolled, lead dip canned (no beta heat treatment) slugs. The untransformed slugs showed significant warp but did not bump in contrast to triple dip control slugs which showed less warp and some bumping.

Effect of Slug Position in the Tube on Warp

It has been noted that the warp of production fuel elements correlates with tube exposure, but not with the individual slug exposure due to an effect of the position of the slug when charged into the process tube. Accordingly, upstream slugs showed the most warp. (1) To determine if this observation is statistically significant, the available warp data were submitted to the Statistics Unit. The results of their analysis show a significant effect of slug position in the tube on warp. By dividing the slugs into eight groups of four each, slugs at positions 1-4 (furthest downstream) being group 1, it was found that group 7, corresponding to slug positions 25-28 (the fifth to the eighth slugs from the front of the tube) warped most in essentially all cases.

Metal Examination Facilities

All phases of the equipment for the 105-C Metal Examination Facility were accepted. The exceptions to the routine examination equipment in Basins II & III neared completion and routine operations should begin during November. Minor Construction forces satisfactorily completed the outside portions for the slug dejacketer. Operational testing of all equipment in Basin IV will be delayed until completion of an extensive list of exceptions.

1. HW-35758, "The Influence of Irradiation on Slug Distortion," P. A. Carlson

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TESTING METHODSUltrasonic Bond Test

The Ultrasonic Bond Tester has been operated semi-continuously on one finishing line of the 313 Building for about two weeks and has tested in the vicinity of 10,000 slugs. Reject rates are running from 10 to 20 percent and up in some cases. There is a large variation in reject rates for small changes in instrument setting. This is believed to be due to the region on the distribution curve (number of slugs versus maximum size of a single unbonded area) where the one square centimeter limit occurs - the region of steepest slope. To aid the operators in setting the equipment to standard conditions, a vernier gain adjustment has been added. This has resulted in fewer rejects.

Many of the slugs being rejected have voids in the braze along the chamfered edge of the slug at either end; and it has been suggested that the machine be "blinded" at this portion of the scan. This can be done by adding mechanical switching arrangements similar to those used on the penetration test to avoid seeing the ends of the slug.

A group of about 300 slugs were selected from normal production with the equipment, about half of which showed more than 300 counts corresponding to 2 1/2 square centimeters of total unbond area or more - the other half having less than 15 counts. These slugs are to be irradiated under Production Test 9P with the object of establishing whether the normal unsymmetrical distribution of void area in porous brazes will result in enough non-uniformity of heat transfer to produce warp.

Al-Si Penetration Test

Five more production model penetration testers (electronic equipment only) have been received from the electronic shop and are being checked out prior to their installation in the 313 Building.

Metal Quality Test

The Metal Quality test equipment has been operating during the month whenever uranium was available to be tested. About 2500 pieces have been checked from M, K, and C lots. The testing has been limited more by the lack of available material than any other factor. Average values of instrument reading on the three kinds of material were: K lots (Fernald cast) + 14; M lots (Mallinckrodt cast) + 3 1/2; C lot (Dingot) 0. These readings were taken with a standard good slug reading zero. A positive reading indicates poorer quality than the standard. One cracked slug was found in a K lot. The crack was visually evident on one end of the slug but was detected by the instrument about two inches from the end giving a reading of + 32. These readings are being taken to plot distribution curves so that a good reject point may be picked.

Internal Friction

Internal friction readings were continued on the piece described last month which was deformed before beginning the series of readings. In an effort to

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speed up the recovery of internal friction the piece was held at about 135 F. At the end of about five days at this temperature, the linear decay versus log of time which was previously observed, began to flatten indicating that the internal friction would level off at a higher value than before deformation. Conversation during the month with Dr. A. S. Norwick at the Hammond Metallurgical Laboratory revealed that the effect is by no means uncommon and that it is generally called the Koster effect. It is attributed to the formation of free dislocations during the deformation which become pinned at lower energy points as time goes on. The increase in internal friction after deformation is believed to result from the increase in the number of unpinned dislocations. The effect in uranium is peculiar, however, in that its anisotropy with respect to thermal coefficients of expansion will result in the effects being produced on a change of temperature as well as by an actual deformation.

Measurements are now being made to locate the frequency at which the internal friction peaks as a result of what is known as thermo-elastic damping. This picture may result in an absolute measure of grain size.

COATINGS AND CORROSION

Intergranular Corrosion

Testing of 2S Al can stock showed no intergranular corrosion in 300 Area tap water from 100 to 150 C; however, intergranular corrosion did occur in steam at higher temperatures.

Tests at 120 C were run on cans for 30 days then terminated because of boiler scale. The weight loss was small ($6 \text{ mg/dm}^2/\text{day}$, about 1%). The loss of bursting strength was within experimental error, so no intergranular corrosion could be demonstrated. Tests at 150 C were terminated after 15 days because of boiler scale. Corrosion rates were higher ($38 \text{ mg/dm}^2/\text{day}$). The bursting strengths decreased about eight percent, very nearly that calculated from weight loss, so the corrosion in this case was also considered uniform. Likewise the results in the 180 day test in the 222-B Flow Cup Laboratory showed that intergranular corrosion does not occur below 90 C and is mild at 90 to 120 C with boiler scale protection occurring around 120 C. These results suggest that the intergranular corrosion observed by O'Keefe(1) in the low exposure failures occurred in steam.

Intergranular corrosion remarkably like that observed by O'Keefe was produced by heating can stock aluminum in steam at 375 C for two hours. The aluminum warped and twisted and metallographic examination showed severe intergranular corrosion, going entirely through the metal. More drastic conditions reduced the metal to a soft gray powder containing both metal and oxide. At 300 to 350 C the oxide tended to be hard and white, containing much less metal, but the attack was still intergranular. The M388 alloy (1% Ni) showed similar attack but at temperatures about 75 C higher.

1. HW-38030, "Interim Report on Examination of Low Exposure Failures," D. P. O'Keefe.

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High Temperature Studies

Corrosion testing of the series of nickel aluminum alloys prepared by Kaiser Aluminum & Chemical Corporation has provided some additional information on the effect of composition variables. A one day test in flowing deionized 350 C water provided data for two conclusions: (1) iron concentration should exceed 0.3 percent; (2) at least for alloys of low iron concentration, increasing the nickel over one percent improves the corrosion resistance to high temperature water.

Kinetic Studies of Corrosion

In the experiments in the 325 Building 90 C flow trough, 36 samples were all put in at the same time and three were removed each week. The samples all showed about the same weight loss, indicating the corrosion was rapid the first week and essentially ceased thereafter. Concurrent with this, another test was run in the same trough in which the samples were changed at one week intervals and all removed at one time. The weight loss on these samples varied over a factor of two, in a sinusoidal fashion. This suggests that the samples corrode for a time and the corrosion then ceases. The amount of corrosion at the time the corrosion ceases is controlled by some factor, presumably water composition, which is not under our control. This week-to-week variation in corrosivity was also important in the old 222-B Flow Cup Laboratory.

Analysis of Corrosion Product Films

A method of determining the aluminum content of the two percent chromic-five percent phosphoric acid stripping solution has been devised. Chromate and phosphoric acid in the solution to be analyzed interfere with the colorimetric determination of aluminum. The chromate is easily and completely removed with anion exchange resin. However, as much as 92 percent of the phosphoric acid passes through the anion exchange. The interference caused by phosphoric acid was measured and with the procedure now used, a minimum concentration of 50 mg of aluminum per liter of stripping solution is necessary to obtain an experimental accuracy of four percent in the aluminum determination.

Corrosion Study Equipment

All equipment for the 1706-KE Flow Lab autoclave installation is on order. Delivery of the autoclave is expected in late December and it is hoped that it can be installed in early January 1956. The equipment will be set up and tested in the 314 Building before moving to 100 K Area.

It has been found impractical to use 300 Area process water for 150 C autoclave tests even with special heat exchangers. It is proposed to improve the water quality to the #1 autoclave in the 326 Building by adding at least 50 percent deionized water. This will decrease the hardness to about that of 100 Area water.

Reaction of Uranium and Water at Elevated Temperatures

The high pressure loop, located in the 3706 Building, was operated in cooperation with the Pile Metallurgy Unit to study the reaction of water at 300 C with uranium at 300 to 600 C.

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DECLASSIFIEDPHYSICS RESEARCH SUB-SECTIONReactor Physics

The LTR was made critical for the first time at 2:06 P.M. on October 25. In order to reach critical with a minimum amount of fuel, it was necessary to remove the steel liners from all the fuel in the reactor except that in the control rod. The critical configuration consisted of forty driver rods in a near cylindrical array together with the leveling rings at the one-inch position. The total fuel at critical was 9.1 kg of U-235. The first rising period observed was a rather long one -- about 200 seconds. Calibration of the control rods is now being done with a few grams excess of U-235 in the center of the reactor. Apparatus has been set up to scan the activity of a copper wire irradiated in the LTR to measure the neutron flux distribution.

Shop drawings of the water-cooled oven to be used for heating the LTR core have been completed and construction will start. Plans are underway for the installation of the electric power necessary for heating this oven.

The wiring of the TTR control board and circuits is proceeding. Facilities are being prepared for heating the thermal column of this reactor.

A J-slug lattice has been assembled at the van de Graaf positive ion accelerator. The accelerator will be used as a strong neutron source to drive this lattice. Flux is expected to be sufficiently high to permit accurate intra-cell measurements.

Measurements have been completed on a 14-inch lattice loaded with bundles of six 0.925 uranium rods at each lattice position. The bundle is assembled in a 3-inch tube which is then filled with water. This lattice is of interest for dual purpose reactor use. A comparison with single rod lattices is given below:

<u>Rod Assembly</u>	<u>Lattice Spacing</u>	<u>H₂O/U</u>	<u>C/U</u>	<u>Al/U</u>	<u>Buckling</u>
Bundle of 6	14"	0.47	71	0.51	8
Single rod	5-3/16"	0.305	68	0.54	68
Single rod	5-3/16"	0.79	68	0.80	17

It is seen that although the lattices are quite similar except for the water content, the buckling of the bundle lattice does not fall between the bucklings of the other two but rather below them both. This implies that the main effect in assembling the bundles has been to increase the resonance capture.

Nuclear Physics

An experiment designed to determine if ν , the average number of fast neutrons emitted per thermal neutron fission, varies with incident (slow) neutron energy, has been started on the neutron spectrometer. The measurement was made possible by the efforts of E. M. Kinderman of the Radiochemistry Unit who obtained the required Pu foils. Preliminary results show no variation of ν from 0.10 ev to 0.35 ev to a precision of

about 2 per cent. Some inconsistencies in the data have been found outside these energy limits and in attempting to verify these results in another manner. The source of the inconsistencies is believed to be known but further work is required on this problem.

Physics Problems Connected with Plant Operation

A study was made of the criticality problems that arise with the processing of enriched uranium in the Purex and Redox plants. It was shown that if the enrichment is 0.94 per cent or less, there is no possibility of chain reaction provided that the material remains in solution. This leaves the slug dissolvers as the only points in the process where chain reaction may be possible. Since conditions in the dissolvers are such that the optimum slug size and spacing for this type of lattice cannot be definitely excluded, it is necessary to determine safe dimensions and batch sizes assuming that the optimum conditions actually are attained. Since experimental information was insufficient to determine the buckling at the optimum conditions, it was decided to carry out a number of subcritical measurements on a "crash" basis. Uranium slugs of 1% enrichment were available and were used in these experiments.

The results obtained with water lattices of 0.925 rods and full water reflector are given below:

<u>Lattice Spacing</u> <u>(hexagonal geometry)</u>	<u>H₂O/U</u> <u>(by volume)</u>	<u>Extrapolation</u> <u>(in cms)</u>	<u>Buckling</u> <u>(in units of 10⁻⁶ cm⁻²)</u>
1.40	1.37	7.56	2900
1.50	1.74	7.28	3450
1.55	1.94	7.17	3300
1.60	2.15	7.00	3000

These measurements indicate that the maximum is close to the 1.5 inch spacing. Therefore, for this spacing, additional measurements were made with an uranyl nitrate solution as reflector instead of water -- a condition which could occur in the dissolvers. Since water was still used as the moderator, the lattice buckling stayed constant and the change in relaxation length was used to calculate the change in extrapolation distance. The results follow:

<u>Lattice</u>	<u>Concentration of</u> <u>U in Reflector</u>	<u>Extrapolation</u> <u>Distance</u>
1.5"	0	7.28 (assumed)
	188 g/l	7.39
	536 g/l	7.78

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These results indicate that at the enrichment of the reflector uranium (0.66%) used, the presence of uranium in the reflector has little effect.

Two measurements were made using a larger diameter (1.66 inches) slug. These are shown below:

<u>Lattice Spacing</u> <u>(hexagonal geometry)</u>	<u>H₂O/U</u> <u>(by volume)</u>	<u>Extrapolation</u> <u>(in cms)</u>	<u>Buckling</u> <u>(in units of 10⁻⁶ cm⁻²)</u>
2.2"	0.84	8.28	1650
2.45"	1.30	7.87	2700

The predicted maximum for this rod size occurs at a spacing of 2.45".

The data described above, together with other data from Brookhaven, permit the determination of the maximum buckling that can be obtained with 1% uranium when slug size and lattice spacing are varied. This value is approximately $3600 \times 10^{-6} \text{ cm}^{-2}$. It has been used to fix critical limits for the plant dissolvers.

A preliminary study has been completed of a method of producing tritium in Hanford piles by using an Oralloid jacket around a lithium aluminum slug. Experimental work on this lattice is planned.

A mathematical interpretation has been made of a new type of iodine reactor originated in the Chemistry Research Sub-Section. Preliminary results show that a large installation of this type is workable.

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METALLURGY RESEARCH SUB-SECTIONFundamental Studies

Ex-pile diffusion studies on U/Zr and U/AlSi are continuing as a basis for interpreting in-pile diffusion studies currently in progress. Four U/Zr couples have been annealed at 450 C (842 F), two for 270 hours and two for 336 hours. The uranium did not adhere to the zirconium in any of these couples. The diffusion interfaces of these couples are being examined by metallographic and x-ray diffraction methods in order to determine whether or not any diffusion occurred. Two U/Zr couples are now being annealed at 700 C (1292 F) in order to compare diffusion in couples cleaned by vacuum cathodic etching to that observed in hot-rolled couples studied at Livermore and to facilitate a study of the properties of the U/Zr diffusion product. Two U/AlSi couples were annealed 96 hours at 250 C (482 F), and one was annealed 24 hours at 303 C (577 F). One of the couples annealed at 250 C (482 F) adhered and is now being cross sectioned to permit metallographic examination of the diffusion zone. The couple that was annealed at 303 C (577 F) was cross sectioned and polished in a plane perpendicular to the diffusion interface, and it appeared to have small isolated points of diffusion approximately 0.001 inch thick. One U/Al diffusion couple (GEH-3-3, RM-59) which was pressed together with a calculated compressive stress of approximately 20,000 pounds per square inch during an MTR irradiation of 182 MWD/AT has been sectioned and given a preliminary examination. A separation of the aluminum from the uranium by as much as 0.010 inch suggests the possibility of more diffusion under irradiation than would have resulted under similar circumstances without irradiation. The unsymmetrical character of this gap, however, makes any interpretation highly problematical with the limited data obtained to date.

In order to compare the microscopic behavior of unirradiated and irradiated uranium under stress, methods and techniques suitable for the study of the mode and extent of deformation in unirradiated uranium are being developed and applied. Two microtensile specimens, which had been beta heat-treated and furnace cooled from 720 C, have been stressed to fracture. Composite maps of the photographs of the respective replicas taken before and after fracture of one specimen shows: (1) the major mode of deformation at room temperature in twinning; (2) the extent of deformation varies markedly, as indicated by gross distortion of individual grains and by the severity of twinning and cross-twinning within certain grains; (3) the fracture proceeds primarily through grains rather than between grains. Motion pictures of a uranium specimen during straining show the formation and propagation of deformation twins. Frames which have been cut from this film and which correspond to various stages of deformation portray the microstructural changes preceding fracture in beta heat-treated, furnace cooled uranium. A correlation of the stress-strain relationship with the microstructure of a uranium specimen is being established by simultaneously recording the stress, strain, and microstructure of uranium metal samples tested in tension. Subsequent experiments on uranium of various histories will permit a comparison of micro stress-strain data with conventional tensile data.

A study has been initiated to determine the adaptability of the cathodic etching technique to the preparation of x-ray diffraction specimen surfaces. Observations indicate that a considerable amount of heat is generated near the surface of the

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sample during cathodic etching, and there is some question as to whether this heat is sufficient to anneal small amounts of structure damage. If minute amounts of damage are retained through the cathodic etch preparation, it will be possible for this technique to be used to help expedite the preparation of x-ray diffraction specimens in the Radiometallurgy laboratory. A heavily cold-worked uranium sample has been prepared, and precise diffraction line shapes and positions are being measured at the present time. When these measurements are completed, the sample will be cathodically etched and line shapes and positions again measured to determine if any annealing has occurred.

Mechanical and Physical Properties of Fissionable Materials

Uranium samples that were irradiated for 0.033 and 0.33 MWD/T in a poison column facility are being studied to determine the effects of short time, low temperature, in-pile exposure on the tensile properties and electrical resistivity of uranium. The preformed tensile and electrical resistivity samples have been removed from the seven perms in which they were irradiated and placed under refrigeration to reduce possibility of temperature sensitive changes occurring in the samples prior to testing. The electrical resistance of one sample that had received 0.33 MWD/T was measured at room temperature at daily intervals over a period of five days to determine whether the recovery of any induced irradiation damage might occur at room temperature. No decrease in resistance was noted. The remaining specimens are being held at 0°C until the post-irradiation examinations can be completed.

A production test designed to obtain mechanical and physical property data of irradiated uranium at 75, 150, 310, and 500 MWD/AT has been undergoing irradiation. The samples from the first three exposures have been received by Radiometallurgy for examination. Three assemblies exposed to 75 MWD/AT have been opened without difficulty. The visual appearance of samples from the 75 MWD/AT assemblies is similar to that of the unirradiated material. The twelve assemblies exposed to 310 MWD/AT contained only tensile samples, and eight of these assemblies have been opened. The assemblies were not as difficult to open as the assemblies from the original production test. The improved decanning qualities were brought about by changing the canning method to include coating all uranium surfaces with colloidal graphite prior to canning, thereby reducing the tendency for diffusion bonding, and by a sample redesign which reduced the possibility of the samples and inserts locking together. The samples from the eight opened assemblies from the 310 MWD/AT exposure were straight and unwarped but were not as smooth in surface appearance as samples from the lower (75 MWD/AT) exposure.

Reactor Structural Materials

The coating of zirconium with a thin layer of aluminum is occasionally suggested as a method of reducing the high temperature reaction of zirconium with gases. This approach appears to suffer from a major drawback since at the temperature where the aluminum is needed for protection, the compound layer between zirconium and aluminum grows by diffusion and the coating will no longer withstand flexing. Another approach which has been investigated is to deliberately form a thick compound layer, break the aluminum coat off of the test strips of zirconium, and then reform a smooth surface by reducing the specimens 30 percent by rolling. This procedure leaves an aluminum-rich layer on the surface of the specimens. Unlike

titanium, which is improved by small additions of aluminum, the zirconium covered with an aluminum-rich layer reacted with air at a faster rate than the untreated zirconium. The coated zirconium specimens gained 12 mg after 60 hours at 500 C, whereas the untreated zirconium gained 7.5 mg under the same conditions.

A special loading of zirconium, Zircaloy-2, and Zircaloy-3 bend test and weight gain specimens was charged into process tube channels 3474 and 3469 of 100-F pile on the first of October (PT-105-524SI). The loadings in both of these tubes are exposed to dry air at a number of different temperatures ranging from 350 to 550 C (652 to 1022 F). It is anticipated that the test will be discharged after 1500 hours of operation at temperature and tested to determine the effect of the in-pile exposure.

Fuel Materials

A study of the reaction kinetics between hot (up to 300 C) water and uranium metal heated 300-400 C above water temperature has been initiated. In the initial experiment uranium heated to 660 C was allowed to react with water at 300 C. The specimen remained in contact with water for 17 hours, the water temperature being above 200 C for two hours. Upon examination, the specimen was found to be almost completely corroded adjacent to each electrode. The center section of the specimen after cleaning had lost about 22 percent in volume. In a second experiment uranium at water temperature was allowed to react with 300 C water. The specimen again remained in contact with water overnight. This unheated specimen exhibited the same end effects as the heated specimen -- the ends of the uranium rod were almost completely destroyed to a point just inside the clamping electrodes. The specimen, originally 0.375 inch in diameter, after cleaning was remarkably uniform in cross section, measuring 0.250 inch in diameter over a length of three inches. This diameter reduction represents a volume loss of 56 percent, as contrasted to a 22 percent loss for the heated specimen. These experiments indicate that a somewhat protective oxide coat is formed when 300 C water contacts a 660 C uranium metal surface. Further experiments are being carried out with canned specimens. The desired temperatures for the experimental studies with canned specimens have not yet been achieved.

Several metal-metal oxide mixtures containing small amounts of metal have been prepared, compacted, and sintered to determine the effect of minor additions of metal on the sintering rate of uranium and thorium oxides. Mixtures of 5 w/o ZrH_2 in UO_2 , 8.65 w/o Mo in UO_2 , 8.8 w/o Mo in ThO_2 , 10.3 w/o Mo and 4.5 w/o UO_2 in ThO_2 , 5 w/o ThO_2 in UO_2 , and 5 w/o UO_2 in ThO_2 , were compacted under 35,000 psi and sintered at about 1900 C for two hours in vacuo. A similarly treated compact of UO_2 was included for comparison. The addition of zirconium or molybdenum to sintered UO_2 resulted in little or no greater sintered density, as measured by mercury displacement. Addition of 5 w/o ThO_2 to UO_2 resulted in a sintered density of 7.28 gm cm^{-3} as compared with 7.63 gm cm^{-3} for UO_2 . The addition of molybdenum, UO_2 , or both, to ThO_2 resulted in negligible increase in sintered density. The metal- UO_2 materials, while not having appreciably greater density than UO_2 , do exhibit a much higher resistance to impact fracture. Metallographic examination of the specimens is in progress. Work has been continued on the preparation of UO_2 cermet materials. Compacts of UO_2 with 15 and 30 w/o iron powder and compacts containing 30 w/o Ni, Cu, and Mo powders have been prepared by pressing at 38,400 psi and

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sintering in argon at 1700-2000 C for twenty minutes. The cermet compacts were easily machined; however, during this operation the 15 w/o iron cermet fractured. All samples have been submitted for metallographic examination which may yield information on the mechanism of bonding in the various compacts. A series of experiments aimed at preparing gross quantities of uranium monoxide are planned and will be run when the installation of the high temperature hydrogen furnace is completed.

A method of producing high density UO_2 shapes by swaging a tube containing packed UO_2 powder is being evaluated. In the initial experiment the UO_2 powder was compacted in a 0.672" OD stainless steel tube using a pneumatic vibrator. The contents and the tube were then reduced to 0.366" OD by swaging at room temperature. The density of the UO_2 prepared in this manner was 9.3 g/cc (approximately 85% theoretical density). Further experiments are in progress to determine whether or not 90% dense shapes might be produced by this process.

About 160 pounds of uranium metal shot have been received from the Mallinckrodt Chemical Works. The shot appears clean and has been separated into five size fractions. Particles range in size from about 0.080" (2000 microns) to 0.006" (150 microns). This shot was obtained by reclaiming the uranium metal particles that are formed and dispersed in the slag during bomb reductions. The shot will be used for evaluation studies of matrix fuel materials.

The irradiation of two Zircaloy-clad, U/Mg specimens approximately 1.00" OD is continuing at the MTR. The estimated exposure on the test specimens is approximately 2700 MWD/T. An interim visual examination of the test specimens has been scheduled at the end of the current MTR operating cycle. Following examination, the samples will be recharged to continue the irradiation to 5000 MWD/T.

Six Zircaloy canned specimens of Th-2 w/o U-235 have been shipped to the MTR for irradiation. These will be exposed to an effective thermal flux of 1.0×10^{14} for burnups ranging from 0.5 to 3.0%. Initial heat generation will be 16.4 kw/in³ of fuel material. The first specimen (0.5% burnup) should be discharged and returned to HAP0 after about 50 operating days in the MTR.

Fuel Element Evaluation

Two cored insulated slugs have been irradiated at the MTR, one having the cored uranium plugged with welded uranium end plugs and one having a uniform core without end plugs. The slugs were insulated with 0.004 inch of Al_2O_3 on the interior of the can. Zirconium disks were placed at each end of the uranium for end cap insulation and to prevent flow of aluminum into the core during the canning operation. As previously reported, these canned slugs increased about one percent in length and diameter during the first 90 MWD/T exposure but showed no further change until they were discharged at about 550 MWD/T exposure. When the slugs were decanned, the uranium was found to be substantially unchanged in length and diameter. Thus, the can had yielded plastically when the uranium reached operating temperature, but the uranium returned to its original diameter. The most striking change in the uranium was the closure of the original 3/8-inch core. The axial core of each piece had filled in with metal. Despite this movement of the central metal, the end plugs of the plugged pieces were undisturbed, and the exterior of both slugs

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was smooth and uniform. Many small cracks were visible around the periphery of each slug, but the major longitudinal cracks that have been observed in cored slugs which were irradiated at low temperature were not present. Initial density measurements of uranium from the open cored slug gave a value of 17.67 g/cc along a radius across the base of the slug and 17.72 g/cc along the edge of the slug. The metal had been reduced in density about 6.3 percent. This density reduction was accounted for by a series of microscopic voids that appeared throughout the metal. In short, a slug of porous uranium has been created in pile, while maintaining a uniform and unwrinkled exterior surface on the slug. It appears possible that a uranium slug operating under these conditions might survive to high exposure before gross change in the exterior diameter occurred. Operation at higher powers while maintaining the same temperature range could be accomplished simply by reducing the thickness of insulation utilized and, if necessary, increasing the diameter of the central core. A second loading of insulated slugs is being irradiated in the MTR. Three slugs have been charged; two containing uranium with abnormally large grain size and one uranium representative of current production. This test will determine whether massive uranium slugs irradiated at high temperatures exhibit the distortion normally associated with large grain size irradiated uranium.

Examination of the three slugs of the "Notched Slug Experiment" continued. Macro-examination of transverse sections of the three slugs revealed that very small cracks were present at the center of the one unnotched slug of the test. The only cracking found in the uranium of the notched slugs was the complete split coincident with one of the two notches in the slug that failed. Hardness testing on transverse sections of the three slugs indicated that the uranium of these slugs had possibly attained temperatures higher than normally produced in slugs in the Hanford reactors.

The stress and strain distributions for fuel elements have previously been calculated without considering the time dependent phenomenon of stress relaxation. A method of analysis for this effect has been reported, but calculations have awaited experimental evaluation of the model for the material behavior. Battelle Memorial Institute has recently completed a program of creep testing, and these data are being used to re-evaluate a model of material behavior. This model is being used to calculate the stresses and strains for solid and hollow fuel elements operating in the temperature ranges: 100 C to 350 C, and 350 C to 600 C.

A survey has been made of the possibility of utilizing a coaxial loading of fuel-target material at HAP0. The fuel would consist of an aluminum clad tube of Al/U-235 alloy, and the lithium-aluminum target would be aluminum clad with integral ribs for loading into the center of the tubular fuel element. Work on fuel-target elements of this type has been in progress at the Savannah River Project for several years. Reactor physics considerations must be completely surveyed before work can be started on such a project.

Experimental weld closures have been made on stainless steel clad uranium rods. These rods are intended for use in testing a cluster fuel element design in the high temperature recirculating loop at H pile. Two types of welds were made. The first method used a stepped end cap, and the weld was circumferential. The step of the end cap can be adjusted to provide a specified clearance between the cap and fuel rod. This may be necessary to allow for thermal expansion of the fuel material operating temperatures. The second type of weld was a peripheral edge weld similar to the

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present Hanford process for welding aluminum clad-uranium slugs. Cooling of the rods during welding is necessary in order to prevent the evolution of hydrogen (from the uranium) which has been observed on second weld passes. Both welds appear satisfactory but will be severely autoclaved to check integrity. Aluminum spiders for spacing of cluster fuel element rods have been successfully cold extrusion-forged. An attempt to produce similar spiders from corrosion resistant aluminum 1.0 w/o nickel will be made next month.

Radiometallurgy Examination

Two warped, beta heat-treated, lead dip canned slugs (PT-313-105-7M) have been selected by the Fuel Element Development Unit for metallographic studies. These slugs were discharged from Tube 1062-D after an exposure of approximately 1200 MWD/T. Since there is a large difference in the amount of warp in the two slugs (0.010 inch vs. 0.088 inch), it is hoped that the examination will reveal data which may be related to warp. A wafer has been obtained from each slug for metallographic examination.

Separations Plant Structural Materials

The Redox H-4 oxidizer suffered a leak in the removable heat exchanger on October 21, 1955. The leaks reportedly were in the upper section of the tubes adjacent to the tubesheet and/or in the area of the weld joint between the steam chest wall and the tubesheet. This heat exchanger is the first plant failure of the removable "bayonet" type heat exchangers but is the fourth structural failure in the Redox H-4 oxidizer service. In addition to the change in design, this heat exchanger was fabricated from one-inch schedule 160 type 304 pipe and subsequently subjected to a solution heat treatment to redissolve the precipitated carbides. As reported in HW-32462, evidence of intergranular attack on the tubes adjacent to the tubesheet was noted following the acid pickling of the heat treated heat exchanger. Although several interesting variables -- heat exchanger design, material of construction, heat treatment, tube wall thickness, nature of the corrosion, exact location of the failure -- require detailed analysis and evaluation, it appears quite probable that the failure occurred by intergranular corrosion on the tubes adjacent to the tubesheet where quenching following heat treatment was not rapid enough to prevent carbide precipitation.

It is anticipated that the Purex atmospheric pressure acid fractionator will be used to produce 50-60 w/o nitric acid during the interim period between Purex startup and the installation of the Purex vacuum fractionator. Since the failure of the heat exchanging coils in the reboiler section of the atmospheric pressure fractionator would incapacitate the entire unit, preliminary investigations of several potential corrosion inhibitors which might extend the service life of this equipment have been conducted. The addition of urea to nitric acid solutions reportedly reduces the lower oxides of nitrogen to free nitrogen and carbon dioxide and consequently reduces the corrosion of stainless steel by nitric acid. Static exposures of stainless steel coupons to 65 w/o nitric acid inhibited with 0.2 M urea have indicated a decrease in the corrosion. Further experiments are currently being conducted to establish the magnitude of this reduction in corrosion.

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An investigation of the corrosivity of boiling synthetic Purex 2WW waste acid concentrate by quantitative, semiquantitative, and qualitative methods upon selected materials under heat-transfer conditions is in progress. The potential high frequency of replacement of the number two Purex acid concentrator heat exchangers necessitated a program that would determine: (1) the nature and magnitude of the corrosion problem, (2) which materials were best suited for this service, and (3) operational data to maximize the service life -- production efficiency ratio. Temperature versus corrosion rate data have been obtained from type 347 stainless steel weld-drawn bayonet heat exchangers exposed to boiling synthetic Purex 2WW waste acid concentrate for 562 hours in a mockup reboiler. The magnitude and slope of the graph of these semiquantitative data agreed within experimental error with quantitative heat-transfer corrosion data previously collected from wrought and sensitized specimens of type 347 stainless steel plate. This close agreement indicates that the service life of reboiler heat exchangers can be estimated from data obtained from the quantitative heat-transfer corrosion test equipment.

Welding Development

Evaluation of data resulting from experiments relating weld quality of Zircaloy-2 weldments to welding conditions is partially completed. Preliminary indications are that only very minor differences exist in hardness, grain size, ductility, and corrosion resistance between specimens made using different degrees of inert gas shielding and different shielding techniques within the limits employed in the experiments.

Metallurgical Laboratory Examination

Evaluation of the flexible connectors being installed on the front face of KE and KW reactors has shown the stainless steel braided sheath used on those connectors to be highly susceptible to stress corrosion cracking. Since a possible improvement in this susceptibility lies in the use of fully annealed stainless steel wire to fabricate the braid rather than the cold drawn wire currently in use, specimens of braid fabricated from type 304 stainless steel wire which had been subjected to only the cold work and stresses induced by the braiding process were subjected to the standard boiling $MgCl_2$ comparison test. Comparative results obtained from these tests indicate a several fold decrease in the susceptibility of the annealed braid to stress corrosion cracking.

Plutonium Metallurgy

The plutonium fabrication program has continued at a rapid pace during the past month. One large piece, which was cast previously, was machined, inspected, and canned. Two other pieces were cast with machining of one of them started. Cans for these pieces were plated and prepared. Six electroformed nickel test samples, 2" in diameter by 0.002" and 0.003" thick were plated. In addition, six plutonium samples 1/2" diameter by 1" long, were cast, machined, inspected, and canned. Ten one gram samples were cast, machined, sealed in glass tubes, and shipped to KAPL. Two large graphite molds were prepared, and castings will be made the first part of next month.

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Metallurgy Research Sub-Section

Cold runs to check out the equipment to be used for the fabrication of PCTR slugs have been progressing. The 7 KG automatic balance has required some minor repair but is expected to be ready for use with plutonium during the first two weeks of next month.

Construction work for the expansion into 231 Building is progressing on schedule. Foundations for the Universal testing machine and for the creep machine were completed, and the connecting drains and pipe trench were installed. The high vacuum melting furnace arrived October 14 in apparent good shape. Closer inspection revealed that many of the parts had been soaked with rain water during transit and rusting of steel parts inside the high vacuum system had occurred. In addition, a capacitor in the control section had broken loose and was damaged beyond repair. The three parts: hood, vacuum system, and generator-control unit, have been located and set into place. Interconnection of electrical, air, and water lines has been started and will proceed during the coming month.

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CONTACT ENGINEERING UNIT

PROJECT ACTIVITIES

Project CA-512

The KE pile was equipped with resistoflex pigtails during the month. All but 250 of the original resistance temperature bulbs were replaced with the "Interim Bulbs".

Enough of the boron steel balls have arrived to make up the 50-50 mix of boron and carbon steel for the KW and KE ball hoppers.

The Beckman systems are still undergoing modification. The new controllers have been installed at KE but will not be put into the safety circuit until further tests have been completed. The fifth channel Beckman has been installed at KE but not at KW.

A lump sum contract has been awarded for completion of the 1706 KER facility.

Project CG-558

One project representatives meeting was held during the month to reconsider the installation of front face fittings under this project. It was concluded that the bases on which the original decision had been made had not changed and therefore there was no reason for cancelling the nozzle installation. Fabrication of the new nozzles is under way and cancellation charges would be appreciable.

The construction phase of Project CG-558 is on schedule and the first major outage is planned for June 1, 1956 with succeeding outages at two month intervals. The bid openings for the lump sum portion of the F and H work has been set for November 22.

Panellit installation was completed at DR during the month and B pile is scheduled for shutdown on November 7 for Panellit installation.

Project CG-600

The AEC has issued a directive for installation of new 190-C pumps but has deleted new front face fittings from the project. The pile flow will be approximately 88,000 gpm without the new nozzles as compared to 94,500 with them.

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PILE TECHNOLOGY SECTION

INVENTIONS

All Pile Technology Section personnel engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during October, 1955, except as listed below. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

Inventors

Title

W. J. Morris

A Flexible System for Reactor Control

R. E. Hueschen
D. C. Kaulitz

Elevated Temperature Tensile Testing
Unit for Irradiated Materials -
(HW-38991)

R. E. Heineman

A Nuclear Reactor Composed of Sub-
Critical Fast Reactor Cores with
Strong Thermal Coupling

O. H. Greager
Manager - Pile Technology
ENGINEERING DEPARTMENT

OH Greager:cvf

EXTERNAL DISTRIBUTION (continued)

- 77. Knolls Atomic Power Laboratory, Attn: HW Alter
- 78. Knolls Atomic Power Laboratory, Attn: JK Davidson
- 79. Los Alamos Scientific Laboratory, Attn: RC Smith
- 80. Los Alamos Scientific Laboratory, Attn: CF Metz
- 81. National Lead Company of Ohio, Attn: JW Robinson
- 82. Patent Branch, Washington
- 83. Phillips Petroleum Company (NRST), Attn: FP Vance
- 84. Phillips Petroleum Company (NRST), Attn: CE Stevenson
- 85. Phillips Petroleum Company (NRST), Attn: DG Reid
- 86. Phillips Petroleum Company (NRST), Attn: JL Schwennesen
- 87. Phillips Petroleum Company (NRST), Attn: CM Slansky
- 88. Savannah River Operations Office, Augusta
- 89 thru 93. Technical Information Service, Oak Ridge

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VISITORS AND BUSINESS TRIPS

S. Audia, National Lead Company, Cincinnati, Ohio visited Hanford on 10-28-55 for consultation on calcination.

A. H. Ruehle, Mallinckrodt Chemical Works, St. Louis, Missouri visited Hanford on 10-7-55 for UO_3 and solvent extraction discussions.

Don Brater, Carbide & Carbon Chemical Co., K-25 Plant, Oak Ridge National Lab. visited Hanford on 10-10-55 thru 10-15-55 to discuss continuous calcination.

G. E. McCullough, J. M. Frame and C. E. Dreyden, G. E. Schenectady visited Hanford on 10-17-55 to discuss G. E. participation in processing commercial nuclear fuels.

Myron Kratzer, AEC, Washington, D. C. visited Hanford on 10-27-55 to discuss separations processes.

R. H. Simon, Knolls Atomic Power Laboratory, visited Hanford on 10-12-55 to discuss water analysis in connection with KAPL-120 coolant.

D. O. Carby and E. R. Irish of Hanford visited E. I. duPont, Savannah River Plant, Aiken, So. Carolina on 10-3-55 thru 10-5-55 and Oak Ridge National Laboratory, Oak Ridge, Tenn. 10-6-55 thru 10-7-55 to discuss ion exchange and other separations problems.

R. J. Brouns of Hanford visited the North Dakota Agricultural College, Fargo, N. D. on 10-2 thru 10-5-55 and the University of North Dakota, Grand Forks, N. D. on 10-6 and 10-7-55 and the University of Minnesota, Minneapolis, Minnesota on 10-10-55 for technical recruitment.

W. R. Dehollander of Hanford visited the University of Washington, Seattle, Wash. on 10-27 and 10-28-55 for technical recruitment.

E. E. Voiland of Hanford visited the Iowa State College, Ames Iowa on 10-23 thru 10-25-55 and the Notre Dame University, So. Bend, Indiana on 10-26 thru 10-28-55 for technical recruitment.

ORGANIZATION AND PERSONNEL

	<u>September</u>	<u>October</u>
Separations Technology General	2	2
Plant Processes Sub-Section	58	59
Chemical Development Sub-Section	78	81
Chemical Research Sub-Section	64	62
Contact Engineering Unit	6	6
Analytical Laboratory Unit	34	34
Technical Shops Unit	31	30
	<u>273</u>	<u>274</u>

Plant Processes Sub-Section: H. S. Gile, Engineer II transferred into the Sub-Section from Chemical Research. C. C. Wheeler, Jr., Tech. Grad transferred into the Sub-Section from Chemical Development on 10/15 and 10/24/55 respectively. R. J. Anicetti, Senior Engineer transferred from the Sub-Section to Pile Technology Section on 10/10/55.

Chemical Development Sub-Section: Jack L. Welch, Engineering Assistant hired into the Sub-Section on 10/17/55. Erma W. Chacon, General Clerk C hired into the Sub-Section on 10/31/55. G. J. Alkire, Sr. Scientist transferred into the Sub-Section on 10/1/55. M. D. Fitzsimmons, Engineer I transferred from the Sub-Section to the Atomic Power Equipment Department, Schenectady, New York on 10/31/55.

Chemical Research Sub-Section: F. P. Brauer, Engineer II transferred into the Sub-Section from the Analytical Laboratory Unit on 10/1/55. M. W. Gift, Engineer II was deactivated on 10/17/55 for Leave of Absence - Pregnancy. G. J. Alkire, Senior Scientist transferred from the Sub-Section to the Chemical Development Sub-Section on 10/1/55. H. S. Gile, Engineer II transferred from the Sub-Section to the Plant Processes Sub-Section on 10/15/55.

Analytical Laboratory Unit: D. J. Criswell, Engineering Assistant was transferred into the Unit on 10/14/55. J. S. Holmgren, Engineering Assistant was trans. into the Unit on 10/14/55. G. W. Jolley, Tech. Grad. was transferred into the Unit on 10/24/55. R. K. Metzler, Engineer II, terminated on 10/28/55 to accept employment with the Weyerhaeuser Lumber Co., Longview, Washington. F. P. Brauer, Engineer II transferred from the Unit to the Chemical Research Sub-Section on 10/1/55. Bruce Griggs, Tech. Grad rotated to the Pile Technology Section on 10/31/55.

Technical Shops Unit: Violette L. Seaberg, Draftsman III transferred to the Graphics Unit on 10/3/55.

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PLANT PROCESSES SUB-SECTION,

REDOX PROCESS TECHNOLOGY

Summary

Production Test 202-S-2, "Storage of Redox Plant Extraction Waste, Part I", (HW-39647), is circulating for approval at report time. The writeup of "Description and Use of Redox Tail-End Ozone Facility" has been completed and is about ready for distribution. The new three month test program is in preparation (to cover November and December, 1955, and January, 1956).

Due to frequent intermittent floods in the IA and IS Columns, resulting in poor uranium decontamination and excessive amounts of solvent in the waste cell, it was necessary to interrupt production briefly for flushes of these columns at the beginning of the month. Decontamination did not improve significantly, however, until the middle of the month. At this time (on October 18), the flowsheet described in HW-38979 (of last month's report) was put into effect stepwise, permitting about a 13.5 per cent increase in instantaneous capacity to about 50 per cent above Phase II design rate. This rate was successfully maintained for approximately two days during which time improvements in both waste loss and decontamination were observed. A series of troubles (largely mechanical) seriously hampered production for the balance of the report period; thus, there has been no opportunity for a prolonged test of the flowsheet.

An over-all dissolver capacity increase approaching ten per cent has been realized since the first week of the month as a result of successful use of the 15 per cent greater charge size mentioned in the report for July of this year.

The 205-S silica gel facility for tail-end treatment of uranium product solution was put into service at the end of September and, except for the problem of a continually plugging prefilter, has operated successfully at rates up to 150 per cent of nominal design capacity. The average gross gamma decontamination has consistently approximated an arithmetic factor of two. This has been adequate to bring most of the product within desired limits (for transfer to the UO₃ Plant) in one pass through the bed.

As a result of an increase in 3BX rate in the third cycle plutonium stripping column, the nitric acid content of PR solution was reduced by about 20 per cent, since more nitric acid is consequently boiled off in the concentration step. The iron content of the PR solution, however, which appeared to decrease somewhat following this change, has since returned to its former average of 90,000 to 100,000 parts per million parts of plutonium.

The emission of iodine-131 was fairly uniform throughout the entire report period, ranging from approximately 0.5 to 2.5 curies per day reaching the stack, with an average of about 1.3 curies per day. This corresponds to an over-all average reactor efficiency of approximately 99.3 per cent.

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The average exposure of the uranium charged to the dissolvers was 255 (205 to 265) MWD/T, its average cooling time was 99 (85 to 127) days, and the over-all plutonium and uranium recoveries were 99.3 and 99.6 per cent, respectively. Concentrated plutonium product ranged from 87 to 113 grams of plutonium per liter, with an average of 98.9 grams per liter.

Feed Preparation

As part of the continuing effort to increase the Redox dissolving capacity, the size of metal batches charged to the dissolvers was increased approximately 15 per cent early in October. This has been apparently completely successful and has resulted in an over-all dissolving capacity increase of about seven to ten per cent.

The time cycles for the second oxidation and catalytic reduction steps were shortened a combined total of about 23 per cent across feed solution pretreatment in order to maintain the accelerated production rate resulting from the successful demonstration of a revised flowsheet (see below). This reduction in feed preparation time cycle appears to have been carried out without adverse effect on fission product behavior during solvent extraction, inasmuch as uranium decontamination improved slightly during this period.

Decontamination

Due to the poor uranium decontamination and intermittent column flooding (particularly IA and IS) being experienced at the end of last month, production was temporarily halted while the columns were flushed. As usual immediately following startup, decontamination was poor but improved rapidly to give satisfactory products. However, it dropped sharply when the IBU gamma monitor was reactivated (following a long period of idleness), probably as the result of disturbance and entrainment of interfacial solids from the IB Column. Plutonium streams were not appreciably affected, but uranium decontamination remained generally poor for the next two weeks. The IB Column interface was lowered into the column packing for a short time, but the period was too brief to permit an evaluation of the effect on uranium decontamination. Immediately before and during the flowsheet test which commenced on October 18, uranium decontamination improved to the extent of allowing all product to be sent to the Uranium Conversion Plant. This improvement probably was the result of continued processing which swept out the disturbed (and entrained) interfacial solids rather than any direct effect of the new flowsheet. The average logarithmic over-all decontamination factors for the month were 6.5 and 7.5 for uranium and plutonium, respectively.

Solvent Extraction

The flowsheet presented in HW-38979, "An Integrated Redox Plant Capacity Study", was tested beginning October 18. A stepwise approach consisting of three successive incremental (equal) increases, culminated in reaching an instantaneous processing rate on October 19, equivalent to approximately 150 per cent of Phase II design rates. No serious trouble was encountered and, in general, both waste

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losses and decontamination improved during the period of 42 hours of operation on this flowsheet. The basic principle of the flowsheet consisted of increasing salting strength and uranium feed stream concentration to increase the distribution of the solute into the organic phase, while at the same time decreasing the organic flow to keep it within the capacity of the solvent recycle pump.

An unfortunate series of mechanical failures (e.g., waste neutralizer agitator, waste concentrator overflow piping, feed oxidizer tube bundle, third plutonium cycle feed pump, etc.) destroyed the continuity of production for the balance of the report period.

Tail-End Silica Gel Treatment

The 205-S Building was put in operation at the end of September and operated for most of the current report period. Severe difficulties were encountered almost at once with the plugging of the feed stream prefilter, which required back-flushing on an average of three to six times per day until it was replaced on October 20 with a redesigned unit which protected the filter element itself with a layer of silica gel. An average gamma decontamination factor (arithmetic) of two was obtained over the report period, which was adequate in the great majority of cases, to permit transfer of the uranium product solution to the Uranium Conversion Plant after one passage through the silica gel bed. The following data are typical of the performance during the month:

	Stream Compositions			Average	
	<u>Gamma Ratio</u>	<u>% Zr-Nb</u>	<u>% Ru</u>	<u>Decontamination Factor</u>	
Influent	2.73	84	16	Gamma	1.9
Effluent	1.43	72	28	Zr-Nb	2.2
				Ru	1.1

Iodine-131 Emission Problem

During the report period, a daily average of about 1.3 curies of iodine-131 reached the stack, corresponding to an over-all efficiency for the silver reactors of approximately 99.3 per cent. No large "bursts" were observed, and the emissions ranged from about 0.5 to about 2.5 curies per day. A short test of the effect of temperature was made during which the reactor inlet temperature was raised from 375 to 400 F during uranium dissolving and returned to 375 F during coating removal. Although the results were inconclusive, a slight improvement may have resulted. This test is to be resumed next month. During the last ten days of the current report period, each silver reactor was given a one-shot regeneration.

Waste Storage

Production Test 202-S-2, Part I, has been written and is circulating for signatory approvals. The test has been prepared to outline a test program designed to establish absolutely safe methods of filling tanks undergoing self-concentration, without undue conservatism. It is intended to cover the balance of 1955,

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and will be supplemented by Part II at the first of the year to cover the storage of waste from two stage waste backcycle operation of the plant. Due to the fact that self-evaporation in Tank 104-SX had reduced the waste level to approximately 25 feet, thereby greatly decreasing the efficiency of the air lift circulator, extraction wastes were diverted to Tank 104-SX from Tank 109-SX for a period of about ten days. This refilled Tank 104-SX to 30 feet, and the new wastes were again routed to Tank 109-SX. This fact, combined with the limited production of the last third of October, points to the possibility that the contents of Tank 109-SX may not reach boiling as anticipated when the production test was written. In this event, it may be decided to complete the filling of this tank with the first waste accruing from operation in 1956 on two stage waste backcycle.

PUREX PROCESS TECHNOLOGY

The lengthened HA and IA Columns were installed and tested for hydraulics. A metallic noise was heard in the HA extraction section at frequencies greater than 80. However, no further investigation was performed pending column extraction performance results.

Operability testing of equipment continued and was concluded by the operation of the acid-diluent flush operation of the plant. Following this run, process vessels were physically cleaned, pump suction screens were removed, and equipment was readied for start of the first cold uranium run.

Special tests are being performed in the L Cell plutonium concentration equipment to determine the extent and source of corrosion and the amount of entrainment from the No. 1 Plutonium Concentrator. Results to date indicate negligible corrosion across the T-L3 Stripper, and it is anticipated that product solution should contain on the order of 8000 parts iron per million parts plutonium when produced at a concentration of 100 grams plutonium per liter and a capacity factor of 1.2 for low g/t plutonium.

The B3 Dissolver was charged with ten tons of canned, depleted uranium slugs in preparation for dissolving.

A design for the prototypical silica gel facility for Purex uranium production was issued on Document HW-39538, and a work order was written to Separations Maintenance for installation of this facility.

URANIUM RECOVERY PROCESS TECHNOLOGY

During periods of processing low quality feed (i.e., high ratio of supernatant to slurry in the feed blends, with resulting high phosphate content and, thus, poor extractability with $K^{1/2}NO_3$ values as low as 2.8, as against a desirable value of five) extraction waste losses were high, as expected, ranging up to ten per cent. Decontamination performance was borderline at the beginning of the month, but was improved by a thorough flush of the solvent extraction system with nitric acid, caustic, and water. During the latter part of the month, with operation under relatively steady-state conditions and with slurry blends approximating flowsheet conditions, plant solvent-extraction losses and decontamination

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performance consistently improved with combined solvent-extraction losses averaging 0.8 per cent for the last week of the report period.

Metal Removal

A summary of the source, age, and irradiation history of the metal removed from the two operating tank farms is given below:

<u>Tank Sluiced</u>	<u>Fraction of Uranium Removed</u>	<u>Minimum Age From Pile Discharge, Months</u>	<u>Average Exposure Level Of Uranium, MWD/T</u>
102-U	0.401	19	444
107-U	0.401	15	201
105-106-115-TX	0.198	31	506

Metal removal from Tanks 105-TX, 106-TX, and 102-U was essentially completed during the month. Metal removal from Tank 107-U was started, and preparation for metal removal from Tank 101-TX (metal aged a minimum of 11 months from pile discharge) is complete with metal removal to start during the next week.

Solvent Extraction

Solvent extraction operations were carried out under modified TBP HW No. 6 Flow-sheet conditions.

The feed processed was consistently supernatant rich. Mole ratios of sodium to uranium averaged 22 and at times exceeded 30, compared to a flowsheet value of 15. Because of the high phosphate ion concentrations characteristic of such feed, the salting strength experienced in the RA Column ($K^+ / {}^{238}\text{UO}_2^{2+}$) was low, and the uranium transfer rate was reduced. Consequently, the RAW loss ranged up to ten per cent and averaged 1.1 per cent of the feed uranium, slightly higher than normal. During the last week, the feed has been consistently good, and the composite solvent extraction losses have averaged less than one per cent with the RA Column contributing approximately 0.4 per cent.

RC Column operation during the first half of the report period was generally unstable, with high and erratic RCW losses. At L/V's less than 0.9 (RAX and RCX flow 120 and 85 per cent of the flowsheet rate, respectively) and volume velocities greater than 600 gallons per hour per square foot, these losses ranged from one to nine per cent.

Because of these high losses, the borderline decontamination achieved, and the limited feed supply, the solvent extraction system was shut down and flushed. The RC Column was flushed with ten per cent caustic, 60 per cent nitric acid, and water, and the organic wash system was flushed with ten per cent caustic, 30 per cent acid, and water. In addition, the intercycle tanks, the second cycle and the product receivers were given flushes. Average RCW losses during the two week periods before and immediately after these flushes were 1.5 per cent of the feed uranium. However, operation after the flush improved steadily so that at month end low

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(less than one per cent) losses are sustained using only 75 per cent of the HW No. 6 Flowsheet RCX flow. Prior to the flush, at least 90 per cent RCX flow was required to give losses of this magnitude.

Solids removed from the RC Column by the flushes were sampled and shown to be similar to those picked up in the intercycle and second cycle flushes. The sulfamic acid in the RDIS is suspected as being a primary source of these solids which cause poor decontamination and changes in plate wetting characteristics. For a portion of the month, a test filter containing sintered stainless steel plates (approximately ten micron pore size) was used to filter the RDIS. During the short period the filter was in service, a heavy black slime resembling carbon black or grease built up, and the filter plugged and cracked. Felt and glass wool will be tested as other possible filter media for this stream. Test filters containing a wound glass-wool element (Fulflo filters similar to those used at Savannah River) will also be installed in the ROS, demineralized water, and REU lines.

Gamma decontamination was generally adequate, although one "startup" batch of REU was reworked. The over-all gamma logarithmic decontamination factor averaged 4.9 and was not affected by the use of uranium from the 107-U Tank (aged 15 to 18 months since irradiation to 200 MWD/T). Average RCU, RDF, and REU gamma activities were 180, 80, and 1.7 times that of aged natural uranium, respectively. Since the flush of the intercycle evaporator system using ten per cent caustic, 30 per cent nitric acid, and water, the RCU and RDF activities are approximately the same. Evidently the flush was effective in removing the "filterable activity" which had accumulated in the intercycle holdup tanks.

Specific fission product data obtained during the month are summarized below:

- A. Before the intercycle flush, processing supernate rich feed principally from 101-U Cascade (19 month minimum age):

Stream	Gross Gamma		% of Gross Gamma				dF			
	Per Cent ANU	dF	Ce	Ru	Cs	Zr-Nb	Ce	Ru	Cs	Zr-Nb
RAF	1.2×10^7		15	10	74	1				
RCU	2×10^4	2.8	25	57	2	16	2.9	2.3	4.7	1.9
REU	170	2.1	--	80	--	20	--	1.4	--	1.4

- B. After the flush, processing feed of nearly flowsheet composition principally from 107-U Cascade (15 month minimum age):

Stream	Gross Gamma		% of Gross Gamma				dF			
	Per Cent ANU	dF	Ce	Ru	Cs	Zr-Nb	Ce	Ru	Cs	Zr-Nb
RAF	1.5×10^7		39	9	25	26				
RCU	8.5×10^3	3.2	3	21	5	71	4.4	2.9	3.9	2.8
REU	175	1.7	--	28	--	72	--	1.6	--	1.7

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Waste Handling

Approximately 7,000 gallons of scavenged waste (concentrated and nickel ferrocyanide-calcium scavenged) per ton of uranium at an average pH of ten were returned to storage for settling in Tanks 107, 108, and 110-BY. The average compositions of the supernatants were:

<u>Tank No.</u>	<u>Sr⁹⁰, Micro- curies per ml</u>	<u>Cs¹³⁷, Micro- curies per ml</u>	<u>PO₄⁼, M</u>
15-110-BY*	0.15	0.01	0.10
16-107-BY	0.20	0.04	0.13
17-108-BY	Sampled on October 23, 1955 - awaiting analysis.		

*Unconcentrated and scavenged with 0.0025 M NiSO₄, 0.0025 M Na₄Fe(CN)₆, and 0.004 M Sr(NO₃)₂.

Soil column tests of the supernatant from 15-110-BY and 16-107-BY indicated they were suitable for ground disposal at up to 1.5 column volumes. The supernatant from 16-107-BY was transferred to BY No. 4 crib, and the supernatant from 15-110-BY was transferred to BY No. 5 crib.

Since low strontium and cesium concentrations were obtained in the plant test employing supplemental inert strontium scavenging (TK-15-110-BY), and since soil retention characteristics of the scavenged supernatant were good, it is planned to employ supplemental inert strontium scavenging routinely in the TBP Plant. The new procedure will be initiated when the present waste tank is filled during the first week of November.

Equipment

At month end, the decision was made to provide the necessary engineering modifications to permit using Section 6 either as a primary feed evaporator or (when operated in series with Section 8) as an intercycle concentrator. When the engineering modifications are completed, two feed evaporators (Sections 7 and 10) will be used for primary feed concentration, and two (Sections 8 and 6 in series) will be used for intercycle concentration. With this method of operation, the present intercycle concentration capacity limitation will be eliminated.

In-Line Monitors

With minor exceptions, the pH controlled waste neutralization system operated without incident and with excellent agreement with laboratory control samples for the entire month.

The 16-1 REU gamma monitor which continuously measures and records the gamma activity of the REU solution as it is pumped from the REU pump-out tank (19-3) to the REU receiver (16-1) operated satisfactorily for the entire month. A clear cut relationship between the monitor record and laboratory gamma activity

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analyses of routine samples of the REU from the REU sampler tank (15-1) has not yet been defined. A varying degree of solids and/or organic entrainment is believed to be the chief reason for the lack of a good correlation between the two analyses.

Work has been started to replace the 16-6 RCU, pulse measuring type, gamma monitor with a current measuring type gamma monitor. The old instrument, originally installed during parallel operation for product monitoring, is not suitable for monitoring the higher RCU activities encountered during series operation.

URANIUM CONVERSION PROCESS TECHNOLOGY

Process

With a high percentage of the feed originating at Redox and containing zirconium and niobium as the primary radioactive contaminants, higher than normal product gamma activity has developed. Average gamma per cent for the last ten car block was 101, and for the first four cars of the current ten car block, the average is 119. Otherwise, the quality of the UO_3 produced was well within specification limits. Total metallic impurities averaged 81 parts per million parts of uranium. On one carload of uranium produced during the replacement of the upper portion of the TD-4 fractionator, impurities totalled 170 parts per million. This higher concentration was caused by the higher nitric acid concentration experienced when concentration is carried out with only one unit in service. Average reactivity was 1:11, using nominal 0.05 weight per cent sulfamic acid as an additive.

Six consecutive calcinations in the same electric pot using 0.2 weight per cent urea and 0.08 weight per cent sulfamic acid as pot additives showed no improvement in time cycle or caking tendency, so no further testing of this additive combination is contemplated.

Equipment

A scheduled replacement of the TD-4 fractionator bottom section was completed. The old bottom, which had developed leaks on several occasions and was in service during the period 60 per cent nitric acid was fractionated, will be moved to the burial ground and cut open for metallurgical examination.

Nitric acid pump C-4 (60 per cent nitric acid cooler) failed after more than 2.5 years of service. The shaft, impellers, and boron carbide bearings were all replaced.

Z PLANT (ISOLATION, PURIFICATION, AND FABRICATION) PROCESS TECHNOLOGY

Isolation (231) Building

The procedure for the preparation of plutonium(IV) oxalate from F-10-P has been modified to eliminate one of the two successive plutonium peroxide strikes formerly required. Test runs have shown that satisfactory product purity can be obtained by a single peroxide strike, followed by the precipitation of the oxalate.

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WITH DELETIONS**Oxalate Precipitation (Task I)

Recycle losses from the plutonium(IV) oxalate precipitation in Task I averaged about four per cent, with the iron content of the feed (from Redox) averaging 12 per cent. In spite of the high iron content of the solutions, a reduction in the volume of the first oxalate cake wash from five to 2.5 liters appears to have no significant effect on final product purity.

Hydrofluorination (Task II)

The refluorination rate averaged eight per cent in October, as compared with 15 per cent in September and 18 per cent in August. The improvement is attributed to the maintenance of clean off-gas lines and good furnace door seals. Testing of the Kel-F coated, silicone rubber door gaskets was continued. Two of the gaskets were used for a total of 37 runs (19 for one, 18 for the other) before replacement. None of these runs required refluorinating. This type gasket is being installed in all furnaces.

Metal Reduction (Task III)

The orifices between the reduction furnaces and the argon-vent manifold were found to be tightly plugged. It is not known how long this condition has existed, but the resultant lack of argon purging of the pressure vessels prior to reduction is believed to have been responsible for the poor quality of the buttons produced, which, in turn, is believed partially responsible for the poor quality of castings obtained this month (see below - Casting). Unground, unrefined Nelco calcium was used as reductant for six runs. Product purities were within specifications.

RECUPLEX DEVELOPMENTPlant Operations

The Recuplex solvent extraction system was operated 430 hours during the month (September 26 to October 26) for an on-stream efficiency of 83 per cent. The

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feed input consisted primarily of dissolved skulls and crucible materials. Approximately 80 per cent of the feed processed was virgin plutonium, and the other 20 per cent was plutonium recycled from within the system. Cribbed waste losses totalled 0.7 per cent of the plutonium, of which approximately 0.1 per cent is attributed to a probable analytical error and about 0.3 per cent resulted from temporary operating difficulties; losses from the solvent extraction system, with the feeds employed, generally represented 0.4 per cent of the feed. The concentration of the product stream was maintained at 75-85 g/l plutonium. The normally stable operation of the system was interrupted by intermittent flooding in the extraction columns. The column upsets were caused by the excessively high specific gravity of some of the feed solutions and the re-introduction of process solutions spilled onto the hood floor during valve failures. The plutonium loaded out (as nitrate) into sample cans ranged in purity from 96 to 89 per cent, the lower purity values being due to the flooding of the extraction columns and the subsequent loss of scrubbing efficiency.

Thirty-three reduction-crucible and seven fluoride-powder runs were processed through the slag-and-crucible hood. Difficulties were experienced in removing iodine from the dissolver solutions, causing discoloration of the solvent in the columns.

Crucible Recovery Studies

The amount of "free fluoride" employed in the initial phase of the slag-and-crucible dissolution cycle was reduced during the month in an attempt to reduce dissolver corrosion rates. The data obtained during the dissolution of three charges of new crucible materials indicated that the use of an Al/F mole ratio of 0.5, rather than 0.2, reduces the plutonium recovery efficiency appreciably. Preliminary data obtained during the dissolution of old crucible materials had indicated that a 0.35 Al/F mole ratio provides satisfactory recovery.

In view of the evident carryover of plutonium between dissolver charges, the fluoride-powder dissolution flowsheet was revised to include an initial "free fluoride" period, i.e., no aluminum present during initial stages of dissolving. The flowsheet for the dissolution of old crucible materials (containing two kilograms of iodine per batch) was also revised to reduce the initial nitric acid concentration, with the result that more efficient iodine removal has been achieved.

Solvent Degradation Studies

Process studies of the solvent extraction system were primarily concerned with the effects of employing 0.01 M sulfuric acid in the C Column stripping solution. The complexing action of the sulfate ion reduced the plutonium losses to the solvent raffinate by a factor of two to three. The consequent decrease in the amount of plutonium recycled to the extraction columns in the solvent stream produced no significant effect upon the plutonium losses to the aqueous extraction wastes, thus indicating the recycled plutonium to be essentially "unstripable".

Tests conducted at month's end to determine the effects of employing 0.01 M hydrogen peroxide in the stripping agent in addition to the sulfate ion indicated no further decrease in plutonium solvent losses. These test runs were accompanied by large plutonium losses to the extraction waste stream. It is believed, however, that these high losses were due to an unknown variance in feed composition rather than to the use of hydrogen peroxide in the stripping column.

Equipment Maintenance

Approximately two-thirds (61 hours) of the down time in the solvent extraction system resulted from 15 process valve failures, most of which were in G. W. Dahl diaphragm sealed valves. Experience with the manually operated and air operated Dahl valves has shown that: (1) The diaphragms provided by the vendor are too weak for pressures obtained with the Roth pumps (50-60 psig); (2) the spring in the air operated valve is too weak to close the valve against pump pressure; and (3) the stem travel of the manually operated valve is excessive, causing additional strain on the diaphragm. Operating experience has been obtained with substitute glass cloth, teflon, and stainless steel diaphragms; of these, the glass cloth proved entirely inadequate, the teflon reduced the failure frequency considerably, and the stainless steel has so far been satisfactory. A program has been initiated to install stronger springs and suitable stem travel stops.

All the welds in the floor pan sumps of the RB and SE process hoods were rewelded during the month to stop leakage through the hood walls.

As of October 25, 1955, the pulse generator bellows in the H-1 and H-2 columns and in the H-3 columns had operated 7.7×10^6 and 11.3×10^6 cycles, respectively.

Process Chemistry

The best average plutonium content of silica slurries from dissolutions of RS-4 crucibles is 0.026 g/l, and from RCDS-1102 crucibles 0.0237 g/l. The ranges at the 95 per cent confidence level are 0.020 to 0.035, and 0.0146 to 0.0382 g/l, respectively.

Stripping studies were performed to see if the use of small amounts of reducing or complexing agents in the CCX would lower the plutonium waste loss in CCW. With Recuplex CCW containing 0.02 g/l plutonium distribution ratios obtained while stripping with 0.2 M HNO_3 were appreciably lowered by the addition of 0.05 M $\text{H}_2\text{C}_2\text{O}_4$, 0.05 M H_2O_2 , 0.01 M HF , or 0.1 M NH_2OH .

A solid adsorbent and an anion exchange resin have been tested for the removal of plutonium and DBP from Recuplex CCW. Precipitated calcium fluoride in the packed column removed 99 per cent of the plutonium and some of the DBP in one test. However, fused calcium fluoride pellets had little effect. A Dowex-1 anion exchanging resin (50-100 mesh) removed 90 per cent of the plutonium and DBP from Recuplex CCW. Breakthrough occurred at approximately 90 column volumes. The capacity of the resin when stripping DBP from plutonium free solvent 0.5 g/l in DBP is approximately 25 grams of DBP per liter of resin.

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234-5 DEVELOPMENTTask I Process Chemistry

The aluminum content of Redox 3BP solution could increase to 100,000 ppm plutonium due to suggested process changes. Concentration of product containing this amount of aluminum can be carried to 110 g/l plutonium with no solid formation except a small amount of silica. Further concentration may result in precipitation of solids such as aluminum nitrate. These solids were observed at a plutonium concentration of 130 g/l.

A homogeneous precipitation of plutonium(IV) fluoride was attempted with plutonium (IV) nitrate solution and ammonium fluosilicate. The original solution was 54 g/l plutonium and one M HNO_3 . Fifty per cent excess fluosilicate was added. A crystalline precipitate formed after 15 or 20 minutes. Excess hydrofluoric acid was added when the precipitation was nearly complete, thus dissolving silica and assuring complete precipitation of the plutonium(IV) fluoride. The crystalline, rapidly settling solid was readily filtered and washed. The composition of the material will be determined and further studies made with hydrofluosilicic acid instead of the ammonium salt.

Chemical Assistance to Metallurgical Studies

Controlled oxidation of plutonium metal turnings can be accomplished by passing mixtures of argon and oxygen over the turnings at elevated temperatures. The oxidation time cycle for a half-inch depth of turnings is three hours in the temperature range 400 to 475 C, with the oxygen content varying from five per cent to 100 per cent. A time-temperature-composition cycle must be followed to prevent an excessive oxidation rate and subsequent sintering. The oxide produced from this procedure may be satisfactorily fluorinated with Freon 12, but in an experiment did not react with hydrogen fluoride.

The direct conversion of plutonium metal turnings to plutonium trifluoride with mixtures of argon and freon is promising. The reaction temperature is approximately 600 C, and the time cycle three hours for a quarter-inch bed depth. Further work will firm up the conditions.

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CHEMICAL DEVELOPMENT SUB-SECTION,HOT SEMIWORKS PUREX STUDIES

Data from Hot Semiworks Run PX-9, carried out at both high and normal processing rates corresponding to 25 and 10 tons/day operation in the Purex Plant HA Column, are attached as Table I. No highly significant changes in HA Column decontamination were detected at the different processing rates or from the use of different diluents. HA Column gross gamma D.F.'s were approximately 160, falling short of the Flowsheet value by approximately four-fold. High uranium and plutonium waste losses from all columns during both processing rates reflect unstable column operation caused by flooding.

After reprocessing PX-9 wastes to recover uranium and plutonium, the solution heels were removed from the process vessels in preparation for cell decontamination and maintenance. Decontamination of B Cell was routine except for several isolated high readings (up to 250 rads/hr.) in the vicinity of the HA Column. After detection, these spots were quickly reduced to suitable background readings. Working times on B Cell equipment ranged from 30 minutes to 2 hours. "A" Cell decontamination during the month has been limited to cell flushes of equipment pieces.

Major items of maintenance and equipment revisions currently being completed in B Cell are as follows:

- (a) Conversion of the pulse generators on the IA, IBX, IBS, IC, 2A, and 2B Columns from the sharp V-type teflon bellows to the deep convolution Dore E-8-A bellows, and replacement of the ruptured Dore bellows in the HC and IO Column pulse generators. These latter bellows failed unexplainably after approximately 1.5×10^6 and 10^6 cycles, respectively.
- (b) Installation of more open, graded-type extraction-section cartridges in the HA and IA Columns.
- (c) Lengthening the HA Column scrub section standard cartridge from 8.3 to 13.0 feet.
- (d) Replacement of the fluorothene perforated plates in the HC, IC, and IO Columns with stainless steel nozzle plates (10% free area, 1/8 in. hole plates, on 4 in. spacing).
- (e) Installation of a 13 ft. standard cartridge in the IA Column scrub section replacing the .080 in. hole plates on 1-in. spacing.
- (f) Replacement of the hydraulic "saw-tooth" wave pulse generator on the HA Column with a mechanical sine-wave generator.

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The Waste Self Concentrator, which is a heated, insulated, 39-in. I.D. tank 36 ft. long simulating a core through a Purex waste tank, is now approximately 2/3 full of concentrated Purex wastes. During the past month "bumping" has become a usual occurrence as indicated by the data below:

WASTE SELF-CONCENTRATOR BUMPS

<u>Time Period</u>	<u>No. of Bumps</u>	<u>Maximum Pressure Developed by Bumps</u>	
		<u>In. of H₂O*</u>	<u>No. of Bumps</u>
Prior to 9/26	2		
9/26 to 10/2	3		
10/3 to 10/9	11	< 20	1
10/10 to 10/16	16	20 to 24	14
10/17 to 10/23	10	25 to 29	16
		30 to 34	5
		> 35	0
		Not recorded	6
Total	42	Total	42

*) Maximum pressure was measured by restricting the vapor line with an open 1/2-in. air-operated valve.

Self-Concentrator Wall Temperatures^(a)

	<u>Tank Top^(b)</u>	<u>Tank Bottom^(c)</u>
First bump	202	216°F.
Second bump	197	230°F.
Third bump	205	226°F.
10/23/55	207	242°F.

- Notes:
- (a) Measured by thermocouples imbedded in metal blocks welded to the outside of the inner tank liner.
 - (b) Wall temperature in the vapor space above the liquid.
 - (c) Wall temperature at the base of the tank.

Additional information as to the frequency, severity and heat liberated during the bumps will be reported in the future.

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Separations Equipment Development

Hot Semiworks Pulse Generators and Teflon Bellows. A mechanical pulse generator (SK-2-50142), powered by a Dudco MF 24E vane-type hydraulic motor was operated 125 hours on test prior to its installation on the Hot Semiworks HA Column. This unit delivers a near sine wave pulse instead of the triangle-shaped pulse delivered by the hydraulic piston pulse drive units installed on all Hot Semiworks columns. Data taken during the testing of the mechanical drive unit indicate that hydraulic line friction losses are responsible for the high hydraulic horsepower input to the system. In view of this, the supply oil will be routed through the 5/8-in. line now used as a return line and the motor discharge will be routed to an existing 200 psi supply header.

Also, during the testing of this unit, amplitude and frequency data were taken using a 4-inch Dore "U"-type bellows installed to pulse water in an unpacked eleven-ft. column. The bellows test installation was prototypical of the Hot Semiworks bellows installations. The amplitude in a four-in. column varied from 0.535 inch at 20 cycles/min. to 0.625 inch at 110 cycles/min. when a 5/16-inch bellows stroke was employed. As a result of this disclosure, an investigation to determine the relationship between pulse amplitude and stroke, frequency, static head, and pulse wave shape is currently being carried out.

The IO and HC Columns four-inch Dore "U"-type inner bellows failed before decontamination flushing was completed at the end of Run PX-9. These bellows had accumulated about 1×10^6 flexure cycles when they failed while, on the other hand, the Dore "U"-type bellows on test in the 321 Building test stand has operated through 20×10^6 flexure cycles. The test stand employed in 321 Building for these tests does not flex the bellows under conditions comparable to Hot Semiworks operating conditions but the new pulser-bellows test stand mentioned above will be more nearly prototypical with the exception of the absence of radiation.

A mechanical pulse generator was designed for pulser and bellows testing in 321 Building. Variable frequency is accomplished by using a variable speed drive unit and stroke is varied by changing the eccentric on the drive shaft. Stroke lengths up to one inch may be obtained with motion characteristics which approach a sine wave.

PUREX DEVELOPMENT

Process Chemistry

Miniature Pulse Column Runs. A series of miniature pulse column runs were made under simulated IA Column conditions using Hot Semiworks IAF as feed and the following solvents: 1) laboratory 30% TBP-Soltrol, 2) recycle of (1) after one pass through the extraction cycle, 3) HSW 30% TBP-Soltrol

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from Run PX-9, 4) HSW 30% TBP-Shell E-2342 from Run PX-9 and 5) HSW 30% TBP-Soltrol from the latter part of Run PX-9 when the IO Column was being run aqueous continuous. Essentially the same Zr-Nb IAF-IAP and IAF-ICP decontamination factors were obtained (approximately 160 and 225, respectively) in all runs. Also, uranium loss was found to be independent of the solvent used.

Rate of Zr-Nb Scrubbing. Previously reported work (Sept.) on the rate of transfer of Zr-Nb activity under IA scrub conditions showed that, from a IAU prepared from HSW IAF three days after sampling, Zr-Nb activity transferred at a considerably lower rate than uranium. Further, Zr-Nb activity transferred at a more rapid rate from IAU prepared using Shell E-2342 as diluent than when Soltrol was used. In similar studies with IAU prepared from the same sample of HSW IAF nineteen days after sampling, Zr-Nb transfer rates were nearly equal to those for uranium and no significant difference was noted in the rates for IAU's prepared from laboratory solvent and recycled HSW solvent (Soltrol diluent). However, the Zr-Nb transfer rate from IAU prepared using reagent grade Shell E-2342 was about 1.5 times as fast as from IAU prepared from Uranium Recovery Process solvent.

Sodium Ion Distribution Under IA Scrub Conditions. Batch contacts of simulated IAP (Soltrol as diluent) with IA scrub solutions spiked to 100, 500 and 1000 ppm. sodium (as NaNO_3) were made. Flame photometric analyses of the organic phases after equilibration with these scrub solutions showed, in all cases, less than 0.5 ppm sodium (limit of detection for the method). Thus, the E_a^0 for sodium ion is less than 0.0005 under IA scrub conditions.

Preparation of Zr Tracer. Approximately 200 millicuries of Zr tracer prepared by TTA extraction of Redox IAW was submitted to the Cold Semiworks for use in demonstration column studies. Laboratory batch contacts indicated extraction and scrub E_a^0 ratios of about 0.007 and 0.008, respectively, for this Zr under Purex IA Column conditions. However, a Cold Semiworks column run with the Zr as tracer produced an over-all decontamination factor (arith.) of about 10, indicating considerably higher E_a^0 values than obtained in the laboratory. E_a^0 values on grab samples taken from the column scrub section were consistent with column behavior. Laboratory batch contacts with Semiworks feed and solvent gave low E_a^0 values comparable with those for laboratory feed and solvent. Further studies are planned to resolve this discrepancy.

Chemical Engineering Development

Pulse Column Studies

Development work directed toward improving Purex A-type column performance continued during the month with emphasis on the following items:

1. Testing was continued in the development of an anti-backmixing cap between the extraction and scrub sections (above the HAF feedpoint) of the HA Column to minimize backmixing of the aqueous phase from the mid-column feed zone into the scrub section. This development has met with partial success in a full plant scale prototype column, and is discussed in more detail below.
2. Development and testing of a more open, "graded" extraction section cartridge for the Purex "A"-Type columns was highly successful in raising the operable pulse frequency (i.e., raising the flooding frequency) by 15 to 25 cycles per minute -- thereby permitting the attainment of more nearly optimum pulse frequencies in the scrub section. The graded cartridge was scouted in a 3-in. glass column and demonstrated in a full plant-scale prototype column, giving consistently lower waste losses (typically 0.001%) than with the previous "standard" cartridge. On the basis of these studies graded cartridges have been installed in the Purex Plant "A"-type columns.
3. Scrub section efficiency studies were conducted using both a dilute uranium flowsheet (described last month) and a radio-zirconium tracer. The tests were intended to determine the effectiveness of the scrub section louver plates and the anti-backmixing cap in improving scrubbing efficiency.

The results of 26 full-scale Prototype and 42 Demonstration Unit runs are summarized in Tables II, III, IV, and V.

Backmixing Studies. Three anti-backmixing caps were tested in the full plant scale Prototype HA Column to demonstrate their effect on column stability and their effectiveness in reducing backmixing from the feed zone into the scrub section. The results of the tests in which sodium nitrate was used as the backmixed component are given in Table II. The anti-backmixing caps designated "B" and "C" in Table II are near-prototypes of the device now installed in the Purex Plant A-type Columns.

The prototype (32-in. diameter) anti-backmixing cap test results are compared with Demonstration Unit (3-in. and 4-in. diameter) results in the following table:

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ANTI-BACKMIXING CAP TESTS

Flowsheet: Purex HW No. 3

Equivalent Rate: 10 tons U/day

<u>Column</u>	<u>Pulse Frequency, Cycles/Min.</u>	<u>Height Above HAF Inlet, In. (1)</u>	<u>Factor of Improvement (2)</u>
Prototype	60	19	3 to 17
	90	19	0.8 to 2.2
D.U.	40 and 60	19	13 to 64
	100	19	13

Notes: (1) Reference sampler located below anti-backmixing cap to sample the HAFS from the column feed point.

(2) Ratio of reduction in Na concentration =

$$\frac{(C/C_0) \text{ without cap}}{(C/C_0) \text{ with cap}}$$

C = Sodium concentration in the scrub aqueous phase 19 in. above the HAF inlet, i.e., above the cap.

C₀ = Sodium concentration at reference sampler, i.e., essentially the HAFS concentration below the cap.

Comparing the comparable data (at 60 frequency) for the prototype and small-scale columns, the plant-scale prototype anti-backmixing caps were approximately 4-fold less efficient in preventing backmixing of sodium from the feed zone. However, the plant-scale cap effected a 3 to 17-fold reduction in sodium concentration at 60 frequency. The lowered effectiveness of the prototype cap at high frequencies has been shown to be due to emulsification in the organic and/or the aqueous traps. The cause of the emulsification is currently being investigated.

In Runs PBM-8 and PBM-9, a mercury seal in the trough supporting the anti-backmixing cap (a possible source of aqueous leakage) did not appear to stop the breakthrough of sodium. A precipitate (probably HgCl or HgCl_2) was observed in the column during the runs. It is conceivable that the precipitate carried adsorbed sodium up the column. This effect is more clearly shown in Run PBM-6, a service run, where essentially complete backmixing occurred throughout the scrub section. The feed for PBM-6 contained free sulfur as well as other miscellaneous ions and solids from previous unrelated development studies.

Anti-backmixing cap "D" (Runs PBM-10 and 11) which was a direct scale-up from the cap tested in the Demonstration Unit showed about the same "factor of improvement" at 19 in. above the HAF inlet as the other prototype caps.

As shown in the following table, the volume contained in the annulus between the anti-backmixing cap and the organic riser is not critical to anti-backmixing efficiency as long as the pulse volume is exceeded.

EFFECT OF BUBBLE CAP OVERLAP ON ANTI-BACKMIXING EFFICIENCY

Equivalent U Rate = 10 Ton/Day

Column Diameter, In.	Cap Overlap, (d) In.	Volume of Annulus (a)	Frequency, Cyc./Min.	C/C_o (b)
32	2.5	1.2	70	0.24 ^(c)
32	4.5	2.2	60	0.15, 0.03
32	6.0	3.4	60	0.09
32	2.5	1.2	90	0.48 ^(c)
32	4.5	2.2	90	0, 21, 0.44
32	6.0	3.4	90	0.56
4	0	0.0	40	0.49
4	0.5	0.3	40	0.42
4	1.0	0.6	40	0.51
4	1.5	0.8	40	0.051
4	2.0	1.1	40	0.0091
4	2.5	1.4	40	0.0078
4	3.0	1.7	40	0.0082
4	1.5	0.8	100	0.055
4	2.0	1.1	100	0.027
4	2.5	1.4	100	0.025
4	3.0	1.7	100	0.027

- Notes:
- (a) Volume contained in one side of cap overlap, measured in "pulse" volumes (i.e., the cu.in. displacement of one pulse).
 - (b) Measured ca. 2 ft. above the feedpoint (i.e., above the cap).
 - (c) Not at steady state.
 - (d) Distance between top of riser and bottom of cap.

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Purex HW #3 Flowsheet HAF solution spiked with 5% by volume of coating removal solution obtained from a slug dejacketing operation to an approximate concentration of less than 25 ppm. Si, 10 g. Na/l., and 0.003 to 0.01 g./l. solids was tested in the Demonstration Unit to determine the effect of these known emulsifying impurities on the cap performance. No adverse effects were observed on cap or scrub section flooding characteristics. In none of the flooding studies made to date has flooding originated at the anti-backmixing cap. Demonstration Unit tests have shown, however, that at 20 tons U/day equivalent plant processing rate the cap will flood under conditions in which the raffinate (HAW) rate exceeds flowsheet requirements by a factor of 2.

Analyses have been attempted of the benefit, in terms of improved decontamination, which can be expected from an effective anti-backmixing device between the mid-column feed point and the bottom of the scrub section in a Purex "A"-type compound pulse column. Analytical approaches have been employed and are still under evaluation based on mass transfer theory and the experimental data from the sodium back-mixing studies, reported above. Although subject to future revision, the broad statements below indicate the improvement in decontamination factor which it appears reasonable to expect from an efficient anti-backmixing device at the bottom of the scrub section in a Purex "A"-type pulse column:

1. At high throughput rates (equivalent to 20 tons of uranium/day through a Purex Plant column) the adverse effect of backmixing tends to be small because of the increased downward flow rate of the scrub solution, and only approximately a 25 per cent improvement in scrub section D.F. would be predicted as a result of preventing back-mixing from the feed plate.
2. At low throughput rates (equivalent to 5 tons/day through a Purex Plant column), the adverse effect of back-mixing is much more pronounced, with improvements in scrubbing decontamination factor by 1.5 to 6-fold being calculated, depending on conditions chosen. The calculated improvement at a 10 ton/day rate is intermediate between the above range of values.
3. The experimentally observed improvement in the Hot Semiworks decontamination attributed to the installation of anti-backmixing caps is believed to be approximately a factor of two at 10 ton/day equivalent rates.
4. Due to the fact that the plant-scale prototype cap was less effective in preventing back-mixing of sodium than was the cap tested in a 4-in. diameter column, it is expected that the improvement in D.F. by the anti-backmixing caps now installed in the Purex Plant columns will range from approximately 25% to 75% in each of the three columns (e.g., HA, IA, and 2D Columns).

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Extraction Cartridge Studies. In the development of an extraction section cartridge which would permit the use of higher pulse frequencies in the Purex Plant A-type Columns, thereby improving scrub section decontamination performance, the philosophy was to "open up" the center portion (which tended to emulsify most readily) by increasing the plate spacing and/or by using plates which provided greater capacity such as nozzle plates or perforated plates with larger free area. Details of the cartridges tested in the Demonstration Unit and the Prototype HA Column are given in Table III. Most of these cartridges increased the extraction section flooding instability threshold from approximately 90 cycles/min. at 10 tons U/day to 105 ± 5 cycles/min., and from approximately 70 cycles/min. at 20 tons U/day to 95 ± 5 cycles/min. From an efficiency standpoint, cartridges F and G (tested in 3-in. diameter columns) were somewhat superior to the others with optimum H.T.U. values ranging from 0.6 to 0.8 ft.

The results of prototype tests to demonstrate the stability, efficiency, and flooding characteristics of a modification of cartridge F are given in Table IV. Optimum H.T.U. values in the plant-scale prototype column were in the range of 0.9 to 1.1 ft. A 20-hour run at 15 tons U/day and 80 pulse cycles/min. produced consistent uranium losses of 0.00005 per cent or less. Flooding tests in the plant-scale column indicated no scale-up effects on the flooding frequency as determined in the Demonstration Unit tests.

This presently-reported series of plant-scale prototype column tests has shown consistently lower waste losses than those made in 1953 employing a "standard" extraction-section cartridge. The technique of "opening up" the cartridge apparently permits more effective utilization of the entire cartridge by producing a more uniform dispersion throughout.

On the basis of the above tests, Cartridge J has been installed in the Purex Plant HA and 2D Column extraction sections. The IA Column contains Cartridge I.

Demonstration Unit tests showed that the choice of diluent (Shell E-2342 or Soltrol 170) had no effect on the H.T.U. in the extraction section.

Scrub Section Efficiency Studies. Scrub section efficiency was studied using a dilute uranium flowsheet and also with radio-zirconium tracer. The results are shown in Table V. Highlights of the runs illustrating the relative effect of louver plates and the anti-backmixing cap on scrub section efficiency are summarized in the following table:

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SCRUB SECTION EFFICIENCY

"Standard Cartridge": 1/8-in. holes; 2-in. plate spacing; 23% free area.

Column Diameter, In.	Frequency, Cyc./Min.	Equivalent Tons U/Day	H.T.U., Ft.		HAF Feed Point Relative to Anti-Backmixing Cap ^(c)	Louver Plates
			U	Zr		
4	60	10	2.5	--	--	Absent ^(e)
4	60	10	2.8	--	--	Present ^(a)
4	50	20	1.8 to 2.6 ^(d)	--	--	Absent
4	50	20		--	--	Present ^(a)
32	80	10	3.0	--	--	Absent
32	80	10	3.2	--	--	Present ^(b)
4	80	10	2.1	--	--	Present ^(b)
4	80	10	--	2.6	Above	Present ^(b)
4	80	10	--	16	Below	Present ^(b)
4	80	20	--	3.1	Above	Present ^(b)
4	80	20	--	3.8	Below	Present ^(b)
4	70	20	--	3.7	Above	Absent
4	70	20	--	4.1	Below	Absent

- Notes:
- (a) Three 18 per cent free area louver plates.
 - (b) Two 18 per cent free area louver plates.
 - (c) HAF feed could be introduced either above or below the anti-backmixing cap.
 - (d) Feedpoint "pinch".
 - (e) When louver plates were absent, perforated plates were installed in the louver-plate section.

The presence or absence of louver plates in the 4-in.-diameter column had little effect on the H.T.U. However, the presence of two louver plates in the 32-in.-diameter prototype scrub section appeared to reduce the H.T.U. by one-third (e.g., from 3.2 ft. to 2.1 ft.), presumably due to overcoming tendencies of the phases to channel.

Contrary to expectation, the apparent efficiency of the scrub section in Zr tracer runs was greater without an anti-backmixing cap between the feedpoint and scrub section. However, in those runs in which the feed was introduced above the cap, the scrub section D.F. (measured between organic phase under cap and HAF) was up to twice as great as the over-all D.F. (measured between HAF and HAF), indicating reflux or Zr transport in other than a normal manner. At 20 ton U/day equivalent rates the over-all D.F.'s with the feed above the cap (e.g., effectively no antibackmixing seal between the feed and the scrub section) were about half those with the cap between the feedpoint

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and scrub section. At 10 ton U/day equivalent rates the over-all D.F.'s were approximately the same regardless of the point of feed introduction. This anomalous behavior of the Zr tracer, together with the fact that zirconium distribution ratios determined from column samples do not agree with those obtained by batch contacts, is being investigated further.

The Zr used to measure efficiency was a blend from two sources:

- (1) About 90 per cent obtained by TTA extraction of Redox IAW.
- (2) About 10 per cent from an irradiated Zr coupon dissolved in H_2SO_4 , precipitated as the hydroxide, and redissolved in HNO_3 .

The blend was digested at approximately 30° C. in 2 M HNO_3 for several days prior to use. The Zr distribution ratio measured on samples drawn from the scrub section averaged 0.078.

Separations Equipment Development

Corrosion Inhibitors. The weight loss of Type 347 and Type 304L stainless steel evaporator tubes was negligible when they were operated in aerated synthetic Purex 2WW solution for ten days (e.g., bottoms from the Purex No. 2 Waste Concentrator). This compares with the results from a control run employing un-aerated synthetic 2WW where the corrosion rate was 6.12 and 3.06 mils/month for Type 347 and Type 304L stainless steel respectively. Repeat tests to firm up these data are in progress.

REDOX DEVELOPMENT

Process Chemistry

Iodine Emission, Laboratory Silver Nitrate Reactor Studies. Data obtained during a number of runs made with a laboratory-scale silver nitrate reactor to determine the removal of iodine from the reactor by various gas atmospheres may be summarized as follows:

1. At plant operating temperature, 190°C., no detectable release of iodine occurred when NO_2 - "dry" air (dew point <25°C.) mixtures ranging from zero to 57 volume per cent NO_2 were passed through the reactor. When similar mixtures involving "wet" air (dew point approximately 70°C.) were used, a very slight evolution occurred at 57 per cent NO_2 (approximately 0.0026 per cent of the iodine on the reactor released per hour).
2. Some evolution of iodine occurred when air only was passed through the reactor if the reactor had been exposed previously to NO_2 . This effect is temperature dependent, evolution being appreciable at 100°C. but very slight at 190°C. Removal of iodine by air only decreased with time of air flow.

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3. It has been noted previously that NO_2 -dry air mixtures removed iodine from a silver nitrate reactor at low temperature ($100^\circ\text{C}.$). No detectable iodine evolution occurred with an NO_2 -wet air mixture at this temperature.

Silica Gel Tail-End Studies. Frequent plugging of an alundum prefilter occurred during the month when off-standard Redox Plant product uranium (3EU) was processed through the silica gel column. Water backflushing partially cleared the filter, permitting operation at reduced rates. A sintered glass filter of similar porosity (40 to 60 microns) was also plugged when filtering a sample of the plant material. The solids removed carried little activity. Observed gross gamma decontamination factors (arithmetic) across the filter were from 1.01 to 1.05. Purging the filter with water, $\text{HNO}_3\text{-H}_2\text{O}_2$ and $\text{NaOH-H}_2\text{O}_2$ both at room temperature and boiling, as well as with steam, acetone, alcohol, $\text{HNO}_3\text{-HF}$, and alternate Na_2CO_3 and HNO_3 failed to clear it completely.

No significant plugging of a silica gel bed one inch in diameter and seven inches long occurred when 12 gallons of plant 3EU (equivalent to 190 tons of uranium through the plant column) was passed through it. The last 1.5 gallons of 3EU passed through the silica gel was subsequently filtered through a sintered glass filter. Pressure drop across the filter built up as rapidly as with non-silica gel-treated feed. Gross gamma decontamination of filtered feed across a similar laboratory column (1-ft. bed height vs. 10 ft. in the plant unit) was about 1.3 as compared with from two to three in the plant across both the prefilter and the column. These low decontamination factors (both in the laboratory and plant units) are attributed to the low acidity ($\sim 0.15\text{ M}$ acid) of the feed.

Process Planning

Simplified Redox Flowsheet. A streamlined Redox flowsheet is being prepared for transmission to the Design Section in collaboration with Design studies of minimum capital investment separations facilities. This flowsheet is based on technology which is incompletely developed at present. It incorporates continuous dissolvers, a partition cycle, and a final uranium solvent extraction cycle. The plutonium product from the partition cycle is concentrated and further decontaminated by an anion-cation resin exchange cycle. The partition cycle and uranium cycle incorporate a combination uranium stripper-concentrator which simultaneously distills the hexone and produces a 60 per cent uranium-nitrate concentration. Should sufficient incentive be demonstrated, it is believed that the necessary development work to firm up the new technology could be completed in two years.

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URANIUM RECOVERY DEVELOPMENTProcess Chemistry

Solids in Uranium Recovery Plant Solutions. Black solids which scavenge ruthenium in simulated RD Column contacts have been observed in sulfamic acid. They are finely divided and remain suspended in solvent for several minutes. Spectroscopic analyses indicate a close similarity to solids isolated from RDF and RC Column flush solutions. X-ray analysis of the material found in sulfamic acid indicates alpha quartz and feldspar as the inorganic components. An unidentified black organic component appears to be responsible for the ruthenium scavenging.

Similar solids were found floating on the surface of solution in the plant RDIS head tank and on a sintered stainless steel filter placed between the RDIS make up and head tanks. The latter solid was bound into a gummy mass by an organic component, apparently the lubricating oil used in the equipment. This material rapidly blinds any filter of sufficiently small porosity to retain the solid. Experiments are in progress to determine optimum means for removing these solids and also the effect of these solids on extraction column behavior.

Continuous Calcination. Twenty-five eight-hour runs (approximately three displacements per run) have been completed in the laboratory 3-in. diameter by 1-ft. long continuous calciner. Variables studied have included operating temperature (feed point temperatures ranging from 230 to 500°C.), agitation rate (25 to 230 RPM), air flow over the bed, and various chemical additives: including SO_4 , Ni, Cu, acetic acid, oxalic acid, ammonium carbonate, urea, finely divided carbon, n-octanol, Triton X-100 (an organic surfactant), dibutyl acetamide, and dimethyl aniline. Standard reactivity ratios (590°C. reduction, 410°C. hydrofluorination) for the powders produced in the absence of sulfate averaged 0.65 (from 0.57 to 0.81) and reduction times (98% reduced at 575°C.) averaged five minutes. Except for the known enhancing effect of sulfate on reactivity ratio, none of the other additives used produced any significant improvement in reactivity ratio or reduction rate of the product powder.

Powder having a 98% reduction time of less than one minute was produced in one run in which the calciner shell temperature was kept low (475°C.). This powder was exceptionally high in water content (2.2 wt. per cent), a property known previously to produce rapid reduction. A powder produced at high feed point temperature (500°C.) had a reactivity ratio of 0.81 (high for this series of runs). Due, apparently, to the high temperature and high agitation speed used (200 RPM), the powder acquired a strong static charge and would not flow from the reactor. Powder of small size and irregular shapes was produced with surfactants as additives, particularly with dibutyl acetamide. A similar effect was observed when operating at low agitation speed (25 RPM). However, no significant improvement in reduction rates or reactivity ratios accompanied these changes in physical properties.

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The improvement in reactivity ratio due to sulfate as an additive is small for powders produced at low feed point temperatures, but can be increased by heat treating the powder. Powders produced when using other additives will be heat-treated to see if a similar improvement occurs.

Tests are in progress to determine the quality of the powder produced in the 321 Building calciner during Run 33. Reduction times of about two minutes (for 98% reduction) were observed for all samples. Standard reactivity ratios (590°-410°C.) on "as received" powder from drums 215 and 218 (representative of the major portion of the run) were 0.47 and 0.58, respectively, and 0.67 for a milled sample from drum 218. The continuous UO_3 produced in Run 33 in the 16-in. diameter semi-plant-scale calciner has been shipped to K-25 for pilot plant reduction and hydrofluorination studies. Preliminary laboratory reactivity ratios reported back from K-25 range from 0.9 to 1.25, indicating significantly higher values than determined at H.A.P.O. The explanation of this difference is being sought.

Standard reactivity ratios for milled samples from drum 218 heated in the laboratory in air for one hour at 400°, 450°, and 500°C. were 0.82, 0.81, and 0.77, respectively. Further work toward defining optimum heat treating procedures is in progress. Also in progress are studies to determine maximum beneficial effects which can be attained by superficial hydration of these powders.

Chemical Engineering Development

Continuous Calcination. The 321 Building 16-in.-diameter semi-plant-scale continuous calciner was operated to produce UO_3 for testing in the K-25 reduction and hydrofluorination pilot plant. The conditions of this run, 230°C. feedpoint temperature, 250°C. discharge temperature, 330 parts sulfur per million parts U, and steam injection into the reactor, were based on promising experience with similar material shipped to the K-25 pilot plant previously. The run was divided into three parts. Part A (2000 lb.) and Part B (10,000 lb.) were operated under the above conditions utilizing 80% UNH and 100% UNH, respectively, as feed. After completion of Part B the UNH feed was shut off and the UO_3 bed present in the reactor was heated to 450°C. and held at that temperature for 2 hours. The reactor was then emptied and the 2000 lb. of UO_3 so obtained was designated as Part C. The reduction rates of materials from Parts A, B, and C were similar to the reduction rate of pot produced UO_3 . Reactivity ratios were as follows (after grinding):

Material	Reactivity Ratio	
	By H.A.P.O. Lab.*	By K-25 Lab.
Part A	0.75	1.1
Part B	0.7	0.9
Part C	0.9	1.25

*) After grinding to pass a 325-mesh screen.

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The discrepancy between the K-25 and H.A.P.O. reactivity ratio data is being investigated.

A total of 17,000 lb. of UO_3 (including three non-steady-state drums not sent to K-25) was produced during the 112 hour run, with no operating difficulties being encountered with the continuous reactor.

WASTE TREATMENT DEVELOPMENT

Process Chemistry

Waste Scavenging. The plant test of strontium phosphate-nickel ferrocyanide scavenging of current Uranium Recovery Process Waste is now complete. Cesium and strontium decontamination were very good. The tankful of waste, when cribbed, averaged 0.02 and 0.12 microcuries per milliliter of Cs and Sr, respectively. Recommended pH for this scavenging procedure is 9.7 ± 0.5 . Concentration of the scavenged waste is detrimental to cesium and strontium decontamination. Two-fold concentration increased the cesium and strontium content of the supernatant liquid by factors up to four and ten, respectively. Addition of the flocculation agent "Separan 2610" to the scavenged waste improved slightly (approximately 25 per cent) the rate of sludge settling in the "unhindered" region. It had no adverse effect on cesium or strontium removal. Its effect on settled volume was not significant.

MISCELLANEOUS SEPARATIONS PROCESS DEVELOPMENT

Process Planning

Continuous Ion Exchange. The continuous ion exchange techniques being developed at the Oak Ridge National Laboratories were evaluated for potential application in H.A.P.O. separations plants. As compared with existing methods of handling the plutonium product stream from solvent extraction, continuous ion exchange offers the advantage of continuously supplying additional decontamination from uranium and fission products and of eliminating any contaminants from the corrosion of stainless steel concentrators. A product concentration of 50 to 75 grams per liter should be readily attainable. It is planned to construct and install a full-scale model in 321 Building to study the mechanical features of such an installation, with the objective of developing the process specifications for a prototype unit to be installed in a production plant, such as Redox or Purex, at some future date.

In-Line Chemical Instrumentation

Iodine Monitor. The prototype dissolver off-gas iodine-131 monitor installed at T-Plant has continued to respond rapidly to changes of radio-iodine concentration in the off-gas line. Preliminary evaluation of the data collected with the monitor by Plant Processes personnel has disclosed good correlation between iodine-131 content in the off-gas and plant operational steps.

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The gamma background has been maintained at tolerable levels since a rinse cycle for flushing the sample cell was incorporated in the monitor program. The ruthenium activity in the stream and chamber has been negligible since the fluorothene-lined chamber and the rinse cycle were incorporated into the system. A ruthenium count will probably be retained in the program as a check even though the ruthenium gamma activity can be neglected.

Purex Plant In-Line Monitors. Development attention has been shifted from the Hot Semiworks in-line monitors to the Purex monitors in preparation for start-up of the plant. The designs of the in-line monitors have been reviewed and modifications have been recommended to insure satisfactory operation and/or incorporate the latest technology developed in the Hot Semiworks and other testing.

Changes recommended for the gamma monitors include: (1) piping changes to allow drainage of the sample cell for background readings, (2) coating of the sample cell with fluorothene to minimize fission product buildup, and (3) replacement of the solenoid valves and rotameters with corrosion-resistant types.

Calculations and previous experience with similar systems indicate that insufficient sample may be obtained from the IAF, 2DF, and 2EU streams. Performance of the samplers on these streams will be evaluated during cold runs when solutions of normal process composition are available.

Changes recommended for the Purex iodine-131 monitor included: (1) incorporation of equipment (valves, rinse storage and program) for sample cell rinsing, (2) minimization of the amount of metal between the sample and the scintillation crystal, and (3) shielding the back of the probe to protect it from background radiation.

Further development has been undertaken to assure satisfactory operation of the pH monitors. A revised flow cell, which has been accepted by plant personnel, was prototyped and tested. This unit will be used on all cold stream installations and may be applicable on some hot stream installations. This cell will also be applicable at other plants and represents a step towards cell standardization.

Separations Equipment Development

Allis-Chalmers Pump. A canned motor, fluid-piston bearing pump failed after 2,550 hours operation pumping water at six gallons per minute against a head of 41.6 feet. The bearings had worn up to 34 mils on the diameter and the journals had worn about 30 mils. The wear on the thrust faces was not measurable but visual inspection disclosed that they were scored and showed severe wear. The rotor can was worn and scored at both ends. No further testing of this unit is planned at the present.

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Jabsco Model 903 Pump. A self-priming, positive displacement, neoprene impeller pump was placed on test pumping 4 M nitric acid to evaluate its performance. The surface of the impeller softened after 100 hours operation and after 287 hours of operation, the pump was inoperable because of nitric acid attack on the neoprene impeller and "O" rings. Flow remained constant at 3.25 gallons per minute but the discharge pressure dropped from an initial 51.7 ft. to 18.7 ft. after 287 hours operation. Although neoprene is known to give poor service when used in nitric acid systems, this pump was considered because of the simplicity of impeller changes and the low (\$2 each) cost for new impellers. Hypalon (chloro-sulphonated polyethylene) impellers and "O" rings will be substituted if the manufacturer can supply the impellers.

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TABLE I

HOT SEMIWORKS RUN PX-9

Dissolving

928 pounds of uranium dissolved in three cuts with an acid consumption of 2.82 moles HNO_3 /mole U and a residual acidity of 0.15 moles HNO_3 /mole U during the first two cuts. (There was no sample of the third cut.) Slugs = 263 MWD/T, cooled 165 days at dissolving.

Equipment and Flowsheet

1. Anti-backmixing caps installed in the HA and IA Columns. HA scrub height = 8 ft.-4 in.; IA = 12 ft.-10 in.
2. HW #3 Flowsheet except:
 - (a) HAS = 3.0 M HNO_3 ; HAF:HAS:HAIS = 100:67:0.
 - (b) No H_2O or NaNO_2 added to No. 1 Waste Concentrator.
 - (c) IOF:IOS:IOR = 100:44:56.

Operation

1. HA-EC cycle operated at 2-1/2 times normal rate (equivalent to 25 tons/day in the Purex Plant) during portions of the run.
2. HA, IA pulse amplitudes = 1.07 in. (extn. section), 0.60 in. (scrub section). IA frequency = 50 to 60 cycles/min.
3. PX-9A: HA (extn.) = 1230 gal./(hr.)(sq.ft.), recycled Soltrol-170, frequency = 50 (8 hours).
 PX-9B: HA (extn.) = 494 gal./(hr.)(sq.ft.), recycled Soltrol, frequency = 70 to 80 (10 hours).
 PX-9C: HA (extn.) = 1230 gal./(hr.)(sq.ft.), fresh Shell E-2342, frequency = 40 (5 hours).
 PX-9D: HA (extn.) = 1230 gal./(hr.)(sq.ft.), recycled Shell E-2342, frequency = 40 (4 hours).
 PX-9E: HA (extn.) = 494 gal./(hr.)(sq.ft.), recycled Shell E-2342, frequency = 65 (6 hours).

Run Data: Continued on following page.

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TABLE I (Cont'd)

Run Data:

Run No.	PX-9A	PX-9B	PX-9C	PX-9D	PX-9E
Equiv. Rate, Tons/Day	25	10	25	25	10
Diluent (* = Recycled)	<u>Soltrol*</u>	<u>Soltrol*</u>	<u>Shell</u>	<u>Shell*</u>	<u>Shell*</u>
HAF Log D.F.	2.0	2.2	2.2	2.2	2.2
HCP Log D.F.	2.2	(1)	2.5	2.2	(1)
HAW U Loss - %	6	0.05	5	2	0.1
HAW Pu Loss - %	4	0.04	2	2	1
HCW U Loss - %	2	(1)	0.03	0.6	(1)
HCW Pu Loss - %	0.6	(1)	0.1	0.02	(1)

	Pu Loss - %		U Loss - %		Log D.F. (IAF = 0.0) (2)	
	<u>Soltrol*</u>	<u>Shell*</u>	<u>Soltrol*</u>	<u>Shell*</u>	<u>Soltrol*</u>	<u>Shell*</u>
IAP					1.1	1.1
IAW	5	0.05	0.1	0.1		
IBP			0.006	0.0004	1.6	1.3
IBU	1	4			2.7	2.2
ICU					(1)	2.2
2AF					1.6	1.3
2AP					4.3	4.6
2AW	20	9				
2BP					4.6	5.2
IOF	0.07	0.01	1	0.07		

Notes:

- (1) No sample. In general the other figures represent only one sample each.
- (2) HAF/IAF log D.F. = 2.0 for recycled Soltrol and 2.3 for recycled Shell E-2342.
- (3) Solvent activity
 - (a) Recycled Soltrol-170: 200 microcuries/l. and 50 microcuries/l. respectively in IOF and in centrifuged IOO (Aqueous continuous IO Column operation).
 - (b) Recycled Shell E-2342: 160 microcuries/l. and 65 microcuries/l. respectively in the IOF and centrifuged IOO (Aqueous continuous IO Column operation).

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TABLE II

RESULTS OF PUREX PROTOTYPE HA COLUMN ANTI-BACKMIXING CAP STUDIES

Flowsheet: Purex HW #3 with 1 M NaNO_3 in the HAF used as backmixing tracer.
 Interface Position: Top
 Equipment: Prototype HA Column, 32-in.-diameter scrub section.
 Scrub Cartridge: 13.3 ft. of standard cartridge. Feed point about 20 in. below bottom of cartridge.
 Anti-backmixing cap located between feed point and bottom of cartridge.

Run No.	Anti-Backmixing Cap (a) Design	Frequency, Cyc./Min.	U Processing Rate, Tons/Day	Na Concentration, Ppm.				Na Ratio: Above/Below Cap	
				Below Cap (HAFS)					
				19	54	109	173 (Top)		
FBM-4a (c) FBM-4b (c)	A	70	10	14,300	3400	1400	140	97	0.24
	A	90	10	14,300	6900	3200	107	69	0.48
FBM-5 FBM-6 (b) FBM-7	B	90	10	10,600	2200	590	50	35	0.21
	B	60	10	17,800	2650	2500	2000	1900	0.15
	B	60	19	13,100	1700	410	92	19	0.13
FBM-8 FBM-9	C	60	10	12,200	320	230	105	35	0.026
	C	90	10	12,300	5400	1450	210	32	0.44
FBM-10 FBM-11	D	60	10	13,000	1200	580	330	100	0.09
	D	90	10	13,000	7300	1900	920	245	0.56

Notes:

- (a) Anti-backmixing cap designs: A - Cap opened toward center of column; 2.5-in. cap overlap (i.e., volume contained in the annulus between cap and riser) = ca. 1.2 pulse volumes.
 B - Same as A except cap overlap increased to 4.5 in.; ca. 2.2 pulse volumes.
 C - Same as B with a mercury seal in the support trough of the cap. (The cap was supported by a trough ca. 4 in. deep welded to the column wall.)
 D - Cap opened toward wall of column; cap overlap = 6.0 in.; ca. 3.4 pulse volumes.
- (b) PBM-6 was a service run. The feed contained considerable quantities of solids and extraneous ions. The feed was exhausted before steady-state was reached.
- (c) Not at steady state.

TABLE III

PUREX EXTRACTION SECTION "GRADED -PLATE" CARTRIDGES

(Cartridges are described from top to bottom)

Cartridges A-G tested in 3-in. diameter Demonstration Unit.

Cartridges H, I, and J tested in 23.5-in. diameter Prototype Unit.

<u>In. of Cartridge Height</u>	<u>Hole Diameter, In.</u>	<u>% Free Area</u>	<u>Plate Spacing, In.</u>	<u>In. of Cartridge Height</u>	<u>Hole Diameter, In.</u>	<u>% Free Area</u>	<u>Plate Spacing, In.</u>
<u>Cartridge A</u>				<u>Cartridge G</u>			
36	0.125	23	2	4	0.125	23	1
48	void			8	0.125	23	2
24	0.125	23	2	8	0.188	33	2
<u>Cartridge B</u>				36	0.188	33	4
12	0.125	23	2	12	0.125	23	4
12	0.125	23	4	38	0.125	23	2
60	void			<u>Cartridge H</u>			
24	0.125	23	4	10	0.125	23	2
<u>Cartridge C</u>				12	(13% F.A. louver plate)		
12	0.125	23	2	12	0.125	23	6
72	0.188	33	6	12	(13% F.A. louver plate)		
12	0.125	23	4	28	0.125	23	4
12	0.125	23	2	12	(13% F.A. louver plate)		
<u>Cartridge D</u>				28	0.125	23	4
12	0.125	23	2	12	(13% F.A. louver plate)		
72(1)	0.125	23	6	36	0.125	23	2
12	0.125	23	4	<u>Cartridge I</u>			
12	0.125	23	2	12	0.125	23	2
<u>Cartridge E</u>				12	(13% F.A. louver plate)		
24	0.125	23	2	4	0.125	23	2
48	0.188	33	4	8	0.188	33	2
24	0.125	23	4	12	(13% F.A. louver plate)		
12	0.125	23	2	16	0.188	33	4
<u>Cartridge F</u>				12	0.125	23	4
18	0.125	23	2	12	(13% F.A. louver plate)		
8	0.188	33	2	28	0.125	23	4
20	0.188	33	4	12	(13% F.A. louver plate)		
32	0.125	23	4	36	0.125	23	2
28	0.125	23	2	<u>Cartridge J</u>			

Same as "I" except bottom two louver plates are 23% free area.

Note: (1) Nozzle plates. Nozzles 0.03-in deep.

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TABLE IV

PUREX A-TYPE COLUMN EXTRACTION SECTION STUDIES USING "GRADED-PLATE" CARTRIDGES

Flowsheet: Purex HW #3 with Pu and F.P.'s omitted. Solvent diluent Shell E-2342.
Interface Position: Top
Equipment: Prototype HA Column; 23.5-in.-diameter extraction section with 13.5 ft. of sieve plate, 32-in.-diameter scrub section with 11 to 12 ft. of sieve plates (standard cartridge). Pulse amplitude = 1.1 in. in extraction section.

Run No.	Cartridge Geometry (a)	% U Loss	H.T.U., Ft.	Equiv. U Rate, Tons/Day (b)	Frequency, Cyc./Min.	Flooding Frequency, Cyclic Local Complete
Plant-Scale Prototype Column						
PBM-4a(c)	H	0.0002	1.03	10	70	
PBM-4b(c)	H	0.0001	1.00	10	90	>90
PBM-5(c)	I	0.0015	1.21	10	90	≥90
PBM-7(c)	I	0.0002	1.02	19	60	
PBM-8(c)	J	0.0002	1.00	10	60	
PBM-9(c)	J	0.00008	0.95	10	90	≥90
PBM-10(c)	J	0.0002	1.00	10	60	
PBM-11(c)	J	0.0001	0.98	10	90	≥90
Flooding and Efficiency Studies without 1 M NaNO ₃ in Feed						
P55-1(d)	I					≥109
P55-2	I	0.0002	1.03	10	90	96 ± 6
P55-3	I	0.0001	1.00	10	60	
P55-4	I			18		85 ± 5
P55-5(e)	I	0.0013	1.19	20	80	
P55-6	I	0.0073	1.40	19	50	
P55-7	J			10		105 ± 5
P55-8	J	0.0003	1.05	10	90	
P55-9	J	0.0008	1.13	10	60	
P55-10a	J			19		85 ± 5
P55-10b	J	0.0001	0.99	19	70	85 ± 5
P55-11	J	0.0076	1.40	19	50	
P55-12	J	≤0.00008	≤0.96	5	100	
P55-13	J	≤0.00005	≤0.92	15	80	
P55-14(r)	J	0.014	1.51	10	40	
P55-15	J					

- Notes: (a) See Table III for description of cartridges.
(b) In the Purex Plant A-type columns.
(24-in.-diam. extraction section)
- (c) HAF contained 1 M NaNO₃ plus 1 M HNO₃ as salting agent.
(d) Temp. = 40°C.
(e) Flooded after 2.5 hours.
(f) Ran for 20 hours.

TABLE V

PUREX A-TYPE COLUMN SCRUB SECTION EFFICIENCY STUDIES

(Interface at Top)

- A. Flowsheet: Dilute U (HASF Organic Feed = 0.7 to 1 g. U/l., 0.1 to 0.2 g. HNO_3 /l. in 30% TBP;
HAS = 0.6 g. HNO_3 /l.)
Equipment: Simple 4-in. diam. glass column; 9 ft. of standard cartridge. Pulse amplitude = 0.6 in.

Run No.	Frequency, Cycles/Min.	Equiv. U Rate, Tons/Day (a)	HAS/HASF Vol. Flow Ratio	% U Loss	H.T.U., Ft.	Remarks
3"-203-AH	60	10	0.27	3.7	2.5	Three 18% free area louver plates inserted with 6-in. void on each side.
3"-204-AH	60	10	0.24	4.7	2.8	
3"-205-AH	50	20	0.24	6.0	3.0	

Equipment: Prototype HA scrub section, 32-in. diam., 12.2 ft. of standard cartridge plus two 16% free area louver plates in PS-1, 11.3 ft. of standard cartridge with no louver plates in PS-2. Pulse amplitude = 0.6 in.

PS-1	80	10	0.21	0.49	2.1	2 louver plates.
PS-2	80	10	0.23	4.2	3.2	No louver plates.

B. Flowsheet: Purex HW #3 with Pu and F.P.'s omitted. Radioactive Zr tracer added to measure scrub efficiency.

Equipment: Dual-purpose glass column, 4-in.-diam. scrub section with 8 ft. of standard cartridge. Bottom of scrub cartridge was about 1 ft. above an anti-backmixing cap with provisions for introducing the feed either above or below the cap. Two 18% free area louver plates were included in 3"-206a-AH through 3"-207b-AH. Pulse amplitude = 0.56 in. in scrub section.

Run No.	Frequency, Cycles/Min.	Equiv. U Rate, Tons/Day (a)	Zr D.F. (b)		Zr H.T.U., Ft. (c)	HAF Introduced Above or Below Cap
			Over-all	Scrub		
3"-206a-AH	80	20	8.4	4.9	3.8	Below
3"-206b-AH	80	21	3.4	6.6	3.1	Above
3"-207a-AH	80	10	7.0	1.6	16	Below
3"-207b-AH	80	10	8.1	10.1	2.6	Above
3"-208a-AH	70	20	7.7	4.5	4.1	Below
3"-208b-AH	70	20	4.2	5.1	3.7	Above

- Notes: (a) In a 32-in.-diam. Purex Plant A-Type Column scrub section.
(b) Over-all D.F. based on HAF and HAP Zr analyses. Scrub D.F. based on HAP and an organic sample taken from within the anti-backmixing cap.
(c) Zr H.T.U. based on Zr EO_3 's obtained during run 3"-208a-AH. These values were 0.076 at the anti-backmixing cap, 0.088 three ft. up, 0.071 six ft. up, and 0.075 at the top of the scrub section.

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Rate Studies

Rates of transfer of fission products between aqueous and organic phases have been measured for simulated Purex systems with solvents of various origin.

Results obtained in studies simulating the Purex HA column scrub section are shown in the accompanying table. Feeds for these studies were prepared by contacting samples of the designated solvents (carbonate and water washed immediately before use) with cold HAF in such quantity as to yield an organic containing ca. 115 g/l uranium. The uranium-bearing organic was then contacted with Hot Semi-Works HAF (obtained during HSW Run PX-7). Organic feeds prepared in this fashion were then contacted intermittently with one-fifth volume portions of cold uranium-bearing solutions of the composition of the aqueous effluent from the HA scrub section. Agitation of the phases was accomplished by means of a centrifugal pump-stirrer identical with those employed in the Purex HA mini unit.

The ruthenium activity in the feeds prepared by this technique was below the gamma scan detection limit with the result that ruthenium behavior could not be followed in the subsequent scrubbing operations.

RATE OF SCRUBBING OF Zr-Nb FROM 30% TBP-HYDROCARBON SOLVENTS
Percent of Total Zr-Nb in Organic Phase

Contact Time (Seconds)	"CP" TBP- Soltrol*	"CP" TBP- Shell E-2342*	Commercial Solvents TBP- Soltrol	HSW Recycled TBP-Soltrol	UR Plant ROO**	Chemically Degraded TBP-Soltrol**
0	100	100	100	100	100	100
5	74	76	100 (?)	92	88	99
15	44	40	58	69	82	95
35	41	26	36	50	76	83
60	24	20	21	29	67	83
120	10	10	11	14	64	80
300	4	7	9	16	45	60
600	4	5	7	10	39	55
E_a^0 (Zr-Nb)	0.000	0.012	0.014	0.02	0.15	0.27

* Prepared from vacuum-distilled TBP.

** Butted to 30% TBP with vacuum-distilled TBP.

*** Prepared by contacting 30% TBP-Soltrol for 27.5 hours at 70 C with an aqueous phase initially 6 M HNO_3 , 0.1 M NO_2^- .

It will be noted that the rate of scrubbing of Zr-Nb is slightly lower and the equilibrium retention of Zr-Nb slightly greater with recycled Hot Semi-Works solvent

than with either of the "CP" solvents or with the solvent prepared from "as received" Commercial Solvents TBP (the TBP employed in the Hot Semi-Works in runs PX-1 through PX-5). The equilibrium retention of Zr-Nb is significantly greater with the 30% TBP solvent prepared from Uranium Recovery Plant ROO and with chemically degraded TBP-Soltrol than with the other solvents.

Some studies have also been made employing systems simulating the feed plate of a Purex HA column. Results obtained in these studies are summarized in the accompanying table. Organic feeds for these studies were prepared by contacting samples of the designated organic solvents with aqueous wastes resulting from a Purex HA column batch countercurrent run. The resultant "hot" organic was then contacted intermittently with a cold HAFS aqueous solution and the transfer of uranium into and fission products out of the organic followed.

BACK SALTING OF ZIRCONIUM AND RUTHENIUM BY URANIUM

Contact Time (Seconds)	"CP" 30% TBP-Shell Spray Base			UR Plant ROO*		
	g/l U in Organic	% of Total Zr in Organic	% of Total Ru in Organic	g/l U in Organic	% of Total Zr in Organic	% of Total Ru in Organic
0	0	100	100	0	100	100
5	11	54	32	12	98	29
15	91	12	10	77	86	17
35	98	--	7	95	76	8
60	96	11	5	95	43 (?)	5
120	99	--	2	97	60	5
300	98	3.4	1.4	96	59	2
600	100	2.2	0.8	96	52	3
E_a^0 (F. P.)		0.01	0.005		0.45	0.02

* Butted to 30% TBP with vacuum-distilled TBP.

Little difference is noted in the rates of transfer of uranium into "CP" solvent and into Uranium Recovery Plant ROO (butted to 30% TBP) or in the rates of transfer of ruthenium out of these solvents. The rate of transfer of zirconium out of the solvent is significantly lower and the equilibrium retention of zirconium significantly greater with the Uranium Recovery Plant ROO than with "CP" solvents.

With either solvent equilibrium is established more rapidly for uranium than for the fission products, implying a larger HETS for the fission products than for uranium in a countercurrent contactor.

Mini Runs

The decontamination performance of Uranium Recovery Plant ROO (butted to 30% TBP) has also been studied in a Purex HA mini run. Mini run 925, employing butted

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Uranium Recovery Plant ROO as the solvent with Hot Semi-Works HAF (Run PX-7) and using the HW #2 flowsheet gave decontamination results as follows. Eleven mini scrub stages and ten mini extraction stages were employed in this run. For comparison, decontamination results obtained in a base-line run (No. 922) with the same aqueous feed and "CP" TBP-Shell Spray base are included.

Run	Feed	Solvent	Log df, HAF to HAP			Log df HAF to HCP		
			Zr-Nb	Ru-Rh	Gamma	Zr-Nb	Ru-Rh	Gamma
922	HSW HAF (HSW Run PX-7)	"CP" TBP- Shell Spray Base	3.78	3.56	3.65	4.19	3.81	3.94
925	HSW HAF (HSW Run PX-7)	UR Plant ROO butted to 30% TBP	2.69	2.95	2.67	2.71	3.09	3.13

Significantly poorer decontamination was observed with the Uranium Recovery Plant ROO. However, it is not known to what extent the lower organic saturation encountered in Run 925 may be responsible for the poorer decontamination observed in this run. The uranium concentration in the HAP was 94 g/l in Run 922 and only 85 g/l in Run 925.

Batch Countercurrent Runs

A second Purex HA batch countercurrent run was made to compare the performance of recycled Hot Semi-Works solvent (HSW Run PX-8) with that of "CP" solvent. The feed for this run was Hot Semi-Works HAF (obtained during HSW Run PX-7). Flowsheet HW #2 conditions were used, with eight scrub stages and four extraction stages. Distribution ratios for the troublesome fission products were substantially identical throughout the scrub sections for these two solvents, as shown in the accompanying table.

COMPARISON OF FISSION PRODUCT DISTRIBUTION RATIOS IN PUREX HA BATCH COUNTERCURRENT RUNS

(Flowsheet HW #2 Conditions, HAF in at stage 9; HAP out, HAS in at stage 1; HAX out at stage 12).

Run	Solvent	Stage No.	Scrub Section							
			1	2	3	4	5	6	7	8
Run 1	"CP" TBP- Soltrol	E _a ⁰ (Zr-Nb)	--	--	--	0.39	0.19	0.09	0.03	0.01
		E _a ⁰ (Ru-Rh)	--	0.40	0.22	0.23	0.14	0.08	0.06	0.03
Run 2	Rec'd. HSW TBP-Soltrol (HSW Run PX-8)	E _a ⁰ (Zr-Nb)	--	--	--	--	0.07	0.06	0.06	0.01
		E _a ⁰ (Ru-Rh)	--	--	--	--	0.06	0.07	0.06	0.03

Extraction Section

Run	Solvent	Stage No.	9	10	11	12
		E_a^0 (Zr-Nb)				
Run 1	"CP" TBP-Soltrol	E_a^0 (Zr-Nb)	0.0012	0.005	0.001	0.0011
		E_a^0 (Ru-Rh)	0.01	0.07	0.09	0.14
Run 2	Rec'd. HSW TBP-Soltrol (HSW Run PX-8)	E_a^0 (Zr-Nb)	0.001	--	0.005	--
		E_a^0 (Ru-Rh)	0.006	--	0.05	--

Solvent Impurity Identification Studies

Chromatographic techniques have been applied to the analysis of the recycled Hot Semi-Works 30% TBP-Soltrol 170 solvent (used in HSW Run PX-6), which showed slightly worse decontamination performance in both Mini runs and in fission product transfer rate studies. As expected, the concentrations of diluent degradation products found in this solvent are extremely low. The total volume of impurities isolated (in six fractions) from a five liter sample of the recycled Hot Semi-Works solvent is ca. one milliliter, of which the bulk is tributoxethyl phosphate and another phosphorus compound as yet unidentified. The volume of impurities originating from the diluent is estimated to be not more than 0.2 milliliter.

Qualitative analysis of certain of the impurity fractions reveals the presence of nitroso compounds (produced presumably through reaction with nitrous acid), nitrites (possibly nitrous acid esters), nitrates, carbonyl compounds, and oxidants.

Since the very small volumes of the six impurity fractions isolated makes further refinement and analysis of these materials impractical, it is planned to employ the fractions thus far isolated as "spikes" in studies of fission product transfer rates and equilibria in an effort to ascertain in which fraction are contained the trace impurities presumably responsible for the poorer zirconium-niobium decontamination observed with this solvent.

Plutonium Dibutyl Phosphate Complex

Studies have been underway for some time with the objective of evaluating the formation constants for the plutonium di-n-butyl phosphate complexes. The information obtained to date has defied quantitative interpretation, but certain qualitative observations appear of interest, viz.,

1. With plutonium concentrations in the region of 10^{-5} M and large excesses of di-n-butyl phosphate (DBP/Pu ratios of 100 and 1000) the predominant plutonium species are distributed almost quantitatively into carbon tetrachloride (E_a^0 values of 6 to 300 into CCl_4 out of 1 M HNO_3).

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2. Addition of plutonium (IV) nitrate to a concentration of 8.4×10^{-4} M in an equal volume mixture of 1 M HNO_3 and CCl_4 containing 0.046 M DBP resulted in formation of a precipitate in both phases which redissolved on continued agitation.

NEW PROCESSES

Solvent Extraction - HCl System

Work on the HCl-TBP solvent extraction system during the month has been concentrated on developing a method of dissolution of uranium metal to yield UCl_4 in a solution suitable for evaluation of the decontamination potential of this system with full-level activities. A smooth, controllable dissolution can be accomplished by addition of gaseous hydrogen chloride to uranium metal immersed in methanol. Qualitative observations indicate that the bulk of the methanol may be separated from the uranium by adding an equal volume of 12 M HCl and contacting with 30% TBP- CCl_4 . The UCl_4 distributes into the organic phase, the methanol largely into the aqueous phase. The UCl_4 can then be stripped into water or dilute HCl.

It is planned to use this procedure to prepare a feed solution from irradiated uranium metal which will be used to evaluate the feasibility of decontaminating uranium by a process consisting of the following steps:

1. Selective extraction of the troublesome fission products (Zr, Nb, Ru, Sb-125) away from UCl_4 out of 1 M UCl_4 , 3 M HCl with 30% TBP- CCl_4 .
2. Oxidation of U(IV) with chlorine or hydrogen peroxide and extraction of UO_2Cl_2 out of 7 M HCl with 30% TBP- CCl_4 .
3. Stripping of UO_2Cl_2 into water.

Power Reactor Fuel Processing

Studies related to the processing of power reactor fuel elements at HAP0 have been concentrated during the past month on studies of means of dissolving zirconium or zircalloy jackets. It was reported last month that "catalytic amounts" of fluoride permit the dissolution of zirconium in a nitric-phosphoric acid mixture, but that precipitation of zirconium phosphate occurs. This investigation has been extended to other acids. No fluoride catalysis was noted with hydrochloric or glacial acetic acid. However, fluoride did catalyze the reaction of zirconium with sulfuric acid. Zircalloy coupons which were not attacked by boiling sulfuric acid in the range 6 M to 10 M dissolved readily when 0.01 to 0.1 M HF was added. The rate of dissolution increases with sulfuric acid and with hydrofluoric acid concentration. That the reaction is truly a catalysis is indicated by the fact that more zirconium dissolves than can be accounted for by any simple stoichiometry. This is attributed to the formation of complexes between zirconium and sulfate and the fact that the latter was present in large excess over the fluoride. Product solutions 0.5 M in zirconium precipitated on cooling to room temperature.

Boiling 14 M H_2SO_4 was found to dissolve zirconium even in the absence of fluoride, but with formation of hydrogen sulfide and sulfur.

Scouting studies have been made of the reaction of PCl_5 , $POCl_3$, and mixtures of these with metallic zirconium. The interest in this stems from the fact that zirconium chloride is known to form highly stable and moderately volatile addition compounds with both these reagents so that such a reaction might afford a means of separating zirconium from uranium. It was found that PCl_5 alone did not react with metallic zirconium but that PCl_5 dissolved in $POCl_3$ did react. Reaction was incomplete, and a mixture of products was obtained. At least one of these (a white solid insoluble in the $POCl_3$ - PCl_5 mixture) is moderately volatile, distilling at 400 C at atmospheric pressure.

Further studies are planned with these reagents, in particular to determine if volatile addition compounds analogous to those formed with zirconium chloride can be formed with UCl_4 or $ThCl_4$.

Ion Exchange Studies

A scouting program has been started to explore the feasibility of applying cation exchange with inorganic salts as a means of removing fission product contamination from uranium and plutonium solutions. Since many of the materials of interest form as gelatinous precipitates, some effort has been expended in devising means of improving the physical properties of such materials by supporting them on inert materials. A method which may have general applicability has been successfully applied to UO_2HPO_4 . By slowly adding a slurry of UO_2HPO_4 to a heated and agitated bed of powdered silica of appropriate particle size a strongly adherent coating of UO_2HPO_4 was obtained on the silica particles. This material when packed in a column 352 mm in length and 10 mm diameter had a free volume of 1.0 to 1.5 ml and a flow rate of 8.5 ml/min (160 gal/hr ft²) was readily obtained through the bed.

For an initial experiment this column was applied to the removal of strontium from aqueous solution. With a feed concentration of 1130 ppm Sr^{++} , the column effluent remained at less than 0.5 ppm Sr^{++} (the detection limit for the flame photometric analytical method employed) through eighty column volumes. Breakthrough occurred after passage of an estimated one hundred column volumes.

It is planned in the near future to determine the feasibility of removing zirconium and niobium from organic extracts of uranium by exchange with solid UO_2HPO_4 .

WASTE TREATMENT

Silver Reactor

The equilibrium gaseous iodine concentration in the system

is being determined by an approximate method in order to establish the lowest level to which iodine can be reduced by a silver nitrate reactor. Preliminary laboratory

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results confirm the theoretical prediction that, at the low iodine and high nitrogen dioxide pressures in dissolver off-gas, the chemical removal mechanism alone will not suffice to reduce the effluent radio-iodine concentration to the desired 0.2 curie/day/reactor (1 curie/day at HAPO). However, this goal may possibly be achieved in a silver reactor system by taking advantage of supplementary isotopic exchange as described below.

Radio-iodine of known specific activity was loaded from an air stream into a laboratory-scale reactor packed with silver nitrate-coated Berl saddles, only a small fraction of the silver nitrate being converted to iodide. The rate of iodine unloading when gas pre-heated to 190 C passes through this reactor was then determined as a function of gas composition and flow, using caustic scrubbers to catch the iodine in the effluent gas. The flow rates were consistently low, thus giving residence times (0.5 to 2.5 minutes) long as compared to that of a plant reactor (ca. 0.1 minute). Although low flow rates increased approach to equilibrium values, the observed iodine gas concentrations are still to be regarded as low, and thus optimistic values. The concentrations may be compared with the hypothetical 24-hour average plant values, 1.6×10^{-5} g/cubic foot in dissolver off-gas (3 T/D per dissolver of 600 MWD/T metal) and 2.5×10^{-8} g/cf goal in reactor effluent gas (0.2 curie/day/reactor) assuming current plant flow rates (250 cfm) and iodine specific activity (22 curies/g from 3.2 MW/T, 90 d cooled metal).

During the loading of the reactor with air-borne iodine at 190 C, the effluent iodine concentration was 4×10^{-9} g/cf (corresponding to an iodine removal efficiency of 99.9993%). On subsequently passing air alone through the reactor, iodine concentrations of this magnitude were observed at low flow rates. Results were somewhat erratic on unloading with nitrogen dioxide-air mixtures due to difficulty in controlling flow and composition. However, the effluent iodine concentrations were high compared to the goal value and increased roughly with the square of the nitrogen dioxide concentration as predicted on the basis of the chemical equation. For illustration, iodine concentrations of 8×10^{-8} and 2×10^{-6} g/cf were obtained with 10 and 50 percent nitrogen dioxide in air mixtures, respectively. Since current plant reactors operate a significant fraction of the time at nitrogen dioxide concentrations in this range (down-draft dissolving in Purex will help in this respect), and since they have much shorter residence times, their average effluent iodine concentrations should be well above the goal value of 2.5×10^{-8} g/cf. It may be noted that, although high, the observed iodine concentrations are approximately fifty-fold lower than those calculated from thermodynamic data. Failure to reach equilibrium may be due in part to the low activity coefficient of silver iodide in the presence of excess silver nitrate.

Following are some implications of these results relative to three methods which have been considered to supplement a silver nitrate reactor:

- (1) Back-up silver reactor - This will remove additional iodine only if equilibrium has not been reached in the first reactor due to insufficient residence time, exhaustion of the silver nitrate charge, or one of many possible causes for malfunctioning. A back-up reactor cannot, of course, reduce an equilibrium iodine concentration which may still be excessive.

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- (2) Caustic scrubber - Caustic traps used for analytical purposes have in every case succeeded in removing additional iodine from the effluent of any plant or laboratory silver reactor on which they have been used. Thus, chemically this method can reduce iodine concentrations to lower values than any known silver nitrate system.
- (3) Isotopic exchange - Although reduction in iodine concentration of a gas is limited by chemical equilibrium considerations, its radio-iodine content may be further reduced by isotopic exchange with an inactive iodine compound such as silver iodide. In fact, there is reason to believe that the high radio-iodine removal efficiencies occasionally observed with plant reactors are attributable to a fortuitous combination of silver nitrate removal and silver iodide exchange. The iodide in this case comes from iodine previously removed whose specific activity decreases as the I-131 decays leaving the inactive I-127 and I-129. Reduction in radio-activity by this mechanism is favored by a high inactive/active isotope ratio. Thus, for greatest effectiveness, the isotopic exchange system should follow chemical iodine removal.

Successive cycling of ammonia-air (coating removal) and nitrogen dioxide-air (slug dissolving) mixtures through the present type silver reactor tends to reduce the surface area of the silver nitrate as indicated by experiments conducted in a glass-walled laboratory reactor. The silver nitrate coating on the Berl saddle packing of this reactor liquefied within minutes after introduction of an air stream containing 5 percent ammonia and pre-heated to 190 C (m.p. silver nitrate, 212 C). In less than an hour, over half the silver nitrate was reduced to silver metal; however, some silver nitrate remained unreduced after four hours. Simultaneous ammoniation (or ammonolysis) and reduction reactions of silver nitrate are thought responsible for the observed action.

After discontinuing the flow of ammonia to the reactor, this gas remained detectable in the effluent stream after six hours of flushing with air. In another experiment, when five percent nitrogen dioxide in air was introduced to the reactor after flushing the preceding ammonia out of the system for but 15 minutes, small quantities of water and ammonium nitrate were produced in the exit line. The saddle coating appeared molten until the reaction between nitrogen dioxide and "absorbed" ammonia subsided whereupon the coating resolidified. Simultaneously, the silver metal produced during the ammonia cycle was reconverted to silver nitrate

This oxidation reaction proceeds somewhat slower than the reduction step.

The ammonia-nitrogen dioxide cycles, each interrupted by pure air flushes, were repeated for several days and produced the same effects during each cycle, although becoming less pronounced with succeeding cycles. After the last nitrogen dioxide

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(slug dissolving) treatment, air saturated with iodine vapor was passed through the reactor to convert all the silver metal and nitrate to the yellow iodide to permit observation of silver distribution on the saddles. Approximately 20 percent of the saddles showed little or no silver iodide on their surface, with the silver having concentrated on other saddles or at the junction of adjacent saddles.

Studies on a larger scale would be required to establish the effect of these reactions on iodine removal efficiency in plant reactors. If found detrimental, ammonia could be removed from the system by scrubbing dissolver off-gas upstream from the silver reactor or by-passing the reactor during coating removal.

It might be added as evidence for the reduction of silver nitrate during coating removal, that a temperature rise (ca. 20°C) is observed in Redox reactors during this period. Similarly, a temperature rise has been observed during the first slug dissolving cut, presumably due to the heat of reaction when silver metal is reoxidized to the nitrate. The molar heat of reaction (at 298 C) for silver nitrate reduction by ammonia is 100 kcalories; for silver oxidation by nitrogen dioxide, 38 kcalories (HW-38311, L. L. Burger).

Cesium Removal from Purex Wastes

As previously reported, nitrite in Purex HAW was found to oxidize nickel ferrocyanide to ferricyanide when present in concentrations greater than 0.002 M, thereby reducing the cesium scavenging decontamination factor to about 30. Reduction of the flowsheet concentration of 0.01 M nitrite by the required factor of at least five to obtain a decontamination factor of about 500 can be accomplished by heating the solution at 90 C for ten minutes or by adding urea to a concentration of 0.01 M and allowing five minutes for reaction. The solution must be at about room temperature when the ferrocyanide is added subsequently, to prevent oxidation by the 2.2 M nitric acid present in HAW.

A minimum of about 0.002 M nickel or 0.005 M ferric ferrocyanide is required to obtain a cesium decontamination factor of greater than 200 from Purex HAW. The resulting precipitate volume is one to two percent of the solution volume in either case, i.e., 10 to 25 gal/ton U. Recovery of 90 to 95 percent of the cesium is obtained from the ferric ferrocyanide by two successive washes with an equal volume of cold, dilute sodium hydroxide. The residual precipitate volume is thereby reduced to about 5 gal/ton U. Removal of cesium from nickel ferrocyanide is negligible in the cold, even with 50 percent NaOH for four hours. However, 70 percent of the cesium is removed and the precipitate volume reduced to about 5 gal/ton U by heating with an equal volume of 50 percent NaOH for one hour at 95 C.

On neutralizing Purex IWW to precipitate iron and uranium (50 to 75 gal/ton U), about ten percent of the cesium is lost to the precipitate. However, about half of this can be recovered by washing the precipitate with an equal volume of water. A minimum of about 0.002 M nickel or ferric ferrocyanide is required to obtain a cesium decontamination factor of over 100 on scavenging the supernate from the neutralized waste (pH 5). This cesium is associated with about 10 gal/ton U of

precipitate in either case. Thus, cesium decontamination of the waste stream is higher and precipitate volumes are lower with HAW as compared to IWW, at least at this stage of process development. Work on full activity level waste is scheduled next.

Preliminary experiments with sodium tetraphenyl boron, reported to be a highly sensitive reagent for precipitating cesium, potassium, rubidium and ammonium ions, indicated that this reagent is not readily applicable to Purex HAW because of reagent decomposition, and poor separation of the precipitate. Attempts to utilize nickel manganocyanide to circumvent nitrite oxidation difficulties with the ferrocyanide were only moderately successful. Although cesium decontamination factors in excess of ten were obtained, the chemistry was obscured presumably because of the high cyanide ion concentration from dissociation of manganocyanide producing a large variety of complexes in the solution.

Strontium and Cesium Removal from Redox Wastes

Very promising results have been obtained in the scavenging of strontium by nickel ferrocyanide from simulated neutralized Redox D-13 waste (pooled, unconcentrated waste from a single back-cycle flowsheet). Although strontium decontamination is negligible at low pH, on neutralization (NaOH/ANN mole ratio of 3 or higher) a single carrier precipitation with coformed 0.01 M nickel ferrocyanide yields a strontium decontamination factor of 1600. This may be compared with a decontamination factor of ca. 5000 required to reduce the strontium content to the 0.1 uc/cc specification for cribbing metal recovery waste. The major objection to these preliminary results is that large precipitate volumes were obtained, viz., 320 gal/ton U even on addition of a NaOH/ANN mole ratio of 4. It is hoped this difficulty may be avoided by adding the acidic waste to excess caustic, rather than the reverse as was done, to avoid the formation of voluminous hydrous aluminum oxide.

Additional study of cesium scavenging by nickel ferrocyanide was also directed toward the D-13 waste. Cesium decontamination from this simulated waste appeared more sensitive to acidity than with the IAW previously reported. However, good decontamination factors (> 100) were obtained with 0.01 M nickel ferrocyanide at 0 and -0.1 M nitric acid, dropping to 10 to 40 at -0.2 or > 0.1 M. A second scavenge with 0.01 M nickel ferrocyanide gave over-all cesium decontamination factors of 3 to 5×10^3 at 0 and -0.1 M acid, dropping to ca. 900, 1000, and 350 at 0.2, 0.1 and -0.2 M acid, respectively. These are very favorable results when compared with the decontamination factor of ca. 2000 required to reduce the cesium concentration to the 0.1 uc/cc specification for cribbing metal recovery waste. Again, the precipitate volumes were discouragingly high (300 to 600 gal/ton U for the sum of two scavengings). Reduction in precipitate volumes is a major objective of current studies. The substitution of ferric ferrocyanide (ferric ion is already present in D-13) for the nickel salt is one approach under investigation, and preliminary cesium scavenging results with it have been encouraging.

The effect of temperature on cesium scavenging by nickel ferrocyanide was found to be deleterious. For example, with D-13 waste, decontamination factors dropped from 270 at 25 C to 30 at 95 C under otherwise identical conditions.

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Waste Storage

The rate of acidity production in high activity waste stored underground has been calculated and documented in HW-39658. The two sources of acidity for which calculations were made are: (a) fixation of nitrogen from the air by radiation, and (b) carbon dioxide in the air introduced by the recirculation pumps being considered to prevent bumping in the tanks. Neither of these sources should produce acidity at a sufficient rate to be of concern in causing corrosion of the steel tank walls.

Nitrogen fixation in the air by radiation, highest in the case of Purex wastes, should contribute at most a few millimoles per liter of acid per year. An air flow rate of 20 cfm per million gallon tank would introduce acidity from the carbon dioxide present in air (0.03 volume percent) at a rate of but 1.7 millimoles per liter year. More acidity may conceivably be produced by radiation decomposition of organic matter present in the waste (up to 1.4 moles per liter per weight percent organic in the waste). The circulators, in addition to preventing bumping, could actually provide a safety factor in sweeping from the tank hydrogen gas produced by radiation decomposition of water and organic matter.

Ruthenium Chemistry

The effect has been determined of a number of process variables on carrier precipitation of ruthenium with copper sulfide homogeneously precipitated by thioacetamide. Ruthenium decontamination factors were determined as a function of time and compared to the following "standard" procedure. Simulated dissolver solution (2 M UNH, 0.2 M HNO_3 , 1 percent dissolver solution spike, 0.05 g/l $\text{K}_4\text{Ru}(\text{NO}_2)_6$) was made to contain 0.01 M cupric nitrate and 0.05 M sulfamic acid (to suppress sulfide oxidation by nitrite). After heating to boiling, thioacetamide was added to a concentration of 0.05 M. The resulting ruthenium decontamination factors were 760, 1400, 970 and 2 after 1/2, 1, 2 and 4 hours, respectively. The effect of changing one of the standard procedure variables at a time follows:

Nitric Acidity - With 1 M acid, copper sulfide redissolves rapidly and no ruthenium decontamination is obtained. With 0 M acid, a higher maximum decontamination factor (6500 at 1 hr.) is obtained as well as less decrease with time (1000 at 4 hrs.). With -0.2 M acid, the decontamination factors are lower again and the values are essentially constant with time (1200 at 1/2 hour, 1800 at 4 hours). Thus, although the current Redox and Purex flowheet dissolver solution concentration of 0.2 M acid is acceptable, not much higher acidities are permissible if this process is to be applied as a head-end treatment.

Temperature - At 50 C, decontamination factors are low, rising from 10 at 2 hours to 170 at 6 hours. At 75 C, the factors are much higher and rise more rapidly, being 720 and 2500 after 2 and 6 hours, respectively. At 90 C, decontamination factors drop off again, being

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630 and 1.3 after 2 and 6 hours, respectively. Thus, 75 C appears optimum if time is not limited; if rapid precipitation is required, 105 C (boiling) is preferable. Actually, heating to boiling for ca. 1 hour and then allowing to cool would probably be the best method of operation, although the decontamination factors under this circumstance have not been determined.

Repeated Thioacetamide Addition - It was shown that the ruthenium species produced on desorption from copper sulfide with time could be rescavenged under proper conditions. After operating with the standard procedure for four hours ($DF < 10$), the solution was made 0.05 M in thioacetamide in one case and 0.05 M each in thioacetamide and sulfamic acid in the second. After three additional hours at 105 C, the decontamination factors were 1 and 1950, respectively. Thus, a "lost" ruthenium decontamination factor can be recovered by a second precipitation provided sulfamic acid is added again as well as thioacetamide.

Substitution of Mercuric Sulfide - Mercuric sulfide precipitation gives even higher ruthenium decontamination factors than copper sulfide but does not significantly extend the high decontamination period. Substituting 0.01 M mercuric for cupric nitrate, gave factors of 6600, 1.2×10^4 (the highest attained to date), 18 and 14 after 1, 2, 3 and 4 hours, respectively.

Cation Excess - Carrying with copper and mercuric sulfide under conditions where the metal ion was in five-fold excess over the thioacetamide instead of the reverse as in the standard procedure, produced inferior decontamination. With 0.05 M copper and 0.01 M thioacetamide, the maximum ruthenium decontamination factor was but 220 (at 2 hours) and dropped to 1 (at 5 hours). With mercuric sulfide at the same concentrations, no decontamination was observed at any time presumably because mercuric sulfide is less soluble than the ruthenium compound. Thus, although the thioacetamide to metal ratio may possibly be reducible to save on reagent cost, an excess of metal ion should be carefully avoided especially in the case of mercury.

Hydrogen Sulfide and Successive Thioacetamide Addition - On bubbling hydrogen sulfide through the standard solution (less thioacetamide) at 105 C, ruthenium decontamination factors of 74, 640, 590 and 820 were obtained after 1, 2, 3 and 4 hours, respectively. For comparison, sulfamic acid was added (an additional 0.05 M) hourly in the standard procedure, giving factors of 1600, 6200 and 910 after 2, 3 and 4 hours, respectively. Thus, a single initial addition of thioacetamide can be protected over an extended period, if necessary, by continued addition of sulfamic acid. Alternatively, gaseous hydrogen sulfide can be added continuously, but this gives generally poorer decontamination.

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Reduced Carrier Concentration - A ten-fold reduction in carrier concentration (0.001 M copper, 0.005 M thioacetamide) gave slightly greater than ten-fold reduction in decontamination. Ruthenium decontamination factors were 60, 62 and 30 after 1/2, 1 and 2 hours, respectively. Saving in reagent cost in this fashion does not appear very attractive although intermediate concentrations should be investigated in the course of development.

Plutonium waste losses to the carrier precipitate were investigated as a precursor to solvent extraction behavior studies. From simulated dissolver solution (2 M UNH, 0.2 M HNO₃ spiked with plutonium nitrate) losses after washing the copper sulfide were very low (ca. 3×10^{-4} percent). However, from lower acidity solution (2 M UNH, 0.2 M HNO₃), losses to the precipitate were 2.5 percent. Some preliminary solvent extraction studies have been made, but are difficult to interpret since the control experiment did not operate as it should. A substitute homogeneous sulfide precipitant is also being sought since thioacetamide is rather expensive (ca. \$18/pound).

URANIUM PROCESSING

Uranium Reduction

From the encouraging results of the "layered charge" experiment in which a 35 percent yield of massive uranium was obtained on reduction of uranium trioxide with calcium metal, it was decided to further pursue the attainment of high fluxing temperatures. It has been postulated that a wall temperature of about 2300 C would result in almost complete reduction of UO₃ by calcium. To test this hypothesis, a charge was prepared consisting of a core of intimately mixed uranium trioxide (0.1 mole) and calcium metal surrounded by a layer of intimately mixed uranium tetrafluoride (0.1 mole) and calcium metal. The two uranium compounds were labelled isotopically so that the origin of the reduced metal could be established. It was hoped that the high heat of reaction of the fluoride would enable total reduction of the oxide to massive metal to occur. The bomb was fired at the bottom in the Ca-UO₃ region and a clean button comprising 0.085 moles of uranium was obtained which contained, according to isotopic analysis, 64 percent of the metal originally in the uranium tetrafluoride and 21 percent of the metal originally in the oxide. Although total reduction probably occurred, complete coalescence of the metal was not affected.

The labelling technique was used to study the reduction of 0.1 mole of uranium tetrafluoride and 0.1 mole of uranium oxide in an intimate mixture with calcium metal. The resulting metal represented a total yield of about 50 percent; 37 percent of the massive metal in one button, 16 percent in 1/8-1/4 inch pellets and the remaining 47 percent in smaller pellets. Isotopic analysis showed the three fractions to be of the same composition; 43 percent of the metal coming from the oxide and 57 percent from the fluoride. Thus, evidence of co-reduction is established. In addition, it was observed that the CaF₂-CaO slag was readily soluble in acetic acid in contrast to the usual behavior of fluoride slags.

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Experiments were performed to utilize lower melting mixed oxide slags in the hope that improved uranium metal coalescence would occur. Calcium-lithium and calcium magnesium were tried but no coalescence occurred.

Chemical Preparation of Uranium(IV) Fluorides

The use of copper as a reductant for uranyl ion was investigated further. Ten mesh copper shot in a 2.2 cm diameter by 30 cm long column reduced a $\text{UNH-H}_2\text{SO}_4$ -urea solution to the extent of only 50 to 60 percent. Stirring a similar solution with copper powder was also unsatisfactory. Although these results were not encouraging, it was deemed worthwhile to attempt the reduction of uranyl with copper incorporated in an ion exchange system. A three foot column of the anion exchanger, Amberlite-IR-45, in the hydroxyl form was saturated with copper sulfate. The column was treated with sodium dithionite in sodium hydroxide thus reducing the copper (II) to a mixture of copper and copper (I). Passage of uranyl nitrate feed resulted in about 60 percent reduction of the uranyl and very slight contamination with copper.

Work has been initiated on process to separate contaminant iron from product uranium fluorides produced by iron (II) reduction of uranyl compounds. This process utilizes conversion of the fluoride to the hydroxide by basic metathesis followed by dissolution in dilute sulfuric acid and reprecipitation as the sodium double fluoride. No measure of iron decontamination has yet been obtained.

Flurex Process

A four day Flurex run was completed using a feed stream derived by stripping Redox LBU (Redox first cycle uranium bearing organic effluent after partitioning from plutonium). Decontamination data with respect to uranium is incomplete, although it appears that the product (sodium-uranium fluoride) contains no more than twice the activity of natural uranium; a very encouraging result.

Some activity was retained by both membranes. The distribution between cationic and anionic membranes was 3:1 for ruthenium and 1:2 for zirconium-niobium. The cation membrane retained three times as much ruthenium as zirconium. The behavior of fission products with respect to these membranes will be investigated.

In addition to decontamination behavior, a loss of permselectivity of the anion exchange membrane was noted when anolyte acidities of four to five molar occurred. This loss of permselectivity brings about an increase of feed chamber hydrogen ion, which migrates into the catholyte in competition with the uranyl ion. The net result is a decrease in uranyl ion in the catholyte and a loss of current efficiency. A study of permselectivity as a function of nitric acid and uranyl nitrate concentrations is being instituted to define operating conditions.

Uranium Hexafluoride Production

Apparatus for testing the conversion of double fluoride salts to uranium hexafluoride is essentially complete.

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Preliminary experiments indicate that partial conversion of NaUF_5 to UF_6 occurs when the double salt is heated to 800 C in a platinum boat in a stream of dry oxygen. A nickel boat cannot be used as the protective oxide coating evidently dissolves in the molten double salt, leaving the nickel vulnerable to further attack by oxygen.

ISOTOPE SEPARATION

Thermal Diffusion

The 25 ton refrigeration unit which will enable the achievement of larger temperature gradients has been installed and is successfully operating. Coolant bath temperatures as low as -30 C have been obtained. A run using the uranyl nitrate-tributyl phosphate system is in progress.

The presence of dibutyl phosphate was noted in the upper column samples from an earlier TBP run. Its presence suggested the possibility of a uranyl nitrate-dibutyl phosphate system which might have the dual advantage of greater chemical stability and, because of the lower molecular weight, improved separation characteristics.

Electromigration in Aqueous Systems

Maintenance of the permselectivity of the anion exchange membranes used in the electromigration process was demonstrated by (1) addition of monobasic anions, (2) introduction of light element cations, (3) regulation of current density, and (4) reduction of ionic strength in adjacent solutions. With this experience, a sulfo-salicylate system using a membrane barrier was operated for longer than 250 hours with fair control of the uranium at all times.

An experiment was performed to establish the relative migration velocities (and hence, the separative effect) of the uranium isotopes in the passage of uranyl ions through a compressed stack of 50 cation exchange membranes. After 122 hours of operation at 400 milliamperes, a sample equal to 3.5 percent of the uranium retained in the resin was isolated from the catholyte. No isotopic enrichment was observed.

ANALYTICAL DEVELOPMENT

The new facilities for the spectrographic analysis of plutonium in the 325 Building laboratory were completed, and metal sample analyses were begun. The facilities are unique in that much of the equipment used for the analytical manipulations was mounted on a turntable in a gloved box, thereby permitting a substantial saving of space. The sample preparation is accomplished in a combination of one gloved box and one hood, while sample excitation is performed in one additional gloved box adjacent to the spectrograph. In the spectrographic analysis of the first plutonium metal sample, the qualitative and quantitative calibration plates gave different results for two of the elements, and a recalibration for these elements is in progress.

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A considerable number of water analyses for iron, chromium, zirconium, and nickel by the ion exchange-spectrographic method have been run in parallel with conventional boil-down methods on pile water samples. Contrary to results with standard samples, the chromium in pile water is not retained by the ion exchange resin; however, acceptable results are obtained for the other elements. The possibility of developing a boil-down-spectrographic procedure is being studied.

In the investigation of the coulometric titration of plutonium, two probable causes of the erratic results previously obtained in the control laboratory were found. These are incomplete formaldehyde removal after the oxidant-kill step and excessive nitric acid concentrations. In addition to establishing the proper nitric acid range, the use of ceric ion as an oxidant for plutonium with excess ceric removal by hydrochloric acid was studied.

The vacuum fusion apparatus for determining gases in metals has been re-designed to permit much more rapid analysis and has been assembled with the furnace in a gloved hood to permit the analysis of plutonium metal. The use of higher speed pumps, better arrangement of components, and hydrogen fired iron for the iron bath have greatly decreased pump-out and out-gassing times. A change in the crucible design makes a higher operating temperature readily accessible, and the addition of gas take-off bulbs permits the rapid analysis of the gas samples by mass spectrometry in all cases except where only very small volumes of gas are available. A charge of about six metal samples can usually be analyzed for hydrogen, oxygen and nitrogen at less than 15 minutes per sample.

Differential thermal analysis, which measures the temperature at which heat absorption or evolution occurs in a sample was applied to several uranyl nitrate and uranium trioxide specimens and significant differences in temperatures of residual nitrate release and of conversion to U_3O_8 were noted between samples. Surface area measurements of UO_3 specimens have begun and a high temperature x-ray diffraction attachment was completed.

Experiments with the prototype gas scintillation fission counter have continued. In addition to observations that the fission pulse amplitude can be at least doubled with the proper control of the gas composition, an additional factor of two was obtained through re-design and re-location of the preamplifier with respect to the multiplier phototube.

Miscellaneous analytical activities included a study of the spectrophotometric interferences in plutonium photometry with particular respect to the application of in-line plutonium photometry on Recuplex streams, the preparation of a uranium-aluminum standard solution for intersite comparison of Bluenose project analyses, and the beginning of a study of radio-caesium and radio-strontium (Sr-90) methods as applied to plant waste solutions which have been scavenged by nickel ferrocyanide. An improved procedure for purifying mercury for re-use in polarography, and high vacuum burets was devised. The procedure consists of a vigorous acid washing in a special apparatus followed by drying and filtering through a commercial gold adhesion filter.

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In-Line Analysis

The data of Hot Semi-Works runs PX2 through PX9 from the in-line uranium photometers were analyzed, and a report is being prepared. The uranium photometers have proven to be mechanically reliable, and they have followed changes in uranium concentration in both aqueous and organic streams very well. However, uranium values differed at times from the laboratory values, frequently showing a bias of five percent or more. The photometer and laboratory data agree within three percent (average deviation) when the bias is arithmetically removed. The source of the bias has not been definitely established although it has been noted that the bias is always absent when fresh solvent is being used in the plant. Some error may also occur because of improper standardization. The data further indicate that the standardization procedure is too complex and should be automated, that the organic color photometer should be moved to a different stream to eliminate the alkalinity contribution, and that the turbidity correction to the Hot Semi-Works photometer values is unnecessary.

An attempt was made to use an interference filter rather than a band pass filter in a uranium photometer with a photoconductive (CdS) photocell, but the poor spectral response of the photocell at the desired wavelength (418 millimicrons) reduced the sensitivity too much. Determination of the spectral response curves of six types of CdS photocells have been made, and one type (Clairex CL-2) has adequate sensitivity to be used with the interference filter. Temperature compensation will be required.

A 50 mg americium-241 source for gamma absorptometry has been prepared, and it gives twice the sensitivity of a thulium-170 source (50 curies) of similar type for uranium or plutonium by gamma absorptometry. However, the source intensity is low, and the higher absorptometer ion chamber current readily obtainable from the Tm-170 source is somewhat more desirable. The use of argon as the ion chamber gas increases the current by only about 45 percent. An Am-241 source of about 200 mg would be very desirable, but the supply of this isotope in pure form is quite limited. An Am-241 source is also being used to study gamma induced fluorescence.

Fluorothene coated sample cells for in-line gamma monitors have proved very successful in the Hot Semi-Works, and all other cells are being replaced by this type. This type cell has been recommended for the Purex gamma monitor cells which can be fluorothene coated in the technical shops.

Chapter III (Re: Gamma Monitors and Program Selector) of the Hot Semi-Works In-Line Instrumentation Manual was issued, and the Manual has been assigned the document number HW-34523.

Polarographic studies using high speed scanning (about six scans per mercury drop) have been applied to the problems of plugging capillaries, polarogram failures in the presence of excess organic phase, and "hashy" waves from plant process streams

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during automatic uranium polarography. Some progress has been made in devising capillaries which are not susceptible to plugging. Recent results show that failure to obtain a polarogram in the presence of organic phase is due to the wetting of the mercury by tributylphosphate to form a non-conducting film over the mercury droplet. "Hashy" waves appear to be due mainly to mechanical factors such as turbidity and gas bubbles in the sample. A shielded polarograph with a continuously variable, high speed, sweep rate has been fabricated to facilitate further studies.

Design activities included the preparation of drawings of the Hot Semi-Works model (probe type) uranium polarograph sensing unit and redesign, prototype testing and issue of drawings of a uranium fluorometric disc flaming apparatus. The RCU gamma monitor has been redesigned as previously recommended to permit more shielding and to change to a current recording type monitor. A multiport valve for in-line monitor sampling systems has been designed although a test model has not been made, and a stainless steel, sealed unit gamma monitor sensing element has been designed for moist and corrosive atmospheres. A report detailing the sampling problems pertaining to the in-line instrumentation program has been issued with data drawn from the Hot Semi-Works experiences.

LABORATORY SERVICES

Activities of Laboratory Services for October may be summarized as follows: Ninety thousand (90,000) gallons of "crib" level waste was transported to 200-W Area for disposal to 200 SL cribs. Average plutonium analysis was 6.8×10^{-5} uc/ml. Average gross beta analysis was 2.5×10^{-2} uc/ml.

Approximately 3,000,000 gallons of "retention" level waste was discharged to the 300 Area ponds.

A special transfer cask designed by Radiometallurgy personnel was used to transport waste to the 300 North Burial Ground on a trial basis. This cask will cut down personnel exposures in the Radiometallurgy Building but will necessitate about twelve more trips per month to the Burial Ground by Laboratory Services personnel. Use of the cask will also require the setting of new concreting pipes at the 300 North Burial Ground to contain the waste discharged.

All other decontamination, building service, and laundry functions were accomplished in a routine manner.

CONTACT ENGINEERING UNIT

A flowsheet method for improved iodine-131 emission control at the Redox Plant was issued for design scoping purposes. The flowsheet, which consists of primary absorption of nitrogen oxides from dissolver off-gases followed by caustic scrubbing for removal of iodine-131, was transmitted to the Design Section in Document HW-39419, "Auxiliary Redox Facilities for I-131 Removal".

The supporting framework for the prototype continuous calciner has been completed and preparations are under way for installation of the motor-gear reducer drive unit.

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ANALYTICAL LABORATORIES UNIT

General Chemical Laboratory

Sodium analysis of aqueous and organic separation-type stream samples constituted a major portion of the work load. The detection limit of sodium in the organic phase was lowered to less than 2 ppm (wt/v) by plotting flame photometric transmission readings against wave length from 580 mμ to 600 mμ. Samples were analyzed as received and by addition of sodium spike, the relative heights for spiked and unspiked sample peaks at the sodium wave length were used as the basis for calculation. A detection limit of 0.5 ppm was attained by this method.

The density of small pieces of uranium oxide (UO₂), pressed and rolled, powders were checked for density by a mercury displacement technique. Two number accuracy was obtained on the first pieces checked. Modifications are in progress to reach three figure accuracy.

Radiochemical Laboratory

Recuplex streams CCP (product, 80 g Pu/l) and CCW (used organic) were assayed for dibutyl-phosphate (DBP). The disengaging time procedure (HW-30643) indicated that Pu-VI should not be an interference. The present investigation has shown that Pu-IV of Recuplex product is a definite interference. Spike recovery on typical CCP samples ranged from 37% to 65%. On one CCP sample, a spike recovery of 93% was obtained, however, the sample had an atypical color and it was speculated that there was considerably more Pu-IV polymer formation than normal which depressed Pu interference with the DBP method.

While the accuracy of the method with respect to the type of samples being assayed was poor, the precision was good and served to indicate relative build-up of DBP in the process being studied. Additional troubles were encountered in the DBP assay of the CCW stream. The direct analysis of these organic samples gave high and erroneous values. This difficulty was corrected by extracting the DBP into 10 percent sodium carbonate. While the results obtained from the analysis of these streams satisfied the customer, it indicates a more specific method for DBP assay, than the present imperial method, is desirable.

Uranium burn-up measurements with less than 3 per cent error were made in support of metallurgical exposure studies. The method alleviates obtaining complete and detailed irradiation history and allows a more accurate measure of irradiation exposure. The analytical procedure is the same as previously used for determining burn-up of ANP fuel elements.

The fabrication of a vacuum fusion apparatus, referred to in last months report, for the determination of impurity gases in plutonium metal was completed. The system provides four (4) different volumes for collecting evolved gases and has provisions for removing the collected gases for subsequent analysis by a mass spectrometric method. Calibration of the system was completed and testing is now in progress. It is anticipated that the apparatus will be useful for metals other than plutonium.

Spectrochemical Laboratory

Plutonium analytical facilities were activated during the month. Samples are now being analyzed for thirty elements. Seven elements (Fe, Cr, Ni, Si, Sn, Mg, and Al) are determined quantitatively with an accuracy of $\pm 20\%$. The remaining elements are determined semi-quantitatively with an accuracy of $\pm$ a factor of 2.

Mass Spectrometry Laboratory

Considerable maintenance was experienced on both the Consolidated-Nier and the General Electric mass spectrometers. The viscous leak on the C-N became plugged from mercury vapors necessitating shutting down the instrument. Maintenance of the G.E. instrument resulted from reaction of gallium chloride with stopcock grease and numerous unrelated electronic troubles. Both instruments were successfully placed back in operation at month's end.

Water Quality Laboratory

Testing of cationic exchange resin (Dowex 50) columns for concentrating water samples on a laboratory scale continued. Difficulties were encountered, however, when it was shown that chromium was not being scavenged from process water. A limited comparison of the boil-down procedure and subsequent colorimetric determinations with exchange column concentration and spectrographic examination follows:

<u>Sample</u>	<u>Boil Down</u>			<u>Exchange Column Concentration</u>			
	<u>Fe</u> <u>ppm</u>	<u>Ni</u> <u>ppm</u>	<u>Cr</u> <u>ppm</u>	<u>Fe</u> <u>ppm</u>	<u>Ni</u> <u>ppm</u>	<u>Cr</u> <u>ppm</u>	<u>Zr*</u> <u>ppm</u>
H-697	.002	.010	.031	.002	-	L.002	.024
H-698	.009	.010	.032	.004	.010	L.002	.023
H-699	.005	.010	.024	.002	.010	L.002	.018

* Samples were spiked with .02 ppm Zr for analysis on spectrograph.

Results with standards carefully prepared from pure metals were good, indicating that chromium in the process water sample is probably anionic and consequently is not scavenged by the ion exchange columns. Similar difficulty could be encountered with zirconium and to some extent with iron. Because of the uncertain performance of the ion exchange resin, some investigative work is underway to determine the possibility of concentrating the samples by boil-down prior to spectrographic analysis.

The major interest in a spectrographic procedure for a water analysis is to allow determination of zirconium in the indicated range and to investigate the possibility of lowering analytical costs.

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Work volume statistics for the Analytical Laboratories Unit are as follows:

	SEPTEMBER		OCTOBER	
	<u>No. of</u> <u>Samples</u>	<u>No. of</u> <u>Determinations</u>	<u>No. of</u> <u>Samples</u>	<u>No. of</u> <u>Determinations</u>
<u>Research and Development</u>				
Pile Technology				
Metallurgy Research	20	286	32	263
Pile Materials	50	1192	43	946
Fuel Technology	43	408	31	580
Separations Technology				
Chemical Research	234	439	295	559
Chemical Development	934	1933	1110	1883
Plant Processes	103	199	57	147
<u>Process Technology</u>	730	1885	547	1861
<u>Other Customers</u>	<u>128</u>	<u>2573</u>	<u>90</u>	<u>456</u>
Total	2242	8915	2205	6695

TECHNICAL SHOPS UNIT

Mechanical Shops

High priority work during the month necessitated the shops working overtime for a total of 2035 man hours. This work included jobs for the Purex Project, the fabrication of equipment for a critical mass experiment, and the fabrication of components and tooling required by the Fuel Technology Group in the prosecution of production tests. The shop backlog continues relatively high running about six weeks, whereas two weeks backlog is considered the optimum work load.

Surplus equipment obtained from the Fairchild Engine Division Plant is now being installed. Existing equipment is also being shifted to provide a more efficient and safer arrangement. This work is expected to be completed by the end of the month.

Buildings and Grounds

The design for Project CG-576, "General Improvements to the Laboratory Area Buildings", was completed this month. The outstanding piece of equipment being fabricated is the shielding cell for the tensile tester. Some hardware procurement difficulties have held up other portions of the project but construction completion has advanced to 86%.

The rough draft of the project proposal for the Graphite Machining Facility (ER-3124) is in the process of being rewritten.

Scoping continued on the project, "Alterations to the Laboratory Area Buildings", which includes a gas loading dock for 328 Building, an access balcony to the pipe gallery and equipment room in 326 Building, and electrification of the elevator doors in 325 Building.

Drafting and Design

Total productive man-hours for the month were 3268 including 8 hours overtime. This total includes the productive time of two men on loan from the Graphics Unit and two men from the Design Section. Outstanding jobs during the past month included a vacuum welding box, and the 4X prototype calciner installation in 224-U Building.

Glass Shop

A total of 150 jobs were processed through the glass shop during the month including 20 quartz fabrications. Total productive hours were 1163 with no overtime being necessary. Due to the light workload that has been experienced in the shop the force is being reduced by one man effective November 18.

Photo Laboratory

The Technology Sections requested photo work during the month totaling \$3992.00 with Fuel Technology and Metallurgy Research being the major customers.

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INVENTIONS

All Separations Technology Section personnel engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during September, 1955 except as listed below. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

<u>Inventor(s)</u>	<u>Title</u>
E. D. McClanahan	Removal of Radio-Iodine from Gases by Isotopic Exchanger.

R. B. Richards
 Manager, Separations Technology
 ENGINEERING DEPARTMENT

RB Richards:khs

MONTHLY REPORT
DESIGN SECTION

VISITORS AND BUSINESS TRIPS

Alden Webber of the Bristol Company, Seattle, Washington visited Hanford October 13th for inspection of instrument installations.

E. D. Pettler of the Consolidated Engineering Corporation, Seattle, Washington visited Hanford October 13th through 14th for consultation on control systems.

I. R. Compton of the Hawthorne Electronics, Portland, Oregon visited Hanford October 19th for inspection of the Gamma Ray Spectrometer Units.

B. E. Teeple attended the Pacific Coast Building Officials Conference, Portland, Oregon October 5th through 6th.

D. W. McLenegan attended a meeting of the Advisory Board, Institute of Technology, Washington State College, Pullman, Washington October 6th through 8th as a General Electric representative.

W. D. Bainard visited the Shell Oil Company, Anacortes, Washington October 14th to examine operating installation of Omega Machine Company Model 63 Silica Activator.

C. D. Swanson visited the Swartwout Company, Cleveland, Ohio; and Panellit, Incorporated on October 23rd through 28th to clarify detail design requirements on instrumentation system.

C. A. Rohrmann visited Canadian Institute of Chemists, Vancouver, British Columbia on October 27th to present a technical paper.

Ezra Hollister visited the Mixing Equipment Company, Rochester, New York October 24th through 28th to confer with engineers on the design and application of agitators for Hanford process vessels.

ORGANIZATION AND PERSONNEL

	<u>September 30</u>			<u>October 31</u>		
		Non-			Non-	
<u>Personnel Statistics:</u>	<u>Exempt</u>	<u>Exempt</u>	<u>Total</u>	<u>Exempt</u>	<u>Exempt</u>	<u>Total</u>
Design Management	2	1	3	2	1	3
Process Engineering Sub-Section	64	12	76	64	12	76
Design Planning Unit	16	14	30	18	13	31
Design Engineering Sub-Section	79	11	90	80	9	89
Design Drafting Unit	<u>7</u>	<u>76</u>	<u>83</u>	<u>7</u>	<u>76</u>	<u>83</u>
Total Section Personnel	168	114	282	171	111	282
Technical Graduates (Rotational)	<u>-</u>	<u>3</u>	<u>3</u>	<u>-</u>	<u>3</u>	<u>3</u>
Total	168	117	285	171	114	285
Accessions - 9						
Separations - 9						

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Design Section

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Three exempt personnel transferred to the Atomic Power Equipment Department during October, 1955.

GENERAL

Design Section engineering and drafting manpower effort on design development programs showed a significant drop during October. Design project activity increased a corresponding amount as a result of design effort on Redox Contamination Control Facilities and the Plutonium Fabrication Laboratory. Distribution by major component is as follows:

	Engineering Man Months Expended	Drafting Man Months Expended	% of Section Effort
Design Development Programs	60.5	14.4	32.5
Design Section Projects	61.5	38.4	42.8
Plant Assistance and Customer Work	30.1	27.9	24.7
	152.1*	80.7*	100.0

*Equivalent man months expended included 168 hours of engineering and 96 hours of drafting overtime, which represents 1.1% of the Section based on the total available hours for a normal 40 hour week.

The Design Drafting Unit production for October was 234 new drawings and 390 drawing revisions for an equivalent of 4.9 man days per drawing.

DESIGN DEVELOPMENT

The total number of engineering and drafting man months applied to design development activities for October were as follows:

	Engineering		Drafting	
	Man Months	% of Total	Man Months	% of Total
Metallurgical Design Development	2.7	4.5	0.1	0.7
Reactor Design Development	29.9	49.4	3.3	22.9
Separations Design Development	23.8	39.3	9.7	67.4
Chemical Processing & Reduction Design Development	2.7	4.5	0.6	4.2
234-5 Design Development	1.4	2.3	0.7	4.8
	60.5	100.0	14.4	100.0

Metallurgical Design Development

Preliminary scope studies are being conducted for various types of fuel element facilities. Included in this investigation are facilities for producing target fuel elements, for fabricating fuel element clusters, and for producing massive uranium of a larger diameter than currently being fabricated.

Work continued on the problem of air contamination by oxides of nitrogen in the 313 Building. Tests conducted during the month with the fume scrubbers on the pickle machine to determine oxide concentration in the scrubber exhaust gasses were inconclusive. Further tests are planned in the near future.

Reactor Design Development

Engineering feasibility studies were prepared for various new reactor plant alternates to provide supplementary plutonium production at Hanford Atomic Products Operation. Alternates which were considered include K reactor design with variations, advanced low pressure re-circulating water cooled design, and advanced high pressure recirculating water cooled design with and without power recovery.

Work has started on preliminary scope studies for a small water-graphite experimental reactor for use in the application of advanced reactor technology. Such a reactor would be rated from 1000-3000 KW and would cost a maximum of \$3,000,000.

Further progress was made on the feasibility study for increasing existing reactor capacity by means of rear face pressurization. Study drawings are in preparation for various means of pressurizing the 105-H rear face and the introduction of quench water. In addition, work has started on the preliminary scope for a pressurized recirculating system for comparison with the once thru quench water system of reactor pressurization.

Program objectives for improved reactor vertical safety rod systems have been prepared and work is in progress on preliminary scope designs including a study of the reactor safety system electrical circuitry.

Work continued on preliminary scope for 100-C continuous charge-discharge facilities. The provision for improved nozzle-to-tube seal and for ease of process tube replacement has been affirmed as a program objective. Estimates are being prepared to determine the increase in capital cost which would result from the incorporation of the multi-purpose nozzle concept.

A test program has been set up to evaluate possible alternate pipeline materials for transporting activated silica. Various concentrations of activated silica solutions will be recirculated at various velocities thru ten test sections of different materials. Considerable difficulty has been experienced with existing carbon steel silica lines plugging. It is hoped that a satisfactory replacement material for the carbon steel may be found which will eliminate or at least reduce line plugging.

The process tube flow monitoring development program continued. Designs were completed for the modification of flow facilities in the 189-D Building to provide a process flow monitoring test facility. Installation of this facility is scheduled for January, 1956. Plans have been formulated for a study which will determine the basic requirements and operating criteria for a flow monitoring system taking into consideration reactor power levels and outlet water temperatures scheduled for the future. In addition, it is planned to establish a philosophy for operating a flow monitoring system to the best advantage.

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Separations Design Development

Work continued during the month on the second of several studies of new integrated plutonium separations facilities. The basis of the second study is a minimum Purex type process flowsheet of a single decontamination cycle.

Preliminary flowsheet studies were initiated on a new separations plant utilizing a Redox flowsheet. Recent Redox operations, utilizing such improvements as waste back-cycling and self-concentration of wastes in storage tanks indicate a reduced reduction in annual operating costs which may reduce the differential between Purex and Redox operating costs. This necessitates a re-evaluation of the economics of the two plants considering operating costs and capital investment.

Significant progress was made on the preliminary scope for Redox Phase III capacity increase. Required column, condenser, and several crucial valve changes have been determined. Studies of concentrator capacities and demineralized water facility potential are under way.

Work was continued during October on the scope of a second remote crane for the Purex Plant. The mechanical design scope of the remote crane was issued for approval separately in order to expedite the preparation of necessary design specifications. The architectural scope drawings and criteria are well advanced.

Preliminary scope designs were completed and a recommendation report prepared covering a back-up iodine facility for the Purex dissolver off-gas systems and provisions for the process vent system. The scope is based on three heater-reactors in a new outside facility for series operation with similar in-canyon equipment on the three dissolver trains.

A preliminary scope design of iodine monitors for the Purex back-up iodine removal facility was completed. The proposed installation would consist basically of three gamma scintillation counter iodine monitors for continuously monitoring the off-gas streams from each of the three dissolvers downstream of the back-up silver reactors.

A study has been initiated to examine the feasibility of utilizing a process other than the UO_3 process for the preparation of uranium or uranium compounds suitable for further processing at off-site installations. The object of such an alternate process would be to substantially reduce the unit cost for uranium metal recovery.

Mechanical development studies which were active during October include the in-line alpha monitor for Purex and separations process agitators. A document was issued describing the performance of the prototype in-line alpha monitor at the Hot Semi-Works installation. Design for installation of a prototype unit in the Purex 2AW stream is essentially complete. A scope package and design criteria for installation of a number of alpha monitors and possibly other in-line instruments in the 200 Areas is being prepared.

Chemical Processing and Reduction Design Development

Preliminary design scope and alternate equipment layouts are being prepared for a second plutonium button line in the 234-5 Building to provide for forecasted increases in plutonium production, to assure production continuity, and to provide for short term peak loads from primary solvent extraction plants.

Study stage drawings for a continuous reduction process were completed and issued for comment. A report describing the process and equipment operation is being prepared.

Flow diagrams for a continuous Task I and II process have been received from the Separations Technology Section. Preliminary equipment layout drawings for installing the process in the existing Task I hoods are being prepared.

234-5 Design Development

Efforts have been accelerated to complete the design scope for installation of permanent mold casting in the metal fabrication line. Drawings are being prepared for the adaptation of Hood 17 and 17S to this process.

Preliminary studies have been started on methods for improving and mechanizing the final inspection area. Initial emphasis is being directed toward faster and more accurate gauging methods and improved cleaning and polishing equipment.

Engineering Standards and Materials Development

The status of progress on standards during October is as follows:

- a. Nine new standards and five revised standards were completed.
- b. HWS-8005-S, Standard Specification for Metal-Clad Switchgear, 5 and 15 KV - 80% complete. HWS-8002-S, Standard Specification for Thermoplastic Insulated Wire and Cable, 600 Volt - 80% complete. HWS-8003-S, Standard Specification for Polychloroprene Jacketed Cable, 600 Volt - 80% complete. HWS-8006-S, Standard Specification for Polychloroprene Jacketed Cable, 5 and 15 KV - 80% complete. HWS-8001-S, Standard Specification for Metal-dud Switchgear, 600 Volt - 20% complete.
- c. An addendum to DG-300-W, The Welding of Miscellaneous Metals and Alloys, is now 75% complete.
- d. Work continued during October on the revisions to DG-103-M, Design Guide for Heating, Ventilating and Air Conditioning.

DESIGN PROJECTS

Statistics

Engineering and drafting effort of the Section on project activity for the month of October was as follows:

	Engineering		Drafting	
	Man Months	% of Total	Man Months	% of Total
4-X Program	10.6	11.6	2.9	4.4
Reactor Plant Modification for Increased Production	15.1	16.5	7.6	11.5
Purex Modifications	10.0	10.9	8.1	12.2
100-K Reactor Plants	10.4	11.4	5.6	8.5
Redox Contamination Control	3.8	4.0	3.8	5.7
Other Design Projects	11.6	12.7	10.4	15.7
Process Technology and Customer Work	30.1	32.9	22.9	42.0
	91.6	100.0	66.3	100.0

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Work continued during October on CA-512, Revision 4 which includes the modification, correction and installation of various systems for satisfactory completion of the 100-K Area facilities. Major items covered by this revision include Gamma Monitoring - 105-K, Acid Addition Facilities - 183-K, Ventilation System Corrections - 1720 and 1704-K, and Retention Basin Foundations - 107-K.

CA-513 - Purex Separations Facility

Design for the Industrial Burial Garden was completed during October. A preliminary project proposal requesting \$60,000 for design of Back-up Radiiodine Removal Facilities for Purex was approved by Management and transmitted to HOO-AEC for approval.

A project proposal for CA-513-E, Revision 5 was prepared by HOO-AEC requesting approval for a new 40-ton remote crane for the Purex Plant and extension of process columns HA and LA. Design status for currently approved major phases of CA-513-E is as follows:

Waste Storage Tank Circulators	100%
Iodine Monitoring Facilities	91.5%
Continuous Sampling Facilities	67%

CA-514 - 300 Area Expansion

Work continued during the month on detailed design for the addition of a caustic waste station in the 313 Building, and on design studies to reduce the noise level at the facing lathe.

CA-539 - Additional Waste Storage Facilities - Redox

Design of the Phase I lump sum bid package was completed during October. Detailed design of Phase II facilities was 95% complete at the end of the month.

CA-546 - Fuel Element Pilot Plant

Total design at the end of October was 95% complete, based on a revised schedule reflecting the addition of four drawings for the development equipment design and installation.

CG-558 - Reactor Plant Modifications for Increased Production

Total design advanced to 93.5% complete. A total of 46 construction drawings were approved during the month, bringing the total number of drawings approved through October to 928. Drawings, specifications and the bid package for lump sum construction of the 190-F and H Buildings were completed and approved during October. Other major design effort during the month included the review and approval of vendor drawings. A project proposal for Revision 5 to Project CG-558 was being reviewed by Management at the end of the month. This proposal requests total project authorization for a Zone Temperature Monitoring System at 105-B, C, D, DR, F and H. Estimated cost of this work is \$900,000; however, no change in presently authorized funds for CG-558, Phase I is requested for the performance of the additional work.

CG-598 - Purex Acid Fractionator

Detailed design for this project was completed in August. During October, effort was expended on design modifications covering the installation of a thermocouple system which will permit calibration and checking of gas filled temperature transmitters without the necessity of entry into an SWP zone for removal of the primary temperature element from the process.

CG-600 - 100-C Alterations

Design completion status remained at 96% during October, with further design progress dependent upon receipt of data from the pump vendor.

CG-603 - Hanford 4X Program - Bismuth Phosphate Plants

Detailed design for the Hanford 4X program - Bismuth Phosphate Plants was completed during the month.

CG-613 - Hanford 4-X Program - Metal Conversion Plant

During October, detailed design for the addition to the UO₃ Plant advanced to 96.5% complete. Remaining items to be completed include design of 224-U bulk handling facilities and preparation of acceptance test procedures for some process equipment.

CG-616 - Installation of Acid Feed Equipment - 100-B, C, D, DR, F and H Areas

Detailed design advanced to 79% complete during the month.

CG-621 - Redox Contamination Control Facilities

Total design for Project CG-621 advanced to 64% during October. Detailed design status for the various phases of the project is as follows:

E Cell Ozonization - Phase I	100%
E Cell Ozonization - Phase II	24%
J-6 Pre-condenser	72%
Canyon Washdown Facilities	53%
Disposal of Contaminated Equipment	50%

CG-624 - Redox Railroad Tunnel Ventilation Barrier

During October, bids on the ventilation barrier for the Redox railroad tunnel were reviewed and the purchase order was placed.

CG-625 - Additional Waste Disposal Facilities - 200 Area

Detailed design for Phase I, excluding jumper drawings was 98% complete at the end of October. Design approval of Phase I drawings has been delayed pending completion of revisions due to scope changes. The overall status of CG-625 including the Phase II tank farm addition was 46.5% complete at month's end.

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CG-626 - Alterations to Redox Inert Gas System

Detailed plans and specifications for this project were completed during the month.

CG-631 - Crib Replacement Facilities - 241-T Tank Farm

During October, a revised project proposal for CG-631 was completed and approved. This proposal requested authorization of a revised scope of work which would exclude a proposed new crib and would provide facilities for transferring supernatants from the 112-T tank to the existing 241-TX crib. Detailed design on the basis of the revised scope of work was 50% complete at the end of the month.

CG-634 - Replacement of Redox 216 S-1 and 2 Crib

Detailed design advanced to 96% complete during the month. Detailed plans and specifications are scheduled for completion early in December.

CG-635 - Redox Stack Particulate Sampler

The number of drawings scheduled for this project has been reduced from the original estimate of nine to a new total of five, based on the philosophy of finishing a minimum design. Detailed design was 51% complete at the end of October.

CG-638 - Alum-Activated Silica Water Treatment Facility - Phase II

Authorization was received from HOO-AEC at the end of the month for the design of alum-activated silica water treatment facilities in 100-B, D, DR, F and H Areas.

CG-643 - Redox Capacity Increase - Phase III

A preliminary project proposal requesting authorization for design of Redox Capacity Increase - Phase III was approved by HOO-AEC during October, and detailed design had been started at the end of the month.

CG-645 - Plutonium Fabrication Laboratory

Authorization was received early in the month from HOO-AEC for the design of the Plutonium Fabrication Laboratory, Building 231-Z. Detailed design was performed on an expedited basis and was 100% complete by the end of the month. Ten new drawings, five revised drawings and fifteen purchase specifications were prepared for this facility.

CG-646 - Modifications to Pickling Machines - 313 Building

Approval of a preliminary project proposal requesting funds for initiation of design of modifications of 300 Area Metal Preparation pickling machines from a spray process to an immersion-dip process was received from HOO-AEC during October. At the end of the month, information had been received from the vendor of the original equipment and preliminary design of the modifications had been started.

D. O. 100757 - As-Built Area Maps

Drafting work on this assignment during October was limited due to the requirements of higher priority work. To date, 348 of 358 required drawings have been completed.

D. O. 101283 - Building 327 - Cell for Tensile Testing Machine (CG-576)

The shielding design was completed during the month. Detailed design for the disposal of water from the 329 Building air conditioners to the process sewer advanced to 40% complete, following completion of a study which determined that sanitary sewer facilities were inadequate for this purpose.

D. O. 101362 - Power Factor Study of Electrical System

Preparation of a report on the analysis of data accumulated in an Analyzer-Board Study of the Hanford Atomic Products Operation electrical system was approximately 35% complete at the end of October.

D. O. 101380 - Shielded Personnel Monitoring Station - Project Proposal

A project proposal, completed in September, for the provision of a shielded personnel monitoring station for the Radiological Sciences Department was waiting approval by Management at the end of October.

D. O. 101398 - Feasibility Study - Dummy Decontamination Facilities - 100 Areas

Issuance of a final recommendation report on the feasibility and economics of methods for decontamination of aluminum dummies used in the 105 Buildings was held up during October pending receipt of comments from the Manufacturing Department on a rough draft report which was issued in September.

D. O. 101399 - Modifications to Industrial Medical Facilities - Kadlec Hospital - Project Proposal

At the end of October, General Electric Management approvals had not yet been obtained on a project proposal, completed in September, requesting \$94,000 for modifications to industrial medical facilities at Kadlec Hospital.

D. O. 101410 - Redox Plant Iodine Monitors - Detailed Design

Detailed design of iodine monitors for the Redox Plant was completed during the month. Delivery of all engineered equipment is expected to be completed early in December.

D. O. A-00102 - TBP Plant Tail-End Treatment - Project Proposal (CG-637)

During October, a project proposal requesting authorization of work to provide for the transportation of contaminated TBP Plant product to the Redox Plant for processing in the Redox silica-gel facility and transportation of the decontaminated product to the Metal Conversion Plant was completed and routed to Management for approval.

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DECLASSIFIEDD. O. A-00153 - Design of Stored Energy Apparatus

During October, a preliminary design for the refinement of existing stored energy apparatus was completed and approval obtained from the Pile Technology Section. Work had been started on final design at the end of the month.

D. O. A-00157 - Auxiliary Radioiodine Removal and Nitric Acid Recovery Facilities, Redox - Project Proposal (CG-648)

During the month, a preliminary project proposal for the provision of auxiliary radioiodine removal facilities for the Redox Plant was approved by Management and submitted to HOO-AEC for approval.

D. O. A-00158 - Preparation of Project Proposals for Plant and Equipment Budget Items

Work continued during October on the preparation of project proposals to obtain advance design funds for the following Plant and Equipment Budget items:

1. Sub-Critical Neutron Flux Monitoring
2. Horizontal Rod Instrumentation
3. Reactor Increased Outlet Temperature Test Facility
4. Improved Reactor Gas Instrumentation
5. Plutonium Purification Facility - Purex
6. Organic Clean-up Facility - Purex
7. Additional Purex Waste Disposal Facility
8. Heat Recovery from Process Concentrators - Purex
9. Automatic Sampling and Monitoring of Radioactive Process Streams - 100, 200 and 300 Areas

Work on the following additional items has been deferred until January, 1956 due to lack of determination of the scope of work involved:

1. Auxiliary Crane - Redox
2. Improved Task II Facility
3. Improved Reactor Vertical Safety Rod.
4. Reactor Temperature Instrumentation

D. O. A-00164 - Flow Loop, 314 Building - Project Proposal and Preliminary Design

Work continued during the month on a project proposal requesting total project funds for the installation in the 314 Building, 300 Area, of a test loop to simulate pile conditions.

D. O. A-00168 - New VSR Tower (CA-548)

During October, work was started on the preparation of a design criteria for a new VSR Test Tower. It is proposed that preliminary and detailed design, fabrication and erection be performed by a lump sum contractor.

D. O. A-00171 - Process Technology - 100-K Reliability Study

During October, recommendations were made for inclusion in a joint report (HW-39501) by the Engineering and Manufacturing Department to the Hanford Atomic Products Operation General Manager regarding the continuity of the flow of water in the 100-K Area. Information was developed regarding changes in the 100-K Area Water Plants which would provide the maximum reliability of operation of the existing emergency electrical systems and of the existing low lift process water pumps when critical shutdown flows were required under emergency conditions. The cost of the changes to the water plants which were considered is estimated at approximately \$2,500,000.

D. O. A-00174 - Installation of Beta Monitors on Retention Basin Effluent Lines - 100-B, C, D, DR, F, and H Areas - Project Proposal

Work was started during the month on a project proposal for the installation of beta monitors on retention basin effluent lines in 100-B, C, D, DR, F and H Areas.

D. O. A-00176 - Water Plant Component Test Loop - Project Proposal

Planning was started during October for the preparation of a project proposal for the installation of a water plant component test loop in the 1706-KE Building.

D. O. A-00187 - Process Technology - 300 Area Expansion Facilities

Work was started during the month on a plant assistance program aimed at achieving satisfactory operation of the 300 Area facilities which were installed under Project CA-514. Items on which effort was expended during October include design of an alternate method for recovery processing of slugs, development of a stop-gap means of reducing the quantity of nitric acid being exhausted from the pickle machine stacks (to be used until pickling machine modifications can be accomplished under Project CG-646), and issuance of a report summarizing difficulties being experienced with the use of the Acme-Gridley cut-off machines.

D. O. A-00188 - Redox Plant Ventilation System Improvements - Project Proposal

Work was started during the month on a project proposal covering the design, fabrication and installation of equipment which will correct deficiencies in the Redox Plant ventilation system.

D. O. A-12284 - Purex Plant - Prototype In-Line Alpha Monitor

At the request of the Separations Technology Section, Design Section is directing the procurement and fabrication of a prototype alpha monitor which is to be installed on the 2AW stream in the Purex Plant. The design for the Purex Alpha Monitor is based on the design of, and operating experience gained with, the prototype In-Line Alpha Monitor which was developed under the Design Section Separations Design Development Program. At the end of October, status on this assignment was as follows:

Procurement	80%	complete
Fabrication	20%	complete

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D. O. B-99316 - Charge-Discharge Equipment, 105-C - Project Proposal (CG-642)

A project proposal requesting \$200,000 for design of full-scale continuous charge-discharge equipment for C Reactor, and for design of a potential demonstration unit (if required) was approved by Management and submitted to HOC-AEC for approval at the end of October.

D. O. C-79326 - Underwater Cutting and Etching Equipment - 105-C Metal Examination Facility

Work was started during the month on the design of equipment for underwater cutting and etching of irradiated fuel elements in the 105-C Metal Examination Facility.

D. O. C-79796 - Ventilating System Study - 3760 Building

A design study of the 3760 Building ventilating system was approximately 95% complete at the end of October.

D. O. C-96297 - 190-C Pumping Equipment - Engineering Analysis

During October, work continued on an engineering study of vibration problems of process pumping units in an effort to determine the cause of recent failures of process pump drives in the 190-C Building. This study is being conducted jointly by personnel of Design Section and Manufacturing Department, and the General Engineering Laboratory in Schenectady, New York. During the month, torsional and lineal vibration tests of 190-C process water pumping and drive units were completed and are being evaluated.

D. O. C-98383 - T Plant - Drawings for Silver Reactor

Design work was 50% complete at the end of October for modifications to the existing T Plant silver reactor installation to provide for more efficient operation and additional capacity.

D. O. 98574 - 300 Area - Engineering Study of Construction Budget Items

Preparation of a study of proposed modifications to the 327 Building advanced to 40% complete during the month.

Design Work Completed During October

D. O. 101389	Permanent Catwalk for Redox Railroad Tunnel Door
D. O. A-00107	Crud Test Heating Section
D. O. A-00136	321 Building - Fire Protection (IR-191-A)
D. O. A-00144	Redox Stack Spray Piping Modifications
D. O. A-6221	Roof Repair - 151-D Building
D. O. A-12533	Redox Plant - Jumper Design
D. O. A-12576	Redox Plant - Jumper Design
D. O. A-13706	Redox Plant - Sampler Installation
D. O. A-13721	Redox Plant - Replacement Jumper
D. O. A-13833	Purex Plant - Jumper Design
D. O. C-41610	U Plant - RCU Hold-Up Tank Decanter
D. O. C-91541	Tube Removal Development - Mechanical Engineering Services

Design Section

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D. O. C-96881 T Plant - Tank Nozzle Connector
D. O. C-98226 TBP Plant - Study of Series vs. Parallel Operation of Section 8 and 9
D. O. C-98493 Purex Instrument Flow Diagrams

INVENTIONS

All persons in the Design Section engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during the period covered by this report. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

Manager - Design
ENGINEERING DEPARTMENT

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DESIGN SECTION WORK STATUS

ENGINEERING MAN MONTHS
PROCESS ENGINEERING SUB-SECTION

Description	Backlog Start of Mo.	Work Time		Backlog End of Month	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Total
		Sch'd Dur.	Spent % of Total Effort								
Purex Modifications	16.0	4.4	7.1	11.6	4	3	2	1	1	1	11.6
CG-558 & CG-600	21.2	1.3	2.1	19.9	2	2	1	1	1	1	12.2
4-X Program	20.0	1.8	2.9	18.2	2	1	1	1	1	1	13.2
Reactor Design Dev.	216.6	23.7	38.5	192.6	25	26	26	26	26	26	192.6
Separations Design Dev.	177.8	19.6	31.9	158.2	22	22	22	22	22	22	158.2
Metallurgy Design Dev.	24.3	1.8	2.9	22.5	2	2	2	2	2	2	22.5
234-5 Design Dev.	15.0	1.7	2.8	13.3	2	2	1	1	1	1	13.3
Weapons Design Dev.	9.8	.4	.7	9.4	1	1	1	1	1	1	9.4
Other Proj. & Misc.*	21.3	1.1	11.1	15.6	6	6	5	5	5	4	39.0
Ant. Future Work	522.0	1.1	100.0	461.3	67	67	66	66	67	57	461.3

Rel. of FY 1956

DESIGN ENGINEERING SUB-SECTION

Purex Modifications	60.2	5.2	6.9	55.0	5	5	5	5	5	5	55.0
CG-558 & CG-600	138.4	12.2	16.3	126.2	11	10	10	9	8	7	126.2
CG-616 1	14.2	2.8	3.7	11.4	3	3	2	1			11.4
CG-621	30.0	3.0	4.0	27.0	3	3	3	3	3	3	27.0
CG-625	36.2	1.6	2.1	34.6	2	2	3	3	3	3	34.6
CG-634	5.4	0.9	1.2	4.5	1	1					4.5
CG-635	3.3	0.4	.5	2.9	1	1					2.9
4-X Program	30.8	7.9	10.5	22.9	6	4	3	2	1	1	22.9
Design Development	129.6	8.5	11.4	121.1	12	12	13	14	14	14	121.1
Other Maj.Minor,Misc.*	117.6	32.5	43.4	113.1	26	25	23	20	18	16	113.1
Ant. Future Work	565.7	28.0	100.0	516.7	75	74	74	73	73	73	516.7

Present total backlog is distributed over the five engineering branches in terms of man months as follows:

Authorized Work FY 1956 & Later	Anticipated Future FY 1956	Totals
Arch. & Civil	95	126
Mechanical	170	232
Electrical	84	124
Instrument	125	166
Standards	44	58
513**	176**	774

*Includes 1706-KRM, CA-514, 526, 538, 624, 626

**Includes Design Development

***Includes Other Major & Miscellaneous Customer Work for FY 1956

****Includes Minor & Miscellaneous Work Budgeted for FY 1956

Design Section

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I. SUMMARY

A. Organization and Personnel

Following is a summary of personnel changes in Project Section during the month:

	<u>September 30, 1955</u>	<u>October 31, 1955</u>	<u>Net Change</u>
Employees on payroll	342	345	+3
Technical Graduates, Rotational	8	6	-2

The end-of-month status involved these changes:

	<u>Project Section</u>	<u>Technical Graduates Rotational</u>
Payroll additions	8	
Payroll removals	2	
Transfers into Section	1	2
Transfers from Section	4	4
Transfers within Section	15	

At the end of the month, there were open requisitions for one exempt and seven non-exempt employees.

B. Scope of Activities

At the end of the month, completion status of major construction was as follows:

<u>Project No.</u>	<u>Title</u>	<u>Completion</u>	
		<u>Scheduled</u>	<u>Actual</u>
CA-512	100-K Area Facilities	100%	100% ^a
	1706 KER Recirculation Facilities	38%	39%
CA-513-A	Purex Facilities, Part A	100%	100% ^a
CA-513-E	Purex Facilities, Part E	65%	70% ^b
CA-539	Additional Waste Storage Facilities	c	37%
CA-546	Fuel Element Pilot Plant	77%	74%
CG-558	Reactor Plant Modifications, Phase I	23%	29%
	Reactor Plant Modifications, Phase II	1%	2%
CG-603	Hanford 4X Program, Bismuth Phosphate Plants	92%	92%
CG-613	Hanford 4X Program, Metal Conversion Plant	d	9.6%

C. Craft Labor

Work on the Reactor Plant Modification Program has been delayed by a jurisdictional dispute between millwrights and electricians. The issue concerned the setting of

- a Complete except for start-up and scheduled design changes.
- b Percentage of completion based on work now approved.
- c A revised schedule to include additional work is being submitted.
- d Revised schedule is being prepared.

motors in 190-B Building, and the millwrights' walkout on October 26, 1955, was joined by the carpenters. Some piping and electrical work progressed at 100-B, but concrete and structural work at 190-D and DR was seriously hindered during the remainder of October.

Following the refusal of Minor Construction craftsmen to use time clocks at the White Bluffs shops, the clocks are being removed.

D. Safety and Security

Eight regular meetings for discussions of safety, security, and health topics were attended by about 185 Project Section employees. Five area mass meetings were conducted in the field for labor service contractor personnel, and Special Hazards orientation was given to 23 new and rehired employees. The Minor Construction safety record was broken at a total of 629,205 safe man-hours. Project Section suffered one security violation during the month, after almost nine consecutive months without a violation.

E. Highlights

Project Auxiliaries Sub-Section

Several reassignments of exempt personnel were accomplished during the month, and functions were re-aligned to permit better communications and controls. Reproduction output decreased about 3,000 square feet per day to an average of 18,573. Engineering Files distributed 184,894 prints, including about 3,000 classified items. For the tracing rehabilitation program, 43 linen reproductions were processed. Estimating Unit workload remained high at 67, of which 23 were completed. The Unit submitted fair cost estimates for five AEC bid openings. Field Surveys completed the original assignment on the resurvey of Richland, Washington, and also assisted with location of houses and easements on lots. This Unit completed inventory and provided routine services in manufacturing areas.

Inspection Sub-Section

The number of orders for items requiring inspection increased slightly, to 733, and the money value of the 652 orders now assigned to inspectors remained about level at \$11,440,000. To meet the shifting workload, the national areas have been reorganized and vendor inspectors have been reassigned to central and eastern United States. Responsibility for inspection of the assigned orders is divided as follows: off-site, 563; on-site, 82; and government agency, seven. The Corrosion Testing Program workload has remained about level with performance of 212 Huey tests, 127 macro-etch tests, 47 chemical determinations, and 39 other laboratory tests. Attention of off-site inspectors has been concentrated on process water pumps for Reactor Modification Program, calciners for expansion of the Metal Conversion Plant, piping for 100 Areas, and fractionators and concentrators for separations plants. For both pump and calciner orders, the major inspection effort was expended on castings of poor quality. Shortages of acceptable materials have also caused numerous difficulties.

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Minor Construction Sub-Section

Manpower of the labor service contractor decreased about 8% to a total force of about 1,008 at the end of the month. The total authorized amount to Minor Construction at the end of the month was \$14,593,000, representing a decrease of about \$1,500,000. The Sub-Section completed its assigned work on four projects and 24 work orders. Assignments of work were received on 41 new work orders and three projects. The main manpower effort was expended on Reactor Plant Modifications, Purex Facilities, Bismuth Phosphate Plants, 100-K Area, Metal Conversion Plant, and 300 Area clean-up. In all area work, extensive attention has been concentrated on radiological control procedures, both for Minor Construction work and for assistance to future lump-sum contractors. SWP clothing, supplies, and radiation timekeepers have been planned for work at 224-U Building, the 105-DR Outfall, 190-F, 190-H, and 183-F. Site preparation was completed at 100-F Area to allow start of fixed-price contract work.

Project Engineering Sub-Section

The workload increased slightly to 40 project items, three informal requests, and miscellaneous engineering requests. The Sub-Section completed assigned work on one engineering request and two projects, Hanford 4X for 100 Areas and Replacement of 300 Area Fence. New work assignments were accepted on one engineering request and two projects, Redox Capacity Increase, Phase II, and the Plutonium Fabrication Laboratory. Major work to be done in 100-K Area is being written into Revision No. 5 to the project proposal, and current efforts were directed to the outfall lines, instrumentation, and preparations for adding 40,000 pounds of boron-steel balls to an equal amount of mild steel balls now being used in the 100-K reactors. Bids for completion of the 1706 KER Recirculation Facilities were opened on October 24, and a new construction schedule is being prepared. For Redox Waste Storage, Tanks #107 and 108-SX are being completed for use during November 1955. Structural work on Project CG-558 has been hampered by the jurisdictional dispute between millwrights and electricians, but good progress was made on electrical and mechanical work for Phase I. Progress at "B" Plant included acceptance testing of about 25 of the 33 cells. For the Metal Conversion Plant the contractor has completed structural steel for 234-UA, and is proceeding with concrete work. The contract for installation of process equipment has been awarded.

Separations Projects Sub-Section

At the end of October, the known items of work for Purex Facilities, Part "A", have been assigned on work orders to Minor Construction and plant forces. Other work items which may appear during start-up will be assigned at that time. Manufacturing Department assumed responsibility for the Purex canyon on October 17. Work on as-builts was about 50% complete at the end of the month. For Part "E" the column modifications were completed on October 8, and other minor modifications were continued. The acid and organic flush procedure was started on October 19, and cold uranium runs were begun at the end of the month. The project proposal for Part "E" was approved by the AEC Board on October 28, with funds of \$3,100,000. Fabrication for Iodine Monitoring Facility vessels has begun. Construction of the Purex Vacuum Acid Fractionator has remained suspended. The revised project proposal requesting total funds of \$920,000 and completion in August 1956 is being circulated for final approvals.

F. Monthly Report of Inventions and Discoveries

All persons in Project Section engaged in work that might reasonably be expected to result in inventions or discoveries were made in the course of their work during the period covered by this report except as listed below. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

None.

J. S. McMahon, Manager, Projects

II. STATISTICAL AND GENERAL

A. Significant Assignments

1. Initial Reporting

CG-643, Redox Capacity Increase, Phase III

The Commission had authorized \$500,000 for design, material procurement, and limited on-site fabrication. Detailed design was initiated October 24, 1955, and the authorization was subsequently lowered to \$100,000 for design only.

CG-645, Plutonium Fabrication Laboratory

The AEC has authorized \$85,000 for General Electric to perform work on this project. Design was essentially complete, and requisitions have been written for essential construction items. A work release for \$49,600 has been issued to Minor Construction for performance of project work and for necessary procurement.

ER 3135, Office Addition to 141-U Building

The scope of work is being prepared for estimating purposes, and scoping is about 25% complete.

2. Final Reporting

CG-599, Hanford 4X Program, 100 Area

The work as originally scoped for procurement of 600 stainless steel buckets has been accepted. The project is now being closed out.

CA-627, Replacement of 300 Area Fence

Project work was completed on October 19, 1955, and information for the physical completion notice is being assembled.

ER 2770, Redox Ventilation Study

Work previously accomplished under this engineering request has been suspended, and the work may be initiated under another request number.

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ER-3129, Modifications to Industrial Medical Facilities, Kadlec Hospital

The project proposal is being prepared by Design Section, and the final draft is being routed for General Electric approvals.

3. Current Projects

CA-512, 100-K Reactor Facilities

With the exception of design changes and start-up items, both design and construction work had been completed. The acceptance test procedure for the tool dolly was completed for both reactors, and no exceptions were listed. Work on the filter plant backwash valves is progressing on schedule, and six valves have been repaired.

Revision No. 5 to the project proposal is being drafted for completion of remaining items. Of the work requested in Revision No. 4, bid packages are being prepared for ventilation work in 1704 and 1720 Buildings, the Dowtherm equipment, and acid feed equipment.

Inspection of the 100-K outfall line has revealed a one-eighth-inch crack the entire length of the concrete encasement which was placed over the KE line. The KW line has a break which apparently will do no damage because of a complete covering of rock and gravel.

During the next outage of sufficient length, 40,000 pounds of boron-steel balls will be mixed in equal quantities with the mild steel balls now used in the 100-K reactors.

A proposal for installation of steam-driven auxiliary equipment in 165-KW and KE Buildings has been received. If approved, this work is to be accepted under a new project number with estimated expenditures of about \$5,000,000 and three and one-half years of construction time.

A new project proposal is being prepared to request installation of a process water test loop in the 1706-KE Building.

CA-512, 1706 KER Recirculation Facilities

With construction 39% complete, bids for completion of 1706 KER by a fixed-price contractor were opened October 24. The apparent low bid was \$329,000, and a new construction schedule is being prepared for work to start in early November 1955. Minor Construction forces started on their portion of the work on October 17, 1955, with installation of service and raw water lines in the 1706-KE Building. This work proceeded concurrently with other pipe modifications. Preliminary work for the 1706-KER tie-in consisted of preparing the electrical trays between 165-KE and KW Buildings and the 105-KE Building for external power supply wiring. A new construction schedule has been prepared and submitted to the AEC for approval.

CA-513-A, Purex Facility

Both design and construction as originally scoped have been completed. At the end of October, the known items of work for Purex facilities, Part "A", have been assigned on work orders to Minor Construction and plant forces. Manufacturing Department

assumed responsibility for the Purex canyon on October 17. This acceptance followed completion of the IA and HA column revisions by Minor Construction on October 16.

Minor Construction is completing items outside 202-A Building and cleaning up the area. Major Minor Construction work was essentially completed by the end of the month with the exception of replacement of the "C" dissolver filter, installation of crane auxiliary periscopes, and modifications to the crane control system.

The acid and organic flush procedure was started on October 19, 1955, and the start of cold runs consisting of ten tons of uranium began on October 30. The start of "hot" operations was scheduled for January 16, 1956.

CA-513-E, Expansion of 200 Area Facilities

At the end of the month, approved work was 70% complete. The project proposal for Part "E" was approved by the AEC Board on October 28. This requests increase of funds from \$1,500,000 to \$3,100,000, an increase of scope to include a new 40-ton remote crane and extension of proposed IA and HA columns.

All equipment is being given acid and organic flushing. Fabrication of vessels for the Iodine Monitoring Facility has begun. The target date for beneficial use of Part "E" is May 1, 1956.

CA-539, Additional Waste Storage Facilities for Redox

Overall construction work was revised downward to 37% to show the addition of other work. The percentage of completion was computed on the remaining incomplete items.

Minor Construction has completed installation of temporary air circulators and instrumentation to permit operation of Tank #109. The fixed-price contractor has completed Phase I installation of circulators and Tanks #107 and 108. The bid package for Phase II air supply and instrumentation (those parts outside the tanks and above ground) has been transmitted to AEC. A new overall construction schedule was submitted on October 24.

Minor Construction has completed the water tie-in at the new condenser house and installed a motor control center at the Emergency Water Facility. The vendor has been requested to make necessary corrections to the motor control center.

According to present production rates, it appears that Tank #109 will be filled by November 15, 1955. Because of revisions to the anodizing equipment, the overall completion of design was reduced to 95%. Construction was revised downward to 74% complete.

CA-546, Fuel Element Pilot Plant

Concrete work in the plating room has been completed, and the steel structures are being installed. The contractor has been required to relocate tank support footings which are one foot out of position. The roof ventilation units have been tested after repairs by the contractor.

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Minor Construction forces are being delayed by slow delivery of stainless steel materials required in the plating room. Expediting action has been applied.

CG-558, Reactor Plant Modification for Increased Production, Phase I

Construction was 29% complete according to the revised schedule as submitted on July 29. A later schedule is being held by Hanford Operations Office until delivery of process water pumps can be determined. This portion of the work continues as the limiting factor. At the end of the month, twelve complete sets of pump castings had been prepared for machining. Of these, two pumps have been delivered to 190-B Building, but neither pump has been set permanently. Machine work on the other ten pumps has been distributed by the vendor to expedite this critical stage. A shutdown of 100-B has been scheduled for November 7, 1955, for replacement of Panellit gauges and installation of a complete poison column facility. Current work is directed toward pre-shutdown work on piping, motors, and pumps. Other work consisted of concrete placement, steel erection, insulation, and preparations for setting equipment in the 190-B Annex. A preliminary acceptance test has been performed on the bridge crane, and the contractor is using it to install pumps, motors, and other heavy equipment. Plant forces have connected pumps #5 and 7 into the power and control buses at 151-B. The motor starters are to be used for the initial testing of all pumps and drives.

At 100-D, an outage has been planned for December 1955 to relocate the backwash pump, perform tie-ins, and install the new process pump. The addition to 151-D Building for new switchgear was essentially complete, and underground ducts and pipe gallery cable trays are being installed from 151-D to 190-D. Work on the 190-D Building Annex consisted of equipment foundations, forms for concrete walls and slab, and placement of concrete. The six-inch effluent line was essentially completed from the new junction box to the downstream tie-in. The outdoor switchgear for 181-D Building is being replaced by excess switchgear for temporary operation of pumps #2, 3, 4, and 5.

At 100-DR Area, replacement of the 183-DR filter bed was essentially complete. Water lines and tie-ins are being relocated and prepared for new systems. Tests of the 105-DR charging machine indicated need for revisions, and field work is being accomplished as the revisions are made.

The fixed-price contractor for the 190-DR Annex has continued with concrete work and structural work and the installation of fabricated sections of pipe. Bid opening for the DR outfall system was scheduled for November 2, 1955.

CG-558, Reactor Plant Modification for Increased Production, Phase II

Construction work was about 2% complete. 100-F Area has been prepared for start-up work for the lump-sum contractor, and 100-H is to be ready by December 15, 1955. Work on Phase II consists of relocating electrical line in 100-F and H Areas and making other preparations for underground pipe. A bid of \$86,000 for modifying switchgear at 151-H has been accepted.

Cutover of the relocated electrical distribution line to 190-F was completed. For 190-H, installation of underground ducts for power lines is proceeding. Minor Construction forces performed the work at the inlet to the 107 Basin.

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Outages at 100-F and H Areas for the next three months have been integrated with those required for tube replacement. The Phase II target schedule for Minor Construction has been reviewed. Deliveries of material are the limiting factors for completion of this phase.

CG-603, Hanford 4X Program, Bismuth Phosphate Plants

Design was completed October 24, 1955; construction progressed 9% to a total of 92%, which is on schedule. Progress in "B" Plant included acceptance testing of about 25 of the 33 cells, and testing of outside lines for "B" Plant was completed. The remaining work at "B" Plant includes installation of air sampling and stack sampling equipment, installation of crane contact segments, and clean-up items. Testing and installation work by Minor Construction proceeded on a two-shift basis.

Receipt of materials is a limiting factor for 200 East Area TBP Scavenging and the Calcium Nitrate Addition Facility for 241 Tank Farm. Final completion of these facilities is expected to be accepted in early December 1955.

CG-613, Hanford 4X Program, Metal Conversion Plant

Design progressed 6.5% to a total of 96.5%. Construction progressed 5.6% to a total of 9.6%. A revised project proposal was forwarded to the AEC on October 25. This proposal requests an increase of funds from \$3,000,000 to \$4,000,000 and the following changes in scope of work: (1) facilities for using five-ton shipping containers, (2) a chemical additive system for the calciner feed material, (3) a maintenance facility to serve the Metal Conversion Plant, and (4) a shielding wall for isolating two uranium lag storage tanks.

Procurement action has been hindered by slow delivery of materials and inadequate workmanship. Because of these conditions, and after a review of plant production requirements, the target beneficial use date has been extended two months to May 1, 1956. The major procurement problems are centered on calciners, process bag filters, and ventilation bag filters.

The reaction vessel was shipped October 26, 1955. Most of the electrical transformers and controls have been shipped. The furnace witness test was delayed until early November 1955 because of a conflict at the testing facilities. The orders for absorber towers and gas coolers are progressing satisfactorily since the vendors now have materials to fabricate one of each.

The contractor for Phase I made a few corrections to foundations for the 224-UA Building during early October, and the contractor for Phase II has completed structural steel work. Most of the miscellaneous iron work has been installed, and forms are being placed for the slab at the 12-foot level.

Bids for Phase II installation of Process Equipment in 224-UA were opened on October 27. The contract for \$289,000 was awarded, and the notice to proceed was issued with the contract completion date of March 22, 1956.

Minor Construction forces have completed 80% of the electrical and structural work in the cells. The ED-7 evaporator has been obtained from spare parts warehouse for installation in "D" cell. This evaporator is to be replaced by one now on order for the project.

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B. Other Assignments

CA-548, Reactivated Project Proposal for New VSR Test Tower

With preliminary design completed, authorization of funds has been received for engineering work. The bid assembly is being prepared.

CA-555, Graphite Hot Shop and Storage Building

Construction progressed 12% to a total of 59%. The additional work was awarded to the contractor for \$3,700. Progress was delayed by diversion of work force to the Fuel Element Pilot Plant. Minor Construction completed connection of the roof, ceiling, and walls of the existing building to the addition.

CG-572, Particle Problem Animal Exposure Equipment

Construction progressed 4% to a total of 99%. For Phase II construction, the final inspection was held on October 10, 1955. A design change has required procurement of two rotameters, and they are now on order.

CG-576, General Improvements to Laboratory Area, 300 Area

Design was completed during the month; construction progressed 4% to a total of 86%. Plant forces worked on alterations to Room 30-C, 326 Building; the cell exhaust system for 327 Building; and the signal system for 327 Building. Minor Construction performed work on equipment installation and partitions for 328 Building. The exit walk for 327 Building is to be installed by a fixed-price contractor.

CG-578, Effluent Water Monitoring Improvements, 100-B, D, F, DR, and H Areas

Construction progressed 13% to a total of 48%. Installation of the gamma monitoring system was completed at 105-H and 105-DR, and the systems are operating satisfactorily. The installation of the gamma monitoring system at 105-B is being delayed until January 1956 to allow more manpower for the tube replacement program. Rotameter racks and fittings for 105-B were fabricated, and the control room instrument panel was installed. The spectrometer assemblies for 105-B are being tested at the shops.

CG-579, Effluent Water Monitoring Improvements, 100-C Area

A control estimate of \$166,000 has been made. A letter proposal requesting an additional \$30,000 and an extension of the physical completion date to July 1, 1956, is being routed for General Electric approvals.

CA-586, First Capacity Increase, 230-KV System

Design had been completed previously. Bids for furnishing labor for construction of the transmission line and related switching facilities were opened on October 26, 1955. The bids ranged from about \$76,000 to about \$163,000, as compared with the fair cost estimate of \$145,000. The proposed construction includes a four-mile tap from the leased line to the 230-KV loop at the K Areas, the terminal station at this intersection, and a switching station at the intersection near Gable Mountain.

CG-587, TBP Waste Scavenging

Completion status remained at design 100%, construction 88%. Present work consisted of procurement by plant forces and fabrication of the make-up tank. Installation work is to be resumed about mid-November 1955. Beneficial use of this revised facility is expected during January 1956.

CG-589, Dejacketing and Ultrasonic Equipment, 105-C Building

This project is being closed out with exceptions.

CA-590, Fly Ash Collection Equipment, Building 384

The AEC directive has authorized \$40,000 for this project. The estimated completion date for design is November 7, 1955. Fabrication and installation are to be performed by a fixed-price contractor.

CG-598, Purex Acid Fractionator

Revision No. 2 to the project proposal is being circulated for signatures. This requests an increase of funds from \$590,000 to \$920,000 and an extension of completion date from December 1, 1955, to September 1, 1956.

CG-600, 100-C Alterations

Construction remained at .3%. The funds were reduced from \$725,000 to \$675,000. This represents the addition of new pumps and deletion of front face nozzles, connectors, and venturi tubes.

CA-601, 300 Area General Improvement Program

The AEC has issued a work authority for \$5,000 to cover costs of scoping, project proposal, design criteria, review of design, and field liaison. Preparation of design criteria is being started.

CG-614, Hanford 4X Program, 300 Area

Construction progressed 18% to a total of 24%. Plant forces proceeded with installation of piping in the autoclave pit, installation of the stamping wheel, and the three additional carriers. The metal recovery area was completed except for the ventilation systems, and a cross order has been issued to Minor Construction to fabricate the exhaust duct from the furnace inductor cooling fans.

CA-615, Mechanical Maintenance Shop Centralization, 100 Areas

With preliminary design completed, the Atomic Energy Commission in Washington, D. C., withheld approval. Additional justification has been prepared and forwarded to the Hanford Operations Office of the AEC.

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CG-616, Installation of Acid Feed Equipment, 100-B, C, D, DR, F, and H Areas

Scoping and design are being managed by Design Section. Work orders are being issued to Minor Construction to cover the costs of preparing existing tanks and pumps for installation by the contractor.

CG-617, Additional Air-drying Facilities, Building 234-5

Construction progressed 12% to a total of 98%. Operation of the air dryer unit has disclosed that the air is not meeting specifications. The components are being tested to increase the efficiency of the air dryer.

CG-618, Replacement of Steam Line Support Poles

Construction work was started in 100-D Area on October 7, 1955. At the end of the month, work was about 50% complete.

CG-620, Melt Plant Modifications, 314 Building

The project is being rescoped because of conflicting opinions from possible vendors. Two vendors are now preparing quotations based on preliminary specifications, and another vendor is developing a unit for testing.

CG-621, Redox Contamination Control Facilities

Construction progressed 4% to a total of 30%; however, the work is being delayed to allow completion of other items on modifications to Redox Inert Gas Vent System and to complete final design of the In-cell Ozonization. Requisitions for some spare replacement vessels are being placed, and a requisition for the J-6 pre-condenser is being prepared. Shop work is being suspended until after January 1, 1956.

CG-624, Redox Railroad Tunnel Ventilation Barrier

The order for the sliding door has been placed, and delivery is expected in time to meet the completion date of January 31, 1956.

CA-625, Additional Waste Disposal Facilities, 200 Area

Design was about 47% complete. Final approval of drawings is awaiting slight revisions to tank structural design.

CG-626, Alterations to Redox Inert Gas Vent System

Construction progressed 25% to a total of 30%. Fabrication work included jumpers, filter dunnage, and modification of filters. The south gallery piping was nearly complete. Nitrogen bleed piping has been installed but not put into use. It is expected that beneficial use can be obtained early in December, although the beneficial use date is December 23, 1955.

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CG-630, Minor Construction Fabrication Shops Modifications

On the basis of additional justification, the project was approved, and Directive HW-362, dated October 13, 1955, authorized \$93,000. Detailed design is being started.

CG-631, Crib Replacement Facilities, 241-T Tank Farm

A "break through" of crib effluent to the ground water has made this project critical. The scope of work has been reduced, and design is being expedited to permit the start of construction during early November 1955.

CA-633, Remodeling of Facilities, Kadlec Hospital

With preliminary design completed, the AEC Directive #62 dated September 23, 1955, authorized \$26,200. The rough draft of Revision No. 1 to the project proposal has been routed for comment, and the final draft is being prepared.

CG-634, Replacement of Redox 216-S-1 and 2 Crib

A Minor Construction field release was issued for fabrication of jumpers, pipe line encasement extension, and hot piping tie-in to the existing lines. Drawings and specifications for the fixed-price contract portion have been transmitted to AEC for the bid assembly.

CG-635, Redox Stack Particulate Sampler

Scoping and design are being managed by Design Section. An architectural print was issued for comment. Design is to be completed about the middle of November 1955, at which time a detailed estimate will be made.

CG-636, Redox Service Facilities Expansion

Design Section is preparing a project proposal to reduce the scope.

CG-637, TBP Product Tail-end Treatment Facilities

The project proposal is being prepared by Design Section. The proposed facilities are those required to recycle out-of-standard 224-U Area material through Redox, including piping and a truck unloading station.

CA-639, Painting Water Plant Structures, 100-DR Area

With scoping completed, the Directive AEC-67, dated October 13, 1955, authorized AEC \$75,000.

CG-642, Continuous Charge-discharge Facility at 105-C

Work was suspended during the month of October 1955.

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IR-191, 321 Building Fire Protection and Staging Study

Design of these facilities was completed on October 25, 1955. A request for the purchase of major items is being prepared.

IR-198, Redox Stack Spray Piping Modification

Approved drawings have been sent to the field. Actual field work is to be started during late November 1955. Minor Construction has initiated procurement of material, including the purchase order for the pump.

* * * * *

The following studies and Engineering Requests, involving preparatory work and scoping of future projects, were active during the month:

ER A-1219, 105-KW Laboratory

The project proposal was returned with comments and is being revised.

ER A-1227, Provide Additional Storage and Shop Space in the 105-B, D, and F Buildings

The final draft of the project proposal is being routed for General Electric signatures.

ER A-1229, Installation of Raw Water Cross-tie, 105-C

The final draft of the project proposal is being routed for General Electric signatures.

ER A-2756, FY-1955 Water Tank Replacements, 100-200 Areas

The design work required for this project is to be performed by Design Section. The project proposal is being routed for General Electric approvals.

ER 2764, 2101 Building Conversion

The project proposal is being prepared for final approval.

ER 2766, 221-U Section 9 Conversion to Intercycle Concentration

Action on the project proposal is still temporarily suspended to await management decisions. The alternate methods are connecting Section 9 in series with Section 8 or parallel operation with Section 8 for intercycle concentration.

ER 2767, Additional Redox Liquid Cooling Waste Cribs

The project proposal is being routed for General Electric approvals.

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ER A-3122, Replacement of Steam Plant Deaerator, 384 Building

Manufacturing Department, Metal Preparations Section, is conducting tests to determine the operating efficiency of the existing deaerator equipment at various load levels.

ER 3124, Graphite Machining Facilities, 300 Area

An informal request is being prepared.

ER 3125, Roof Repairs, Central Stores

Comments on detailed specifications were forwarded to Design Section on October 14, 1955. Repair of the roof is to be postponed until the spring of 1956.

ER 3126, Replacement, Repair, and/or Removal of Valve Houses, 100-B, D, and F Areas

A project proposal is being routed for General Electric approvals.

ER 3127, Painting of Two High Tanks at 105-C Area

The contractor started work on the south tank on October 24, 1955. The contract completion date is November 26, 1955. The work was estimated to be 5% complete.

ER 3128, Decontamination Facilities, 100-H, 200-W, and 300 Areas

A construction estimate and a rough draft of the project proposal are being prepared.

ER 3130, Conversion of Sprinkler System and Rewiring of Old Portion of Kadlec Hospital

The final draft of the revised project proposal is being prepared.

ER 3131, Shielded Personnel Monitoring Station, 747 Building Addition

Information was provided the Design Section on October 19, 1955, for inclusion in the project proposal.

ER 3134, General Improvements, Central Stores

Rough draft copies of the informal request were distributed for comments on October 19, 1955. A cost estimate is being prepared.

C. Related Functions

The inspection workload increased slightly during the month with, however, a slight decrease of dollar value. At the end of the month, there were 733 orders requiring inspection of which 652 had been assigned to inspectors. The division of orders was as follows: off-site inspectors, 563; on-site inspectors, 82; government agency, seven. The national areas have been reapportioned to provide adequate coverage with fewer vendor inspectors. The Pacific Southwest and Pacific Central Areas have been combined into one, and a new area called the East Central Area has been established with headquarters in or near Pittsburgh, Pennsylvania.

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HW-39751

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The work load for the Corrosion Testing Program consisted of 212 Huey tests, 127 macro-etch tests, 47 chemical determinations, and 39 laboratory tests. Present planning is based on this workload remaining about level for the next few months.

Following is a resumé of inspection activities during the month:

<u>Items</u>	<u>Number</u>	<u>Value</u>
New orders received during the month	144	
Total orders for items requiring inspection	733	
Cumulative orders assigned to inspectors	652	\$11,400,000
Orders assigned to inspectors this month	148	1,157,000
Orders completed during the month	135	1,685,000

There was also a financial increase of about \$360,000 because of purchase order changes.

Reproduction output decreased to an average daily rate of 18,573 square feet. This was accomplished during a 20-day working period with only 70 hours overtime. For the tracing rehabilitation program, 43 linen reproducible were processed. Distribution of prints by Engineering Files decreased to a total of 184,894 prints, including about 3,000 classified items. The largest single order was 12,999 prints for the Reactor Modification Program.

The Project Administration Unit continued its routine work on reports, procedures, review of project proposals, and other similar assignments. The cost control functions were assumed by the newly organized Project Cost Control Unit, and these functions were continued within the Project Auxiliaries Sub-Section. Considerable attention was devoted to development of procedures for control of services and cost codes for fixed-price contractors. Property evaluation work was in progress on seven projects, and one project report was completed and forwarded to Plant Accounts.

Estimating Unit completed 23 estimates of the total workload of 67. The completed estimates included the following: construction, four; preliminary, six; study, eight; and fair cost, five. The fair cost estimates were used by the AEC Contract Branch for bid purposes on the following projects: Fuel Element Pilot Plant, Circulator Facilities for Purex Tank Farms, Increase for the 230-KV System, and the Reactor Plant Modification Program.

Field Surveys completed the original assignment on the survey of Richland, Washington; however, work is still being performed on additions to the assignment. This Unit also completed the semiannual coal inventory in the 300 Area, 200 Areas, and in 100-B, D, F, and H Areas. Other routine services were provided as requested.

D. Craft Labor

See Summary above.

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III. REPORT OF VISITORSA. To Hanford, October 1955

L. P. Sharts and V. M. Schwartz, L. H. Butcher Company, Seattle, Washington, visited P. J. O'Neil October 19 for arbitration of final payment on HWC-3890.

B. To Other Installations, October 1955

G. G. Taylor went to a meeting of the National Safety Council Congress October 14 to 23 as a member and as Minor Construction representative.

H. F. Scott visited off-site vendors in Los Angeles, California, September 28; Seattle, Washington, September 30; Chicago, Illinois, October 17; Akron, Ohio, October 18; Warren, Pennsylvania, October 19; Philadelphia, Pennsylvania, October 20; Newark, New Jersey, October 21; and Boston, Massachusetts, October 24, to conduct discussions with off-site inspectors to clarify new expense account policy.

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ADVANCE ENGINEERING SECTION

MONTHLY REPORT

OCTOBER 1955

A comparative safety study of Hanford pile loadings for tritium production indicates the J-N loading to be slightly more hazardous than the E-N loading.

Studies have been initiated on three advanced concepts for graphite moderated, water cooled reactor design. These are high power density types which appear to have substantial potential for unit cost reduction.

F. W. Albaugh

Manager, Advance Engineering
ENGINEERING DEPARTMENT

FW Albaugh:pk

SECRET
Fh-1

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

MONTHLY REPORT SUMMARY - OCTOBER, 1955

PERSONNEL PRACTICES SECTION

The number of applicants interviewed in October was 1335 as compared with 1537 for September. In addition, 74 new applicants applied by mail. Open, nonexempt, nontechnical requisitions decreased from 201 at the beginning of the month to 173 at month end. One hundred twenty-seven employees were added to the roll and 69 removed during the month. The separation rate for fiscal month of October was .62% and for fiscal month of September was 2.27%. These rates when converted to annual rates are 8.08% and 23.68% respectively. During October, 51 new requests for transfer to other type work were received by Employment and 34 transfers were effected. Attendance recognition awards were distributed to 152 employees in October, including 15 who qualified for five-year awards.

Two employees died during the month of October. One hundred and thirty two visits were made to employees confined to Kadlec Hospital, and 18 checks were delivered to employees confined at the hospital or at home. At month end, participation in the Pension Plan was 98.5%, in the Insurance Plan 99.5%, and the Employee Savings and Stock Bonus Plan 53.4%. At month end there were 631 non-veterans registered under Selective Service and 691 military reservists were on the roll. Since August 1, 1950, 423 employees have terminated to enter military service, of which 167 have returned, 49 have not claimed re-employment rights, leaving 207 still in military-leave status.

Fifty-three adopted suggestions were approved for awards in October resulting in cash awards totaling \$2,715 with a total net savings of \$22,553.89.

Since the beginning of the 1955-56 season, starting September 1, 15 offers will be extended to BS/MS graduates for the R.T.P. Acceptances have been received from 27 experienced candidates (including 20 carry-overs from the 1954-55 season). Since the beginning of the 1955-56 season 63 PhD cases have been considered, 10 have been invited to visit and three have accepted invitations to visit. There are seven open offers including five carry-overs from the 1954-55 season.

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS SECTION

The Press Relations Unit issued 53 releases during the month, eight of which were especially planned for national publicity purposes and were sent to the Schenectady Press Relations Section. Five manuscripts were approved for publication, and ten papers received all required approvals. Arrangements were made for two speeches to be delivered before public groups. The Community Newsletter was written and distributed to community leaders in Pasco, Kennewick and Richland. Three Management NEWS Bulletins were produced and distributed to all exempt personnel during the month.

Twenty-nine items (ranging from one paragraph to a full page) and eleven illustrations, describing engineering technology and progress at Hanford during 1955, were submitted to the editor of the GE REVIEW for publication in the January 1956 issue of that magazine.

A specially developed radio program, THE GENEVA CONFERENCE, using actual recorded excerpts from the GE press conference and television program, was tape recorded and broadcast by the Eastern Washington network during October.

Employee Communications and Public Relations Section (Contin)

A total of forty-two visual aids were prepared for HAPO representatives to use in their "business review" presentation to visiting GE officials.

A total of 315 photographic assignments were covered for the month of October, and 16,236 prints were produced.

UNION RELATIONS SECTION

At month-end it appears that a sufficient number of affirmative votes have been cast by the Hanford Atomic Metal Trades Council's 21 affiliated local unions to assure ratification of the contract in November. Contractual details have been worked out with the Guards, Building Service employees, and Community Firemen, and it is expected that ratification of the agreements will take place the first of next month.

By letter of October 11, 1955, we were informed that the National Labor Relations Board's General Counsel had sustained the decision of the Regional Board that there was insufficient evidence of an unfair labor practice to warrant the issuance of a complaint in the closing of the Prosser Barricade. A plan for restricted operation of the barricade during periods of shift change, which had been held in abeyance pending the outcome of this issue, was promptly put into effect.

During current negotiations, oral agreement was reached with the Hanford Atomic Metal Trades Council that they would withdraw the litigation regarding the 300 Area "working agreement."

Four meetings with Reactor Section supervision, reviewing the new union contracts, changes, proper interpretation, and application were conducted by the Section Manager. Some 48 meetings with non-exempt groups were held by other Union Relations representatives to explain the pension and insurance plans.

SALARY AND WAGE ADMINISTRATION SECTION

A section representative concluded a three-week trip to other Company components during which 29 additional representative positions were reconciled.

A request for reimbursement authorization covering features of the new five-year program applicable to most non-exempt employees and excluding Richland Firemen was submitted to the AEC and the authorization was received.

EDUCATION AND TRAINING SECTION

The total number of persons on the Rotational Training Program remains at 56, after two placements and two new hires during October.

Five faculty members from the University of Idaho, and five faculty members from Oregon State College visited Richland during the month and counseled students in the Nuclear School of Engineering.

HEALTH AND SAFETY SECTION

A business review of activities of the Health and Safety Section for the past nineteen months was presented to the staffs of the General Manager and the Manager of Employee and Public Relations.

Health and Safety Section (Contin)

A visit to Caterpillar Tractor Company revealed that management is very well satisfied with results of its mental health program. This program includes psychological measurements as an aid in employee placement, employee counseling and supervisory training.

One major injury in operations brought the yearly total to six and a frequency rate of .42 injuries per million man hours worked. Total injuries were down to 355 for the month continuing the recent favorable trend.

The average daily adult census increased from 54.5 to 55.5 as compared to 68.6 a year ago. This represents an occupancy percentage of 50.9.

Fifty communicable disease cases were reported. This is double last month's number but is about average for this time of the year.

AUXILIARY OPERATIONS AND PLANT PROTECTION SECTION

Two vacant dormitories were made available to appraisal and sales groups associated with the community disposal program. One of these buildings is now occupied by FHA appraisal personnel.

At the request of the Commission, arrangements have been made to vacate approximately 6,500 square feet of GE occupied office space in the Administration Building to accommodate Commission personnel now located in Building 760. GE personnel who are vacating this space will be relocated in Building 760 and other Administration Area buildings.

Security violations decreased from six to three in the 700 Area and from 30 to 22 in the 300 and outer areas. The number of classified documents unaccounted for was reduced from 198 to 197 through one declassification.

On October 7, 1955, security regulations were revised to permit privately owned vehicles to enter limited areas under emergency conditions at times when regular bus transportation is not available.

COMMUNITY SECTION

The Community qualified for the Central Safety Council Safety Award with 1,590,000 lost time, injury free, manhours.

The Community disposal program schedule was outlined to the constituents by the Community Council following a review of the schedule with representatives of AEC-HOO and HAPO. The Schedule briefly provides for: appraisals to start in November, 1955 and be completed in April, 1956; first offerings for sale in June 1956; transfer of the hospital among the first facilities (probably prior to incorporation); and incorporation of the City in July, 1957. Without confirmation from AEC-HOO to date, it is planned to provide full level of maintenance and renovation service to community residents up to the time of first offering for sale. No plans are being made, however, for exterior painting in the spring of 1956.

LLGerman/ib
11/17/55

Employee and Public Relations

PERSONNEL PRACTICES

Employment

September, 1955 October, 1955

Applicants interviewed

1,537

1,335

214 of the applicants interviewed during October were individuals who applied for employment with the Company for the first time. In addition, 74 applications were received through the mail.

September, 1955 October, 1955

Open requisitions

Exempt

-

1

Nonexempt

201

172

Of the 201 open, nonexempt, nontechnical requisitions at the beginning of the month, 138 were covered by interim commitments. Of the 172 open, nonexempt, nontechnical requisitions at month end, 115 were covered by interim commitments. During October, 88 new requisitions were received requesting the employment of 132 nonexempt, nontechnical employees.

September, 1955 October, 1955

Employees added to the rolls

147

127

Employees removed from the rolls

203

69

NET LOSS OR GAIN

-56

+ 58

Separation Rate:

Fiscal Month
September, 1955
Male Female

Fiscal Month
October, 1955
Male Female

1.62% 5.27%

.36% 1.82%

Fiscal Month
September, 1955

Fiscal Month
October, 1955

Over-all Separation Rate:

2.27%

.62%

During October, 10 employees left voluntarily to accept other employment and 1 left to enter military service.

Employee and Public Relations

PERSONNEL PRACTICES

Transfer Data

Accumulative total of requests for transfer received since 1-1-55	711
Number of requests for transfer received during October	51
Number interviewed in October, including promotional transfers	72
Transfers effected in October, including promotional transfers	57
Transfers effected since 1-1-55, including promotional transfers	432
Transfers effected in October for employees being laid off	--
Number of stenographers transferred out of steno pool in October	12
Transfer requests active at month end	353

ADDITIONS TO THE ROLLS

	<u>Exempt</u>	<u>Nonexempt</u>	<u>Community Firemen</u>	<u>Total</u>
New Hires	6	84	--	90
Re-engaged	-	1	2	3
Reactivates	5	27	-	32
Transfers	<u>1</u>	<u>1</u>	<u>-</u>	<u>2</u>
TOTAL ADDITIONS	12	113	2	127

TERMINATIONS FROM THE ROLLS

	<u>Exempt</u>	<u>Nonexempt</u>	<u>Community Firemen</u>	<u>Total</u>
Actual Terminations	10	19	-	29
Removals from rolls(deacti- vates)	6	27	-	33
Transfers	<u>7</u>	<u>--</u>	<u>-</u>	<u>7</u>
TOTAL TERMINATIONS	23	46	-	69

GENERAL

	<u>9-1955</u>	<u>10-1955</u>
Photographs taken	217	180
Fingerprint impressions	91	115

PERSONNEL SECURITY QUESTIONNAIRES PROCESSED

	<u>9-1955</u>	<u>10-1955</u>
General Electric Cases	149	113
Facility Cases	<u>26</u>	<u>18</u>
Total	175	131

Employee and Public Relations

PERSONNEL PRACTICES

The Supervisor-Employment spoke to the Pacific Northwest Business Schools Association at their convention in Yakima, Washington on October 14, 1955. The meeting was attended by approximately 50 members of the organization and it is hoped that some additional contacts were established for recruitment of stenographic personnel.

Advertisements placed in the Yakima, Spokane and Portland newspapers for stenographic personnel the week end of September 25, 1955, netted a few responses. This gives an indication of the tight market for stenographic personnel.

The G. E. Supervisory Selection Program was used for the first time by the Pile Technology Section. Twenty-five candidates were administered the test batteries for the group during the month.

Personnel Records and Investigations

<u>INVESTIGATION STATISTICS</u>	<u>9-1955</u>	<u>10-1955</u>
Cases received during the month	137	144
Cases closed	290	241
Cases found satisfactory for employment	128	147
Cases found unsatisfactory for employment	36	10
Cases closed before investigation completed	10	6
Special investigation conducted	4	9

PERFECT ATTENDANCE RECOGNITION AWARDS

Total one-year awards to date since January 1, 1950	5397
One-year awards made in October for those qualifying in September	34
Total two-year awards to date since January 1, 1950	3095
Two-year awards made in October for those qualifying in September	37
Total three-year awards to date	1823
Three-year awards made in October for those qualifying in September	31
Total four-year awards to date	910
Four-year awards made in October for those qualifying in September	35
Total five-year awards to date	284
Five-year awards made in October for those qualifying in September	15

SERVICE RECOGNITION

Total Service Recognition Pins presented to date	5409
Five-year Service Recognition Pins presented during October to Exempt personnel	17
Five-year Service Recognition Pins presented during October to Nonexempt personnel	30

During October, 12 people whose continuity of service was broken while in an inactive status were so informed by letter.

Employee and Public Relations

PERSONNEL PRACTICES

Employee Services

The following contacts were made with employees during the month:

Employee contacts made at Kadlec Hospital	132
Salary checks delivered to employees at Kadlec Hospital	16
Salary checks delivered to employees at home	2

At the end of the month, participation in the Benefit Plans was as follows as compared with last month's participation:

	<u>SEPTEMBER</u>	<u>OCTOBER</u>
Pension Plan	98.5%	98.5%
Insurance Plan	99.5%	99.5%
Savings & Stock Bonus Plan	53.5%	53.4%
Good Neighbor Fund	70.9%	70.5%

Two employees expired during the month of October, namely:

Joseph E. Kelly	W 9195-6602	10/6/55	Manufacturing
Henry H. Balcer	W 7111-4641	10/28/55	Employee & Public Relations

All necessary arrangements have been made to settle all matters of business in connection with the named deceased employees at an early date.

Two employees retired during the month of October:

Bert Shockley	W 6959	Normal Retirement
Loren I. Hobble	M 7843	Normal Retirement

All matters pertinent to retirement have been discussed with these employees in order that they will be fully informed of their retirement benefits.

A total of 97 new employees attended Orientation Programs given by members of this group during the month of October. Of this number, 100% have signed up to participate in the Pension Plan, 99% have signed up to participate in the Insurance Plan, and 97% have signed up for the Good Neighbor Fund program.

45 letters were written in regard to matters concerning deceased employees and their families during October regarding payment of monies from the Company, and general information.

Employee and Public Relations

PERSONNEL PRACTICES

Military Reserve and Selective Service

Total number of non-veteran employees subject to military service training through Selective Service System

631

Number Classified 1A	149
Number Classified 1AO	1
Number Classified 1D	54
Number Classified 2A	110
Number Classified 3A	230
Number Classified 4A	3
Number Classified 4F	83
Number Classified 2S	1
	<u>631</u>

Number of Technically Trained & Engineering Personnel for whom deferments are currently being requested.

114

Number of Non-Technically Trained & Engineering Personnel for whom deferments are being requested.

	5
Total	<u>119</u>

Accumulated total of deferments requested

1563

Accumulated total of deferments granted

1256

Current number of deferment requests pending

28

Current number of deferment requests denied

0

Current number of deferment requests granted

4

During Month of October

Number of deferment requests pending at Local Board Level

22

Number of deferment requests pending at Appeal Board Level

5

Number of deferment requests pending at Presidential Appeal Level

	1
Total	<u>28</u>

Number of deferment requests denied by Local Boards

0

Number of deferment requests denied by State Appeal Boards

0

Number of deferment requests denied by Presidential Appeal Board

	0
Total	<u>0</u>

Number of deferments granted by Local Boards

3

Number of deferments granted by State Appeal Boards

1

Number of deferments granted by Presidential Appeal Board

	0
Total	<u>4</u>

Employee and Public Relations

PERSONNEL PRACTICES

Military Reserve and Selective Services

Number of Technically Trained & Engineering Personnel denied, or requesting no further appeal, now pending induction 11

Number of Technical Graduates with over two years of deferments 77

Number of Selective Service vulnerable Technical Graduates Enlisted 0

Number of Selective Service vulnerable Technical Graduates Drafted 0

Number of Technical Graduates called to active duty under R.O.T.C. 0
Total 0

Reservists Data - Total Number of Reservists on Roll

Number of Active Reservists 164

Number of Inactive Reservists 506

Number of employees in the National Guard 21
Total 691

Reservists and National Guard members subject to drills, tours of duty, Cruises, Summer Camp and/or Weekly or Monthly meetings 255

Military Service Leaves of Absence - Aug.1, 1950 thru Oct. 31, 1955

Reservists 129

Selective Service System 286

Female Employees Enlisted 8
423

Total number returned to roll 167

Reservists 72
Sel.Serv.System 95
167

Known number not claiming reemployment rights 49

Number of employees still on military leaves 207

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

<u>Suggestion Plan</u>	<u>September</u>	<u>October</u>	<u>Total Since 7-15-47</u>
Suggestion Received	201	219	17964
Acknowledgements to Suggesters	215	216	
Suggestions Pending Acknowledgement	16	19	
Suggestions Referred to Depts. For Investigation	267	255	
Suggestions Pending Referral to Departments	24	22	
Investigations Completed and Suggestions Closed	268	201	
Suggestions Adopted - No Award	1	1	
Adopted Suggestions Approved by Board for Award	75	53	
Total Net Cash Savings	\$6,627.67	\$22,553.89	
Total Cash Awards	\$1,140.00	\$2,715.00	
Total Number Suggestions Outstanding to Departments	504	470	

Cumulative suggestion statistics for the first ten months of 1955, compared with 1954, are:

	<u>1955</u>	<u>1954</u>	<u>Increase</u>
Received	2,343	1,873	25.1%
Adopted	879	586	50.0%
% of Adoption	37.5%	31.5%	--
Awards	\$19,534	\$12,075	61.8%
Savings	\$146,828	\$89,487	64.1%
Award/Savings	13.3%	13.5%	--

Six awards totalling \$1,520 were approved by the Atomic Energy Commission during the month of October.

At a regular Suggestion Board meeting on October 20th, a proposed OPG concerning decentralization of the Suggestion Plan was reviewed by the entire board and it is anticipated that a final draft of the OPG will be issued for distribution to department managers in the immediate future.

At the National Association of Suggestion Systems Convention, October 31 and November 1, HAPO was awarded a plaque for the excellence of its Operation 4-S promotional program. Three plaques of equal value were awarded with Chrysler Corporation and Corning Glass Company receiving the other two plaques.

Life Insurance

Sixty-three requests for code information were received from insurance companies and investigation agencies and furnished during the month of October, 1955. The code information is supplied in accordance with a prearranged plan whereby employees of this project may be insured on the same basis of those working elsewhere.

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

Insurance Statistics

Claims reported to
Department of Labor

September, 1955	
Long Forms	Short Forms
<u>48</u>	<u>484</u>

October, 1955	
Long Forms	Short Forms
<u>42</u>	<u>442</u>

Total Since September, 1946 - 29,553

Claims reported to
Travelers

September, 1955	October, 1955
<u>7</u>	<u>* 10</u>

Total Since September, 1946 - 1,023

Workmen's Compensation

- a. Lucille A. Clark, 8002070 -- Date of Injury: December, 1954; Employer: General Electric Company; Nature of Injury: Arthritis, Right Middle Finger

Following rejection of her claim Mrs. Clark appealed to the Board of Industrial Insurance Appeals contending that breathing of perchlorethylene fumes while at work lowered her resistance to the point where insignificant bumping of her finger caused it to be painful and troublesome. A hearing on the matter was held on October 11th at Richland. Mrs. Clark testified and Dr. T. J. Albertowicz appeared as a witness on her behalf. It was agreed that the case would be suspended for a 30-day period and that unless the claimant advised that she wanted to produce further testimony, the Board would consider that she had rested her case and a further hearing would be scheduled for testimony on behalf of the employee and the Department of Labor and Industries.

- b. Fletcher F. Collins, 8001370 -- Date of Injury: 12-5-52; Employer: General Electric Company; Nature of Injury: Ruptured Intervertebral Disk

Mr. Collins filed a claim with the Department of Labor and Industries for an alleged back injury of December 5, 1952. After rejection of the claim by the Department he appealed to the Board of Industrial Insurance Appeals. Mr. Collins had also filed three other claims with the Department for back injuries which were possibly related to the injury of December 5, 1952. In October the Board ruled that rejection of the claim by the Department of

* Of the claims reported to Travelers Insurance Company during the month of October seven were property damage and three were bodily injury claims.

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

Workmen's Compensation, Continued

Labor and Industries was proper and that Mr. Collins had not shown that he had sustained an injury in the course of his employment. One of the other three claims submitted by Mr. Collins is now outlawed by the statute of limitations, however, the other two remain open and may be set for hearings at a later date.

- c. William J. Mateer, 8001589 -- Date of Injury: 10-16-53; Employer: General Electric Company; Nature of Injury: Dermatitis

Mr. Mateer alleged that he had sustained injuries to his hands and lungs as a result of performing his regular duties as a painter. After his claim was closed with no permanent partial disability award he appealed to the Board of Industrial Insurance Appeals. A hearing on the matter was held in Richland on October 26th and evidence was presented on behalf of Mr. Mateer. A continuance was requested by the Assistant Attorney General in order to present evidence on behalf of the Department of Labor and Industries and the employer.

- d. Woodrow W. Montgomery, 8001879 -- Date of Injury: 6-4-54; Employer: General Electric Company; Nature of Injury: Contusion of Neck

Mr. Montgomery, a fireman in the Auxiliary Operations and Plant Protection Section, sustained a "contusion of the neck" on June 4, 1954 while engaged in the course of his employment. The Department of Labor and Industries allowed his claim and on April 26, 1955 issued an order terminating total temporary disability. Mr. Montgomery was then assigned to a job which was well within his capabilities, however, he refused to report for work and following extended absences he was terminated for unsatisfactory attendance.

Although his Workmen's Compensation claim is still open, Mr. Montgomery brought an action against the Blaw-Knox Company on October 10, 1955. His complaint alleges that Blaw-Knox had negligently failed to provide adequate barricades or lights to warn of a ditch and that as a result the fire truck on which Mr. Montgomery was riding struck the obstacle resulting in his injury. The total amount sought is \$74,875 plus costs.

- e. Benjamin S. Reynolds, 8002050 -- Date of Injury: Indefinite; Employer: General Electric Company; Nature of Injury: Muscle Strain of Back

Mr. Reynolds' claim for a back condition was rejected by the Department of Labor and Industries and he appealed to the Board of Industrial Insurance Appeals. There was no record of an industrial injury on the date the claimant alleged his injury occurred. A hearing on the matter was held in Sunnyside on October 25th and the matter is to be continued to Yakima for additional testimony on behalf of the claimant.

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

Liability Insurance

a. Doris Hall vs. General Electric Company, B-6835992

Mrs. Hall filed suit against the General Electric Company on August 15, 1955 alleging damages in the amount of \$51,250 plus costs and disbursements as a result of an alleged "whiplash" injury sustained when a government bus driven by a General Electric employee bumped the rear of her car. After negotiations, The Travelers recommended settlement in the amount of \$7,500 which was approved by General Electric and the Atomic Energy Commission. We have since learned that Mrs. Hall wants to have another medical examination before accepting the settlement figure.

b. M. T. Powell vs. General Electric Company, B-6835907

Mr. Powell filed a Summons and Complaint on June 2, 1955 alleging loss of vision in the right eye as a result of an injury allegedly caused when he was struck by an ashtray thrown by another employee. The Complaint states damages in the amount of \$25,000. Mr. Powell is a janitor in the Reactor Section of the Manufacturing Department. His deposition was taken on October 17th and trial has been set for December 28th in Federal Court for the Southeastern District of Washington before Judge Samuel Driver, without a jury.

c. Milo Riste vs. General Electric Company and Dr. P. A. Fuqua, B-6835809
Curtis Swearingen vs. General Electric Company and Dr. P. A. Fuqua,
B-6835841

These actions, which were brought alleging negligence on the part of General Electric doctors for failure to properly diagnose a tubercular condition at annual examinations, were argued before the Supreme Court on October 4th. The appeal to the Supreme Court was from a decision of the Superior Court sustaining demurrers filed by our attorneys.

d. Leo Q. Volmer, B-7858017

On December 4, 1954 a fire at 1208 Wright resulted in severe injuries to Mrs. Leo Q. Volmer and subsequent death to two of their children. The Matter was discussed with The Travelers adjuster and he went into the case with our Fire Department personnel. Since the Fire Department investigation did not indicate negligence on the part of General Electric, it was concluded that it was not necessary to file a report to The Travelers. On October 11, 1955 a letter was directed to General Electric by the law firm of Minnick & Hahner of Walla Walla advising that they felt there was negligence involved and that they would like to explore the possibilities of a settlement before filing suit. The matter has been reported to The Travelers for handling.

Technical Recruitment

Six colleges and universities were visited during October in Region five and one in Region four. Coordinated recruiting at these schools has resulted in a total of fifteen offers to be made.

As of September 1, we had 9 acceptances carried over from the 1954-55 season, five are now on the roll. Two of these candidates were added in October.

Experienced recruiting results may be summarized as follows:

<u>Field</u>	<u>Open Invitations</u>	<u>To Visit</u>	<u>Open Offers*</u>	<u>Acceptances not OTR*</u>	<u>Offers Extended*</u>	<u>On the Roll</u>
Engineering:						
Chemical	2		1	1	2	1
Electrical	2		1	3	7	2
Mechanical	1		1	3	5	1
Industrial			1	1	2	1
Civil				1	1	
Geological				2	2	1
Science:						
Chemistry				7	8	5
Physics		1		2	3	2
Math-						
Statistics				2	3	1
Other:	—	—	2	5	9	4
Totals:	3	1	6	27	42	18

*Offer totals include 24 carryovers from the 1954-55 season of which 20 were acceptances not on the roll as of 9/1/55, and 4 were open offers at that time.

Business Graduates

Thirty-one offers have been extended to business graduates. At this time we have received 16 acceptances and 15 rejections. We have only one acceptance not yet on the roll.

PhD Recruiting

Since October 1, 34 new cases have been considered, 4 visit invitations were extended, 3 candidates visited, 4 employment offers were extended, and no acceptances were received. There are 7 open offers, 5 of whom were carried over from the 1954-55 season, and 2 offer rejections were received.

PhD Recruiting (continued)

The 1955-56 recruiting activities to date are summarized in the following table:

	<u>Cases Considered</u>	<u>Invitations</u>			<u>Visited to date</u>	<u>Offers</u>			<u>On the Roll</u>
		<u>Invited</u>	<u>Open</u>	<u>Accepted</u>		<u>Made</u>	<u>Open</u>	<u>Accepted</u>	
New PhD's	76	44	6	34	26	18	7	8	2
Experienced	<u>31</u>	<u>7</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Sub-totals	107	51	8	37	29	18	7	8	2
1954-55 Carryovers	<u>44</u>	<u>41</u>	<u>5</u>	<u>34</u>	<u>20</u>	<u>13</u>	<u>5</u>	<u>8</u>	<u>0</u>
55-56 Totals	63	10	3	3	9	5	2	0	2

Terminations

During October there were 15 terminations of technical or major exempt employees: 6 left for other jobs, 1 to return to school, 1 retired, 7 transferred to other GE sites. Six of the transfers were to APED, San Jose.

Employee & Public Relations

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

During the month of October, Press Relations issued 53 releases. The breakdown by category, distribution and content was as follows:

<u>Subject</u>		<u>Distribution</u>	
Pay and Benefits	16	Hanford Area	41
Employment Services	11	West Coast Area	4
Good Will	4	National	5
Technology and Research	10	Other Special	3
Utilities and Public Works	3		
Safety and Fire	1	<u>Content</u>	
Security	1	Information	5
Real Estate	1	Pictures	1
Education and Library	3	Short	42
Organization Changes	2	Long	5
Police and Fire	1		

The following stories were forwarded to J. D. Morton for placement with national media:

A story about a new robot "laboratory" the size of a small TV set, devised to automatically analyze waste streams at Hanford's plutonium refinery.

A story describing an underwater telephoto camera used at Hanford to automatically photograph radioactive uranium fuel.

Schenectady had requested a supplement to the GE School of Nuclear Engineering story. A story with 13 pictures was sent featuring one of the women students, Barbara Warren, who is studying for her master's degree in chemistry.

A picture with cutlines of a device used at Hanford to automatically analyze a chemical process stream was furnished in answer to a request from Schenectady for material to be forwarded to ELECTRICAL ENGINEERING.

Electronics Park Press Relations requested information about Hanford's closed-circuit color TV system. Two pictures and a story were furnished. The same story and pictures, plus three color transparencies were forwarded to the Schenectady Press Relations office.

A release to the daily list gave highlights of a speech by W. E. Johnson, project manager at Hanford, at the fifth annual pensioner's luncheon at Richland.

The Spokane, Washington SPOKESMAN REVIEW requested material to be used in their 1955-56 Progress Edition. They were provided with a comprehensive roundup of technological progress at Hanford and a color transparency showing closed-circuit color TV in use at the new separations plant.

A release sent to the science-engineering and local list announced that Dr. F. W. Albaugh had been named Manager of GE's Advanced Engineering section at Hanford.

Employee & Public Relations

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

A release sent to the science-engineering and local list described a lecture given at the Everett, Washington Rotary Club by Dr. Paul F. Gast of Hanford. Dr. Gast gave first-hand impressions gained at the UN "Atoms for Peace" Conference.

Releases on the following speeches and technical papers presented by Hanford employees were sent to the local list:

L. L. German's speech to members of the Pacific Northwest Personnel Management Association at Spokane.

Dr. Charles A. Rohrmann's talk to members of the Vancouver Section of the Chemical Institute of Canada.

Technical paper presented by Dr. R. E. Rostenbach to members of Pacific Northwest Sewage and Industrial Wastes Association.

Advance notice of an address by Zane D. Wood, to be made at a meeting of the Pacific Northwest Business Schools Association in Yakima.

Appointment of R.J. Schier to the position of Manager, Purchasing and Stores to replace R. J. Gandy was announced in a local release.

The fifth annual pensioner's luncheon for retired employees from Hanford was described in detail in a local release.

A local release told of an idea submitted through the suggestion plan paying off one and a half years after an employee had left HAPO.

Dale Cook, reporter for the local COLUMBIA BASIN NEWS, requested and was furnished with the latest annual going rate of HAPO payroll; same reporter was furnished varied information about Richland's telephone exchange system.

A local release announced that Community service workers had qualified for their first Central Safety Council Award on October 3.

A story forwarded to library bulletins described the summer reading program for children at Richland's Public Library.

A write-up with pictures covering the ten most-read publications from the Hanford library was sent to the two local papers, various library journals, and ten publications involved.

Stories with pictures on color television, in-line analyses, and a picture showing a GE employee at Hanford using head antenna and throat microphone to report by radio on radiation intensity were sent to Schenectady as suggested material for this year's Highlights report.

Twenty-nine items (ranging from one paragraph to a full page) and eleven illustrations, describing engineering technology and progress at Hanford during 1955, were submitted to the editor of the GE REVIEW for publication in the January 1956 issue of that magazine.

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EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

A group of six photographs which appeared in connection with a GE REVIEW article (July 1955) were sent to the Industrial Editor of DUN'S REVIEW AND MODERN INDUSTRY at her request.

Outline of two articles, "Graphical Reporting of Laboratory Control Analyses," by W. G. Hudson and "Savings Realized by Tailoring Gloves to the Job," by Hilton A. Jones, were approved and have been submitted to our Schenectady office.

An article on the Hanford Graduate School of Nuclear Engineering with a series of pictures was sent to Western Industry for their consideration.

The following manuscripts received all required approvals during the month:

M. B. Larson, "A Method of Analysis of Heat Transfer from a Slug Following a Power Failure Scram," for use at Oregon State College or for future publication.

C. N. Spalaris, "Absorption Properties of Virgin and Irradiated Graphite," for use as a PhD thesis.

J. G. Bennett, "Report on Design and Installation of the Air Raid Warning System at Richland, Washington," written as partial fulfillment for a Professional Engineering License.

Approval was obtained for J. DePangher to transmit a group of photographs of the Van de Graaff positive ion accelerator to the High Voltage Engineering Corporation at the latter's request.

The following papers received all required approvals during the month:

D. G. Miller, "Gamma Absorptometry," for presentation at the local Naval Reserve group, October 11, 1955.

W. C. Roesch and J. DePangher, "A Neutron Dosimeter with Uranium Sensitivity from 0.1 to 3.0 Mev," for presentation at the American Physical Society meeting in Los Angeles on December 28 - 30, 1955, and for publication in the BULLETIN OF THE AMERICAN PHYSICAL SOCIETY.

Dr. W. D. Norwood, "Treatment of Plutonium Poisoning with Zirconium Citrate and with Ca EDTA," for presentation at a meeting on radioelement poisoning at Argonne National Laboratory, October 20, 1955.

C. A. Rohrmann, "Process Engineering Problems in the Hanford Separations Process," for presentation at a meeting of the Vancouver, B. C. Section, Chemical Institute of Canada, October 27, 1955.

L. W. Smith, Jr., "Model Building for Mathematical Programming," for presentation at the second national meeting of the Institute of Management Sciences, New York, New York, October 20-21, 1955.

M. W. Carbon and C. R. McNutt, "Experimental Studies on Steam-Water Pressure Drops in an Annulus with Heat Transfer," for presentation at a meeting of

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the American Institute of Chemical Engineers in Los Angeles, California, February 26-29, 1956.

C. Groat and V. R. Cooper, "Pulse Transmission to a Pulse Column," for presentation at a meeting of the American Institute of Chemical Engineers in Los Angeles, California, February 26-29, 1956.

J. L. Jaech, "Life Testing - m Populations," for presentation at the 5th Annual Statistical Symposium, General Engineering Laboratory, New York, New York, November 15, 1955.

R. G. Wheeler, "Notch Slow-Bend Testing of Zirconium and Zircaloy-2," for presentation at the American Welding Society meeting, Buffalo, New York in May 1956.

W. R. Smith, "Joint Design for Joining Tubes to Tube Sheets for Corrosive Radioactive Chemical Service," for presentation at the American Welding Society meeting, Buffalo, New York in May 1956.

A half page ad was placed in the special edition of the COLUMBIA BASIN NEWS on October 15, 1955.

Although a request for a tour of Hanford facilities for a group of Sunnyside science teachers had to be denied, Public Communications furnished the requester with a wide selection of available educational booklets. He was also informed that we would inform him if the situation on Hanford tours was ever relaxed.

Copies of the September issue of the GE REVIEW, containing an article by Philip D. Reed on Industry's Aid to Educational Institutions, were mailed to the educational leaders on Public Communication's community mailing list.

A community Newsletter was written and distributed to community leaders in Richland, Kennewick, and Pasco.

A new Picture Tour of Hanford was prepared and set up in the lobby of the Desert Inn Hotel in connection with Richland's Farm-City Week activities.

Beginning October 5, the LaPierre report was changed from weekly to daily. This unit now collects information for the report from Employee and Public Relations Department only rather than the entire Operations.

Arrangements for travel, meals, and others were made for a visit of the Military Liaison Committee during the week. This is part of a new continuing assignment to coordinate required arrangements for large groups visiting Hanford.

Charts were produced for use at the educational meetings for employees explaining the revised GE Pension and Insurance Plans.

Help was given in the preparation of a letter recanvassing those not members of the Insurance Plan.

Material was supplied the Department Manager relating to GE employee benefits and welfare program.

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The supervisor-Employee Communications attended the 17th annual conference of the Pacific Northwest Personnel Management Association in Spokane on October 27-29. He also served on the executive board which met in Spokane on October 26 and again on October 29, during which his election as Area Vice-President of PNPMA was announced.

Responsibility for planning and coordinating the General Manager's annual meeting was assigned to Employee Communications, and all departments were requested to submit suggested "topics" for discussion at the meeting.

Carmichael Junior High School auditorium was reserved for the nights of January 24 and 25, 1956, for the General Manager's annual meeting with members of HAPO management. The school cafeteria was also reserved for both nights and preliminary arrangements for refreshments made.

Survey of Manufacturing Sections to determine current value of area information racks was initiated. Inasmuch as no new GE booklets have been available for several months, the racks will be removed unless the various areas indicate a desire to maintain them.

Reports of employee meetings held in each department during third quarter of 1955 were received as requested from each department. Preliminary compilation of these reports into an over-all HAPO report was accomplished.

An additional 1000 copies of the November GE REVIEW issue, which will be devoted entirely to peacetime uses of atomic energy, were ordered to permit distribution of this issue to all exempt employees.

Three Management NEWS Bulletins were distributed during the month, one on October 12 and two on October 21. The second bulletin on October 21 was produced and distributed on a rush basis to provide an advance announcement of reopening of the Prosser barricade to all shifts. Communication of the reopening via telephone to the areas was arranged with the various departments concerned.

A priority message distributed October 31 announced payment of recent salary increases on a current basis to be included in salary checks distributed November 4 to all non-unit nonexempt employees. Priority message of October 4, 1955, announced winning of the Central Safety Council Award by Community people.

Publications in production during the month included: "Horizons at Hanford," Technical Personnel recruiting booklet; "Radiation Protection for You," revision of Radiological Sciences booklet; "Air Tight," respiratory protection booklet for Radiological Sciences; Savings and Stock Bonus Plan information folder for Employee Services, and "About Radiation," booklet for Hanford visitors requested by Radiological Sciences.

Copies of the booklet, "Here's Hanford," were supplied to the Hanford Operations Office for a visit of AEC officials on October 31. Special reprinted copies, together with identification name tags, were prepared and delivered to the Hanford Operations Office for use during the visit of the Military Liaison Committee.

October issues of "Your Manufacturing Month" was produced. October health bulletin, "Loused Weekend," and October safety topic, "No False Alarm," were distributed.

Employee & Public Relations

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Seventeen color slides were prepared for use by the Manager-Employee and Public Relations for an address before the annual convention of the Pacific Northwest Personnel Management Association in Spokane.

At the request of Reactor Section, 50 posters were produced for use during fire prevention displays in the 100-K Area.

Fifteen movie projection engagements were met with showings to 160 employees.

Four 8-page issues of the GE NEWS were produced and distributed during the month. Two of the 4 issues were handled by the associate editor during the editor's vacation. The associate editor was assisted by the EC & PR Communications' - Specialist.

The 32-point "Better Living" program was given major emphasis in all GE NEWS issues during the month. Plant-wide employee meetings on the revised Pension and Insurance Plan were given prominent coverage. Details of the program, plus distribution of the new Insurance Plan booklet were highlighted.

Company viewpoints on Automation and on the future of atomic energy were presented in separate issues. President Cordiner's report during a congressional hearing on Automation in Industry was published in the October 28 GE NEWS issue. Statements by O. B. Falls on future of atomic power were published in the October 7 issue.

Safety was given special GE NEWS emphasis during the month. Items reported included: Community people's winning the Central Safety Council Award; announcement of the start of the annual 200 Area Stampede; and reports in each week's issue of fire prevention activities throughout all areas.

Special editorials and features, in addition to the regular weekly articles, emphasized the need for constant vigilance in preventing security leaks. Special emphasis was given to preventing such violations as open files and unguarded classified documents. This promotion was to back up efforts by Security to curtail a rising trend in security violations.

The problem of unofficial telephone calls between the plant and community was approached through a humorous feature on this subject. Continuing emphasis on this subject is planned. Other special GE NEWS features during the month covered: the new Central Mask cleaning station; cooperation between HAPO management and Steel Companies in supplying highest quality stainless steel; local suggestion award winners; and topping six million dollars in suggestion awards throughout the Company.

Eight questions on rumors, problems and other subjects of general interest were answered in the October "Can You Tell Me?" column.

Artwork for publications produced by the Employee Communications commercial artist during the month included: revised cover of the AEC version of "Here's Hanford" booklet; layout and final art for Savings and Stock Bonus Plan pamphlet; layout for the November safety topic, layout for the pamphlet "Air Tight"; and cover layouts for "Horizons at Hanford" booklet.

Artwork for 17 colored slides for a presentation by the Manager-Employee & Public Relations before the annual conference of the Pacific Northwest Personnel Management Association were prepared. These included 8 colored cartoons and 9 charts with lettering.

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Miscellaneous artwork during the month included extensive air brushing and retouching of News Bureau photos, final artwork for "Signs of the Pioneers" community relations message, color layouts and drawings for the Operation 48 display to be made at the National Association of Suggestion Systems annual convention, and layout and final artwork for "K" area fire prevention poster.

Five GE HANFORD SCIENCE FORUM radio programs were developed and broadcast over a regional radio station during the month.

Five export editions of the radio program INSIDE HANFORD were developed and broadcast over the Eastern Washington network during the month.

A specially developed radio program, THE GENEVA CONFERENCE, using actual recorded excerpts from the GE press conference and television program, was tape recorded and broadcast by the Eastern Washington network during October.

The Second Edition of the script for the motion picture THE KW REACTOR INCIDENT was completed and submitted to Engineering Department officials for review. Film editing is progressing on this project.

The Final Edition of the revised script for the AEC motion picture THE HANFORD REACTOR EXPANSION PROGRAM, and additional filming, was completed this month. The film will be assembled at the California studio early in November, and completion is expected by the middle of that month.

Two live television programs were produced this month by Audio-Visual Communications, and televiewer reaction was exceptionally good.

Arrangements were made by Audio-Visual Communications to provide special tape recordings of the Technical Shops Safe Procedures Forums being conducted for high-level discussions of hazards peculiar to certain shop operations.

Distribution of Graphics October Assignments

	<u>Percent</u>
General Administrative (Including Operations Research)	3
Employee and Public Relations	21
Engineering	26
Manufacturing	21
Financial	8
Radiological Sciences	16
Atomic Energy Commission	5
	<u>100</u>

	<u>September</u>	<u>October</u>
Total Assignments completed	42	53
Total Assignments backlog	44	49

A total of twenty-one visual aids and one hundred place cards were prepared on a rush basis for the Reactor Safeguard Committee Meeting of October 10 and the Military Liaison Meetings of October 26 and 27.

Forty-three speedball flip-over charts were prepared for instructional lectures on the new GE Employee Insurance Benefit Plan. As six sets were required, the aids were pre-

Employee & Public Relations

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

pared on tracing paper and duplicated by means of the Ozalid reproduction process. It is recommended that this method be utilized in the future as the results were highly satisfactory. The reproduction process is fast and by far the most economical.

Twenty-one plates were prepared for slide presentation in the Community and Health and Safety Section Business Review Meeting.

Twenty-nine visual aids were prepared for business review meetings within the Manufacturing Department. Sixteen of the plates were for the Metal Preparation Section Review of October 24, 1955.

Graphic assignments completed for Technical Publications included preparation of twenty-three photo copy plates for document HW-36370 titled "Attenuation Properties of Hanford Pile Shield Materials"; seven photo copy plates of "Gamma Detectors"; ten plates for document HW-38991 on metallurgy research; eleven plates for document HW-38379 on pile material studies; and thirty-one plates for document HW-36718 titled "Uranium Charging During Reactor Operation". Work required for HW-36718 included cut-a-way illustrations of improved inlet and outlet assemblies, flow diagrams, equipment illustrations, charts and photo retouch.

Three figures were prepared for a report titled "Pressure in Pulse Transmission Lines" which is to be released in a Chemical Engineering publication.

Additional funds were requested from the Pile Technology Section in order to continue construction of the Fuel Element Pilot Plant model. Causes of the over-run in costs have been investigated and it is evident that the original plans used for estimating purposes were incomplete. In addition, changes and revisions were made after work started on the model.

Three new letterheads were designed and accepted by the Safety Unit.

A series of illustrations and title plates were prepared for the Audio-Visual Communications Unit to use in a construction progress motion picture of 100-K Area.

A total of 315 photographic assignments were covered for the month of October, 16,236 prints were produced of which 4,038 were "A" and 4,039 were "B" photographs; 8,159 were area and news. 1,390 negatives were exposed.

See attached statistical report for Photography Unit.

PHOTOGRAPHY UNIT
MONTHLY REPORT
OCTOBER, 1955

[illegible]

PHOTOGRAPHY UNIT
MONTHLY REPORT
OCTOBER, 1955

2"	2"	2"	4"	5"	8"	8 1/2"	11"	16"	N	35mm	35mm	3 1/4" X 4"	3 1/4" X 4"	3 1/4" X 4"	16mm
X	X	X	X	X	X	X	X	X	E	Color	B&W	Color	Color	B&W	M.P.
2"	4"	5"	7"	10"	11"	11"	14"	20"	G.	Slides	Slides	Slides	Slides	Slides	Film

7 PLANT	4	42	17												
MAINTENANCE	1	7	7												
FINANCIAL	3	4													
RADIOLOGICAL SCIENCES															
RADIOLOGICAL RECORDS & STANDARDS	1	1													
BIOPHYSICS	7	8	86						33						
BIOLOGY	5	7							41	2		11			
RADIOLOGICAL ADMINISTRATION & COMMUNICATIONS	6	5	25						40	12		10			
A.E.C. SAFETY	6	4	52						38						

TOTALS	315	4056	4208	1030	158	1214	5481	83	6	1390	32	47	133	2350
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	AUGUST	SEPTEMBER	OCTOBER
TOTAL ASSIGNMENTS	322	315	315
TOTAL NEGATIVES	1,024	1,189	1,390
TOTAL PRINTS	11,498	14,918	16,236

Employee and Public Relations

UNION RELATIONS

The definitive details of a Settlement Agreement with the Hanford Atomic Metal Trades Council were reached on September 23, 1955. The month of October has been consumed by meetings of the 21 affiliated local unions for the purpose of voting upon the acceptability of the contract. While an appreciable amount of opposition to the Company's offer was expressed by certain local unions, it appears at month-end that a sufficient number of affirmative votes have been cast to assure ratification.

Contractual details have been worked out with the Guards, Building Service Employees, and the Community Firemen. It is expected that ratification of the Agreements will take place the first part of November.

In June 1955 the regional office of the National Labor Relations Board refused to issue a complaint against the Company in connection with an unfair labor practice charge brought by the HAMTC regarding the closing of the Prosser Barricade. The Council appealed that decision and by letter of October 11, 1955 we were informed that the NLRB General Counsel had sustained the decision of the Regional Board, concurring in its conclusion that there was insufficient evidence of an unfair labor practice to warrant the issuance of a complaint. A plan for restricted operation of the Prosser Barricade during periods of shift change, which had been held in abeyance pending the outcome of this issue, was promptly put into effect.

A law suit brought by the Hanford Atomic Metal Trades Council against the Company in June 1955 charged unilateral disregard for a "working agreement" originating in the 300 Area which had been signed by supervision and a group of Chemical Worker stewards in May 1953. During the course of current negotiations oral agreement has been reached with the Council that the litigation will be withdrawn. The action is subject to the eventual ratification of the 1955-60 Settlement Agreement.

Four meetings with field supervision in Reactor Section were conducted by the Section Manager. This is the first in a series of meetings contemplated to give extensive coverage to a program of reviewing the new contracts, the changes, proper interpretation and application. Some 48 meetings with non-exempt groups, involving approximately 2275 employees, to explain the pension and insurance plans were held by other Union Relations representatives.

Grievance Statistics:

A total of twenty-four (24) grievances were received and no Step II grievance meetings were held during the month. A breakdown of the grievances received and processed follows:

	<u>ALL DEPARTMENTS</u>			Total	Total	
	<u>HAMTC</u>	<u>HGU</u>	<u>BSEIU</u>	<u>Unit</u>	<u>Nonunit</u>	<u>Total</u>
Received this month	22	1	0	23	1	24
Received this year	379	5	1	385	17	402

Employee and Public Relations

UNION RELATIONS

ALL DEPARTMENTS (Cont'd.)						
	<u>HAMTC</u>	<u>HGU</u>	<u>BSEIU</u>	<u>Total Unit</u>	<u>Total Nonunit</u>	<u>Total</u>
Step I						
Pending September 30	0	0	0	0	0	
Settled this month*	16	0	0	16	1	17
Settled this year	264	3	0	267	7	274
Pending October 31	0	0	0	0	0	
Step II						
Pending September 30	42	0	0	42	0	
Settled this month**	0	0	0	0	0	0
Settled this year	108	2	0	110	10	120
Pending October 31	47	1	0	48	0	
Arbitration						
Pending September 30	0	0	0	0		
Settled this month	0	0	0	0		0
Settled this year	0	1	0	1		1
Pending October 31	0	0	0	0		
Total settled this month	16	0	0	16	1	17
Total settled this year	372	6	0	378	17	395

BY DEPARTMENTS

	<u>Received</u>		<u>Settled Step I*</u>		<u>Settled Step II**</u>	
	<u>This Mo.</u>	<u>This Year</u>	<u>This Mo.</u>	<u>This Year</u>	<u>This Mo.</u>	<u>This Year</u>
Manufacturing						
Reactor - Unit	10	170	8	112	0	43
- Nonunit	1	1	1	1	0	0
Separations - Unit	9	103	3	89	0	19
- Nonunit	0	9	0	4	0	9
Metal Preparation - Unit	1	45	3	28	0	12
- Nonunit	0	1	0	0	0	1
Transportation - Unit	1	19	1	11	0	3
Electrical Utilities - Unit	0	4	0	2	0	2
Stores - Unit	0	5	0	4	0	4
Employee & Public Relations						
Community - Unit	0	7	0	2	0	3
Aux. Ops. & Pl. Pro. - Unit	1	20	0	11	0	10
Radiological Sciences - Unit	1	12	1	8	0	0
- Nonunit	0	1	0	1	0	0
Engineering - Nonunit	0	3	0	0	0	2
Financial - Nonunit	0	2	0	1	0	1
Total	24	402	17	274	0	120

*Grievances brought to Step II prior to August 1, 1955 but never processed by the union are, for the purpose of this report, considered settled at Step I.

**Grievances which the union formally indicated their intention to submit to arbitration but have taken no further action since August 1, 1955 are, for the purpose of this report, considered settled at Step II.

Employee and Public Relations

UNION RELATIONS

BY SUBJECTS

Unit	Manufacturing		Emp. & Pub. Relations		Radiological Sciences		Engineering		Financial	
	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year
Recognition	0	1	0	0	0	0				
Discrimination	0	3	0	0	0	0				
Jurisdiction	12	137	0	11	1	2				
Health-Safety-Sanitation	0	11	0	3	0	2				
Hours of Work	1	17	0	3	0	0				
Overtime Rates	3	57	0	3	0	4				
Vacations	0	1	0	0	0	0				
Seniority	3	32	1	2	0	2				
Wage Rates	0	22	0	1	0	0				
Miscellaneous	2	63	0	2	0	2				
Sick Leave	0	2	0	0	0	0				
Grievance Procedure	0	2	0	0	0	0				
Nonunit										
Continuity of Service	0	1	0	0	0	0	0	0	0	0
Overtime Rates	0	0	0	0	0	0	0	0	0	1
Wage Rates	1	7	0	0	0	0	0	1	0	0
Miscellaneous	0	0	0	0	0	1	0	1	0	0
Health-Safety-Sanitation	0	1	0	0	0	0	0	0	0	0
Working Conditions	0	1	0	0	0	0	0	0	0	0
Work Assignment	0	0	0	0	0	0	0	1	0	1
Holidays	0	1	0	0	0	0	0	0	0	0
Total	22	359	1	25	1	13	0	3	0	2

Employee & Public Relations

SALARY & WAGE ADMINISTRATION

In addition to the normal flow of routine work in Salary & Wage Administration, the following work was conducted during October:

1. The quarterly salary administration statistics report was completed and issued to the AEC and to appropriate local and off-site G-E personnel. A special report comparing the status of HAPO with the total G-E Company was also prepared for the AEC.
2. The quarterly revision of the position relationship data sheets was prepared and issued.
3. The quarterly summary of organization changes covering the third quarter of 1955 was issued.
4. A section representative concluded a three-week trip to other Company components during which 29 additional representative positions were reconciled.
5. The revised Exempt Employee Appraisal Guide and Form were submitted to department managers for comment prior to final issuance.
6. A request for reimbursement authorization covering features of the new five-year program applicable to most non-exempt employees and excluding Richland Firemen was submitted to the AEC and the authorization was received.
7. Section personnel participated in meetings with Union representatives regarding assignment of responsibilities and job classifications in an operating facility.
8. Additional comparisons made necessary as a result of supervisory comments on clerical-functional job lists are approximately 75% complete. Paired comparison of secretarial and stenographic jobs are approximately 50% complete. Work on developing appropriate pricing structures for clerical, functional and semi-technical job categories was initiated.
9. The section participated in wage surveys conducted by three outside organizations, and salary range information and related data were exchanged with an outside concern.

Employee and Public Relations Department
EDUCATION AND TRAINING SECTION

The report of the Education and Training Section is submitted as follows:

PERSONNEL DEVELOPMENT PROGRAMS

The technical graduates on the Rotational Training Program are assigned to departments as follows:

<u>Department</u>	<u>Last Month</u>	<u>This Month</u>
Engineering		
Pile Technology	13	12
Separations Technology	7	7
Design	5	3
Project	7	5
Engineering Administration	0	1
Manufacturing		
Metal Preparation	3	2
Separations	8	11
Reactor	9	11
Radiological Sciences		
Biology	0	0
Records & Standards	1	1
Bio-physics	2	0
Radiological Engineering	0	1
Financial		
Procedures & Computing	1	2
	—	—
Total	56	56

There were two placements off the Rotational Training Program, as follows:

Design	1
Reactor	1

Two new trainees reported on the Rotational Training Program during the month. About three others are scheduled to report before the end of the year.

The Technicain Training Program has a total of 29 Engineering Assistants. One employee who had transferred to the Program dropped out, but is still employed at HAPO. Placements are as follows:

Engineering	
Pile Technology	14
Separations Technology	2
Design	1

Employee and Public Relations Department
EDUCATION AND TRAINING SECTION

Manufacturing	
Separations	5
Reactor	2
Metal Preparation	3
Purchasing	1
Employee & Public Relations	
Community	1
	—
Total	29

Four of the trainees have been placed in temporary assignments and six trainees are without security clearance.

SCHOOL OF NUCLEAR ENGINEERING

Fall Semester

On October 6 the course in Mechanical Design held its first meeting. More than 25 attended this session of the class, which was set up specifically for plant design draftsmen. To date nearly all students have paid the course tuition with the total fall enrollment now 530.

During October the following faculty members from the University of Idaho visited Richland to counsel 80 students who wanted to register a course for graduate credit.

Dr. L. C. Cady, Dean of the Graduate School
Dr. W. H. Cone, Head of Physical Sciences
Professor N. F. Hindle, Chairman of Mechanical Engineering Department
Dr. M. L. Jackson, Chairman of Chemical Engineering Department
Dr. J. J. Miller, Chairman of Physics Department

Also visiting Richland were the following faculty members of Oregon State College who counseled 30 G.E. students.

Dr. H. P. Hansen, Dean of the Graduate School
Dr. E. C. Gilbert, Chairman of Chemistry Department
Dr. A. T. Lonseth, Chairman of Mathematics Department
Professor M. Popovich, Assistant Dean of Engineering
Dr. E. A. Yunker, Chairman of Physics Department

Glenn Jones, Director of Washington State College Extension Service, visited Richland to discuss undergraduate credit which many students want.

Oregon State College has notified the school that the present courses and instructors have been approved.

Announcement was made by the school that an M.S. program in Nuclear Engineering was available to qualified students in Richland. Oregon State College is the only school to accept this program so far, and as a result there were over 20 students who discussed this problem specifically with the OSC representatives.

Employee and Public Relations Department
EDUCATION AND TRAINING SECTION

PERSONNEL DEVELOPMENT

Personnel development courses were presented as follows:

<u>COURSE</u>	<u>NUMBER OF TIMES PRESENTED</u>	<u>NUMBER IN ATTENDANCE</u>
Your Stake in American Industry	1	22
Job Relations Development	3	55
Job Methods Improvement	1	9
Job Instruction Training	1	8
Supervisor's Accident Prevention	2	30
Conference Leading	2	24
Principles and Methods of Supervision	1	12
Responsibilities of a Supervisor ("McGregor")	1	25
Secretarial-Stenographic	1	27
Safety Consciousness	1	15

During the first part of the month, staff members worked with the Personnel Practices Section in preparation and scheduling of employee information meetings on revised pension and insurance plans. Following this, further assistance was given by staff members in conducting 16 information meetings with a total of 295 exempt and non-exempt personnel in attendance.

UNIVERSITY RELATIONS

Letters have been written to the following colleges and universities giving a list of talks that Hanford people could give before student professional societies:

Seattle University
University of Utah
Stanford University
University of Colorado
University of California
Montana State College
Reed College

Brigham Young University
Gonzaga University
University of Oregon
University of Idaho
Oregon State College
State College of Washington
University of Washington

EMPLOYEE & PUBLIC RELATIONS DEPARTMENT
HEALTH & SAFETY SECTION
OCTOBER 1955

General

Personnel Changes

Five additions and one deletion resulted in an increase to 220.

Employee Relations

Employee attendance at 49 meetings was 306.

General

A business review of activities of the Health and Safety Section for the past nineteen months was presented to the staffs of the General Manager and the Manager of Employee and Public Relations.

Visits

Mr. Williams and Dr. Norwood attended the National Safety Congress in Chicago. During the same week Dr. Norwood attended and presented a paper at the meeting at Argonne National Laboratory on "Treatment of Radioelement Poisoning." On the same trip he attended the Directors Meeting of the Industrial Medical Association and visited Dr. Vonachen at the Caterpillar Tractor Company to secure information about their mental health program.

Mr. Bakko attended a meeting of the board of trustees of the Washington State Hospital Association and the annual meeting of this association in Spokane.

Industrial Medicine

Dispensary visits increased from 5752 to 6190 while medical examinations decreased from 1125 to 948.

Absenteeism Statistics

	<u>Sept.</u>	<u>Oct.</u>	<u>Year to Date</u>	
			<u>1954</u>	<u>1955</u>
Sickness	1.45%	1.44%	1.58%	1.64%
Total	2.22%	2.45%	2.35%	2.36%

A visit to Caterpillar Tractor Company revealed that management is very well satisfied with results of its mental health program. This program includes psychological measurements as an aid in employee placement, employee counseling and supervisory training.

Safety and Fire Prevention

During the next several months management will stress analysis of specific job hazards, careful instruction of employees and day to day followup by supervisors to insure that each element of each job is being performed as safely as possible. One major injury in operations brought the yearly total to six and a frequency rate of .42 injuries per million man hours worked. Total injuries were down to 355 for the month, continuing the recent favorable trend.

Kadlec Hospital

The average daily adult census increased from 54.5 to 55.5 as compared to 68.6 a year ago. This represents an occupancy percentage of 50.9.

HEALTH & SAFETY SECTION

OCTOBER 1955

General (Continued)

Public Health

Fifty communicable diseases cases were reported. This is double last month's number but is about average for this time of year.

HEALTH & SAFETY SECTION

OCTOBER 1955

Industrial Medical Services

The total number of dispensary visits increased from 5,752 to 6,190. The year to date total is 57,165. There was one major injury and two sub-major injuries among General Electric employees. There were 27 nurses and one nurse aid on the non-exempt roll.

The total number of physical examinations decreased from 1,125 to 948.

A scientific meeting for the Industrial Physician Staff was held on October 26th. Dr. Mankowski reviewed the papers heard at the Washington State Heart Association meeting. One general information meeting was also held during the month.

To help lessen employment and insurance risks on applicants for employment, where there are multiple applicants for a particular job, we are now advising the Employment Section when "other applicant priority" is recommended, in an individual case. This classification is reserved for the questionable or borderline case with objective findings but not of sufficient magnitude to justify medical rejection for employment.

Third quarter absence figures showed that 164 employees had four or more absences as compared to 188 the previous quarter. Of the 164 there were 49 who had four absences or more reported in previous quarters. There were 22 who had six or more absences. These cases are being investigated.

The Health Activities Committee met on October 19th and the Health Topic on "Snoring" was presented. Material on this subject was prepared for distribution throughout the plant. Sickness absenteeism for October was 1.44% - bringing the year to date figure to a total of 1.64%. The comparative figures for 1954 were 1.58% and 1.58% respectively.

Net costs for the month of September increased approximately \$1,250 over the August level due mainly to an increase in salary costs, offset in part by a decrease in other costs. This increase was due to a provision for the recent general salary adjustment and an increase in continuity of service expense from 8% to 9%.

Costs-Operations

	<u>Sept.</u>	<u>Aug.</u>	<u>Increase (Decrease)</u>
Salaries	\$37,084	\$34,711	\$ 2,373
Continuity of Service	3,338	2,777	561
Laundry	134	175	(41)
Utilities, Transportation, Maintenance	4,541	3,800	741
Supplies and Other	4,925	7,862	(2,937)
Total Gross Costs	50,022	49,325	697
Less: Revenue	984	936	(48)
Expense Credits	11,291	11,889	598
Net Cost of Operation	\$37,747	\$36,500	\$ 1,247

HEALTH & SAFETY SECTION

OCTOBER 1955

Industrial Medical Services (Continued)

Costs-Operations (Continued)

While net costs for the first quarter of FY 1956 are approximately \$13,000 below budget levels, it should be noted that gross costs are only \$3,000 less than anticipated. The annual bogey is \$1,000 less than actual costs, however this may be attributed to the heavy travel expense incurred during the quarter which actually represents over 50% of the budget provision for the entire year.

HEALTH & SAFETY SECTION

OCTOBER 1955

<u>Industrial Medical Services (Continued)</u>	<u>September</u>	<u>October</u>	<u>Year to Date</u>
<u>Physical Examinations</u>			
<u>Operations</u>			
Pre-employment	116	84	1230
Rehire	12	9	148
Annual	348	326	2289
Interim	25	20	385
A.E.C.	28	28	264
Re-examination and recheck	152	134	1452
Termination	192	52	933
Sub-total	873	653	6701
<u>Contractors</u>			
Annual	3	3	93
Pre-employment	116	93	1471
Recheck	34	28	438
Re-examinations	0	0	1
Termination and Transfer	62	118	605
Interim	37	53	352
Sub-total	252	295	2960
Total Physical Examinations	1125	948	9661
<u>Laboratory Examinations-Clinical</u>			
<u>Operations</u>			
Government	126	128	1039
Pre-employment, Termination, Transfer	1760	942	21910
Annual	1892	1911	12717
Recheck (Area)	136	139	2118
First Aid	17	17	157
Sub-total	3931	3137	37941
<u>Contractors</u>			
Pre-employment, Termination, Transfer	1162	1314	5250
Total Clinical Laboratory Examinations	5093	4451	43191
<u>X-Ray</u>			
<u>Operations</u>			
Government	9	9	120
Pre-employment, Termination, Transfer	177	120	3087
Annual	421	389	3044
First Aid	85	41	799
Sub-total	692	559	7050
<u>Contractors</u>			
Pre-employment, Termination, Transfer	153	133	657
First Aid	10	10	39
Sub-total	163	143	696
Total X-Ray	855	702	7746
Electrocardiographs	121	146	1175
Physical Therapy Cases Referred	194	109	2196

HEALTH & SAFETY SECTION

OCTOBER 1955

<u>Industrial Medical Services (Continued)</u>	<u>September</u>	<u>October</u>	<u>Year to Date</u>
<u>First Aid Treatments</u>			
<u>Operations</u>			
New Occupational Cases	554	480	5313
Occupational Case Retreatments	2116	1841	18558
Non-occupational Treatments	3001	3770	29666
Sub-total	5671	6091	53537
<u>Construction</u>			
New Occupational Cases	21	25	678
Occupational Case Retreatments	47	65	2137
Non-occupational Treatments	13	9	813
Sub-total	81	99	3628
Total First Aid Treatments	5752	6190	57165
<u>Major Injuries</u>			
General Electric	1	1	6
Contractors	0	0	3
Total	1	1	9
<u>Sub-Major Injuries</u>			
General Electric	3	2	23
Contractors	1	0	3
Total	4	2	26
<u>Nurses Visits</u>			
Calls made	1	0	17
Employee Personal Illness	1	0	14
No. absent due to illness in family	0	0	1
No. not at home when call was made	0	0	2

HEALTH & SAFETY SECTION

OCTOBER 1955

Kadlec Hospital

The average daily adult census increased from 54.5 to 55.5 as compared to 68.6 a year ago. This represents an occupancy percentage of 50.9 broken down as follows: Mixed Service (Medical, Surgical, Pediatrics). 48.6; Obstetrical Service 60.5. A further breakdown of the Mixed Service shows an occupancy percentage of 48.9 on Medical, 44.7 on Surgical and 54.7 for Pediatrics.

It appears that the November census will be lower than anticipated and while every possible action is being taken to compensate for this reduction, it may not be possible to meet the November budget.

The minimum and maximum daily census ranged as follows:

	<u>Minimum</u>	<u>Maximum</u>
Mixed Service	23	55
Obstetrical Service	8	19
Total Adult	37	65

The average daily newborn census increased from 10.3 to 13.8 as compared to 13.0 a year ago.

Nursing hours per patient per day:

Medical, Surgical, Pediatrics	3.89
Obstetrical	4.09
Newborn	2.61

The ratio of inpatient hospital employees to patients (excluding newborn) for the month of September was 2.24. When newborn infants are included, the ratio is 1.38.

The net expense for the operation of Kadlec Hospital for September was \$20,993 as compared with \$15,288 for August. Summary is as follows:

Kadlec Hospital net expense	\$20,993
-----------------------------	----------

This is an increase of about \$5,700 over the month of August. Gross costs increased approximately \$2,950 due largely to a general increase in salaries for all personnel effective August 29 and an increase in the continuity of service charges from 8% to 9%. Revenue declined about \$2,400 due primarily to a change in composition of the patient load. There was also a decrease of \$350 in Expense Credits for the month.

HEALTH & SAFETY SECTION

OCTOBER 1955

Kadlec Hospital (Continued)

Activities of the past 21 months at the hospital were reviewed at a meeting of the General Manager and his department representatives as a part of a Business Review of the Health and Safety Section.

Following is a summary of employee relations meetings held in the Health and Safety Section during the month of October.

	<u>Meetings</u>	<u>Attendance</u>
Hospital	37	233
Industrial Medicine	3	14
Public Health	6	36
Safety & Fire Prevention	1	11
General	<u>2</u>	<u>12</u>
Total	49	306

HEALTH & SAFETY SECTION

OCTOBER 1955

<u>Hospital Unit (Continued)</u>	<u>September</u>	<u>October</u>	<u>Year to Date</u>
<u>Kadlec Hospital</u>			
Average Daily Adult Census	54.5	55.5	58.1
Medical	17.2	18.1	16.1
Surgical	17.5	14.3	21.0
Pediatrics	7.7	10.4	10.1
Mixed	42.4	42.8	47.2
Obstetrical	12.1	12.7	10.9
Average Daily Newborn Census	10.3	13.8	11.1
Maximum Daily Census:			
Mixed Services	51	55	83
Obstetrical	20	19	20
Total Adult Census	71	65	95
Minimum Daily Census:			
Mixed Services	25	23	20
Obstetrical Service	7	8	3
Total Adult Census	36	37	29
Admissions: Adult	420	442	4548
Discharges: Adult	416	454	4553
Medical	101	138	1097
Surgical	183	138	1914
Pediatrics	54	88	751
Mixed	338	364	3762
Obstetrical	78	90	791
Newborn	75	84	735
Patient Days: Adult	1633	1721	17679
Medical	516	562	4902
Surgical	524	444	6380
Pediatrics	230	323	3074
Mixed	1270	1329	14356
Obstetrical	363	392	3323
Newborn	309	427	3361
Average Length of Stay: Adults	3.9	3.8	3.9
Medical	5.1	4.0	3.6
Surgical	2.8	3.2	3.3
Pediatrics	4.2	3.7	4.1
Mixed	3.8	3.7	3.8
Obstetrical	4.7	4.4	4.2
Newborn	4.1	5.1	4.6
Occupancy Percentage: Adults	50.0	50.9	53.3
Medical	46.5	48.9	43.5
Surgical	54.7	44.7	65.6
Pediatrics	40.5	54.7	53.2
Mixed	48.2	48.6	53.2
Obstetrical	57.6	60.5	51.9
Newborn	39.6	53.1	42.7
(Occupancy Percentage based on 109 adult beds and 26 bassinets.)			

HEALTH & SAFETY SECTION

OCTOBER 1955

Hospital Unit (Continued)	September	October	Year to Date
<u>Kadlec Hospital (Continued)</u>			
Avg. Nursing Hours per Patient Day:			
Medical, Surgical, Pediatrics	3.90	3.89	
Obstetrics	3.57	4.09	
Newborn	3.49	2.61	
Avg. No. Employees per Patient (excluding newborn)	2.24		
Operations: Major	47	53	627
Minor	64	65	696
E.E.N.T.	46	18	515
Dental	1	0	7
Births: Live	78	84	732
Still	0	0	11
Deaths	8	1	39
Hospital Net Death Rate	.61%	.19%	.30%
Net Autopsy Rate	37.5	0	35.9
Discharged Against Advice	0	1	6
One Day Cases	140	144	1430
Admission Sources:			
Richland	83.6	86.2	82.5
North Richland	.5	.2	3.8
Other	15.9	13.6	13.7
Admissions by Employment:			
General Electric	80.5	83.2	76.6
Government	3.3	1.8	2.8
Facility	3.1	3.6	5.6
Contractors	1.7	1.4	5.7
Schools	0.7	0.7	1.1
Others	10.7	9.3	8.2
Hospital Outpatients:			
First Aid	527	519	4912
Clinical Laboratory	107	124	1402
Bacteriological Laboratory	51	51	485
X-Ray	156	149	1596
Physical Therapy	178	226	2745
<u>Physical Therapy Treatments</u>			
Outpatient Treatments	178	226	2869
Hospital	62	102	776
Total	240	328	3645
<u>Pharmacy</u>			
No. of Prescriptions Filled	2399	2608	24598
No. of Store Orders Filled	466	552	4965

HEALTH & SAFETY SECTION

OCTOBER 1955

<u>Hospital Unit (Continued)</u>	<u>September</u>	<u>October</u>	<u>Year to Date</u>
<u>Kadlec Hospital (Continued)</u>			
<u>Clinical Laboratory Examinations</u>			
Outpatient Examinations	316	329	3787
Hospital	3377	3489	34136
Public Health	0	0	1
Total	3693	3818	37924
<u>X-Ray Examinations</u>			
Outpatient Examinations	162	165	1651
Hospital	201	199	2042
Public Health	3	4	77
Total	366	368	3770
<u>Electrocardiographs</u>			
Outpatient Examinations	1	0	15
Hospital	19	25	243
Total	20	25	258
<u>Bacteriological Laboratory</u>			
Treated Water Samples	175	172	2011
Milk Samples (Inc. Cream & Ice Cream)	40	38	380
Other Bacteriological Tests	387	443	4462
Total	602	653	6853
<u>Patient Meals</u>			
Regulars	2541	2778	27345
Children under 8	483	643	6358
Specials	978	748	7164
Softs	379	415	5375
Tonsil and Adenoid	85	34	769
Liquids	153	150	1406
Surgical Liquids	61	57	802
Total	4680	4825	49219
<u>Cafeteria Meals</u>			
Noon	1270	1321	14723
Night	253	312	2822
Total	1523	1633	17545

HEALTH & SAFETY SECTION

OCTOBER 1955

Public Health Unit

Communicable disease cases reported doubled the total for September. The fifty cases, however, are not high for this season of the year. Chickenpox and ringworm accounted for 60% of the total with 15 and 14 cases respectively. Two polio cases reported during the month increased the year-to-date figure to six.

To check the spread of ringworm, a letter was sent to parents warning them of the problem, and outlining some protective measures they could take. Local physicians were provided with copies of this letter. A reminder of the state health department regulations concerning ringworm was given schools and physicians.

Field nursing visits showed a 32% increase, distributed rather evenly over several categories - communicable disease, maternity, infant and pre-school and hearing.

A crippled children's clinic was held, with Dr. C. Don Platner, Walla Walla orthopedist, in attendance. He was assisted by a team from the State Health Department, including a nutritionist and social worker, and local staff. Thirty-six youngsters were given diagnostic and followup examinations.

Waring Fitch, conservation of hearing specialist from the State Health Department, visited the unit in conjunction with a program to give hearing aid advice and consultation to affected school children.

W. A. Barratt, Jr., Seattle social worker, interested in employment with the unit visited here and has since accepted the position offered. He will report for duty on December 12th.

The unit's TV programs are continuing and have caused some favorable comment. The October programs demonstrated areas of baby care that are covered in the classes for expectant parents, sponsored by the unit.

Of the 86 contacts made by the social service counselor this month, 37 were directly concerned with family relationships; 19 related to marital conflict, and 18 to difficulties between parents and their children.

Personality and behavior problems were the focus of 35 interviews. There were 12 direct contacts with children and 23 with adults.

One contact was in regard to physical illness and handicap, 3 regarding intellectual retardation and 10 contacts were regarding medical financial problems.

One drive-in restaurant was degraded to a "B" for continued violations of sanitation requirements. Other food handling establishments were found to be satisfactory from the sanitation standpoint. One restaurant changed hands during the month.

HEALTH & SAFETY SECTION

OCTOBER 1955

Public Health Unit (Continued)

Bacteriological tests of pasteurized milk samples continued to meet established standards.

Considerable time was spent during the month checking disinfection and taking samples of new water lines within the community. Bacteriological tests on all water samples collected during the month were approved.

Numerous samples of insects were brought in for identification and proved to be either carpenter ants or carpet beetles. Advice on methods of control was given to the tenants.

The #2 sewage disposal plant was shut down during the month to allow for complete overhaul. All sewage is presently being treated through the #1 plant.

HEALTH & SAFETY SECTION

OCTOBER 1955

Public Health (Continued)	September	October	Year to Date
<u>Education</u>			
Pamphlets distributed	9,990	10,989	113,940
News Releases	8	4	85
Staff Meetings	1	1	9
Classes	6	24	110
Attendance	23	98	1,223
Lectures & Talks	11	15	82
Attendance	220	444	3,441
Films Shown	2	3	123
Attendance	65	105	4,769
Community Conferences & Meetings	21	23	153
Radio Broadcasts	8	12	79
<u>Immunizations</u>			
Diphtheria	0	0	235
Diphtheria Booster	0	0	915
Diptussis	0	0	15
Tetanus	0	0	1
Tetanus Booster	0	0	276
Pertussis	0	0	1
Pertussis Booster	0	0	272
Schick Test	0	0	1
Smallpox	2	2	1,649
Tuberculin Test	7	1	53
Typhoid	0	0	1
Typhoid Booster	1	0	1
Immune Globulin	0	0	93
Other	0	0	1
First Polio Series	0	0	795
Second Polio Series	0	0	476
<u>Social Service</u>			
Cases carried over	34	31	743
Cases admitted	6	9	123
Cases closed	9	1	193
Remaining case load	31	39	673
Activities:			
Home Visits	12	3	27
Office Interviews	96	83	2,414
Conferences	34	19	436
Meetings	6	2	100
<u>Sanitation</u>			
Inspections made	87	74	1,025
Conferences held	25	21	249

HEALTH & SAFETY SECTION

OCTOBER 1955

Public Health (Continued)	September	October	Year to Date
<u>Communicable Diseases</u>			
Chickenpox	0	15	239
Erysipelas	0	0	1
German Measles	3	1	72
Impetigo	2	0	8
Influenza (U.R.I.)	0	0	4
Infectious Mononucleosis	2	0	11
Infectious Hepatitis	0	0	17
Measles	4	1	32
Meningitis	0	0	2
Mumps	1	7	438
Pinkeye	2	0	9
Pneumonia	0	0	1
Polio-myelitis	2	2	6
Rheumatic Fever	0	0	1
Ringworm	6	14	32
Roseola	2	5	26
Salmonellosis	0	0	1
Scarlet Fever	0	4	123
Strep. Infection (Throat)	1	0	42
Tuberculosis	0	0	6
Whooping Cough	0	1	17
Total	25	50	1,088
 Total No. Nursing Field Visits	 202	 266	 3,641
Total No. Nursing Office Visits	42	33	407

COMMUNITY SECTION

OCTOBER 1955

ORGANIZATION AND PERSONNEL:

	<u>BEGINNING OF MONTH</u>		<u>END OF MONTH</u>	
	<u>Exempt</u>	<u>Nonexempt</u>	<u>Exempt</u>	<u>Nonexempt</u>
Community Administration	1	1	1	1
Maintenance & Renovation Unit	9	144	9	145
Police Unit	15	25	15	25
Commercial & Residential Property Unit	7	24	7	25
Fire Unit	50	0	50	0
Transfer Study	1	0	1	0
Community Operations Administration	1	1	1	1
Electrical Unit	4	16	5	15
Engineering Unit	6	4	6	4
Water & Sewerage Utilities Unit	6	24	6	23
Library Unit	4	9*	4	10*
Public Works & Recreation Unit	<u>6</u>	<u>32</u>	<u>6</u>	<u>33</u>
	110	280	111	282

	<u>Exempt</u>	<u>Nonexempt</u>
Additions to Payroll		6
Transfers In	1	7
Removals from Payroll		
Transfers Out		11
Net Increase	<u>3</u>	

*Includes two half-time employees.

MAINTENANCE AND RENOVATION UNIT

October, 1955

	<u>Exempt</u>	<u>Nonexempt</u>
Employees - Beginning of month	9	144
New hires	0	3
Transfers in	0	1
Transfers out	0	3
Employees - End of month	9	145

GENERAL:

Painting of the Richland Public Library was completed on October 5, 1955.

Gga-1

INTERIOR PAINT REPORT - FY 1956

October, 1955

FOREMEN: R. A. CHAMELISS; D. W. LUKINS; M. E. TAPPAN

TYPE UNIT	NO. UNITS SCHEDULED	COMPLETED THIS MONTH	COMPLETED TO DATE	BALANCE TO BE PAINTED
A	403	23	40	363
B	346	40	52	294
C	160	7	9	151
D	2	1	1	1
E	23	1	2	21
F	64	9	9	55
G	5	1	1	4
H	68	13	13	55
K	57	3	4	53
L	37	0	0	37
M	7	0	0	7
Q	28	0	1	27
R	21	0	0	21
S	5	0	0	5
T	0			
U	77	0	0	77
V	183	4	6	177
Y	16	6	10	6
Z	2	0	0	2
LBP	7	2	4	3
2BP	24	3	14	10
3BP	7	2	3	4
Tract	19	0	1	18
LBR Apt.	26	0	0	26
2BR Apt.	69	2	5	64
W-13 Apt.	0			
Dormitories	5	0	0	5
<hr/>				
TOTAL	1661	117	175	1486

10 Units added.

Est. MH B. F.	2822	Actual MH B. F.	2941½
Est. MH This Month	<u>5927</u>	Actual MH This Month	<u>5888</u>
Total Est. MH	8749	Total Actual MH	8829½

PLUMBING SHOP

October, 1955

FOREMAN: F. L. ELSENSOHN

Electric water heaters replaced	10
Laundry trays replaced	20
Miscellaneous plumbing work orders completed	22
Cleared major sewer stoppages caused by tree roots	61
Cleared major stoppages in main sewers for Public Works	3
Plumbing for floor and sink linoleum	80
Steam work orders completed	7
Dormitory radiators completely overhauled	16
Shower stalls replaced	6
Replaced street steps	16
Blacktop walks repaired or replaced	11
Worked on plumbing service orders	52.5 hrs.
Hauled salvage to North Richland	27 hrs.
Service orders - hauling top soil	8 hrs.
Loaned one plumber to Public Works	20 hrs.
Furnished 2 men to screen sand at disposal plant for sand blasting	57.7 hrs.
Furnished 3 men to work at 100-F Area	25.8 hrs.
Furnished men to do routine plumbing and steam- fitting at Kadlec Hospital	

Made routine steam inspection once each week in Government owned commercial facilities, dormitories, and apartments.

Excavated with backhoe machine and handwork for the cleanout out of roots in sewer lines, and to repair all leaking and broken underground piping, and backfilled.

Landscaped where sewers and other lines were dug out and trees were removed, and seeded excavated portions.

SERVICE ORDER CREW

FOREMAN: L. F. CARPENTER

A. Service orders on hand at beginning of month	1238
B. Received during the month	2164
C. Completed during the month	1848
D. On hand at end of month	1554

E. A total of 227.6 manhours were spent on work orders.

F. Backlog of service orders by craft:

Plumbing	591
Electrical	729
Carpentry	<u>234</u>
Total	1554

RENOVATION AND LABOR CREW

October, 1955

FOREMAN: B. C. BAIN

Houses renovated	55
Minor carpenter repairs to renovated houses	43
Trash pick ups	34
Minor repairs to dormitories	9
Renovation minor paint jobs	53
Redecorated following a fire	2
Houses sprayed for insect control	6
Floors cleaned and sealed in renovation houses	12

Provided weekly service of delivering linens and janitorial supplies to occupied dormitories.

Provided weekly pickup and delivery of laundry from various General Electric Company units to Richland Laundry and Dry Cleaners.

MECHANICAL SHOP

FOREMAN: Z. H. MAYBERRY

A. Millwright Crew:

Furnace service orders	291
Routine furnace inspections	130

All cooler pads have been removed from dormitories.

Two light plans have been mounted on wheels to make them portable for use with electric saws in the tree removal program.

B. Sheetmetal Crew:

Installed shower stalls	9
Replaced smoke pipes	15
Furnace orders (sheetmetal work)	11
Installed flashings (for Carpenters)	350 ft.
Replaced gutters	4
Replaced Ranch house wardrobe tracks	48
Replaced metal thresholds	8
Fabricated drip caps	50

Work is presently in progress on a fire truck in the shop.

C. Service Crew:

Tree removal orders completed	51
Topsoil orders	3
Tree limb pickups	11
Sidewalk replacements	9

LINOLEUM AND CARPENTER SHOP

October, 1955

FOREMAN: R. M. MARTIN

Replaced bath wall tile	1
Repaired bath wall tile	1
Replaced bath floor linoleum	7
Replaced kitchen floor linoleum	35
Replaced bedroom floor linoleum	1
Replaced living room floor linoleum	4
Replaced dining room floor linoleum	2
Replaced hall linoleum	1
Replaced steps and landing linoleum	21
Replaced sink top linoleum	60
Repaired sink top linoleum	1
Replaced cupboard linoleum	2
Replaced work bench linoleum	8
Replaced sinks	7
Chempoints	151
Paint touch ups	47
Replaced sink - Kadlec Hospital	1
Replaced sink linoleum - Kadlec Hospital	1
Repaired floor linoleum - Kadlec Hospital	1
Repaired porches	9
Jack & shim	21
Thresholds	1
Raised slabs	10
Sash balances	4
Exterior door repair	9
Interior house repair	190
Repaired siding	2
Repaired roofs	60
Ranch ladders	23
Street steps	9
Replaced screen doors	104
Repaired screen doors	175
Prefab window screens	108
Repaired walls	4
Repaired ceilings	4
Replaced floor boards	2
Sidewalk forms	12
Braced roofs	2

COMMUNITY SECTION
RICHLAND POLICE DEPARTMENT
MONTHLY REPORT
OCTOBER 1955

ORGANIZATION

	EXEMPT	NON-EXEMPT
EMPLOYEES - BEGINNING OF MONTH	15	25
TRANSFERS IN	0	0
TRANSFERS OUT	0	0
NEW HIRES	0	0
TERMINATIONS	0	0
TOTAL - END OF MONTH	15	25

GENERAL

A RECOMMENDATION WAS MADE TO INSTALL TWO MERCURY VAPOR LIGHTS IN THE 1500 BLOCK ON JADWIN, AND ALSO TO INSTALL ONE MERCURY VAPOR LIGHT AT THE CROSS-WALK ON GEORGE WASHINGTON WAY JUST NORTH OF THE NO. 1 FIRE STATION.

TWO TRAFFIC FILMS, ONE IN BLACK AND WHITE, ENTITLED "CHAIN REACTION", AND THE OTHER IN COLOR, ENTITLED "LOOK WHAT YOU'RE MISSING", HAVE BEEN PURCHASED FOR USE IN OUR TRAFFIC SAFETY PROGRAM.

THE FILM "STOP AND GO ON A BIKE" WAS OBTAINED ON LOAN FOR SHOWING TO ALL GRADE SCHOOL AND JUNIOR HIGH STUDENTS IN CONNECTION WITH THE ANNUAL BIKE SAFETY PROGRAM. A TOTAL OF 3,788 CHILDREN VIEWED THE FILM.

MEMBERS OF THE TRAFFIC CONTROL SECTION CONDUCTED TWO TRAFFIC SAFETY MEETINGS THIS MONTH.

THREE CUB SCOUT GROUPS WERE ESCORTED ON TOURS THROUGH POLICE HEAD-QUARTERS THIS MONTH.

SEVERAL MEMBERS OF THE RICHLAND POLICE DEPARTMENT ATTENDED A DEMONSTRATION OF A NEWLY DEVELOPED JUVENILE COURT SYSTEM WHICH WAS HELD IN THE PASCO CITY HALL AUDITORIUM ON OCTOBER 27. THE PROGRAM WAS CONDUCTED BY A STAFF FROM EVERETT, WASHINGTON, HEADED BY JUDGE STIGER, WHO DEVELOPED THE IDEA. NUMEROUS LAW ENFORCEMENT OFFICERS AND JUVENILE PROBATION OFFICERS WERE IN ATTENDANCE.

TRAFFIC

RICHLAND	1955		1954		1955	1954
	SEPT.	OCT.	SEPT.	OCT.	TOTAL TO DATE	TOTAL SAME PERIOD
REPORTABLE ACCIDENTS	20	19	20	19	185	196
PROPERTY DAMAGE ACCIDENTS	17	19	18	16	162	169
INJURY ACCIDENTS	3	0	2	3	23	27
TOTAL PERSONS INJURED	3	0	2	4	27	28
FATAL ACCIDENTS	0	0	0	0	0	0
ACCIDENTS-DAYLIGHT HOURS	18	13	15	12	140	138
DARKNESS "	2	6	5	7	45	58
ACCIDENTS-BUSINESS DIST.	8	6	9	12	58	61
RESIDENTIAL "	11	6	8	6	91	105
OTHER "	1	7	3	1	36	30
ACCIDENTS INVESTIGATED	15	15	16	13	129	126
CRIMINAL COMPLAINTS FILED	10	9	13	8	75	93
VIOLATIONS CONTRIBUTING TO ACCIDENTS:						
NEGLIGENT DRIVING	4	5	5	4	29	37
FAIL. TO YIELD RT. OF WAY	7	10	6	5	61	60
FOLLOWING TOO CLOSELY	1	2	4	4	27	34
DRUNK DRIVING	0	0	0	1	3	3
PEDESTRIAN VIOLATION	0	0	1	1	5	7
INATTENTION TO DRIVING	2	0	1	3	6	5
RECKLESS DRIVING	0	0	0	0	1	5
SPEEDING	0	0	0	0	1	1
UNSAFE SPEED	0	0	0	0	18	21
IMPROPER BACKING	0	0	0	0	6	8
DISREGARDING STOP SIGN	0	1	1	0	5	2
HIT AND RUN	0	0	0	1	0	1
IMPROPER PASSING	1	0	0	0	6	2
IMPROPER TURN	2	0	0	0	5	1
FAILURE TO SIGNAL	1	1	0	0	3	1
WIDE RIGHT TURN	0	0	0	0	1	1
BICYCLE VIOLATION	2	0	0	0	6	3
DEFECTIVE EQUIPMENT	0	0	1	0	2	1
WRONG SIDE OF ROAD	0	0	0	0	1	0
ANIMAL IN ROAD	0	0	0	0	2	0
PASSENGER JUMPED FROM CAR	1	0	0	0	1	0
SIDESWIPE	0	1	0	0	1	0

RICHLAND	1955		AVE. PER ACCIDENT 1955		AVE. PER ACCIDENT 1954	
	SEPT.	OCT.	SEPT.	OCT.	SEPT.	OCT.
ACCIDENT PROPERTY DAMAGE	\$5747.50	\$3630.00	\$287.38	\$191.05	\$259.45	\$301.58

TRAINING

THERE WAS NO RANGE ACTIVITY DURING THE MONTH OF OCTOBER.

ACTIVITIES	SEPTEMBER	OCTOBER
BICYCLES IMPOUNDED	0	10
BICYCLES REGISTERED	82	36
CHILDREN LOST OR FOUND	28	15
COMPLAINTS INVESTIGATED	89	102
DEATHS REPORTED	0	0
DOG, CAT, LOOSE STOCK COMPLAINTS	14	14
DOGS, CATS, OTHER ANIMALS REPORTED LOST/FOUND	5	15
DOORS, WINDOWS, FOUND OPEN IN FACILITIES	55	54
EMERGENCY MESSAGES DELIVERED	9	6
FIRES INVESTIGATED	12	13
GUNS REGISTERED	11	9
LAW ENFORCEMENT AGENCIES ASSISTED	3	4
LETTERS OF INQUIRY	151	195
MISCELLANEOUS DETAILS AND ESCORTS	5	4
PERSONS INJURED BY DOGS	1	1
PLANT DEPARTMENTS ASSISTED	23	32
PRISONERS PROCESSED THROUGH JAIL	7	5
PRIVATE INDIVIDUALS ASSISTED	44	17
PROPERTY LOST OR FOUND	19	19
RECORDS INQUIRIES	31	35
REPORTS PROCESSED THROUGH RECORDS	173	172
STREET LIGHTS OUT REPORTED TO ELECTRICAL	114	157
TRAFFIC SAFETY MEETINGS (OCT. ATTEND. 3,984)	3	13
TOTALS	879	928

MONTHLY REPORT
 RICHLAND POLICE DEPARTMENT
 OCTOBER 1955

OFFENSES	KNOWN	UNFOUNDED	CLEARED OTHER*	CLEARED ARREST
PART I				
1. Criminal Homicide				
a. Murder & Non. Neg. Mans.				
b. Mans. by Negligence				
2. Rape				
3. Robbery				
4. Aggravated Assault				
5. Burg.-Break. & Entry	1	-	-	-
6. Larceny Over \$50.00	6	1	-	-
Under \$50.00	16	-	2	3
7. Auto Theft	1	-	1	-
TOTAL PART I CASES	24	1	3	3
PART II				
8. Other Assaults	1	-	1	-
9. Forgery & Counterfeit	2	-	-	-
10. Embezzlement & Fraud	4	-	1	2
11. Stolen Prop:Buy:Receive	-	-	-	-
12. Weapons:Carry:Possessing	-	-	-	-
13. Prostitution	-	-	-	-
14. Sex Offenses	-	-	-	-
15. Offenses Ag. Fam. & Child	-	-	-	-
16. Narcotics	-	-	-	-
17. Liquor Laws	-	-	-	-
18. Drunkenness	1	-	-	1
19. Disorderly Conduct	-	-	-	-
20. Vagrancy	-	-	-	-
21. Gambling	-	-	-	-
22. Drunk Driving	1	-	-	1
23. Viol. Road & Driving Laws:				
Speeding	16	-	8	8
Stop Sign	17	-	3	14
Right of Way	3	-	1	2
Negligent Driving	13	-	-	13
Reckless Driving	4	-	1	3

OFFENSES

	<u>KNOWN</u>	<u>UNFOUNDED</u>	<u>CLEARED OTHER*</u>	<u>CLEARED ARREST</u>
Defective Equipment	12	-	12	-
Illegal Passing	1	-	1	-
Parking	14	-	10	4
24. All Other Traffic Violations	17	-	7	10
25. All Other Offenses:				
Illegal Shooting	4	-	4	-
Malicious Mischief	5	-	4	-
Disturbance	4	-	4	-
Bike Violations	10	-	10	-
Pickup for Outside Agency	1	-	-	-
Annoying Phone Calls	2	-	-	1
27. Suspicion	1	-	-	-
<u>TOTAL PART II CASES</u>	<u>133</u>	<u>-</u>	<u>67</u>	<u>59</u>

PART III

28. Missing Persons	-	-	-	-
Lost Persons	17	-	17	-
Lost Animals	7	-	5	-
Lost Property	16	-	10	-
29. Found Persons	-	-	-	-
Found Property	42	-	35	-
Found Animals	1	-	-	-
<u>TOTAL PART III CASES</u>	<u>83</u>	<u>-</u>	<u>67</u>	<u>-</u>

<u>OFFENSES</u>		<u>KNOWN</u>	<u>UNFOUNDED</u>	<u>CLEARED OTHER*</u>	<u>CLEARED ARREST</u>
<u>PART IV</u>					
30.	Fat. M.V. Traff. Accid.	-	-	-	-
31.	Pers. Inj. M.V. Traff. Accid.	-	-	-	-
32.	Prop. Dam. M.V. Accid.	19	-	-	-
33.	Other Traffic Accidents	-	-	-	-
34.	Public Accidents	) No Accurate Statistics Kept			
35.	Home Accidents	)			
36.	Occupational Accidents	)			
37.	Firearms Accidents	-	-	-	-
38.	Dog Bites	1	-	-	-
39.	Suicides	-	-	-	-
40.	Suicide Attempts	1	-	-	-
41.	Sud. Death & Bod. Found	-	-	-	-
42.	Sick Cared For	-	-	-	-
43.	Mental Cases	-	-	-	-
<u>TOTAL PART IV CASES</u>		21	-	-	-
<u>COMPOSITE TOTALS</u>					
<u>PART I, II, III, IV CASES</u>		261	1	137	62

Cases listed under "Cleared Other" are those cleared by various means other than arrest, such as: orders from prosecutor, juvenile probation officer or other situations in which a mutual agreement is obtained. They are definitely "cleared" cases and differ from the arrest column only in that there was no arrest.

Property reported stolen	Richland \$2,925.24
Property recovered	Richland \$2,071.25

MONTHLY REPORT		RICHLAND POLICE DEPARTMENT				JUVENILES INVOLVED				OCTOBER 1955		
OFFENSES	NO. CASES	JUVENILES	SEX	6	7	11	12	14	15	16	17	
Mischief	3	7	M	1	2	-	-	-	-	3	1	
Illegal Shooting	1	1	M	-	-	-	-	-	1	-	-	
Larceny	3	4	M	-	1	2	-	-	-	-	1	
Disturbance	1	6	M	-	-	-	-	2	-	4	-	
		4	F	-	-	-	1	1	1	1	-	
TOTALS	8	22		1	3	2	1	3	2	8	2	

RICHLAND POLICE DEPARTMENT
RICHLAND JUSTICE COURT CASES
OCTOBER, 1955

VIOLATIONS	CASES										FINES SUSP.
	NO. OF CASES	NO. OF CONV.	NO. OF FORF.	CASES CONT.	CASES DISM.	SENT. JAIL	SENT. SUSP.	LIC. REV.	ORIG. PREV. MONTH	BAIL FORF.	FINES
INVALID VEHICLE LICENSE	2	1	1							\$ 7.50	\$ 12.50
NO CERTIF. OF REG.	3	2		1					1		15.00
NO DRIVER'S LICENSE	5	4			1						20.00
NO VEHICLE LIC	1	1									7.50
NEGLIGENT DRIVING	14	6	5	3		1	2			150.00	110.00
RECKLESS DRVG	5	2		3			2			100.00	127.50
DRUNK DRIVING	3		1	1					1	52.50	
SPEEDING	8	3	3	2						30.00	37.00
ILLEGAL PARKING	8	3	5						1	17.50	9.50
STOP SIGN	14	8	6							60.00	63.50
FAIL TO YIELD RIGHT OF WAY	5	4		1							100.00
RAN SCHOOLBOY PATROL FLAG	1	1							1		32.50
PERMITTING CHILD TO OPERATE VEHICLE	1	1									7.50
PUBLIC INTOXICATION	2		2							35.00	
PUBLIC NUISANCE*	2	2									32.75
PETTY LARCENY	2	2									25.00
POSSESSION OF STOLEN PROPERTY	1	1				1	1				
TOTALS	77	41	23	11	2	2	1	6	4	\$152.50	\$600.25

1 RAN SCHOOLBOY PATROL FLAG - FINED \$32.50, \$15 SUSP, LIC HELD BY CRT 90 DAYS.

1 NEG. DRVG. - FINED \$27.50, \$15 SUSP, LIC HELD BY CRT 60 DAYS.

1 NEG. DRVG. - FINED \$2.50, LIC HELD BY CRT 30 DAYS.

1 RECKLESS DRVG. - FINED \$52.50, DRVG PRIV SUSP 90 DAYS.

1 RECKLESS DRVG - POSTED \$100, FINED \$75, LIC SUSP 60 DAYS.

2 RECKLESS DRVG - CHANGE OF VENUE.

1 DRUNK DRVG - AMENDED TO NEG. DRVG, BF \$52.50

1 DRUNK DRVG - CHANGE OF VENUE

1 FTYROW - FINED \$2.50, LIC HELD BY CRT 30 DAYS.

** THESE PUBLIC NUISANCE CHGS WERE DEFECTIVE EQUIPMENT.

1 PETTY LARCENY - FINED \$25, \$5 SUSP IF
RESTITUTION IS MADE.

1 PETTY LARCENY - FINED \$25, FINE SUS-
PENDED, PROVIDED HE
DOES NOT APPEAR IN CRT
FOR AN INDEFINITE PER-
IOD OF TIME.

\$ 73.50 (9)

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT
COMMUNITY SECTION
October, 1955

PERSONNEL - COMMERCIAL AND RESIDENTIAL PROPERTY UNIT:

	<u>Exempt</u>	<u>Non-Exempt</u>
Employees - beginning of month	7	24
Transfers In	0	1
Transfers Out	0	0
New Hires	0	0
Terminations	0	0
Employees - end of month	<u>7</u>	<u>25</u>

PERSONNEL - COMMERCIAL AND NONCOMMERCIAL FACILITIES:

	<u>Commercial</u>	<u>Noncommercial</u>	<u>Total</u>
September	1,629	110	1,739
October	<u>1,596</u>	<u>102</u>	<u>1,698</u>
Net Change	-33	-8	-41

SUMMARY OF ROUTINE ITEMS PROCESSED:

	<u>Commercial</u>	<u>Noncommercial</u>	<u>Total</u>
Work Orders	35	4	39
Back Charges	0	1	1
FY Work Orders	132	11	143
FY Back Charges	7	1	8

CONTRACTS AND NEGOTIATIONS:

A. Commercial

1. Leases:

C. D. McGuinness - a ground lease covering the construction and operation of a new and used car sales and service and a service station.

2. Supplemental Agreements

- a. Robert Kaiser - to provide for new rent, separate payment for utilities and services, and incorporation of additional required articles in accordance with lease renegotiation.
- b. Walton Hills Investment Co. - to provide for a new use of premises.
- c. Richland Shoe Salon - to provide for a new use of premises (newspaper office) and a new rent.

3. Business Development:

Invitations to Bid were mailed to 30 prospective Lessees in connection with leasing space in a Government-owned building, formerly occupied by the Elite Shop.

GENERAL:

A. Commercial

1. E. E. Green, Real Estate, opened for business in the L. G. Cook Building in the Westgate Shopping District.
2. Sherwood Jewelers opened for business in the L. G. Cook Building in the Westgate Shopping District.
3. The Parkway Beauty Salon opened for business in the Gray Building in the Downtown Shopping District.
4. Ernie's Typewriter Exchange opened for business in the hutment adjacent to Paul's Inc.
5. J. R. Parcell's Shell Service Station located at the intersection of Goethals Drive and Williams Blvd. opened for business.
6. Fission Chips reopened in the McVicker No. 4 Building.
7. Worley Surveying and Engineering Service opened for business in the Automatic Laundry Co. Building in the Uptown Shopping District.
8. Dale Mathis - Dental Lab. - terminated his lease in the Medical Dental Building.
9. Dr. Otho Simms terminated his lease in the Medical Dental Building.
10. Commonwealth Inc. terminated their sublease in the Automatic Laundry Co. Building.
11. Rita Launer and Miriam Minnear d/b/a Richland Secretarial Service, terminated their sublease in the Automatic Laundry Co. Building.
12. Bolton's Shoes sublease expired in the Diana Langevin Building.

B. Non-Commercial

Sixteen permits for private boat moorage purposes were issued.

COMMERCIAL PROSPECTS:

Inquiries were received during the month concerning the establishment of the following types of enterprises in Richland:

Home Furnishing Store
Warehouse Space

Custom Painting
Drive-In

SUMMARY OF OCCUPANCY AND EXPANSION STATUS:

A. Commercial	<u>SEPTEMBER</u>	<u>OCTOBER</u>
1. Number of Government-Owned Buildings	41	41
a. Number of Businesses operated by Prime Lessees	37	37
(1) Number opened	0	0
(2) Number closed	1	0
b. Number of Businesses operated by Sublessees	19	21
(1) Number opened	1	2
(2) Number closed	0	0
c. Total Businesses in Government-Owned Buildings	56	58
2. Doctors and Dentists in Private Practice	33	32
3. Number of Privately Owned Buildings	81	81
a. Number of Businesses operated by Prime Lessees	49	49
(1) Number opened	0	0
(2) Number closed	0	0
b. Number of Businesses operated by Sublessees	120	121
(1) Number opened	6	4
(2) Number closed	<u>1</u>	<u>3</u>
c. Total Businesses in Privately Owned Buildings	169	170
4. Privately Owned Buildings under Construction	11	10
5. Total Number of Businesses in Operation	225	228
a. Total openings	7	6
b. Total closings	2	3
B. Noncommercial:		
1. Government-Owned Buildings		
a. Churches	1	1
b. Clubs and Organizations	5	5
c. Government Agencies	<u>2</u>	<u>2</u>
Total	8	8

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT - COMMUNITY SECTION

October, 1955

	<u>SEPTEMBER</u>	<u>OCTOBER</u>
2. Privately Owned Buildings		
a. Completed and in Use	11	11
b. Under Construction	5	5
3. Church Plots and Buildings in Private Ownership	6	6
4. Pasture Land Permits	99	99
5. Private Boat Moorage Permits	53	69

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT

TENANT RELATIONS

PROGRESS REPORT

	Orders incomplete as of September 30, 1955	Orders issued 9-30 to 10-31	Total orders incomplete as of October 31, 1955
Service orders	1475	2455	1540
Work orders	1061	704	1252
Service charges		210	

Principal work order loads

	Incomplete as of September 30, 1955	Incomplete as of October 31, 1955
Kitchen cabinet linoleum	79	135
Kitchen floor linoleum	83	84
Bathroom tileboard	12	19
Shower stalls	8	4
Laundry trays	30	39

341 alteration permits were issued as compared to 284 issued in September.

Reverse range & refer	1	Install air conditioner	4
Install automatic washer	40	Install automatic dryer	78
Install TV antenna	34	Install fence	15
Install oil burner	36	Install electrical heat	87
Basement excavation	8	Remove bar counter	2
Install additional wiring	8	Install handrails	1
Install door	3	Install carport	1
Install additional lites	1	Install shelving	1
Install sink	1	Install windows	1
Install partitions	6	Install patio	2
Install garbage disposal	1	Build tool shed	1
Install dishwasher	1	Sand floors	2
Change hot water heater	1	Remove laundry trays	1
Install concrete slab	1	Install gutters	2
Extend porch	1		

1357 inspections were made as compared to 1086 in September.

Alteration permits	220	Basement	9
Bathroom	11	Doors	18
Floors	18	Laundry trays	23
Linoleum	184	Lot lines	32
Paint	149	Porch	6
Range & refer recall	10	Steps & walks	36
Sink	16	Shower stall	2
Toilet seat	7	Trees	42
Walls	11	Windows	19
Yard	6	Renovation rechecks	55
Dormitories	157	Miscellaneous	23
Cancellations	96	Renovations	98
Shows (new tenants)	109		

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT

TENANT RELATIONS

TENANT STORES

<u>Merchandise Issued</u>	<u>Total Amount</u>
Shades	1061
Reflectors	46
Ice cube trays	14
Hydrator glass	9
Meat tender	6
Drip tray	15
Door stops	25
Cooker pot and lid	3
Caulking compound	2
Refer parts	5
Furnace parts	3
Furniture recall	14
Furniture delivery	30
Space heater recall	7
Space heater delivery	7

RECALL AND DELIVERY OF RANGES AND REFRIGERATORS-- MONTH OF OCTOBER

	RECALL		DELIVERY	
	RANGES	REFERS	RANGES	REFERS
A	8 SC	5 TA	4 SC	2 TA
B	2 SC	2 TA	3 SC	4 TA
H	1 SC	1 TA	2 SC	
V		1 GM		1 TA
Y	2 GE	3 GM		1 TA 1 GM
1Br.				1 TA
2Br.	1 SC	6 TA	1 SC	7 TA
3Br.	3 SC	5 TA	2 SC	4 TA
Tract	1 SC	1 TA		
Total	18	23	12	21

Excessed: 1 range, hotpoint, 4 burner; 1 range, 3 burner, AB, No.SC54

Ranges in warehouse 57 SC and 6 GE
 Refers in warehouse 12 TA, 2 GM 6', 2 GM 7' (SO-82)
 Refers in warehouse to be repaired 14
 Refers in 722 hanger to be repaired 17

COMMERCIAL & RESIDENTIAL PROPERTY UNIT
RESIDENTIAL LEASES

OCTOBER 1955
DORMITORY REPORT

Dormitories:

	<u>Beds Available</u>	<u>Vacant Beds</u>	<u>Occupied Beds</u>
Men	477	136	341
Women	381*	128**	253*
Total	858*	264**	594*

*This includes 2 beds used for Dormitory Offices

**This includes 7 beds vacant in Dormitory M 13.

Waiting Lists

	Single Rooms	Double Rooms
Men	0	0
Women	0	0

The following Dormitories are in stand-by condition:

W 16--50 beds	W 15--50 beds	M 7--39 beds
Total beds: 139		

Released for temporary office use: W 21--50 beds W 15--50 beds
Total beds: 100

RESIDENTIAL LEASING

CANCELLATIONS

ALLOCATIONS

Voluntary terminations	9	Houses allocated to new tenants	72
R.O.F	2	Exchanged houses	4
Discharge	0	Moves (within Richland)	39
Transfers	12	Turnovers (divorce, death)	2
Retirement	2	Wherry house move to GE houses	0
Move off project	20	Total leases signed	117
Divorce	0	Total cancellations	100
Death	3	Houses assigned "As Is"	59
Move to W.H.	1	Houses sent to "Renovation"	42
Military Service	2	Applications pending	616
Not Eligible	2		
Medical Leave	2		
Total	55		

RICHLAND HOUSING

HOUSING UTILIZATION AS OF MONTH ENDING OCTOBER 31, 1955
HOUSES OCCUPIED BY FAMILY GROUPS

	Conven.	A&J	T	Pre Cut	Ranch	Pre Fab	Dorm Apt.	A&J Apt.	2BR Apt.	4th Hsg.	Tract	Total
G. E. Employees	2212	266	10	397	880	1125	7	56	59	208	31	5251
Comm. Fac.	104	18	0	26	52	46	0	5	4	9	4	268
AEC	65	28	0	17	35	25	3	3	4	9	2	191
Other Gov't.	11	2	0	0	4	3	0	0	0	0	0	20
Post Office	9	0	0	0	2	8	0	0	0	0	1	20
Schools	65	0	0	6	11	41	0	0	1	1	0	125
Comm. Activities	9	0	0	1	6	5	0	0	0	0	0	21
Med. Facilities	4	16	0	0	1	3	0	0	0	3	0	27
Kaiser Eng.	0	0	0	0	0	0	0	0	0	0	0	0
J. A. Jones	3	3	0	0	3	0	0	0	0	0	0	9
Minor Const.	0	0	0	0	0	1	0	0	0	0	0	1
Not Certified	3	0	0	0	3	4	0	0	0	0	0	10
Total	2485	333	10	447	997	1261	10	64	68	230	38	5943
Ready to Rent	5	0	0	0	1	6	0	0	0	0	1	13
In Renovation	10	0	0	3	2	9	0	0	2	0	0	26
	2500	333	10	450	1000	1276	10	64	70	230	39	5982

	Begin Month	Moved In	Moved Out	End of Month	Difference
Conventional Type	2481	+30	-26	2485	+4
A&J Type	333	+0	-0	333	0
"T" Type	10	+0	-0	10	0
Pre-cut Type	448	+3	-4	447	-1
Ranch Type	995	+17	-15	997	+2
Prefab Type	1249	+55	-43	1261	+12
Dorm Apts.	10	+0	-0	10	0
A&J Apts.	63	+5	-4	64	+1
2BR Apts.	68	+2	-2	68	0
Fourth Housing	229	+2	-1	230	+1
Tracts	42	+0	-4	38	-4
Total	5928	+114	-99	5943	+15

COMMUNITY SECTION
RICHLAND FIRE DEPARTMENT
MONTHLY REPORT

November, 1955

Organization and Personnel

	<u>Exempt</u>	<u>Non- Exempt</u>
Employees - Beginning of Month	50	0
Transfers In	0	0
Transfers Out	2	0
Terminations	0	0
New Hires	2	0
End of Month	50	0

Fire Protection

Fire Loss (Estimated): Government	\$ 116.85
Personal	1,201.00
October Total	<u>\$1,317.85</u>
Year's Total	\$8,193.35

Response to Alarms	30
Investigations of Minor Fires and Incidents	2
Ambulance Responses	13
Inside Schools or Drills	21
Outside Drills	7
Safety Meetings	8
Security Meetings	4
Alarm Boxes Tested	217

Two off-project fire responses were made in October, one on the 4th to assist Kennewick Fire Department with a dwelling house fire at Island View and another on October 17th for an automobile fire on Highway 410, three miles West of the Richland "Y".

Eleven employees attended informational meetings during October on the revised insurance and pension plans.

Fire Department participation in Fire Prevention Week activities included conducted fire station tours for 855 juveniles and adults; five fire truck demonstrations at public schools; seven vehicles in the October 8 parade, and examining 12 Boy Scouts for their Firemanship merit badge awards.

After Fire Prevention Week, 104 students and 13 adults from Public and Parochial schools visited fire stations. Fire Department members gave two

Fire Protection - continued

fire extinguisher and fire alarm demonstrations, as well as a talk on home fire hazards to General Electric employee groups.

Fire companies were dispatched on October 26 and 27 for standby at the AEC Airport for aircraft landing and take-off.

The annual testing of fire department for hose was completed during October with the pressure-testing of 1100 feet of 2 1/2 inch hose.

The Fire Department's residential inspection program was completed during October, except for one house where the tenants were on vacation. A total of 386 inspections were made during the month.

Fire Prevention

A total of 127 buildings were inspected, resulting in 14 hazard reports being submitted.

Organized and conducted the annual fire prevention week program, which resulted in one of the finest campaigns ever conducted in Richland. Some of the highlights of the program were as follows:

1. A spectacular parade on October 8.
2. "Operation's Telephone" by Richland Women's Club.
3. "Baby Sitters Clinic" (4-weeks course) by Junior Women's Club.
4. House of Hazards by VFW Auxiliary.
5. Speaker's Bureau by Fire Department and Toastmasters.
6. Bicycle Slogan contest by Chamber of Commerce.
7. Window display contest by Chamber of Commerce.
8. Gold Badges for children completing inspection forms.
9. All service clubs devoted meetings to Fire Prevention.
10. TV and Radio Programs conducted by Fire Department.
11. Exceptionally fine program in all schools.
12. Skit performed by Jayceettes.
13. Combined meeting of VFW and Auxiliary devoted to Fire Prevention.
14. Extensive newspaper coverage.
15. Special news releases by Fire Department personnel.
16. Distributed 72,000 pieces of promotional literature.
17. Conducted fire drills in all major 700 Area buildings.
18. Conducted fire extinguisher and fire alarm demonstrations for 700 personnel.
19. Open house at Fire Stations.

Compilation was started of scrapbook to enter in the National Fire Protection Association contest in Boston November 30.

COMMUNITY OPERATIONS SUB-SECTION
 RICHLAND ELECTRICAL UNIT
 MONTHLY REPORT
OCTOBER 1955

ORGANIZATION AND PERSONNEL

	<u>Exempt</u>	<u>Non-Exempt</u>
Employees Beginning of Month	<u>4</u>	<u>16</u>
Transfers In	<u>1</u>	<u> </u>
Transfers Out	<u> </u>	<u>1</u>
Terminations	<u> </u>	<u> </u>
Total End of Month	<u>5</u>	<u>15</u>

SYSTEM MAINTENANCE AND OPERATION

Outside Lines

Poles set	<u>4</u>
Poles Transferred	<u>41</u>
Anchors installed	<u>3</u>
Guys installed	<u>3</u>
Street lights installed	<u>0</u>
Mast arms installed	<u>0</u>
Street lights relamped - 1100 Area	<u>160</u>
Street lights relamped - 700 Area	<u>9</u>
Flood lights relamped - 1100 Area	<u>11</u>
Flood lights relamped - 700 Area	<u>14</u>
Stack lights relamped - 700 Area	<u>0</u>
Traffic signals relamped	<u>1</u>
Primary line footage added	<u>0</u>
Primary line footage removed	<u>0</u>
Transformer KVA added	<u>840</u>
Transformer KVA removed	<u>1175</u>
New services installed	<u>1</u>
Services removed	<u>5</u>
Scheduled outages	<u>3</u>
Unscheduled outages	<u>3</u>
Trees Trimmed	<u>37</u>
Stand by and Escort	<u>0</u>

TRAFFIC SIGNALS

Operational failures	<u>1</u>
Installations	<u>0</u>
Removals	<u>0</u>
Routine check R. R. signal at Van Giesen	<u>4</u>
Total signals in operation - automatic	<u>19</u>
Total signals in operation - manual auxiliary controls	<u>5</u>
Total signals in operation - flasher	<u>3</u>

RICHLAND ELECTRICAL UNIT

PUBLIC WORKS ELECTRICAL MAINTENANCE

Electrical motors checked and serviced - irrigation	<u>15</u>
Electrical motors checked and serviced - water	<u>41</u>
Electrical motors checked and serviced - sewage	<u>51</u>

FIRE DEPARTMENT TEST AND MAINTENANCE

Inside circuit and equipment checks	<u>10</u>
Outside circuit checks	<u>6</u>
Inside faults repaired	<u>0</u>
New circuits placed in operation	<u>0</u>
Outside faults repaired	<u>3</u>
New boxes placed in operation	<u>0</u>

SUBSTATIONS

Main feeder and tie breaker checks - BB1S1	<u>4</u>
Main feeder and tie breaker checks - BB1S2	<u>4</u>
Secondary and pad located stations - checked jumpers, cutouts, grounds and general condition	<u>26</u>

METERING - OPERATION, MAINTENANCE, CONSUMPTION AND REVENUE

Voltage and load checks	<u>1</u>
Meters tested - customer's requests	<u>3</u>
New meters shop tested	<u>0</u>
Faulty meters replaced or repaired	<u>1</u>
Damaged meters and covers	<u>0</u>
Residential read-ins	<u>203</u>
Residential read-outs	<u>158</u>
Residential disconnects	<u>15</u>
Residential reconnects	<u>15</u>
Radio interference checks	<u>0</u>
Overloaded meters changed out	<u>18</u>
Routine meter tests	<u>27</u>

Consumption and Revenue:

	<u>No. of Meters</u>	<u>KWH</u>	<u>Revenue</u>
Residential - Schedule 1	6,980	4,125,235	\$45,940.37
Commercial - Schedule 2	<u>417</u>	<u>3,672,147</u>	<u>\$28,269.63</u>
Total	7,397	7,797,382	\$74,210.00

COMMENTS

STREET LIGHTING:

Replaced defective photo-electric controllers on two circuits.
Performed the usual routine relamping, trimming of trees from circuit and station maintenance.

TRAFFIC SIGNAL SYSTEM:

Revised the timing of the traffic signal at the Van Giesen railroad crossing and removed Police Department call-in telephones from the Uptown and Downtown business districts all at the request of the Police Department.
Installed capacitors in all Crouse-Hinds traffic signal controllers so as to eliminate radio interference and to prolong the life of the contacts.
Called out one man and foreman to repair traffic signal controller at Community House.
Performed routine maintenance on all traffic signals and controllers.

FIRE PROTECTION SYSTEM:

Performed routine auxiliary circuit tests and maintenance to Dental Building, Medical Center, Desert Inn and community dormitories.
Repaired defective fire alarm box No. 251.
Performed routine maintenance and repair for 4 master fire alarm boxes, main control board and the battery banks at the Central Fire Station.
Repaired damaged fire alarm conduit and wiring at Spalding School master box.

WATER SYSTEM:

Repaired defective water pressure control at Ditch Riders residence at Korn Rapids Dam.
Disconnected 3000 area well motors as required by pump maintenance crew.
Performed weekly routine maintenance and servicing of electrical installations at domestic and irrigation wells.

SEWAGE TREATMENT AND DISPOSAL SYSTEM:

Repaired broken conduit to motor at sewage treatment plant.
Replaced broken wire to pilot lamp on 440 volt control panel at No. 2 Pump House at sewage treatment.
Overhauled Detritor pump motor and installed two new bearings.
Performed routine inspections, maintenance, relamping, connecting and disconnecting of electrical motors as required.

GENERAL COMMUNITY MAINTENANCE:

Connected and disconnected paint buses and services to houses as required by Community Maintenance.
Installed 2 Unifan heaters at the 722 Hangar and removed one florescent fixture for maintenance.
Performed motor overhaul on floor buffer at Community House.
Repaired loose connection to main switch at W-20 Building.

SUBSTATION AND METER MAINTENANCE:

Replaced illegible old high voltage signs with new signs on substation fences. The remainder of the signs will be replaced as soon as new signs are available. An investigation is being made as to relative cost of repainting old signs or purchasing new.

Performed routine transformer maintenance as required.

Completed routine cleaning and calibration of all feeder relays in both main substations.

Performed routine inspection and maintenance of all 115 and 7.2 KV substations. Returned to Stores approximately 1/2 the substation maintenance inventory. It is the intent of the substation maintenance crew to use Central Stores as much as possible for their material.

Performed routine meter maintenance and increased capacity of watthour meters where required due to new house heating installations, primarily in the ranch house district.

Disconnected and reconnected upon proper payment 15 residential customers because of non-payment of bill.

OUTSIDE LINE MAINTENANCE:

Completed pole line rebuild #1 and #2 which resulted in a net reduction of 335 KVA in transformer capacity due to better utilization of transformers. To complete these two pole line rebuilds it was necessary to have three scheduled outages. An unscheduled outage occurred to eight houses on Fries Street because of failure of foreman to take into account different phase connections of transformers during cut-over period on one of the rebuilds; length of outage was result of people affected thinking the unscheduled outage was a part of the scheduled outage and not reporting it until 12:15 pm.

Reviewed stocking and distribution of line material and procedure for control of this material. Steps have been taken and are being taken to improve the situation and to comply with recommendations of Inventory Accounting.

Two call outs were required because of blown fuses on transformers due to footballs being kicked into secondaries and one due to customer being disconnected because of an accounting error.

Bare secondaries, which are easily knocked together by footballs and the like, are being replaced with insulated wire as time permits.

A two hour outage was required at Curtis Sand and Gravel to overhaul transformer station and provide clearance to Curtis Sand and Gravel for their electrical maintenance.

Removed services to tract houses at 1825 Kadlec Road, 1007 and 1107 Lee preparatory to excessing houses.

Installed 1-37½ KVA and 1 - 15 KVA transformer in rear of Farmers Market to serve commercial area along 1100 block on Lee.

Reviewed Bonneville Power Administration's plans for the Benton-Richland 115 KV line reroute along Thayer and Stevens Drive. Made estimate for work to be performed by Richland Electrical Unit on transfer of facilities but no commitment has been received from either AEC or BPA on who will pay for transfer. Work is presently scheduled to start in February 1956.

CALL OUTS:

Five weekly men and four monthly men were called out during the month.

COMMUNITY OPERATIONS SUB-SECTION
ENGINEERING UNIT
MONTHLY REPORT
OCTOBER 1955

<u>PERSONNEL:</u>	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>
Employees Beginning of Month	6	4	10
Transfers Out	0	0	0
Transfers In	0	0	0
Terminations	0	0	0
Total End of Month	6	4	10

BUILDING PERMITS ISSUED IN OCTOBER

1. R. H. Jack - Carport - 1421 McPherson
2. Samuel C. Russell - Accessory Building - 303 Thayer Drive
3. O. Mageeshon - Hobby Shop - 2004 Trippe
4. A. B. Cambalski - Garage - 1220 Cottonwood Drive
5. P. H. Hutton - Carport - 1502 Perkins
6. 2 Sign Permits

NEW MUNICIPAL CONSTRUCTION STARTED IN OCTOBER

NONE

NEW PRIVATE CONSTRUCTION STARTED IN OCTOBER

R. H. Jack - Carport - 1421 McPherson
Samuel C. Russell - Accessory Building - 303 Thayer Drive
O. Mageeshon - Hobby Shop - 2004 Trippe
A. B. Cambalski - Garage - 1220 Cottonwood Drive
P. H. Hutton - Carport - 1502 Perkins

PRIVATE CONSTRUCTION COMPLETED IN OCTOBER, OR ON WHICH FINAL INSPECTION MADE

NONE

ENGINEERING JOBS COMPLETED IN OCTOBER

G-01015 - Water Service to Commercial Users (7 locations)

STATUS OF ENGINEERING UNIT PROJECTS

G-01015 - Water Service to Commercial Users (7 locations) - Complete. Physical completion prepared.

STATUS OF ENGINEERING UNIT PROJECTS (Cont.)

- G-01018 - Relocation of 20" Meter at 300-F Wall - Construction 50% complete.
- G-02171 - Automatic Bar Screens Sewage Lift Station - 20% complete. All equipment on job site.
- G-02197 - Water Meter Installation for 300 Area Supply Lines - Material on order. Excavation made. Material due first week in November.
- G-03629 - Replacement of Thin Wall Steel Water Lines (FY 1955) - Construction 85% complete.
- G-03641
(Formerly C-0579) - Harris Avenue, Gaillard Place & Hains Avenue Extension - Design 75% complete.

STATUS OF ACTIVE ENGINEERING WORK ORDERS

- C-0572 - Study of Drainage Ditch from Swift Blvd. to Origin on Wellsian Way - 80% complete. Design delayed for pressing construction work.
- C-0580 - Design & Installation Water, Sewer on Wellsian Way - Scoping 99% complete. Project proposal prepared at request of A.E.C.
- C-5108 - Furnish Plat & Legal Description for 1125 Warehouse - 50% complete.
- C-9455
(Supersedes ESR I-91024) - Retirement of Irrigation Canal - Design 75% complete. Delayed for rush work on completion of city plat.
- C-9457
(Supersedes ESR I-91014) - Retirement of Separate Irrigation Canal - Design 90% complete. Delayed for rush work on completion of city plat.
- C-11460 - Plat and Legal Description, Christian Science Society - 90% complete.
- C-11461 - Revise Legal Description of 11 Churches - 80% complete.
- C-81020 - "As Builts" - Phase III - Scope of work twice increased during month. Overtime being employed, and personnel have been borrowed from the Engineering Department to meet the schedules set by A.E.C. to co-ordinate with F.H.A. appraisal work for sale of city property.
- C-81384 - Plot Lot Lines on Utility Drawings from Plats of Richland - 90% complete. Work is being rushed in coordination with job C-81020.
- C-81578 - Basin Located West of No. Richland Recharge Basin - Design 95% complete. Work has been delayed by pressing construction work.
- C-95450 - Replace Lot Line Corner Stakes - an open active file. Work being performed as requested.

STATUS OF ACTIVE ENGINEERING WORK ORDERS (Cont.)

C-98020 - Plat and Legal Description, Vacant Lot So. of Morgan's Warehouse - 90% complete.

C-98054 - Legal Description "Rose Garden" - 95% complete.

BUILDINGS UNDER CONSTRUCTION

Assembly of God Church - 99% complete. Final inspection to be made.

Plans, Specs., Inspections, All Saints Episcopal Addition - Construction 70% complete. Work progressing on schedule.

First Baptist Church (Richmond & Raleigh Sts.) - 92% complete. No progress this month.

Plans, Specs., Inspections, Christ of King (Catholic) - Construction materially complete and buildings occupied.

Plans, Specs., Inspections, L. G. Cook Bldg. - 95% complete. Work progressing slowly.

Plans, Specs., Inspections, Johnny's Drive-In Farmers Market - 90% complete. Work progressing very slowly.

Plans, Specs., Inspections, Shell Oil Company Service Station - Final inspection to be made. Open for business.

Plans, Specs., Inspections, Style-Rite Painting and Decorating - Final inspection to be made. Open for business.

Plans, Specs., Inspections, Parker Hanson Bldg. - Construction 35% complete. Work progressing slowly.

Plans, Specs., Inspections, Davis Furniture Company Alterations - Complete. Final inspection to be made.

Plans, Specs., Inspections, Davis Furniture Company Addition - 60% complete. Work progressing slowly.

Plans, Specs., Inspections, Moore's Service Station - Wright & Van Giesen - 50% complete. No progress this month.

Plans, Specs., Inspections, Parcell's Service Station, Wellsian Way - 50% complete. Work progressing slowly.

Plans, Specs., Inspections, True's Oil Company (Old "Rose Garden" site) - Plans submitted for review.

COMMUNITY OPERATIONS SUB-SECTION
PUBLIC WORKS AND RECREATION UNIT
MONTHLY REPORT
OCTOBER 1955

<u>ORGANIZATION AND PERSONNEL</u>	<u>Exempt</u>	<u>Non-Exempt</u>
Employees Beginning of Month	6	32
Transfers Out	0	4
Transfers In	0	4
New Employees	0	1
Terminations	0	0
Total End of Month	6	33

ROADS AND STREETS

The two approaches to the commercial parking lot in the 700 Block on Goethals Drive were improved. Catch basins and siphons were installed to correct the drainage problem at this location.

Broken and settled curbs were replaced at five (5) separate locations on the city streets. The locations were 28 Duane, the intersections of Thayer and Putnam, Thayer and Torbett, Torbett and Sanford, and Perkins and Van Giesen. Total overall length of curb replaced was 74 lineal feet.

Street cleaning was resumed during the month, with a total of 101 cubic yards of debris removed. Total mileage travelled was 315 miles.

Sterilization of road shoulders was started and 3 miles were covered using a soil sterilant for this work.

Clean up of catch basins and storm sewers was completed throughout the city during the month in preparation for the seasonal run-off anticipated during the coming fall, winter, and spring.

Street patching was continued as required.

All secondary roads were bladed following the fall rains.

The Scoopmobile used for loading materials was out of service during the entire month for engine repair.

Total materials handled this month are as follows:

PUBLIC WORKS AND RECREATION UNIT

ROADS AND STREETS (Cont'd.)

1. Blacktop - 54 tons
2. 3/4" Minus Rock - 36 cubic yards
3. Pitrun Rock & Gravel - 340 cubic yards
4. Street Refuse Removed - 101 cubic yards

Total - 531 cubic yards

One serviceman was added to the Road and Streets crew which gave this crew a full complement of men.

A request was made to the Transportation Section to purchase an additional street sander to be used on the city streets during the coming winter.

SANITATION

The total weight of garbage and trash collected and disposed of during the month was: Residential, 780 tons; Commercial, 217 tons; Trash Wagons, 125 tons; for a total of 1,122 tons.

The heavy equipment at the Disposal Pit was used for site improvement of the boat ramp at the end of Bradley Road during slack periods.

Two (2) new signs were placed at the Disposal Pit to facilitate the more orderly dumping of trash by residents at the Pit. A number of the residents are becoming careless in the handling of the garbage, and news articles will be submitted during the coming month requesting their cooperation in cleaning and repairing their garbage cans and in wrapping their garbage.

A request was made to the Transportation Section to replace one (1) D-7 Caterpillar Tractor with a D-8 for a more efficient operation at the Disposal Pit.

PARKS AND PUBLIC GROUNDS

The boat ramp at the end of Bradley Road was widened and renovated in order to accommodate the heavy usage this ramp receives. Approximately 100 loads of rock were used on the upstream side to prevent further erosion of the ramp and the enlarged section stabilized.

PUBLIC WORKS AND RECREATION UNIT

PARKS AND PUBLIC GROUNDS (Cont'd.)

All hose and sprinklers were removed from public areas and placed in storage for the winter. Due to the limited amount of inside storage now assigned to the Public Works and Recreation Unit, all irrigation equipment was stored outside in the 700 Area.

The winterizing of all irrigation lines and irrigation systems serving the public parks areas and shelter belts is completed.

The comfort stations at Riverside Park and Columbia Playfield were drained and winterized for the coming winter season. These buildings will be closed until spring.

All mowing equipment was turned back to the Transportation Section and placed in storage for the winter.

Clean up and burning of weeds and debris in public areas was started during the month.

Approximately 50 bushels of grain rye was purchased and approximately 25 acres of eroding open areas were seeded. Seeding will continue into next month.

Two (2) large, dead Poplar trees were removed from Riverside Park and some necessary pruning of the trees in the park was accomplished during the month.

Tree planting at Riverside Park, north of Lee Boulevard in the newly developed section, was started.

RECREATION

General

The Public Works and Recreation Unit and the Richland Youth Council fall and winter activity program began on Monday, October 3. The program consists of Arts and Crafts, Elementary and Junior Square Dancing, Tumbling, Fencing, Ballroom Dancing, Archery, Photography, and the Elementary Movies.

The FHA Appraisal Group vacated their temporary office space at the Community House during the month and moved to Dormitory W-16.

The Washington State Recreation Society's fall meeting held at Yakima, Washington, was attended by John Maruca, Recreation Supervisor of this unit.

PUBLIC WORKS AND RECREATION UNIT

RECREATION (Cont'd.)

General (Cont'd.)

Satisfactory progress is being made on the relocation of private boats on the Riverside Park waterfront. To date 53 boat owners have been organized into four (4) clubs and have selected their tentative sites.

Attendance Statistics - October 1955

	<u>No. of Sessions</u>	<u>Youth</u>	<u>Adults</u>	<u>Sub Total</u>
<u>A. Community House</u>				
American Red Cross	1		154	154
Arts & Crafts	9	79	48	127
A.S.M.E.	1		16	16
Atomic Energy Commission	1		20	20
Boy Scouts	4	37	54	91
Camera Club	1		15	15
Campfire Girls	2	20	45	65
City Council	2		455	455
Community Council Committee	1		15	15
Cyclists Shop	1	7	9	16
Elem. & Jr. Square Dancing	4	635	102	737
Elementary Movies	4	653	102	755
Fencing	5	6	53	59
F.H.A. Appraisal Group	14		42	42
Games Room	25	1 418	284	1 702
Girl Scouts & Leaders	6	61	139	200
Hi Spot	9	2 733	35	2 768
International Folk Dancers	2	7	20	27
Junior Sportsmen	1	18		18
League of Women Voters	1		24	24
National Little League	2		50	50
Orthopedic Guild	1	15	80	95
Pre-School PTA Group	1	10	40	50
Rec-A-Teers	4		525	525
Richland Rod & Gun Club	1	25	275	300
Richland Women's Club	1		27	27
Richland Youth Council	1		7	7
Social Security	2		53	53
Stamp Clubs	2	4	15	19
Tri-City Herald	1	35	3	38
Tumbling	4	222	54	276
Total Community House	114	5 985	2 761	8 746

PUBLIC WORKS AND RECREATION UNIT

Attendance Statistics - October 1955 (Cont'd.)

	<u>No. of Sessions</u>	<u>Youth</u>	<u>Adults</u>	<u>Sub Total</u>
B. <u>Parks and Playgrounds</u>				
Wellsian Lake	31	1 200	150	1 350
Hi School P.E. Classes (Columbia Playfield)	22	6 600	44	6 644
Memorial Softball Field (Camporee)	2	300	175	475
Scheduled Picnics	12	190	158	348
 Total Parks and Playgrounds	 67	 8 290	 527	 8 817
C. <u>Summary</u>				
Community House and Parks and Playgrounds total for October 1955	<u>181</u>	<u>14 275</u>	<u>3 288</u>	<u>17 563</u>
 Calendar Year to Date				<u>313 011</u>

COMMUNITY OPERATIONS SUB-SECTION
WATER AND SEWERAGE UTILITIES UNIT
MONTHLY REPORT
OCTOBER 1955

ORGANIZATION AND PERSONNEL

	<u>Exempt</u>	<u>Non-Exempt</u>
Employees Beginning of Month	6	24
Transfers Out	0	1
Transfers In	0	0
New Employees	0	0
Terminations	0	0
Total End of Month	6	23

DOMESTIC WATER

Normal operations and routine minor maintenance were continued throughout the month. Several water main shutdowns were made to facilitate tie ins in connection with the contractors work in replacing sections of thin wall steel water mains. This work is nearing completion and the contractor is starting work on 3000-F well meter change and on installation of meters on the 300 Area supply lines.

Well pumps number 3000-5 and 3000-E were taken out of service during the month and scheduled for overhaul.

A six inch by one and one half inch compound water meter was installed in the water supply line to Spaulding Elementary School on October 14th. This meter is to be used as a guide in estimating school district water consumption.

DOMESTIC WATER DATA

	<u>Well Production</u>	<u>Av. Da. Prod.</u>	<u>Total Consumpt.</u>	<u>Av. Da. Cons.</u>
Richland	28,370,000	915,100	138,023,800	4,452,300
North Richland	150,590,000	4,857,700	29,278,000	944,400
Columbia Field	64,693,800	2,086,800		
300 Area			76,602,000	2,471,000
Total	243,653,800	7,859,600	243,903,800	7,867,700

Maximum daily production 13,117,400 gallons on October 2, 1955

Maximum daily consumption 12,367,400 gallons on October 2, 1955

WATER AND SEWERAGE UTILITIES UNIT

SEWERAGE SYSTEM

The sewerage system and treatment plant operation have been abnormal throughout the month. The 24" Swift Blvd. sewer main into the lift station has been bypassed into the north trunk sewer line to facilitate contractors work on mechanical Bar Screen installation.

The number two sewage treatment plant was taken out of service on October 8 for routine inspection and maintenance. On inspection of the main units of equipment at this plant it was found that the protective coatings of paint that had been put on the equipment had failed and the metal surfaces were deteriorating more rapidly than normally expected. Because of the conditions found, a program of thoroughly cleaning and applying a good grade of protective paint was commenced and is about 70 per cent complete at present.

To facilitate the inspection and maintenance work on the number two plant the entire sewage flow is being processed through the number one plant.

SEWAGE DATA

Plant No. 1 Total Flow	101,530,000	Average Daily Flow	3,275,100
Plant No. 2 Total Flow	3,266,000	Average Daily Flow	105,300
Total Flow	<u>104,796,000</u>		<u>3,380,400</u>

IRRIGATION SYSTEM

The irrigation canal and all irrigation pumping stations were shut down on October 7. Winterizing work on the irrigation distribution systems is presently in progress.

Annual maintenance and cleaning of the irrigation canal system has commenced.

COMMUNITY OPERATIONS SUB-SECTION
RICHLAND PUBLIC LIBRARY
MONTHLY REPORT
OCTOBER 1955

<u>ORGANIZATION AND PERSONNEL</u>	<u>EXEMPT</u>	<u>NON-EXEMPT</u>
Employees beginning of month	4	9
Transfers in	0	0
Transfers out	0	0
New hires	0	0
Terminations	0	0
End of month	4	9

GENERAL

Circulation

Books	18,429
Magazines	534
Pamphlets	152
Records	1,340
Inter-library loans	28
Grand total	20,483

Current Book Stock

Books added this month	559
Books withdrawn this month	91
Grand total	36,388
Phonograph records added	8
Phonograph records withdrawn	1

Registration

Adult	160
Juvenile	57
Grand total	217
Total registered borrowers	20,350
Meetings in North Hall	13
Children's Story Hour attendance	947 (Pre-school - 736 Elementary - 211)

Two hundred and fifty-two children attended the special Halloween story hours held on October 25 and 26 for the pre-school children and on October 31 for the elementary school age children. Decorations, candy and costume prizes for these special story hours were made possible by the sponsorship of the children's special activities program by the Richland Chapter of the American Association of University Women. It is interesting to note that this month's attendance (947) at children's story hours is the largest it has ever been and exceeds that of a year ago by 346.

AUXILIARY OPERATIONS AND PLANT PROTECTION SECTION

MONTHLY REPORT - OCTOBER 1955

ORGANIZATION AND PERSONNEL

Number of employees on payroll:

	<u>Beginning of Month</u>	<u>End of Month</u>	<u>Increase</u>	<u>Decrease</u>
Staff	2	2		
Administration Area Maintenance	104	103		1 (a)
Security and Patrol	468	464		4 (b)
Fire Protection	132	130		2 (c)
Office Auxiliaries	117	115		2 (d)
Telephone	85	80		5 (e)
	—	—	—	—
TOTALS	908	894		14

NET DECREASE: 14

(a) - Administration Area Maintenance

1 Transferred in
1 Deactivated
1 Transferred out

(b) - Security and Patrol

1 Reactivated
1 Transferred out
2 Deactivated
2 Terminations

(c) - Fire Protection

2 Transferred out

(d) - Office Auxiliaries

11 New Hires
2 Reactivated
14 Transferred out
1 Termination

(e) - Telephone

1 Deactivated
2 Transferred out
2 Terminations

FIRE PROTECTION UNIT

Fire Responses

HAPO 7

Description of Fires

Manufacturing - Reactor - Electrical, 100-B Area, Time 3:35 PM, 10-14-55
Responded to an automotive alarm at 105-C parking lot. Found gas leaking from carburetor onto manifold of Ford pickup 1C-173. No damage.

Engineering - Separations Technology, 300 Area, Time 4:06 PM, 10-19-55
Response made to alarm box 12, 325 Building. A check was made of the building and no fire was found. False alarm..

Engineering - Minor Projects - Minor Construction, 200-E Area, Time 11:23 AM, 10-21-55
Responded to box 424, Central Warehouse. Carpenters working in the building had accidentally broken the glass of an auxiliary box, thereby actuating master box 424. System was restored to normal operation.

Radiological Sciences - Biophysics - Physics, 300 Area, Time 5:11 PM, 10-24-55
Response made to an alarm at Building 329. Found considerable smoke emitting from a counting machine. It was disconnected and allowed to cool. Fire confined to the transformer. No loss.

Engineering - Minor Projects, 200-E Area, Time 10:11 AM, 10-28-55
Responded to box 424, Central Warehouse. A check was made of the building and no fire was found. False Alarm.

Manufacturing - Metal Preparation - Finishing, 300 Area, Time 6:29 PM, 10-28-55
Response made to Box 27, 313 Building. Upon arrival found that operating personnel had extinguished a fire in glass insulation of an Achme-Gridle lathe. Box was reset and system restored to normal operation. No loss.

Manufacturing - Electrical Utilities, 300 Area, Time 3:31 PM, 10-31-55
Responded to alarm NW of 313 Building, Transformer Bank 352-A. Transformer fuse had burned out necessitating power shut-off by the Electrical Department. Fire Department pumper stood by while this procedure was in progress. No loss.

Drills Held During October

Outside drills held	113
Inside drills held	99

28,165 feet of fire hose and 434 feet of ladders were used for drill purposes during October.

Bids have been accepted from the Ward LaFrance Company for two 750 gallon pumpers.

Fire department tanker 68D-5448 was placed in service October 25, 1955. This truck had been out of service since May 10, 1955.

Fire Protection Unit participation in the Fire Prevention Week Parade included the Chief's car, a float emphasizing the responsibility of the individual to fire prevention and a 1000 GPM pumper.

Fire Protection (Contin)

Fire Protection personnel and equipment performed ten demonstrations for all areas. Operable mock-ups of sprinkler, heat detector and alarm systems were emphasized. Fire extinguisher demonstrations and brief orientations on fire statistics were also included. Approximately 1,050 people were in attendance.

Fire Protection officers held 18 classes on fire extinguishers, Chemox masks and First Aid with 193 people of various departments in attendance.

A Fire Protection officer held two Civil Defense Rescue Classes with 100-Area emergency crews for a total of 16 hours instruction.

Fire Extinguishers

Inspected	1374
Installed	10
Delivered to new locations	6
Seals broken	24
Serviced	209
Weighed	406

Gas Masks

Inspected	43
Serviced	19

<u>Hose Boxes</u> inspected	23
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<u>Hand Lines</u> inspected	77
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OFFICE AUXILIARIES SUB-SECTION

Plant Mail Unit

Internal mail and postal mail remained normal; postal outgoing mail increased in weight and postage used which does not reflect in the volume count of mail.

Special assignments increased sharply and included two postal mailings, one to each home in Richland and one to each employee at home. Eighty-five separate mailings from addressograph were made including Organization and Policy Guides, Health Bulletin, off-site material for distribution, Management News Bulletins, etc.

Office moves and changes in the 703, 760, 761 and 762 Buildings have necessitated complete revisions of the mail boards in the four buildings.

The volume of look-up mail increased sharply during the past period due to incomplete, illegible and mail devoid of any addresses. Also, approximately one thousand pieces were received from the Finance Department for distribution to the Company educational roll. This involved addressing each of the 1,000 pieces of mail.

Addressograph work volume remained normal. Two new machines were installed in the Addressograph Room, one a 1900 Model Addressograph with automatic feeder and a Macy Collator.

Types and Pieces of Mail Handled

	<u>September</u>	<u>October</u>
Internal	4,925,097	4,734,402
Postal	77,383	82,204
Special	2,058	2,158
Registered	9,218	9,266

	5,013,756	4,828,030
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Total postage used	\$3,306.08	\$2,901.46
Total teletypes handled	3,528	2,933
Total store orders handled	493	554

<u>Addressograph</u>	<u>Number of Runs</u>	<u>Total Copies</u>	<u>Number of Runs</u>	<u>Total Copies</u>
Plate name list	128	170,414	121	162,527
Housing List	14	49,836	15	48,988
Payroll List	6	18,930	6	19,737

Total new plates	3,385	2,967
Total corrected plates	4,136	3,286

	7,521	6,253
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Printing Unit

Priority type printing requests were extraordinarily heavy during the month. While the total orders received and completed were somewhat less, the type of material was more complicated and time consuming to run. Very heavy demand for documents connected with the Civilian Application Program and a revision of the two-color booklet, "Here's Hanford" to be issued to the Military Liaison Committee were two of the more complex assignments which required strict deadlines. Some other rush assignments included 11,000 letters to accompany booklets on the revised insurance plan, Civil Defense instructions, approximately 6,000 sets of a four-page housing questionnaire including two sets of envelopes for AEC, as well as material for Fire Protection Month.

It was necessary to work 192 hours of overtime during the month to meet the demands. This is the heaviest overtime month this year.

<u>Work Completed</u>	<u>September</u>	<u>October</u>
Orders Received	398	370
Orders Completed	381	365
Average Orders on Hand	78.2	70.5
Copies Printed	859,435	900,468
Vacuum Frame Plated Masked	521	522
Negatives Processed	708	725
Photo copy prepared	216	335
Litho Plates Processed	587	611

Stenographic Unit

Six Stenographer-Typists and three Stenographers were assigned to the Stenographic Unit in October. Eleven permanent transfers and twenty temporary loan assignments were made to other plant units.

The work load was fairly consistent throughout the month. Larger assignments included 41.5 hours typing and miscellaneous work for AEC - Community, 65 hours for Employee Services on Community Chest drive material, 59.5 hours for Radiation Monitoring-Separations typing non-exempt ratings and personal histories, 119 hours collating Stores catalogs, 80.5 hours typing Manufacturing cost reports, 90 hours collating and enveloping Organization and Policy Guides, 90 hours typing for Biophysics Section.

At the request of the Separations Section, the Secretarial-Stenographic Training Program was given on October 18 for approximately half the secretaries and stenographers of the section. The balance will attend the program scheduled for November 15.

	<u>September</u>	<u>October</u>
Total production hours	2,591.5	2,100.5
Training hours	617	311
Unassigned hours	94	69
Holiday hours	88	----
Meeting hours	7	15.5
Absentee hours	0	8
	<hr/>	<hr/>
	3,397.5	2,504

Duplicating Unit

On October 12, 1955, a model 1250 duplicator which had been released by the Printing Unit, was installed in the 760 Building Duplicating office. This installation provides a total of six large offset presses in the 700 Area which will be available to the 703 and 760 Duplicating offices at peak workload times. Service on Financial Department cost reports, Unit Cost statements, the Plant Monthly Report, Organization and Policy Guides, and priority news messages (Management News Bulletins) as well as other routine duplicating orders should be materially improved.

Minor alterations were made to the Embosograf equipment located in 760 Building during the month. A longer operating pressure handle was installed to provide additional leverage, thereby making the equipment less difficult for female employees to operate.

Workloads in the 3760 Building Duplicating office continued to increase due to additional copy requirements on formal type reports processed at this location for use in the Civilian Applications Program. To illustrate the trend, monthly production totals in the subject office for the past four months were: June, 138,178 copies; July, 167,776 copies; August, 161,222 copies; September, 238,497 copies.

Duplicating Unit (Contin)

	<u>September</u>	<u>October</u>
Orders received	3,417	3,511
Orders completed	3,375.	3,451
Orders on hand	190	150
Offset plates	14,907	14,492
Offset copies	1,177,072	1,072,602
Verifax masters	3,383	3,933
Verifax copies	10,939	10,042
Ditto masters	514	269
Ditto copies	12,580	5,915
Zerex plates	1,584	1,444
Ozalid masters	66	181
Ozalid copies	515	528
Embosograph orders	3	4
Embosograph copies	10	166
Number of copies duplicated	1,201,116	1,089,253

Office Equipment Unit

Office Furniture

The expendable office furniture inventory account 93 was valued at \$11,616 on September 30, 1955, or an average of 2.3 months supply on hand. Withdrawals for the month were \$3,178.00 and receipts were \$4,390.00. The average turnover of stock for the year to date is 4.4 times.

The following is a detailed list of pieces of furniture handled during the month:

<u>Item</u>	<u>Issued</u>	<u>Received</u>	<u>Salvage</u>
Bookcase	1	0	0
Blackboard	14	0	0
Cabinet	104	46	17
Card File	2	8	0
Costumer	28	6	0
Chair	156	67	26
Desk	55	22	6
Table	37	16	14
Miscellaneous	208	51	15
	<hr/> 605	<hr/> 216	<hr/> 78

A total of 41 desks have been issued to fill requirements for additional personnel during the last two months. Adequate furniture was available from inventory stock to furnish FHA offices located in the W-16 Building. Twenty desks and ten office tables were released to AEC Community Section who will be responsible for the furniture and equipment issued to this agency.

A total of 86 service orders were issued for general maintenance and locksmith repairs. Eleven work orders were issued to cover those items of a special category such as re-upholstering a metal chair and lubricating all swivel chairs in 700 and 1100 Area buildings.

Office Furniture (Contin)

There was a total of 521 debit and credit store orders processed during the month. This is an average of 21.7 orders per working day.

A requisition was issued to cover cost of rehabilitating ten metal swivel chairs by an outside contractor. The cost to repair metal chairs will be analyzed to determine if it will be economical to repair worn chairs or reclaim remaining value through salvage channels.

Office Machines

The annual inventory and reconciliation of office machines has been completed. A total of 79 machines could not be located or accounted for by physical checks and audit of records back to 1950. These are machines that were carried on Plant Accounts records which have not been physically accounted for since May 1953. A large number of the missing machines were picked up on records during a plant-wide survey of office machines made in 1949. From all indications, the loss of missing machines can be contributed to errors in transposing serial numbers and HW control numbers, documents not posted properly and errors made in previous physical inventories.

The total number of machines in service and stock as of the 20th of October was 4,318 or a net increase of four machines over previous month.

The Macy Collator machine was installed in 703 building and it is available to perform collating of two or more sheets. This service is available to all departments.

Office Machine Repair Unit

Inspection was made during the month of the 722-C cleaning room, purpose of inspection was to assure that all equipment used and methods of cleaning would meet all safety standards.

Two journeymen were assigned to work in spare parts inventory. The inventory is approximately 80% complete at this time. The inventory will be complete before the end of November.

Three mechanics received special training during the month on the following equipment: one Macy collator, one Model 2000 Addressograph machine. This required two days.

During the month, a parts price catalog was completed. This catalog was developed to have as a ready reference, the price, description and bin location of every spare part on hand. This catalog lists approximately twenty-five thousand (25,000) parts.

Instrument personnel put into service a compound Sparling water meter, at the Spaulding Grade School, during the month.

The instrument work load has been rather heavy during the month due to checking and putting into service steam flow meters at the Kadlec Hospital, Desert Inn and the various schools in Richland, and the Mart. This work also included the changing of orifice plates in the above mentioned locations.

Repair tickets processed:

September

432

October

489

ADMINISTRATION AREA MAINTENANCE SUB-SECTION

Agreement was reached with AEC on mass exchange of 700 Area office space. Problems in connection with relocating GE personnel have been resolved. Overall plan for moves and office alterations has been scoped and arrangements made for accumulating costs on special code.

It is expected that this move program will be completed before the end of November except for segregating individual office enclosures, which will have to await receipt of additional supply of movable partitioning.

Purchase Requisition covering movable partitioning was approved by the Commission in October. Supplier has promised shipment in December.

Twelve office moves were made in October.

Thirteen lineal feet of Hauserman partitioning were released this month to permit three small installations in 700 Area and one in 300 Area.

Landlord responsibility for vacated dormitories W-15 and W-16 was transferred to us from Community. A portion of W-16 is now occupied by FHA appraisal personnel. W-15 will be occupied later by property sales groups.

Building and Equipment Maintenance

Three carpenters were assigned to swing shift for a period of approximately ten weeks, commencing October 10, to lay asphalt tile on wooden floors of Building 703 which have been worn thin through use and repeated sanding. As of October 27, a total of 7,820 square feet of tile had been installed.

Thirty-six lineal feet of Hauserman partition were relocated in Building 703, and a 16-foot frame partition dividing Rooms 2129 and 2131, Building 703, was removed.

Work was completed on the cutting of a door opening and installation of exterior concrete landing and steps on the north side of Building 702.

Roof repairs were made on Building 1170, Warehouses 13, 14 and 41, a Transportation building at Hanford, and a warehouse on Duane Avenue.

Interior cycle painting completed during October included: two ladies restrooms in Building 705; two ladies restrooms in Building 762; 12 rooms, first floor corridor; 5th wing and south stairwell, 5th wing in Building 703. The bulk of this work was done on swing shift, to which two painters have been assigned since October 10.

Work was continued on the installation of twelve "Comfort" evaporative coolers at Buildings 761 and 762 and present status of this job is: platform remodeling is complete and all coolers are mounted on platforms; sheetmetal ducts are installed on three of six coolers at 761, and ducts are fabricated for the remaining three coolers at this building; ducting is in place on three coolers at 762; electrical service is 75% complete. Remaining work includes completion of sheetmetal and electrical work, and running of water and drain lines.

Several miles of highway within the barricade were center-striped with reflective paint, and the By-Pass Highway in Richland has been laid out and marked preparatory to application of center-line and channelizing stripes.

Annual inspection and overhaul of the fire sprinkler system in Building 747 was completed. Work included the replacement of 10 heads damaged by corrosive fumes.

Building and Equipment Maintenance (Contin)

Monthly inspection of 700 Area fire alarm circuits, and semi-weekly inspection of civil defense warning sirens was continued per schedule.

Four millwrights were assigned to the standard rotating shift schedule, one to each shift, on October 3, and the work load was redistributed to these shifts so that a mechanic would be available around the clock to perform the maintenance work essential to satisfactory and continuous operation of the hot air furnaces at Building 1171. Experience to date during this heating season indicates that alterations and overhaul completed on these furnaces in September have resulted in improved operations.

To provide better access to the six zone blowers in the air distribution system at Building 1171, and thereby facilitate the maintenance of these units, hanging platforms of steel and wood construction were designed and fabricated, and three of the platforms have been installed.

Winterizing of evaporative air coolers in the 700 Area and Transportation shops is in progress and is approximately 85% complete.

A 2" water line was installed between the 4th and 5th wings of Building 703 to interconnect the two water systems of this building and provide service to the first through fourth wings while the water main serving this section was out of service because of construction work in progress.

Water, steam and electrical services were activated at W-16 to allow for occupancy of this building by FHA personnel.

Miscellaneous installations completed during the month include: eleven convenience outlets and circuits; six buzzer systems; 19 light fixtures requiring three new circuits; 3 - 220 volt and one 440 volt circuits; exhaust fans in two restrooms of 703; floodlight circuit at W-10 parking lot; 25 breakers as replacements for fuses in drop lines from trolley busways at 1171; electrical heater for heating oil tank at 1170; two steam radiators each in 703 and 761; and four unit heaters in 716.

Routine maintenance was provided for buildings and equipment in the 600 and 700 Areas, Central Stores, and Transportation Shops; and glazier and locksmith service was furnished for all areas.

Building Services

Janitorial coverage was extended to provide service to W-16 which has been activated as an office building.

Protective floor-seal was applied to wood floors in the following locations; Building 721, all wood floors; Building 761, Rooms 101 through 115, 125 through 134, 201, 203, 205, 207, 209, 211, 213 and 214 through 218; Building 703, Rooms 2129 and 2131.

Color seal was applied to concrete floors in the large open office space in the southwest section of Building 713.

Routine janitorial service was continued in all assigned buildings in accordance with schedule.

Steam Operation

Nos. 1 and 3 boilers were in service at the beginning of the month, with No. 4 in reserve and No. 2 undergoing biennial major overhaul.

On October 4, No. 4 boiler was placed in service and No. 1 removed from the line for several minor repairs and preparation for inspection by a representative of Travelers' Indemnity Company on October 19.

At the close of the month, Nos. 3 and 4 boilers were in service, No. 1 in reserve, and No. 2 undergoing major overhaul.

The quantity of steam generated at 784 Plant was 3.9% less than for the same period of the previous year.

All but a very few of the heating steam outlets connected to the distribution system were in service at the end of the month.

Seasonal orifice changes were made on the steam flow meters at several customer outlets.

On October 5, at the request of Stores, the boiler at Central Stores Heating Plant was placed in service. Time clock governing operation of boiler was set to come on at 4:00 A.M., and turn off at 10:00 A.M., Mondays through Fridays. Boiler operation at this location has been entirely satisfactory so far this heating season.

Coal consumed: 1,150.60 net tons.

Steam generated:	16,660.8 M. Lbs.
Steam leaving plant:	14,540.5 M. Lbs.
Steam delivered:	12,159.7 M. Lbs.

Total water softened:	2,278,100 gallons
Total soft water sent to Kadlec Hospital:	81,700 gallons
Total soft water sent to 784 Heating Plant:	2,196,400 gallons

TELEPHONE SUB-SECTION

A total of 179 new residence telephones were installed and 96 outside moves were completed. 130 requests for new residential telephones and 65 requests for outside moves were received. At the end of the working day, October 21, there were 40 unworked requests for new residential telephones and 21 outside moves. The oldest unworked request, other than three or four which were unworked pending reply from applicants, was dated September 23.

Plant Telephone Operations

Approximately 25 telephones were relocated in the 762 building on Saturday, October 15.

One cable crew worked two weeks in the underground system between manholes 12 and 20 making cable reconnections to permit inclusion of all trunk cable circuits in a single quad-type cable.

Inspected wiring and tested equipment used on inward long distance calls in an attempt to determine the reason for "cut-offs" on long distance connections.

Located and cleared two moisture faults in the BY to White Bluffs trunk cable. Both faults were found to be sheath openings caused by ring wear.

Plant Telephone Operations (Contin)

Tested and spliced in a new 11-pair entrance cable at the 190 DR building. Replaced one cable terminal and relocated a second one in the 200-W area. Installed a protected type main distributing frame in the 202-A building in connection with the building PAX system.

Installed a new PAX switchboard and associated dial telephone instruments in the 221-T building to replace an old sound powered system. PAX and PBX equipment in the 200-E and 200-W areas were routine tested and all necessary repairs made.

Completed inspection of condition of poles in the BY to point H trunk cable line. Three poles were found to be in need of replacement in the near future.

Completed arrangements with the Stores Sub-Section for transfer of telephone items from Spare Parts to General Supplies, excess and telephone inventory stock.

Reviewed an AEC-BPA plan for relocating the 115 KV line in the vicinity of the old bus area and recommended that the existing aerial section of the T-5 trunk cable on the West side of Stevens Drive not be overbuilt by a relocated power line. Conference on the matter resulted in AEC postponement for relocating the section paralleling Stevens Drive.

Conducted exhaustive tests on all equipment in the 700 area Plant Exchange that might have in any way been responsible for unusually high number of cut-offs on long distance connections. No trouble was found in the Exchange equipment and it is believed that the cause of the trouble was in Bell System circuits.

Completed unitization of 700 Area Plant Telephone Exchange equipment as requested by the Plant Accounting Unit.

Prepared job specification P-56-9 to replace three poles in the T-5 trunk cable line. These replacements were required to provide sufficient clearance over a new Army roadway.

Prepared necessary documents to cover the transfer of 35 telephones and a portion of a main distributing frame from the White Bluffs Central Shops area to the 221-T Building, 200-W area and the transfer of 142 main frame protectors from White Bluffs Central Shops area to the 202-A Building, 200-E area.

Prepared an appropriation request to cover the cost of procuring, fabricating and installing four additional telephone answering turrets for area Patrol Radio rooms.

Made a study of material in telephone inventory account 0420-952 to determine what items may not properly belong in the inventory account.

Prepared job specification P-56-12 to cover the removal of the items of telephone exchange equipment in the old 100-B area telephone exchange.

Commercial Telephone Operations

Located and repaired two ring-cut faults in the Pasco trunk cable.

Completed installation of additional distribution cable required to serve the new Westgate Shopping Center.

Commercial Telephone Operations

Rearranged and enlarged the Sears-Roebuck Catalog office telephone installation for the Christmas season.

Established a teletypewriter circuit between the Richland Western Union office and the Drift Inn Tavern.

Replaced and rerouted the service entrance cable to the Davis-Korten-Elite Building made necessary by building expansion.

Engineered four jobs relating to Richland outside plant improvement.

Radio System Operations

Shop-serviced 28 mobile receivers, 28 mobile transmitters, eight fixed station transmitters, eight fixed station receivers, four tone generators, five sound-movie projectors and one pack-type radio transmitter receiver.

Field-serviced 68 mobile transmitter-receiver sets and eight fixed station sets.

Routine checked 10 fixed station transmitter-receiver sets.

Recorded Science Forum programs on October 5, 12, 19 and 25.

Installed tape players and public address systems for use with fire prevention displays in the 300 Area, at Central Transportation Building and in front of the 703 Building.

Installed microphone and headphones in the Kadlec Hospital to be used in conjunction with hearing tests.

Modified intercommunication system in the 717-A Building and added a six circuit master station for the Photo Unit.

Installed a temporary public address system in the Desert Inn Hotel for the GE Pensioners' Dinner on October 20.

Relocated one 12 station intercom set for the Public Health Unit.

Moved Radio Station KKE-624 No. 8 (200-E area) from the temporary badge house to the permanent Patrol Headquarters.

Radio Station KKE-624 No. 6 (200-W area) was out of service on October 5 from 4:30 AM to 8:55 AM due to tube failure.

Statistical Data - 20th of October

	At 20th of October	Change from Previous Month	Change from Year Ago
Residential Subscribers	6034	+ 104	- 29
Business Subscribers	463	- 1	- 25
Paystation Telephones	44	- 2	- 26
Official Subscribers			
Richland Exchange	250	+ 3	-738
700 Area Exchange	885	+ 12	+885
Process Areas Exchanges	1639	- 3	-174
		+ 113	-107

New Service Requests Received During the Month

For Residential Service	116
For Business Service	6
	<hr/>
TOTAL	122

Backlog of Service Requests

For new residential telephones	36
For new business telephones	0
For residential outside moves	26
For business outside moves	0
	<hr/>
TOTAL	62

Service Orders Processed

In connection with business & residential service	484
In connection with plant service	255
	<hr/>
TOTAL	739

Telephone Facilities - Installed, In Service and Available

	<u>Installed</u>	<u>Exchange Lines In Service</u>	<u>Available</u>	<u>Party Lines Available</u>
Richland Community	4006	3628	378	848
700-1100 Areas	1230	866	364	
Process Areas	1950	1631	319	
	<hr/>	<hr/>	<hr/>	<hr/>
	7186	6125	1061	848

Radio Stations - In Service

	<u>At 20th of October</u>	<u>Change From Previous Month</u>	<u>Change From Year Ago</u>
Fixed Stations	34	0	- 1
Mobile Stations	154	0	1
	<hr/>	<hr/>	<hr/>
	188	0	0

SECURITY AND PATROL SUB-SECTION

Document Report

Number of classified documents and prints unaccounted for as of
October 1, 1955:
(101 of the above 299 documents are chargeable to du Pont Company)

299

Document Report (Continued)

Number of classified documents and prints reported as unaccounted for during October: 2

Number of classified documents and prints either recovered or downgraded in classification during October: 3
(These three documents were all declassified but not located)

Number of classified documents and prints remaining unaccounted for as of November 1, 1955: 298
(101 of the above 298 documents are chargeable to du Pont Company)

The Non-Technical Document Review Board held two meetings during October and reviewed a total of 119 documents. Of this number -

31 had their classification retained, and
88 were declassified.

Security Education

Three security items appeared in the GE NEWS during October.

There were 336 security meetings held and attended by 4,801 Hanford Atomic Products Operation personnel. A representative of the Plant Protection Services Unit showed one of the security films at some of these meetings as indicated below:

<u>Film Title</u>	<u>Number of Meetings</u>	<u>Average Attendance per Meeting</u>	<u>Total</u>
Handle With Care	16	24	384
Badge of Honor	3	15	45
Turn Left Across the Bridge	1	25	25

A "Special Security Bulletin" was issued by the Security and Patrol Sub-Section on October 10 entitled "Something's Gone Wrong".

A memorandum was issued by the Security Office entitled "200-E Limited Area and 202-A Exclusion Area" on October 10, concerning the reclassification of the Purex facility effective October 31, 1955.

A memorandum entitled "Signs of the Times" was issued by the Manager of the Engineering Project Section regarding the decrease in the number of security violations for the Project Section and attaining a goal of "No Violations" committed by employees of that Section.

An item of security interest appeared in two issues of the Management News Bulletin as follows:

October 12 issue: "Privately owned vehicles driven by employees with area clearances may, under certain conditions, be permitted inside the 100 or 200 areas when normal transportation is not available."

October 21 issue: "The Prosser barricade will be open a limited number of hours each day starting Monday, October 24, to accommodate area employees on all three shifts."

Security Education (Contin)

119 employees of the General Electric Company received a "Q" security orientation talk from either a representative of the Plant Protection Services Unit or a Patrol Supervisor, and 26 employees received the "L" security orientation lecture during the month.

Nine "squirrel" mobiles replaced the "fish" mobiles in each of the plant areas during October. The slogan seen on the mobiles is "Provide for the future but don't hoard documents."

650 copies of the security poster with the slogan "In any direction, we are prepared when you -- remember security", were posted in the plant areas during this period.

200 copies of the Department of Defense poster with the security slogan "Freedom can not be taken for granted -- it is based on a solid foundation of vigilant security ... America's security is your security," were posted in the plant areas. A picture of the Statue of Liberty appears in the background.

Statistical Report of Patrol Activities

	<u>100-B</u>	<u>100-D</u>	<u>100-F</u>	<u>100-H</u>	<u>100-K</u>	<u>200-E</u>	<u>200-W</u>	<u>300</u>
Pat Searches	96	93	93	93	96	0	0	2
Escorts	3	23	3	50	55	2	25	24
Ambulance runs	2	4	1	5	1	1	4	5
Passes issued:								
One day temporary	40	12	11	13	11	21	39	52
Travel	0	0	0	0	0	0	0	148
Red Tag	92	59	90	37	33	156	485	131
Telephonic	0	0	0	0	0	0	0	0
Supervisor's Post Contacts	382	217	174	142	391	315	422	210

Other Patrol Activities (Computed by Hours)

								300 & 700
File Check	186	202.5	207	475.5	344	288	288	2,294
Building Check	329	53	270.7	1137.5	344	288	288	744

Arrest Report

<u>Violations</u>	<u>Number of Violations</u>	<u>Cont. Cases from September</u>	<u>Cases Cleared</u>	<u>Pend- ing</u>	<u>Fined</u>	<u>Dismissed</u>
Failure to Observe						
"Stop Sign"	1	0	1	0	1	0
Illegal Parking	1	2	1	2	1	0
Negligent Driving	1	0	1	0	1	0
No Driver's License	0	1	0	0	0	1*
Speeding	0	1	0	0	0	1*
	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
TOTAL	3	4	3	2	3	2

* These cases have been held for one year in the pending file and are now being dropped from the records.

Arrest Report (Contin)

Citation Tickets issued:	3
Warning tickets issued:	21
Verbal Warnings	0

Patrol Training Activities

393 Patrolmen attended classroom instruction during the month.
164 Patrolmen attended firearms training during the same period.

General

The comprehensive search of the Classified Files, in the 300 Area, for unaccounted for documents which was started September 19, 1955, by the Security Audit and Investigations Unit, was completed October 17, 1955. A total of six classified documents, previously reported as unaccounted for were located as a result of this search.

The Atomic Energy Commission Security Branch advised GE Security Office on October 17 that the Washington Office of the Commission had approved the recommended listing of Hanford Atomic Products Operation sensitive positions. 209 Hanford Atomic Products Operation positions are classified in the category "sensitive positions".

Effective October 25, the Patrol Unit returned all the 50 and 30 caliber machine guns and ammunition to the Atomic Energy Commission for excess.

The Security Audit and Investigations Unit assisted in the bus tour of the areas by the Military Liaison Committee which visited Hanford October 26 and 27. They also assisted in monitoring conferences scheduled by the Committee.

Security Administration

Daily Badge Log entries	3,348	
"Q" clearances	119	
"L" clearances	26	
Formal "P" clearances issued	27	
"P" approval clearances issued	22	
Category access granted	42	
Category access withdrawn	41	
Category access revised	30	
Number of photos for "A" badges	21	(728 from January 1 to date)
Number of photos for "B" badges	96	(3,395 from January 1 to date)
Number of persons rephotographed	19	

Photo identification passes laminated and issued:	371
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"A" badges assembled and distributed to the areas:	922
"A" badges received from the areas:	475
"A" badges received from the areas for repair:	47

Top Secret Clearances

Top Secret clearances cancelled during October:	18
Clearances requested:	31
Clearances granted:	33

HAIFORD ATOMIC PRODUCTS OPERATION
General Electric Company
Richland, Washington

REPORT OF VISITORS FOR PERIOD ENDING OCTOBER 31, 1955

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT - EDUCATION AND TRAINING SECTION						
I. Visits to other Installations						
D. S. Roberts to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss university relations and engineering education	W. W. Grigorieff R. W. Johnson	10-6-55	10-6-55	X	
EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT - HEALTH AND SAFETY SECTION						
I. Visits to other Installations						
W. D. Norwood, M.D. to: Argonne National Lab. Lemont, Illinois	Speak at meeting on radioelement poisoning	J. Schubert Dr. Hathaway	10-19-55	10-20-55	X	
EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT - SALARY AND WAGE ADMINISTRATION SECTION						
I. Visitors to this Works						
R. Z. Bouton Knolls Atomic Power Lab. Schenectady, New York	Salary administration discussions	R. C. Grant	10-31-55	11-4-55	X	700-703
II. Visits to other Installations						
R. C. Grant to: Aircraft Gas Turbine Cincinnati, Ohio	Discuss salary administration matters	G. Deveraux L. F. Hardy	10-3-55	10-10-55		X
R. C. Grant to: Knolls Atomic Power Lab. Schenectady, New York	Discuss salary administration matters	W. G. Urbon	10-10-55	10-14-55		X

<u>Name - Organization</u>	<u>Purpose of Visit</u>	<u>Person Contacted</u>	<u>Arrival</u>	<u>Departure</u>	<u>Restricted Data Class.</u>	<u>Unclass.</u>	<u>Areas</u>
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ENGINEERING DEPARTMENT - ADVANCE ENGINEERING SECTION

I. Visits to other Installations

F. W. Albaugh
to: Division of Production
U. S. Atomic Energy Comm.
Washington, D. C.

R. L. Kirk
Attend meeting of
Production Planning
Committee

10-17-55 10-20-55 X

P. F. Gast
to: Aircraft Gas Turbine
Evendale, Ohio

D. R. Shultz
Discuss reactor
development work

10-10-55 10-10-55 X

ENGINEERING DEPARTMENT - ENGINEERING ADMINISTRATION SECTION

I. Visits to other Installations

C. G. Stevenson
to: Westinghouse Atomic Power
Pittsburgh, Pennsylvania

R. E. O'Dette
Discuss high tempera-
ture water technology

10-20-55 10-21-55 X

ENGINEERING DEPARTMENT - PILE TECHNOLOGY AND SEPARATIONS TECHNOLOGY SECTIONS

I. Visitors to this Works

E. F. Adlutori
Knolls Atomic Power Lab.
Schenectady, New York

G. E. Wade
H. A. Fowler
Discuss KAPL-120 loop
operation

10-6-55 10-14-55 X
100-H 105
100-K XXX
300 303; 700

C. L. Angerman
E. I. du Pont de Nemours & Co.
Savannah River Plant
Augusta, Georgia

L. A. Hartcorn
Attend meeting of
Metallograph Sub-
Committee

10-3-55 10-6-55 X
100-K 105-KW
202-A
300 XXX; 700

S. F. Audia
National Lead Company
Fernald, Ohio

G. S. Cochrane
Discuss broaching develop-
ment and inspect
broaching machine

10-28-55 10-28-55 X
200-W 221-U
300 303

DECLASSIFIED

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass. Areas
A. E. Austin Battelle Memorial Institute Columbus, Ohio	Discuss subcontract work M. Lewis Battelle will be doing for Hanford	M. Lewis	10-25-55	10-26-55	X	100-D XXX 300 XXX
R. Boucher Parker Appliance Company Cleveland, Ohio	Discuss problems of seal design of O-rings and fitting problems	J. E. Robb	10-3-55	10-5-55	X	700
D. C. Brater Union Carbide and Carbon Oak Ridge, Tennessee	Discussions on continu- ous calcination process	F. W. Woodfield	10-10-55	10-14-55	X	200-W Redox, 221-U 300 XXX 700 ; 202-ACR
R. F. Dickerson Battelle Memorial Institute Columbus, Ohio	Discuss metallography of uranium and uranium alloys	L. A. Hartcorn	10-3-55	10-7-55	X	100-K 105-KW 202-A 300 303
C. E. Dryden General Electric Company Schenectady, New York	Discuss fuel processing and hot laboratory problems	R. B. Richards	10-17-55	10-21-55	X	100-K 105-KE 200-E 202-A, 201-C 300 303; 700
F. R. Duke Ames Laboratory Iowa State College Ames, Iowa	Lecture on fused salt program for the American Chemical Society	W. R. DeHollander R. H. Moore C. Wheelright	10-28-55	10-28-55	X	300 XXX
J. (nmn) Parr National Lead Company Fernald, Ohio	Observe broaching experi- ment and broach machine	J. W. Riches W. P. Wallace	10-31-55	11-10-55	X	100-B 105-B, 105-C 300 303
M. M. Frame General Electric Company Schenectady, New York	Discuss fuel reprocessing problems and hot laboratory design	R. B. Richards	10-17-55	10-19-55	X	100-K 105-KE 202-A 300 303; 700
R. Geiser General Engineering Laboratory Schenectady, New York	General instrumenta- tion consultation	A. B. Greninger	10-31-55	11-3-55	X	100-K 105-KE, 105-KW 202-ACR 200-W XXX 300 303; 700 100-K 105-KW 202-A 300 303
E. Guay National Lead Company Fernald, Ohio	Attend Metallographic Sub-Committee Meeting	L. A. Hartcorn	10-3-55	10-5-55	X	300 303

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass. Areas
R. B. Gunia United States Steel Company Pittsburgh, Pennsylvania	Consultation on materials of construction	N. D. Groves	10-18-55	10-18-55	X	300 XXX
N. R. Hart Columbia Geneva Company Seattle, Washington	Consultation on materials of construction	N. D. Groves	10-18-55	10-18-55	X	202-A 300 XXX
G. Henry North American Aviation Co. Downey, California	Fuel element assembly works and metallurgy research	V. R. Cooper	10-31-55	10-31-55	X	300 XXX
J. F. Hogerton Vitro Corporation New York, New York	Discussions on Reactor Handbook under contract AT/30-1/-1782	R. B. Richards	10-5-55	10-7-55	X	100-K 105-KE 202-AGR 300 303; 700
J. S. Kane University of California Livermore, California	Graphite discussions	D. B. Lovett	10-20-55	10-21-55	X	300
H. C. Kloepper, Jr. Mallinckrodt Chemical Works St. Louis, Missouri	Attend Metallography Sub-Committee Meeting	L. A. Hartcorn	10-3-55	10-9-55	100-K	100-K 105-KW 202-A 300 303
W. J. Koshuba Aircraft Nuclear Propulsion Lockland, Ohio	Attend meeting on fuel elements	J. J. Cadwell	10-27-55	10-27-55	X	300 XXX
M. Kratzer U. S. Atomic Energy Comm. Washington, D. C.	Discussions on separa- tions process	R. E. Tomlinson F. W. Woodfield	10-27-55	10-27-55	X	300 XXX
R. E. Larson Knolls Atomic Power Lab. Schenectady, New York	Review KAPL-120 loop operations and data analysis	J. A. Berberet	10-19-55	12-31-55	X	100-D XXX 100-H 105 100-K XXX 300 303; 700
L. D. Loch Battelle Memorial Institute Columbus, Ohio	Discuss subcontract work Battelle will be doing for Hanford	M. Lewis	10-25-55	10-26-55	X	100-D XXX 300 XXX

DECLASSIFIED

Name	Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
						Class.	Unclass. Areas
H. Lowenberg	Vitro Corporation New York, New York	Discussions on Reactor Handbook under contract AT/30-1/-1782	R. B. Richards	10-5-55	10-7-55	X	100-K 105-KE 202-ACR 300 303; 700
J. E. McCullough	General Electric Company Schenectady, New York	Discuss fuel reprocessing problems and hot laboratory design	R. B. Richards	10-17-55	10-21-55	X	100-K 105-KE 202-ACR 300 303; 700
S. McLain	Argonne National Laboratory Lemont, Illinois	Attend Reactor Handbook editorial committee meeting	R. B. Richards	10-5-55	10-7-55	X	100-K 105-KE 300 XXX; 700
J. L. Michaelson	General Engineering Laboratory Schenectady, New York	General instrumentation consultation	A. B. Greninger	10-31-55	11-3-55	X	100-K 105-KE, 105-KH 202-ACR 200-W XXX 300 303; 700
A. F. Owings	U. S. Atomic Energy Comm. Technical Information Service Washington, D. C.	Attend meeting of editorial board of Reactor Handbook development	R. B. Richards	10-6-55	10-7-55	X	100-K 105-KE 202-ACR 300 303; 700
A. E. Ruehle	Mallinckrodt Chemical Works St. Louis, Missouri	Attend a metallography Sub-Committee Meeting	L. A. Hartcorn	10-3-55	10-9-55	X	100-K 105-KW 202-ACR 300 303
R. H. Simon	Knolls Atomic Power Lab. Schenectady, New York	Review KAPL-120 loop program	J. A. Berberet R. L. Dickeman	10-7-55	10-21-55	X	100-D XXX 100-H 105 100-K XXX 300 303; 700
H. Soodak	Nuclear Development Corp. of New York, New York	Attend meeting of Reactor Editorial Handbook Committee	R. B. Richards	10-6-55	10-7-55	X	100-K 105-KE 202-ACR 300 303; 700
C. R. Tipton, Jr.	Battelle Memorial Institute Columbus, Ohio	Discuss Reactor Handbook	R. B. Richards E. C. Wood	10-6-55	10-7-55	X	100-K 105-KE 202-ACR 300 303; 700

UNCLASSIFIED

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass Areas
J. W. Watt University of Texas Austin, Texas	Consultation on Redox and Separations processes	R. B. Richards	10-30-55	11-4-55	X	200-W 234, 235 Redox 300 XXX; 700
C. E. Weber Knolls Atomic Power Lab. Schenectady, New York	Attend Intra-G.E. Coordination Meeting	J. J. Cadwell	10-26-55	10-27-55	X	100-H 105 100-K 105-KE, KW 300 303
II. Visits to other Installations						
R. J. Anicetti to: Battelle Memorial Inst. Columbus, Ohio	Discuss oxide fuel material fabrication	A. Allison	10-20-55	10-20-55	X	
R. J. Anicetti to: Westinghouse Atomic Power Pittsburgh, Pennsylvania	HAPO representative on Oxide Committee for meeting	J. M. Shapiro	10-18-55	10-19-55	X	
J. M. Atwood to: U. S. Atomic Energy Comm. Pittsburgh, Pennsylvania	Discuss zirconium avail- ability and technology	R. Long	10-20-55	10-21-55	X	
J. M. Atwood to: Westinghouse Atomic Power Pittsburgh, Pennsylvania	Establish information exchange on high pressure water cooling	H. Hughes	10-20-55	10-21-55	X	
L. P. Bupp to: U. S. Atomic Energy Comm. Pittsburgh, Pennsylvania	Discuss zirconium availability and technology	R. Long	10-19-55	10-21-55	X	
L. P. Bupp to: Westinghouse Atomic Power Pittsburgh, Pennsylvania	Establish information exchange on high pressure water cooling	H. Hughes	10-20-55	10-21-55	X	
V. R. Cooper to: National Lead Company Fernald, Ohio	Attend Metal Develop- ment Committee Meeting	G. Wunder	10-19-55	10-20-55	X	
V. R. Cooper to: U. S. Atomic Energy Comm. Washington, D. C.	Exploratory discussions on ETR Program	U. M. Staebler I. Zartman	10-21-55	10-21-55	X	

DECLASSIFIED

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
						Areas
D. O. Darby to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Discuss ion exchange and other separations problems	L. C. Peery D. A. Orth F. Rober	10-3-55	10-5-55	X	
D. O. Darby to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss ion exchange and other separations problems	F. L. Culler I. Higgins	10-6-55	10-7-55	X	
D. E. Davenport to: Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Attend Industrial Criticality Meeting on criticality hazards	C. L. Schuske	10-6-55	10-7-55	X	
D. E. Davenport to: General Electric Co. Cincinnati, Ohio	Attend Critical Experi- mental Equipment Conference	J. W. Morfitt	10-10-55	10-12-55	X	
D. E. Davenport to: Westinghouse Electric Pittsburgh, Pennsylvania	Discuss analog computing equipment	S. Krasik	10-12-55	10-13-55	X	
R. L. Dillon to: Knolls Atomic Power Lab. Schenectady, New York	Discuss problems on aluminum corrosion and high temperature water	E. L. Brady	10-13-55	10-14-55	X	
D. J. Donahue to: General Electric Co. Cincinnati, Ohio	Attend Critical Experi- mental Equipment Conference	J. W. Morfitt	10-10-55	10-12-55	X	
E. A. Evans to: Phillips Petroleum Co. Arco, Idaho	Examine irradiated fuel elements	D. Alvord	10-31-55	11-2-55	X	
T. W. Evans to: Knolls Atomic Power Lab. Schenectady, New York	Consultation on in-pile experimentation, fission gas and fuel element problems	T. J. E. Glasson	10-20-55	10-21-55	X	

CONFIDENTIAL

CONFIDENTIAL

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
T. W. Evans to: Argonne National Lab. Lemont, Illinois	Consultation on in-pile experimentation, fission gas and fuel element problems	J. H. Kittel	10-24-55	10-24-55	X	
J. E. Faulkner to: Westinghouse Electric Pittsburgh, Pennsylvania	Attend AEC sponsored Reactor Physics Conference	S. Krasik	10-27-55	10-29-55	X	
H. R. Gardner to: Iowa State College Ames Laboratory Ames, Iowa	Consultation on uranium metallurgy	F.H. Spedding	10-10-55	10-11-55	X	
H. R. Gardner to: Battelle Memorial Inst. Columbus, Ohio	Consultation on uranium metallurgy	J. Keeler	10-12-55	10-13-55	X	
H. R. Gardner to: Knolls Atomic Power Lab. Schenectady, New York	Consultation on uranium metallurgy	T. Snyder	10-14-55	10-14-55	X	
O. H. Greager to: Knolls Atomic Power Lab. Schenectady, New York	Discuss Assistance to Hanford program	R. A. Bennett	10-17-55	10-18-55	X	
O. H. Greager to: National Lead Company Fernald, Ohio	Attend Metallurgical Development Advisory Committee meeting	G. Wunder	10-19-55	10-20-55	X	
R. E. Heineman to: Westinghouse Electric Pittsburgh, Pennsylvania	Attend AEC sponsored Reactor Physics Conference	S. Krasik	10-27-55	10-29-55	X	
R. E. Heineman to: Argonne National Lab. Lemont, Illinois	Discuss reactivity gains exponential physics	B. I. Spinrad	10-31-55	10-31-55	X	
H. L. Henry to: General Electric Co. Cincinnati, Ohio	Attend Critical Experi- mental Equipment Conference	J. W. Morfitt	10-10-55	10-12-55	X	

DECLASSIFIED

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
E. R. Irish to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Discuss ion exchange and other separations problems	L. C. Peery D. A. Orth F. Rober	10-3-55	10-5-55		X
E. R. Irish to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss ion exchange and other separations problems	F. L. Culler I. Higgins	10-6-55	10-7-55		X
D. C. Kaulitz to: Phillips Petroleum Co. Arco, Idaho	Discuss GEH-6 loading and equipment on Material Test Reactor	D. R. Alvord	10-19-55	10-20-55		X
D. C. Kaulitz to: GE-Aircraft Nuclear Propulsion Idaho Falls, Idaho	Discuss and inspect Propulsion remote handling equipment	R. W. Coyle	10-20-55	10-20-55		X
R. S. Kemper, Jr. to: Phillips Petroleum Co. Arco, Idaho	Discuss GEH-6 loading and equipment on Material Test Reactor	D. R. Alvord	10-19-55	10-20-55		X
R. S. Kemper, Jr. to: GE-Aircraft Nuclear Propulsion Idaho Falls, Idaho	Discuss and inspect Propulsion remote handling equipment	R. W. Coyle	10-20-55	10-20-55		X
D. D. Lanning to: Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Attend Industrial Criticality Meeting on criticality hazards	C. L. Schuske	10-6-55	10-7-55		X
D. D. Lanning to: General Electric Co. Cincinnati, Ohio	Attend Critical Experi- mental Equipment Conference	J. W. Morfitt	10-10-55	10-12-55		X
J. W. Lingsfelter to: Argonne National Lab. Lemont, Illinois	Discuss motor arc and resistance welding of zirconium and aluminum	R. A. Nolan	10-3-55	10-3-55		X

DECLASSIFIED

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass. Areas
J. W. Lingafelter to: Battelle Memorial Inst. Columbus, Ohio	Discuss research work in resistance, tungsten- arc and consumable arc welding aluminum and zirconium	C. R. Tipton	10-4-55	10-5-55	X	X
J. W. Lingafelter to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss cone arc and tungsten arc welding	P. Patriarca	10-6-55	10-6-55	X	X
J. W. Lingafelter to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Discuss mutual canning and welding problems	R. D. McCrosky	10-7-55	10-7-55	X	X
J. W. Lingafelter to: Westinghouse Atomic Power Pittsburgh, Pennsylvania	Discuss tungsten-arc, consumable arc and fabrication techniques on zirconium	F. Forscher	10-10-55	10-10-55	X	X
J. W. Lingafelter to: Knolls Atomic Power Lab. Schenectady, New York	Discuss tungsten-arc and resistance welding zirconium	D. W. White	10-13-55	10-13-55	X	X
N. R. Miller to: Argonne National Lab. Lemont, Illinois	Discuss high tempera- ture aluminum corrosion	J. E. Draley W. E. Ruther	10-26-55	10-28-55	X	X
J. T. Mommsen to: Argonne National Lab. Lemont, Illinois	Discuss motor arc and resistance welding of zirconium and aluminum	R. A. Nolan	10-3-55	10-3-55	X	X
J. T. Mommsen to: Battelle Memorial Inst. Columbus, Ohio	Discuss research work in resistance, tungsten- arc and consumable arc welding aluminum and zirconium	C. R. Tipton	10-4-55	10-5-55	X	X

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
J. T. Mommsen to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss cone arc and tungsten arc welding	P. Patriarca	10-6-55	10-6-55	X	
J. T. Mommsen to: E. I. du Pont de Nemours and Savannah River Plant Augusta, Georgia	Discuss mutual canning and welding problems	R. D. McCrosky	10-7-55	10-7-55	X	
J. T. Mommsen to: Westinghouse Atomic Power Pittsburgh, Pennsylvania	Discuss tungsten-arc, consumable arc and fabrication techniques on zirconium	F. Forscher	10-10-55	10-10-55	X	
R. Reidner to: Material Test Reactor Idaho Falls, Idaho	Establish contact at MTR in line with changed responsibility for liaison concerning Hanford experimentation	D. R. Alvord	10-24-55	10-25-55	X	
W. E. Niemuth to: General Electric Co. Cincinnati, Ohio	Discuss reactor safety and equipment for critical experiments	J. W. Morfitt	10-10-55	10-11-55	X	
D. P. O'Keefe to: Knolls Atomic Power Lab. Schenectady, New York	Consultation on hot laboratory operation	T. J. E. Glasson	10-12-55	10-12-55	X	
D. P. O'Keefe to: Westinghouse Atomic Power Pittsburgh, Pennsylvania	Consultation on hot laboratory operation	R. Fillnow	10-13-55	10-14-55	X	
W. J. Ozeroff to: Oak Ridge National Lab. Oak Ridge, Tennessee	Attend meeting on Critical Mass problems	D. Callihan	9-26-55	9-27-55	X	
W. J. Ozeroff to: Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Attend Industrial Criticality Meeting	C. L. Schuske	10-6-55	10-7-55	X	

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data		
					Class.	Unclass.	
						Areas	
P. G. Pallmer, Jr. to: Argonne National Lab. Lemont, Illinois	Discuss X-ray diffraction techniques	M. Mueller	10-13-55	10-15-55		X	
D. C. Pound to: General Electric Co. Cincinnati, Ohio	Discuss reactor safety and equipment for critical experiments	J. W. Morfitt	10-10-55	10-11-55		X	
F. B. Quinlan to: Mallinckrodt Chem. Wkrs. St. Louis, Missouri	Installation and operation of uranium shotting machine	J. A. Fellow	10-3-55	10-14-55		X	
F. B. Quinlan to: Mallinckrodt Chem. Wkrs. St. Louis, Missouri	Installation and operation of uranium shotting machine	J. A. Fellows W. M. Leaders	10-10-55 10-17-55	10-21-55 10-28-55		X X	
H. E. Ralph to: Material Test Reactor Phillips Petroleum Co. Idaho Falls, Idaho	Check on HAPL Fuel Element Testing Facility and Equipment	R. J. Nertney D. R. Alvord	10-11-55	10-31-55		X	
J. H. Rector to: Knolls Atomic Power Lab. Schenectady, New York	Discuss control rod developments of Submarine Intermediate Reactor and SAR	Dr. Bennett	10-21-55	10-21-55		X	
J. W. Riches to: Iowa State College Ames Laboratory Ames, Iowa	Consultation on uranium metallurgy	F. H. Spedding	10-10-55	10-11-55		X	
J. W. Riches to: Battelle Memorial Inst. Columbus, Ohio	Consultation on uranium metallurgy	J. Keeler	10-12-55	10-13-55		X	
J. W. Riches to: Knolls Atomic Power Lab. Schenectady, New York	Consultation on uranium metallurgy	T. Snyder	10-14-55	10-14-55		X	

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
						Areas
M. J. Sanderson to: General Electric Co. Cincinnati, Ohio	Discuss fuel material and fuel element developments	A. E. Focke	10-24-55	10-24-55	X	
M. J. Sanderson to: Battelle Memorial Inst. Columbus, Ohio	Discuss fuel material and fuel element developments	H. A. Saller	10-26-55	10-26-55	X	
W. R. Smith to: Boeing Aircraft Company Seattle, Washington	Discuss welding equip- ment, processes, techniques, and applications	L. M. Crawford	10-13-55	10-13-55	X	
J. T. Stringer to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Process inspection for uranium fabrication	W. M. Leaders	10-31-55	11-1-55	X	
W. P. Wallace to: Sylvania Electric Products Bayside, Long Island, New York	Consultation on fuel elements development	S. Roboff H. A. Hausner	10-27-55	10-27-55	X	
W. T. Wallace to: Argonne National Lab. Lemont, Illinois	Discussion on fuel elements development	F. Foote C. C. Stone	10-28-55	10-28-55	X	
E. C. Wood to: Battelle Memorial Inst. Columbus, Ohio	Internal friction measure- ments and non-destructive testing	R. E. Maringer S. A. Wenk	10-12-55	10-12-55	X	
E. C. Wood to: Hammond Metallurgical Lab. Yale University New Haven, Connecticut	Internal friction studies	A. S. Nowick	10-13-55	10-13-55	X	
E. C. Wood to: Argonne National Lab. Lemont, Illinois	Non-destructive testing methods	W. J. McGonnagle	10-10-55	10-11-55	X	
D. C. Worlton to: National Lead Company Fernald, Ohio	Inspect ultrasonic test- ing equipment	P. Merrill	10-17-55	10-21-55	X	

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
H. H. Burley to: Iowa State College Ames Laboratory Ames, Iowa	Consultation on uranium metallurgy	F. H. Spedding	10-10-55	10-11-55	X	
H. H. Burley to: Battelle Memorial Inst. Columbus, Ohio	Consultation on uranium metallurgy	J. Keeler	10-12-55	10-13-55	X	
H. H. Burley to: Knolls Atomic Power Lab. Schenectady, New York	Consultation on uranium metallurgy	T. Snyder	10-14-55	10-14-55	X	
O. W. Rathbun to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Process inspection for uranium fabrication	W. M. Leadere	10-31-55	11-1-55	X	
FINANCIAL DEPARTMENT						
I. Visits to other Installations						
D. M. Johnson to: Knolls Atomic Power Lab. Schenectady, New York	Discuss classified financial information	R. Turner W. W. Smith	10-6-55	10-7-55	X	
MANAGEMENT						
I. Visits to other Installations						
W. E. Johnson to: E. I. du Pont de Nemours Wilmington, Delaware	General Technology and Management	B. H. Mackey	10-3-55	10-3-55	X	
W. E. Johnson to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	General Technology and Management	D. C. Miller	10-4-55	10-4-55	X	

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
W. E. Johnson to: Oak Ridge National Lab. Oak Ridge, Tennessee	General Technology and Management	C. Center	10-5-55	10-5-55	X	
W. E. Johnson to: Argonne National Lab. Lemont, Illinois	General Technology and Management	N. Hilberry	10-7-55	10-7-55	X	
W. E. Johnson to: Knolls Atomic Power Lab. Schenectady, New York	Business Review	K. R. Van Tassel	10-6-55	10-6-55	X	
W. E. Johnson to: U. S. Atomic Energy Comm. Washington, D. C.	Consultation with AEC officials	E. J. Bloch	10-6-55	10-7-55	X	

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MANAGEMENT- OPERATIONS RESEARCH STUDY SECTION

I. Visits to other Installations

C. A. Bennett
to: U. S. Atomic Energy Comm. lations
Idaho Falls, Idaho

10-14-55 10-14-55

X

C. A. Bennett
to: Phillips Petroleum Co.
Idaho Falls, Idaho

10-14-55 10-14-55

X

MANUFACTURING DEPARTMENT

I. Visitors to this Works

S. F. Audia
National Lead Company
Fernald, Ohio

Discuss machining and
production problems

S. M. Gill
R. E. Olson

10-28-55 10-28-55

X

200-W 221-U
300 303

J. R. Clark

E. I. du Pont de Nemours & Co. problems
Savannah River Plant
Augusta, Georgia

Study waste disposal

10-24-55 10-28-55

X

200-W 221-U, Redox
300 XXX
700

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Unclass.	Areas
K. L. Flanders E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Discuss performance and machine equipment for production of fuel pieces	E. W. O'Rourke K. V. Stave	10-10-55	10-12-55	X	300 303	
H. G. Henry North American Aviation Co. Downey, California	Inspect metallurgical manufacturing and development facilities	K. V. Stave	10-31-55	11-1-55	X	300 303	
J. C. Mead National Lead Company Fernald, Ohio	Discuss slug to good slug inspection results and standards and uranium metal quality control	S. M. Gill K. V. Stave	10-12-55	10-14-55	X	202-ACR 100-H 105 300 303	
II. Visits to other Installations							
W. A. Blanton to: National Lead Company Fernald, Ohio	Attend Metal Quality Advisory Committee Meeting	G. Wunder	10-19-55	10-20-55	X		
D. E. Braden to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Obtain operational information from TBP type separations plant and study control procedures	J. K. Lower S. D. Smiley L. C. Peery	10-24-55	10-26-55	X		
V. R. Chapman to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Obtain operational information from TBP type separations plant and study control procedures	J. K. Lower S. D. Smiley L. C. Peery	10-24-55	10-26-55	X		
L. M. Knights to: U. S. Atomic Energy Comm. Washington, D. C.	Attend AEC accountability procedures and policies meeting	M. M. Mann	10-5-55	10-5-55	X		
W. K. MacCready to: U. S. Atomic Energy Comm. Washington, D. C.	Attend Production Planning Committee Meeting	E. J. Bloch	10-4-55	10-6-55	X		

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
C. A. Priode to: U. S. Atomic Energy Comm. Committee Meeting Washington, D. C.	Attend Production Planning	E. J. Bloch	10-4-55	10-6-55	X	
RADIOLOGICAL SCIENCES DEPARTMENT						
I. Visitors to this Works						
A. L. Baietti Naval Rad. Defense Lab. San Francisco, California	Discuss future atomic tests	M. L. Mickelson W. A. McAdams A. J. Stevens D. C. Fleckenstein	10-31-55	11-1-55	X	109-H 105 200-W Redox, 221-T 300 XXX; 700 100-K 105-KE
J. R. Clark E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Chemical and hydro-logical techniques related to waste disposal practices	J. F. Honstead R. E. Brown D. W. Rhodes J. R. McHenry	10-25-55	10-25-55	X	300 XXX
N. S. Hall Division of Biology & Medicine U. S. Atomic Energy Comm. Washington, D. C.	Discuss current investigations and study earth sciences	H. A. Kornberg J. H. Rediske J. F. Honstead R. E. Brown	10-10-55	10-11-55	X	100-F 108 200-W 222-U
J. E. Law, Jr. Naval Rad. Defense Lab. San Francisco, California	Discuss future atomic tests	M. L. Mickelson	10-31-55	11-1-55	X	100-H 105 100-K 105-KE 200-W Redox, 221-T 300 XXX; 700
A. A. Smales Atomic Energy of England Harwell, England	Discuss chemical analytical methods pertaining to radiological protection of personnel and bioassay facilities	D. W. Pearce R. L. Watters W. C. Roesch C. W. Thomas	10-12-55	10-13-55	X	300 XXX 700
F. G. Tabb Aircraft Nuclear Propulsion Idaho Falls, Idaho	Attend demonstration on decontamination	H. M. Parker W. A. McAdams	10-3-55	10-7-55	X	100-K XXX 100-P XXX 100-F XXX 100-H XXX 200-F XXX 200-W XXX 300 XXX 700

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
B. F. Trum University of Tennessee Knoxville, Tennessee	Re investigation of fall-out	H. A. Kornberg	10-12-55	10-14-55	X	
J. Wolf Division of Biology & Medicine U. S. Atomic Energy Comm. Washington, D. C.	Discuss current investigations and study earth sciences	H. A. Kornberg J. H. Rediske J. F. Honstead R. E. Brown	10-10-55	10-11-55	X	
F. J. Woodman Atomic Energy of England Windscale, England	Discuss chemical analytical methods pertaining to radiological protection of personnel and bioassay facilities	D. W. Pearce R. L. Watters W. C. Roesch C. W. Thomas	10-12-55	10-13-55	X	300 700 XXX
II. Visits to other Installations						
J. M. Nielsen to: National Lead Company Fernald, Ohio	Present paper on "Analysis of Urine for Thorium at Bioassay and	R. L. Hoover	10-6-55	10-7-55	X	
J. M. Nielsen to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss energy analysis, chemical and activation analysis methods and monitoring	S. A. Reynolds D. J. Knowles	10-10-55	10-11-55	X	
J. M. Nielsen to: Argonne National Lab. Lemont, Illinois	Discuss gamma ray spectrometry, shielding materials and anti-coincidence techniques for bioassay methods	J. Rose J. Sedlet	10-12-55	10-13-55	X	
J. M. Nielsen to: Institute for Nuclear University of Chicago Studies Chicago, Illinois	Discuss low background counting techniques, shielding, and coincidence circuitry	J. R. Arnold	10-14-55	10-14-55	X	
H. M. Parker to: AEC Project Western Reserve University Cleveland, Ohio	Attend meeting of AEC Biomedical Program Directors	Directors	10-24-55	10-25-55	X	

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
W. C. Roesch to: Los Alamos Scientific Lab. Los Alamos, New Mexico	Study human body radio- activity measurements; P. Chism tritium target produc- tion techniques	E. C. Anderson P. Chism J. Coon	10-6-55	10-7-55	X	
R. C. Thompson, Jr. to: Argonne National Lab. Lemont, Illinois	Discussions on tritium studies	W. Manning	10-24-55	10-25-55	X	
C. M. Unruh to: Atomic Energy of Canada Chalk River, Ontario	Discuss and observe uses of radiological pro- tective apparel	A. J. Cipriani	10-4-55	10-5-55	X	

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RADIOLOGICAL SCIENCES DEPARTMENT

OCTOBER 1955

SUMMARY

Twenty informal, twelve Class I and no Class II radiation incidents were recorded.

Emission of I^{131} averaged 15 curies per week, but there was no excessive deposition on vegetation.

In the reactor section, a close approach of a group of employees to the annual working limit of 3 r has necessitated reassignment of work schedules.

A break in a KW effluent line in the river may require corrective action to prevent intake of contaminated water at downstream reactors.

The first instance of breakthrough of a long-lived fission product, specifically Cs^{137} , to the ground water table has been recorded.

Salmon spawning in the local section of the Columbia River has been unusually meager this year; however, there is no known reason to associate this with Hanford waste disposal practices.

Good progress is being made toward finding out what happens when P^{32} is fed to fish. This has a bearing on the permissible release of the material to the river...

In preliminary work on mice, indications of lung cancer induction by radioactive particles have been found. It is important to realize that this has no immediate bearing on the possibility of tumor induction in man.

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RADIOLOGICAL SCIENCES DEPARTMENT

OCTOBER 1955

The month-end force of 422 included 35 supervisors, 96 engineers and scientists, 24 clerical and 267 other personnel.

Number of Employees on Payroll

Beginning of Month	419
End of Month	422
Net Increase	3

All persons engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during the period covered by this report except as listed below. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries

<u>Name</u>	<u>Title of Invention</u>
John W. Baum	Electrical-Inertial Aerosol Collector
Ward G. Spear	An Alpha, Beta, Gamma Detection Probe
Richard E. Ewing	Hygrometric "On-Off" Electric Control Device

There were 32 radiation incidents, including 12 Class I and no Class II incidents. This is a considerable improvement compared with recent experience. It is noted that it is coincident with apparent improvements in safety and security performance. Probably one factor in all these performance areas is the general attitude and morale of the force, which would introduce a partial correlation. Detailed correlation is neither found nor to be expected.

In last month's report, the sharp increase in Class I incidents for 1955 was pointed out as a signal for tightening of controls in radiation work. Another signal occurred this month, under conditions that may affect the convenience and relations of a group of employees. This relates to the matter of the uniform G.E. and HAP0 working limit of 3 r per year (or the equivalent in mixed penetrating radiation). The radiation work load in the Reactor Section has been such that a substantial number of employees, especially in the radiation monitor force, have reached or are imminently approaching this limit. It is said that the only practicable way to preserve the limit is to transfer selected personnel between the various monitoring groups on a temporary basis.

Apparently there has been some misunderstanding as to the meaning of a working limit. A working limit in radiation protection is a real limit in the sense that

Radiological Sciences Department

it should not normally be deliberately exceeded; it has more force than a desirable target or bogey. However, it is not real in the sense that an individual is to be considered overexposed if the limit is exceeded. National and international committees currently take no cognizance of an annual limit. The official limit is based on a maximum permissible exposure in any seven days, a hopelessly complicated method administratively, with a grudging recognition of a quarterly limit for special cases.

In past Hanford practice, we have always had a safety factor, that is, a working limit lower than an official limit. In the first years of operation, this was rather easily maintained at 10. When the basic official limit was reduced several years ago, our internal safety factor was changed to 5, which represented about the same actual working limit. Control since 1950 has been on the basis of an annual limit of 3 r, with a maximum weekly score of 0.3 r in any one week, which is more liberal and practical than a uniform safety factor of 5 for each week. The increase in operations in the last year or year and a half has led certain areas into a more continuous application of the 0.3 r per week limit than is desirable. Cooperative steps will be taken to modify some of the more hazardous tasks in such areas. A general reduction of exposure level should also help in the administration of over-time, which is currently affected by the integrated exposures of some personnel.

A review of the general atmosphere of radiation protection at the Geneva Conference suggests that international control may eventually lead to a safety factor of 10. This tends to emphasize some tightening of present controls, and is a contributing factor to the desirability of currently avoiding the deliberate passing of the 3 r annual limit. Nevertheless, it must be admitted that its maintenance by transfers for as short a period as 8 weeks must appear to have arbitrary or capricious aspects. In future years, more responsive action to the quarterly summaries of exposure can eliminate such late changes.

Emission of I^{131} averaged 15 curies per week, compared with the target of not more than 10 curies per week. Average atmospheric dilution was still such that no untoward deposition on vegetation occurred. It was noted that the thyroid activity of natural rodents in the area increased by a factor of 12 during the month. This supports the expectation that continued emission at the present rate would lead to excessive thyroidal uptake as winter conditions are established.

A break was noted in the KW reactor effluent line in the river. This may need correction because it will tend to introduce adverse activity patterns at the intakes of downstream reactors.

Ground water beneath the T Plant second cycle crib now contains Cs^{137} , at about 1% of the permissible limit. Laboratory experience leads one to expect a rapid increase in the Cs^{137} concentration; alternate crib facilities are being provided as expeditiously as possible. This is the first occasion on which a long-lived fission product has been detected in the ground water. How well this situation can now be controlled will be a good test of the adequacy of waste disposal planning.

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Radiological Sciences Department

Tests in another well, made possible by the inadvertent rupturing of its casing, suggest that for the Redox cribs, Sr radioisotopes, rather than Cs^{137} may be the first component to reach the ground water. This "anomalous" behavior may be due to low pH of these solutions. Whether the behavior is properly described as anomalous is quite doubtful. There has for some time been a difference between HAPO and Canadian results as to which of these two fronts is the leading one. The resolution of the discrepancy is most likely that either one may lead, with pH as one controlling factor, and probably the amount of other ions such as Ca^{++} and PO_4^{---} as other parameters.

Commitment of various wastes to ground, as controlled by Earth Sciences tests, continued at a favorable pace.

Work also progressed favorably on the future requirements for Columbia River monitoring. With conditions likely to approach close to permissible limits before they may eventually be reduced by recirculating systems or the like, full and comfortable coverage of all possible phases of monitoring would require a major investment. Operational analyses are being made to select a program that is broadly adequate, although not complete, at a moderate cost. The risk in this approach is that arbitrary interpretations of limits in possible state, national, or international codes would require a crash program in the future. Developments of such codes is therefore being carefully watched in order to anticipate adverse regulation with an adequate lead time.

An aerial census of salmon spawning has shown few nests so far. Unless there is a spectacular increase in the next few weeks, this year's spawning will be far below normal. Although there is no reason to associate this with Hanford operations, it would obviously have been more comfortable to have found a good local yield. As a local nuisance, the paucity of fish has made it impossible to get local salmon eggs so that the important studies on temperature effects will have to be made with imported eggs that are known to have somewhat different characteristics.

Tests of chromate toxicity in fish continued to show damage at values less than the officially accepted permissible concentration of chromate ion in drinking water.

The direct test of lethality of P^{32} in fish is progressing well, with the pattern of sub-acute exposure leading to death already fairly well established. We use the expression "sub-acute exposure" in the sense of a continuous exposure of more than a few weeks' duration being necessary to produce the biological effect studied. In the special case in which this effect happens to be lethality, there can be some semantic objection to the term "sub-acute," especially from the point of view of the affected experimental animals.

In the environs of the river, the activity density of P^{32} in waterfowl continued to be high, with a quite discouraging failure of the active material to confine its interest to bone. It appears that it would not be appropriate for off-project

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Radiological Sciences Department

personnel to consume an average of more than 50-100 gm of waterfowl flesh per day. This is too close for comfort to the feasible intake of successful hunters.

The beta radiation action on pig skin is being studied with prepared radiostrontium plaques. These results can be compared both with similar exposures on sheep skin and with the particle-source reactions on pig skin. The latter have now been healing from 8 to 16 months, and a general picture of the late effects can be drawn. There is a notable difference between those cases treated acutely (1-2 days) and those treated sub-acutely (2 to 4 weeks).

Experimental procedures are being prepared for the irradiation of semi-isolated gastro-intestinal tract with X-rays and later with other agents. This reflects the current strong interest in the true permissible dose for gut irradiation which may be a primary limiting factor in radioisotope intake.

Mice subjected to a heavy dose of plutonium oxide particles in the lung some 400 days ago are now being examined at autopsy. Of six examined in detail so far, two appear to have cancer of the lung. Work of this kind is notoriously treacherous, as for example in the conflicting data on lung cancer possibly induced by smoking. All that should be concluded from the subject data is the possibility that lung cancer in a particular strain of mice may be induced by the presence of radioactive particles. If this is confirmed by further experiments in the mouse, and substantiated by tests in other animals, one would have a basis for its extrapolation to man. The quantitative hazard in man could then be defined, and from it, some reasonable value of the permissible release of active particles. The recently completed aerosol exposure facility at the animal farm will make much of this program possible.

It must be remembered that at the present time there is no authentic case on record of lung cancer induction in man from a specific radioactive particle.

HM Parker

Director,
RADIOLOGICAL SCIENCES DEPARTMENT

HM Parker:kss

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Radiological Sciences DepartmentAPPENDIX1. Condensed Exposure Records

Type	Number of Readings	Potential High Results	Confirmed High Results
Pocket chambers - gamma	298,678	30	0
Pocket chambers - slow neutron	1,910	1	0
Film badges - beta-gamma	53,265	30	0
Film badges - neutron	714	0	0
Pu bioassay	1,125	56	3
F. P. bioassay	1,236	26	0
U bioassay	465	7	0
Alpha hand counts	53,380	0	0
Beta hand counts	65,721	18	0
Thyroid counts	134	0	0

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Radiological Sciences Department2. Regional Monitoring Records

Sample Type and Location	Activity Type	Average Activity Density /uc/ml	Trend* Factor
<u>Drinking Water and Related Materials</u>			
Benton City Water Company Well	alpha	1.3×10^{-8}	--
Richland, N. Richland, Benton City Wells	alpha	$(0.5 \text{ to } 1.3) \times 10^{-8}$	--
100 Areas	beta	$(0.05 \text{ to } 2.3) \times 10^{-6}$	+3
200 Areas	beta	$< 5 \times 10^{-8}$	--
Pasco, Kennewick, McNary Dam	beta	$(0.6 \text{ to } 6.9) \times 10^{-7}$	--
Backwash Solids - Pasco Filter Plant	beta	3.4×10^{-2} /uc/gm	+4
Backwash Liquids - Pasco Filter Plant	beta	3.4×10^{-7}	-2
Sand Filter - Pasco Filter Plant	beta	3.4×10^{-5} /uc/gm	--
Anthracite Filter - Pasco Filter Plant	beta	7.5×10^{-5} /uc/gm	--
<u>Other Waters and Related Materials</u>			
300 Area Wells #1 and 3	alpha	$(0.7 \text{ to } 12) \times 10^{-8}$	--
300 Area Well #4	alpha	1×10^{-7}	--
Well #4 measured as Uranium	U	8.7×10^{-8}	--
Other Wells on the Reservation	beta	$(0.005 \text{ to } 2.7) \times 10^{-4}$	+6
Columbia River - Hanford Ferry	beta	1.1×10^{-5}	--
Columbia River - Below Reactors	beta	1.2×10^{-5}	--
Columbia River - Paterson to McNary	beta	1.3×10^{-7}	--
Columbia River - Shore Mud	beta	$(0.3 \text{ to } 1.9) \times 10^{-4}$ /uc/gm	--
Raw Water - Operating Areas	beta	$(0.05 \text{ to } 5.8) \times 10^{-6}$	+2
Reactor Effluent Retention Basins to River	beta	5,600 to 18,000 /uc/sec/reactor $(0.6 \text{ to } 5.1) \times 10^{-3}$	--
Reactor Effluent Retention Basins to River	alpha	< 0.04 /uc/sec/reactor $< 5 \times 10^{-9}$	--
I-131 in Farm Wastes to River	I-131	16 /uc/day 3.4×10^{-7}	--
I-131 in Columbia River - Hanford	I-131	$< 7 \times 10^{-8}$	--
300 Area Pond Inlet	alpha	2×10^{-6}	--

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H-7

Radiological Sciences Department

Sample Type and Location	Activity Type	Average Activity Density /uc/ml	Trend* Factor
<u>Atmospheric Pollution</u>			
Gross Alpha Emitters	alpha	$<4.0 \times 10^{-15}$	--
Gross Dose Rate - Separations Areas	beta - gamma	(0.30 to 2.44) mrad/day	--
Gross Dose Rate - Residential Areas	beta - gamma	(0.40 to 0.92) mrad/day	--
Active Particles - Separations Areas	beta	$(0.9 \text{ to } 5.7) \times 10^{-13}$	--
I-131 Separations Areas	I-131	$(<0.4 \text{ to } 1.7) \times 10^{-13}$	-7
I-131 Separations Stacks	I-131	2.0 curies/day	--
Ruthenium - Separations Stacks	Ru ¹⁰³⁻¹⁰⁶	<0.01 curie/day	--
Active Particles - Wash., Idaho, Ore., Mont.	--	$<0.0004 \text{ to } 0.003$ ptle/m ³	--
Active Particles - HAP0	--	$<0.004 \text{ to } 0.31$ ptle/m ³	--
Tritium (as oxides) - Reactor Stacks	T	1.17 curies/day	--

Vegetation

Environs of Separations Areas	I-131	$(<3 \text{ to } 9) \times 10^{-6}$ /uc/gm	--
Residential Areas	I-131	$<3.0 \times 10^{-6}$ /uc/gm	--
Eastern Washington and Oregon	I-131	$<3.0 \times 10^{-6}$ /uc/gm	--
Non-Volatile Beta Emitters- Wash. and Oregon	beta	$(1.4 \text{ to } 2.2) \times 10^{-5}$ /uc/gm	--
Alpha Emitters - Separations Areas	alpha	$(<0.5 \text{ to } 8.7) \times 10^{-7}$ /uc/gm	--
Alpha Emitters - 300 Area	alpha	5×10^{-8} /uc/gm	--

* The trend factor shows the n-fold increase (+) or decrease (-) from last month, where values of n less than 2 will not be noted.

DECLASSIFIED

SECRET

FINANCIAL DEPARTMENT MONTHLY REPORT
OCTOBER, 1955

DECLASSIFIED

A report covering operating cost data for 100-K Area during the first quarter of FY 1956 and the Annual Goal estimate was furnished the Reactor and Design Sections for use in scoping a proposed new reactor area.

At the request of USAEC - Washington, a report was prepared of the estimated costs of attendance for the five delegates at the Geneva Conference. These costs were broken down by salaries, travel and living, preparation, printing and reproduction of technical booklets.

On October 11, a letter transmitted to HOO-AEC requested an increase in the "Sub-Program 9950 - Equipment Not Included in Construction Projects" of \$1,400,000. This increase was to compensate for a similar loss in the Plant and Equipment Projects Budget for projects on which Washington - AEC recommended be financed from "Equipment" funds.

The Community Cost Unit is fulfilling requests for certain cost information originating with the FEA appraisers. Information required to date has been concerned principally with commercial property and concerns primarily maintenance, utility, and waste removal costs over the past three years. This information is being supplied to the Commercial Property Unit which, in turn, will present the desired data to the appraisal group.

Responsibility for preparation of the Annual Motor Vehicle Report for AEC has been assigned to the Manufacturing Cost Unit. During October a meeting was held with representatives of the Transportation and the Procedures and Computing Sections to firmly establish contributions from each group.

Information meetings relating to the proposed revised AEC-GE prime contract had been held or scheduled with personnel in four departments at the end of the month. This included the staffs of all section managers of the Employee and Public Relations Department; all of the key personnel in the Radiological Sciences Department; section managers of the Manufacturing Department; and section managers of the Financial Department, as well as all exempt employees in two sections of this department.

The September "Summary of Disbursements," transmitted to the Commission through the director of its Finance Division, showed net expenditures of \$6,954,980, summarized as follows:

Payrolls and payroll deductions disbursed	\$4 621 095
Materials (including orders placed on requirements contracts) and freight	2 193 351
Subcontracts and agreements	102 325
Advances for traveling and living expenses	91 390
Miscellaneous	<u>295 259</u>
Gross Disbursements	7 303 420
Less: Revenue	<u>348 440</u>
Net Disbursements	<u>\$6 954 980</u>

Charges from HAPO against the overhead allowance in October were \$4,098, consisting of:

Nonreimbursable transfer expense	\$2 069
Travel and living expense variation	1 242
Conference expense	785
Nonreimbursable telegraph expense	<u>2</u>
Total	<u>\$4 098</u>

Cash discounts earned during October through payment of invoices within discount periods amounted to \$7,723. Total discount earned this fiscal year to date amounts to \$31,170.

A review has been initiated of all Organization and Policy Guides which will be affected by the recently signed union agreements, and necessary revisions are being prepared.

Requests for Reimbursement Authorizations were submitted to the AEC covering the Company's Five-Year "Better Living" program. Reimbursement Authorizations numbered 248, 249, 250 and 251 were issued by the Commission covering the costs of the program.

An inserting and mailing machine was installed during the month in the Personnel Accounting Section. The machine is used to insert weekly salary checks and earnings statements into envelopes. It is estimated that a reduction of 35 to 40 man-hours per week will result from use of the new machine in Personnel Accounting. The machine will also be used for work of other Departments.

The revised Insurance and Pension Plans were explained to employees of HAPO in a series of educational programs developed and presented in cooperation with Employee Services.

The first meeting on integration of reactor data processing was held on September 29. The following groups were represented: Reactor Section, Pile Technology Section, Advance Engineering Section, Statistics Unit, SS Accountability Section, and the Procedures and Computing Section. Detailed lists of data processing requirements were received from Pile Technology and Reactor Sections, and similar lists promised from the remaining groups participating in the program. These lists will be summarized, and copies sent to the originators to insure that all facets of this integrated system have been covered.

The first phase of converting stores inventory control to an electronic data processing system is in progress. Stores orders filled after October 19 will be punched into IBM cards by Central Stores. The cards will be transmitted to Procedures and Computing, where the issues will be priced and a weekly summary of issues by stock number will be prepared for Central Stores. This weekly summary of issues will be posted to the inventory record card rather than each individual stores issue.

A representative of Procedural Analysis Unit attended the eighth annual meeting of the Systems and Procedures Association, held in Detroit, Michigan. During the meeting, contacts were made with other companies who have or will have an IBM Model 702 EDPM in use in the near future. In conjunction with this, trips were made to the Chrysler Corporation, the Schenectady office of General Electric Company, and to Commonwealth Edison in Chicago. Contacts were established with these organizations for exchange of information pertaining to the operating techniques used on the machine.

The annual inventory of automotive and railway equipment parts and anti-freeze in the custody of the Transportation Section was conducted on October 24, 25 and 26, and results will be reported in November.

Report of physical inventory and reconciliation covering motor vehicles was issued during the month, results of which showed items in the amount of \$1,400 inventoried and not on record and \$118 for items on record not located by physical inventory. Report of inventory and reconciliation of railroad rolling stock was issued during the month and indicated no discrepancies.

Listing of ranges and refrigerators recorded in Community facilities was completed during October and entailed recording of approximately 11,000 items. In order to maintain location data on these items, the supervisor of Tenant Relations has been established as the property control custodian.

An extensive property management evaluation survey of the various departments of the Plant was completed during the month and a composite evaluation of each department prepared.

Sixteen appropriation requests totaling \$38,233 were investigated and processed during the month. Nine project proposals, representing an aggregate of \$1,677,500, were reviewed, approved and processed to the Commission during the month. After receipt and analysis of AEC directives and work authorities, twelve project authorizations were issued for a total of \$1,452,000.

In accordance with the new procedure recently adopted, a letter requesting \$200,000 to cover engineering studies necessary for budget preparation was sent to the Manager, HOO. The Commission has withheld authorization of the requested funds pending concurrence of AEC, Washington regarding the allocation of funds for advance engineering and the establishment of procedures for authorization and control.

In conformity with the SS Accountability Section's standard procedure, revisions of the Metal Preparation SS accountability controls have been delayed during the period of major process change. The final process status is now emerging and the conveyor belt system of operation is currently scheduled for operation some time after December 1. Therefore the SS Accountability Section is working with the Metal Preparation Section in the establishment of a completely revised SS accountability procedure in which reduction in material balance areas and condensed transfer forms appear to be the factors offering the greater opportunities for improvements.

A trip report was issued covering Rocky Flats processing measurements, statistical control system accounting and container processing. These items have specific application to shipper-receiver variance problems. The report (HW-39505) has been well received and follow-up conferences are scheduled at HAPO among operations-process and SS Accountability for purposes of defining HAPO contributions to the cooperative action recommended.

Detailed reports for the Financial Department appear on succeeding pages, as follows:

Summary of Cash Disbursements, Receipts and Advances	I - 5
Auditing Section	I - 6
Budgets and Measurements Section	I - 7 through I - 8
Contract Cost Section	I - 9 through I - 12
General Accounting Section	I - 13 through I - 21
Persomel Accounting Section	I - 22 through I - 25
Procedures and Computing Section	I - 26 through I - 28
Property Accounting Section	I - 29 through I - 33
SS Accountability Section	I - 34 through I - 36
Personnel and Organization Statistics	I - 37 through I - 38

SUMMARY OF CASH DISBURSEMENTS,
RECEIPTS AND ADVANCES

A summary of cash disbursements and receipts (excluding advances of \$6,800,000 by the Atomic Energy Commission for October and also for September) for the months of October and September, 1955, is shown below:

<u>Disbursements</u>	<u>October</u>	<u>September</u>
Payrolls (net)	\$3 131 296	\$3 651 060
Materials and Freight	1 890 714	1 659 707
Payroll Taxes	755 077	671 632
Payments to Subcontractors	676 670	635 970
United States Savings Bonds	218 435	143 232
Group Insurance Premium	146 726	146 893
Pension Plan - Employees' Portion	109 917	88 246
Income from Invested Funds	93 502	-0-
Travel Advances to Employees	88 211	91 390
All Other	161 366	215 290
Total	<u>7 271 914</u>	<u>7 303 420</u>

<u>Receipts</u>		
Rent	109 678	105 069
Income from Invested Funds	93 502	-0-
Electricity	58 015	54 697
Hospital	51 495	46 791
Telephone	49 291	51 570
Sundry Accounts Receivable	37 491	18 098
Sales to AEC Cost-type Contractors	27 750	21 379
Refund of Travel Advances to Employees	11 222	11 121
Bus Fares	9 302	8 816
Refunds from Vendors	425	4 547
Other	9 145	26 353
Total	<u>457 316</u>	<u>348 441</u>

Net Disbursements	<u>\$6 814 598</u>	<u>\$6 954 979</u>
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Outstanding advances as of October 31, and September 30, 1955 were as follows:

	<u>October</u>	<u>September</u>
Cash in Bank - Contract Accounts	\$1 890 221	\$1 904 819
Cash in Bank - Salary Accounts	20 000	20 000
Total	<u>\$1 910 221</u>	<u>\$1 924 819</u>

AUDITING SECTION
MONTHLY REPORT - OCTOBER 1955

Reports were issued for the completed audits listed below:

- Plant Libraries
- Shipping Activities
- Taxes
- Administrative Services - Office Auxiliaries Sub-Section

At month-end a report was being prepared for the audit of Employee Awards and Recognition Pins.

Field work was continued on the following audits:

- SS Accountability
- Cost Accounting - Manufacturing Cost
- Overtime Administration

The following audits were started during the month:

- Telephone and Telegraph Administration
- Employment Administration and Practices
- Management of Capital Assets

Follow-ups were made to determine the extent of compliance with recommendations in reports of the following audits:

- Timekeeping Practices
- Cost Accounting (Part II)
- Classified Files
- Accounts Receivable - Kadlec Hospital
- General Accounts

On October 24, 1955 Mrs. Belle Bean replaced Mrs. Alice Randolph as secretary to the Manager - Auditing.

Four information meetings for exempt employees were held during the month. Two safety films were shown in one of these meetings, which was also attended by the non-exempt employees.

BUDGETS AND MEASUREMENTS SECTION
MONTHLY REPORT - OCTOBER, 1955

General

Thirteen Business Graduates from the 1955 June graduating class have reported. Twelve have been granted "Q" clearances, and ten have been permanently assigned. Two of the remaining three will be assigned early in November. Decision was made to recruit an additional six from the December graduating class if possible.

The Business Training Course is progressing well. Of the original 37 students, 36 remain on the rolls with one voluntary drop-out.

There were no Financial Department suggestions on the agenda for action by the Board during the month. Work is continuing toward full decentralization of the Board with the Financial Department representative being chosen to draft parts of the proposed Organization and Policy Guide.

The regular monthly meeting of the Safety Program Activities Board was attended by the Financial Department representative. Ways and means of counteracting the recent upsurge in accident rates were discussed. It was also pointed out that there is increasing difficulty in obtaining adequate safety awards within present dollar limits.

Budgets

The FY 1956 annual bogey was revised for total production cost and unit cost in line with Secret-Rough Draft of W. K. MacGready dated September 1 but distributed October 7. Revised amounts were used on the current bogey issued October 20 except for "material credit" where calculations have not been completed by Manufacturing Cost. Complete revised annual bogey schedules will be retyped and issued about November 1.

Some revisions and improvements were made in the FY 1956 performance bogey with plans to revise further based on December performance.

A meeting was held with HGO-AEC Budget Chief and Engineering Division Head to discuss the categories used in report form AEC-4280. Some difference in reporting base appears to exist in listing construction forces of prime contractors between Hanford on one hand and Oak Ridge, Paducah, Savannah River and Los Alamos on the other. We were requested to show 104 employees in Minor Construction Sub-Section as "construction management" in the future rather than as "architect-engineer".

HAPC cost charts were revised and distributed on October 20.

Measurements

Considerable progress was made on our "HAPC Measurements Philosophy". This is now believed by us to merit consideration by the General Manager.

Measurements (cont.)

Work is underway on the Quarterly Manufacturing Savings Report which is now the responsibility of the Measurements group. The report should be issued early in November for the period ending September 30.

Work was also undertaken to collect all officially issued HAPO objectives, determine actual accomplishments, and report quarterly.

A measurements information meeting was held in the Separations Section, 200-W Area, with the section manager and his entire staff of sub-section managers and specialists.

Many individual contacts were made as part of measurements services including assistance to two Personnel Accounting unit supervisors, several Employee and Public Relations section managers and three Radiological Sciences section managers. Considerable time was also spent discussing measurements responsibilities and developments with various departmental representatives.

CONTRACT COST SECTION
MONTHLY REPORT - OCTOBER 1955

The draft of the revised Obligation of Funds report brought up to date at September 30, 1955 is complete and will be transmitted to Management during the second week of November. Cash expenditures by General Electric during the first quarter of FY 1956 on Plant and Equipment Projects is estimated at \$4,565,000 for the plant and an additional \$44,000 for Community.

Total costs charged to "Construction Work In Progress" for the first quarter of FY 1956 on projects which General Electric manages or performs A.E.M. services amounted to \$7,152,000 or a going rate for the year of \$28,600,000. Four projects: CG-588, Phase I, "Reactor Plant Modification for Increased Production"; CG-603, "Hanford 4X Program - Bismuth Phosphate Plant"; CA-512, "100-K Area Facilities" and CA-513-A, "Purex Facilities", represented 65% of total first quarter expenditures.

A new report concerning RDX Equipment was issued for the first time in October at the request of Property Management to insure adequate review of major equipment items charged to expense.

At the request of the Director, Radiological Sciences, a report was prepared for the month of September on the first day of October estimating the department's costs for the month of September broken down by section and showing allocation of costs to protection of plant and personnel or to research within each section. This report will be issued monthly in the future to assist department management in their control functions.

A major activity during the month centered around the preparation of information for the Business Reviews. The Reactor Section Business Review was held Wednesday, October 19th in the 100-H Area and the review of the Community Section and the Health and Safety Section was held on October 26. Prior to the reviews, significant financial data of past, present and future section activities was accumulated for the Section Manager's use. After each review, a condensation of the information presented is to be prepared to serve as a management report on the review.

Preparation of the Midyear Budget Review was underway in all cost units during October with completion scheduled for mid-November.

All personnel attended the Insurance and Pension Plan meetings held during the month.

Employee and Public Relations Cost Unit

Work is progressing on the Midyear Budget Review and it now appears there will be little change in the present total net figures. Although some attrition of personnel is anticipated, this is expected to be offset by reduced revenues.

The financial representative to the Health and Safety Section has been participating in a review of inventory materials being conducted by Hospital personnel who are attempting to reduce the inventory levels wherever possible. Slow moving items are being reviewed and where the need is no longer apparent, material will be excessed.

Special projects for November include conversion of first quarter of FY 1956 costs to a hypothetical cost report reflecting the cost as it would have been recorded had Industrial Medical purchased services from Kadlec Hospital. This is part of an overall study designed to eventually place plant operations in the position of a customer purchasing Industrial Medical services from a separate entity.

Engineering Cost Unit

The FY 1956 Midyear Plant and Equipment Projects Budget is in draft preparation stage and should be ready for Management review during the second week of November. Information being developed for presentation to HOO-AEC will be used as a basis for a "Contract Modification" with respect to Obligation of Funds for Plant and Equipment Projects.

Financial data has been compiled at the request of the Manager, Separations Technology Section for presentation at the forthcoming business review for this section. To be presented are historical costs relative to research and development and process technology, average operating cost per exempt man, and investment in capital facilities along with other comparative data.

Quarterly detailed operating cost reports were issued during October for Pile and Separations Technology Sections. This quarterly reporting is in conjunction with the present manner of reporting each month only the major cost components and end function totals.

Physical inventory of Minor Construction Small Tools was conducted in all areas on October 17, 1955. Inventory count is now being consolidated and priced. Property Accountability cards will be prepared from this inventory. Through co-operation of J. A. Jones management Job Superintendents will sign for and be accountable for all non-expendable small tools assigned to foremen under their direction.

Physical inventory Shop Equipment Parts, Lumber, and Plumbing Supplies was conducted on October 3, 1955. Reconciliations have been completed. On October 31, 1955, physical inventories were started on Heavy Equipment Parts, Small Tools Parts, and Metal Bars, Shapes and Plates. Schedule for Physical Inventories has been maintained, and all inventories will be completed November 30, 1955.

Meetings with representatives of the Project Section resulted in the distribution of overliquidations of cost as follows: Small Tools Maintenance, \$40,000; CPFF Service Contract Fee, \$15,610; Minor Construction Indirect Expense, \$60,000; Major Equipment Maintenance, \$29,122. It was also decided that the standard liquidating rate for Small Tools Maintenance would be reduced from 5% to 4% of applied labor effective with November business.

Meeting was held with representatives of Procedures and Computing relative to weekly IBM Cost-To-Date Work Order listings. Effort is being directed to replacing present hand-posted Work Order ledgers with IBM ledgers. It is expected that change-over can be accomplished by the year end.

General and Consolidations Cost Unit

A departmental summary of equipment funds available with encumbrances against available funds was issued. This summary included the "Requests in Process" as encumbrances since these requests have been approved by the Accountants and are either in the form of an appropriation request or a purchase requisition and will be true commitments in the near future. Although this method is in conflict with AEC reporting practices, it is the preferred method for General Electric reporting purposes.

In order to show the actual funds now available for Budget Item 2-23X-56-L-2, "General Plant Projects", an arbitrary allocation of the \$144,000 reduction was made based on the original budget request. Total funds now available are \$1,856,000. A revised allocation will be made based on the Midyear Review.

The FY 1956 first quarter revised Control Budget was included as a line item in the September Consolidated Cost Report for departmental comparison of actual costs with the Control Budget.

Comments on the application of "whole dollar" accounting were prepared for the Manager - General Accounting for inclusion in a summary report to be sent to Schenectady for evaluation against work of other General Electric components. Until the 702 conversion is completed, most of the use of "whole dollar" accounting is being prepared on a manual basis.

Final cost closing schedule for the second quarter of FY 1956 was issued in October. Due to conversion problems in the Computing Unit, the closing schedule for trial balance has fallen as high as two full working days behind in the last few months.

Manufacturing Cost Unit

Responsibility for preparation of the Annual Motor Vehicle Report has been transferred from the AEC to General Electric Company. A meeting was held between members of AEC and General Electric Company to discuss the report and outline various responsibilities. M. F. Rice, L. S. Johnson and L. M. Warden represented Transportation Section inasmuch as the major portion of the work of reporting will be done by them. Financial's responsibility will be that of tabulating and summarizing (IBM) and coordinating the final report (Manufacturing Cost). Additional details will be worked out by responsible individuals.

The EWIP report was prepared using the new needle card system. Very little difficulty was experienced although typing was slow for the first month. Future EWIP reports will be prepared more on a consolidated basis which should cut down on the number of pages and still give all the major control figures required. All AR's will be reported individually and other equipment will be reported by major categories.

Arrangements were made with the Reactor Section, the Electrical Utility Section, and the Engineering Department to transfer to Project CG-558 the cost of water treatment chemicals and electricity consumed in testing 190 Building pumps which are being installed as part of this project.

The distribution of Reactor Maintenance overtime premium charged to individual work orders during October amounted to \$15,290. This results in a more equitable distribution of overtime premium to customer and may result in a reduction of IME rates.

Preparation was started on a review of all liquidation procedures and rates for all Units of Manufacturing Department. This is expected to be completed in December.

During the month of October, the Financial Representative for Reactor Section and Metal Preparation Section conducted tours of the Areas for two employees of the Budgets and Measurements Section. Also during the month, Internal Audit Section conducted an audit of some of the activities of Manufacturing Cost personnel assigned to the outer areas. Manufacturing Cost personnel were contacted by the auditors to obtain information pertinent to the audit.

Stores Sub-Section cut over to the revised IBM procedure on October 20, 1955. A considerable amount of time and effort was spent coordinating and making arrangements to facilitate a smooth transition of paper flow during this period. The current arrangement of sending one clerk from Manufacturing Cost to Central Stores daily for pre-auditing purposes appears to be working quite well.

Measurements statistics covering Purchasing and Stores and Transportation Sections were compiled for the first nine months of calendar year 1955.

The physical inventory of 300 Area essential materials was witnessed during the month.

A series of Information Meetings are being held weekly covering OPG's, Accounting Methods and Procedures, and Personnel Policies. Questions submitted by personnel are reviewed and answers explained to the group. These meetings are scheduled based on group interest.

GENERAL ACCOUNTING SECTION
MONTHLY REPORT--OCTOBER, 1955

ACCOUNTS PAYABLE UNIT

Number and amount of vouchers processed in Accounts Payable during the month was normal; 4,406 vouchers amounting to \$3,798,761 being recorded. There was a 20% increase in the activity in the freight account; 1,687 freight bills amounting to \$311,200 were processed during October as compared to the September volume of 1,404 bills amounting to \$286,886.

Cash discounts earned during October through payment of invoices within discount periods amounted to \$7,723. Total discount earned this fiscal year to date amounts to \$31,170.

Active contracts handled by Accounts Payable, excluding requirements contracts, numbered 40 and contract commitments at the end of October amounted to \$901,517. Payments on these contracts in October amounted to \$86,098. Requirements contract orders placed during October numbered 14 in the amount of \$618,487, and commitments at month-end amounted to \$948,709. Payments under requirements contracts for the month were \$587,152.

Accounts Payable:

	<u>October</u>	<u>September</u>
Balance at beginning of month	\$ 827 108	\$ 702 309
Vouchers entered	3 798 761	3 629 380
Cash receipts	424	4 547
	<u>4 626 293</u>	<u>4 336 236</u>
Less: Vouchers Paid	<u>3 922 172</u>	<u>3 509 128</u>
	<u>\$ 704 121</u>	<u>\$ 827 108</u>
Number of vouchers recorded	4 406	4 372
Number of checks issued	2 635	3 123
Number of freight bills paid	1 687	1 404
Amount of freight bills paid	\$311 200	\$286 886
Number of purchase orders received	1 950	2 272
Amount of purchase orders received	\$2 598 104	\$2 283 650
Amount of cash discount earned	\$7 723	\$7 560

ACCOUNTS RECEIVABLE UNIT

A reconciliation was made of uncollectible accounts transferred to Benton-Franklin and Columbia Valley Credit Exchanges on October 7. During the course of reconciling these accounts, some minor discrepancies were noted, and the necessary action has been taken to bring all records into agreement.

In compliance with a directive issued by the Atomic Energy Commission, thirty-five tenants occupying Government houses and twelve dormitory tenants were served, on October 6, a three-day eviction notice for nonpayment of rent.

ACCOUNTS RECEIVABLE UNIT (Continued)

Except for one dormitory tenant and two tenants who vacated premises, satisfactory arrangements or rent payments were received by October 12, the date specified in the eviction notice. The dormitory tenant was evicted on October 21.

As requested by our attorney, a detailed summary of the American Legion's delinquent rent payments, plus interest through September 30, 1955, was prepared and forwarded to him. This summary was subsequently forwarded to the Atomic Energy Commission with the recommendation that the Commission assume the role of creditor in the impending reorganization under Federal Bankruptcy Laws petitioned by the American Legion.

In connection with the automatic inserting machine recently obtained by Personnel Accounting, a study was conducted in connection with using this machine for the insertion of telephone statements, and it has been concluded that it is not feasible to use the machine for this purpose.

The gross accounts receivable balance at October 31 amounted to \$314,017, a reduction of \$2,434 from the balance of \$316,451 at September 30. Comment concerning the various categories of accounts receivable follows:

Kadlec Hospital - The balance in the Kadlec Hospital account reflects an increase of \$1,379 due to increased out-patient and in-patient sales amounting to \$3,639; further substantiated by adult patient day census increasing to 55.5 or an increase of 1 over the month of September.

Electricity - Increase of \$5,418 reflected in this account results from increased demand for electricity caused by the winter season.

Telephone - Due to a reduction in revenue received during October, an increase of \$3,881 is reflected in the telephone account. This situation results from subscribers submitting telephone revenue after the last day of the month, as telephone receipts amounting to \$11,167 were received during the period November 1 through November 4, 1955.

AEC Cost-Type Contractors - A billing to University of California Radiation Laboratory for equipment charges amounting to \$26,459 results in an increased balance in this account of \$1,282.

Rents - Although there was not a significant change in the balance of this account from the balance last month, the outstanding balance of \$42,647 is an abnormally high figure. This high figure is caused primarily by delinquent commercial facility rent amounting to \$34,857, broken down as follows:

a) Bankrupt - Reorganization Proceedings	\$ 4 696
b) Disputed Audit Claims	3 202
c) Private Housing Projects	20 621
d) Nonpayment of Rent	5 200
e) Retroactive Municipal Services	42
f) Other	1 096
	<u>\$34 857</u>

ACCOUNTS RECEIVABLE UNIT (Continued)

The action being taken on the above accounts is as indicated:

- a) Lessee has petitioned Federal Court for reorganization; appears account to be assigned to Commission in November
- b) Claims being studied by G.E. and A.E.C. Legal. Have been advised two claims amounting to \$2,060 have been referred to A.E.C., Washington, D.C.
- c) Collection to be made through normal collection procedure.
- d) Personnel of Commercial Facilities Unit have been requested to assist in collection of delinquent rents as normal collection procedure has not been successful.
- e) Being reduced monthly by individuals concerned.
- f) Collection to be made through normal collection procedure.

Disconnect notices were mailed to 122 telephone subscribers, and the service of 12 subscribers was suspended due to nonpayment of bills. During the month 400 delinquent notices and 96 final notices were mailed to electricity customers. The service of 19 electricity customers was suspended due to non-payment of bills.

Statistics pertaining to accounts receivable are summarized below:

<u>Account</u>	<u>Balance</u> <u>9-30-55</u>	<u>Net</u> <u>Charges</u>	<u>Collec-</u> <u>tions</u>	<u>Balance</u> <u>10-31-55</u>	<u>Active</u> <u>Accounts</u>
Kadlec Hospital:					
Active	\$ 93 155	\$ 58 392	\$ 56 742	\$ 94 805	1 561
Collection Agencies (74 accounts)	7 686		271	7 415	
Electricity	25 694	63 949	58 571	31 112	4 116
Telephone	32 398	54 535	50 654	36 279	7 783
Sundry:					
Active	53 261	24 684	37 468	40 477	263
Collection Agencies (125 accounts-a)	7 333	300	965-b)	6 668	
AEC Cost-Type Contractors	31 693	29 032	27 750	32 975	27
Rents	42 981	379 067	379 401	42 647	6 951
Equipment Sales to Facilities (1 account)	20 591		598	19 893	
Safety Shoes	1 327	2 547	2 439	1 435	278
Loans to Employees (2 accounts)	<u>332</u>		<u>21</u>	<u>311</u>	
Sub-Total	316 451	<u>\$612 506</u>	<u>\$614 940</u>	314 017	<u>20 979</u>
Reserve for Bad Debts	<u>35 469</u> cr.			<u>36 439</u> cr.	
General Ledger Balance	<u>\$280 982</u>			<u>\$277 578</u>	

(a- Includes all utility and rental accounts.

(b- Includes commission retained by agencies and accounts amounting to \$793 returned by agencies as uncollectible.

ADMINISTRATIVE PLANNING

A total of 48 new or revised Organization and Policy Guides were distributed during October. Of these, 11 were Instruction or Policy guides, 36 were Organization guides, and one was the numerical Index. In addition, 21 OPGs were in the process of duplication or distribution at the end of the month.

The 11 Instruction-type guides are as follows:

- 04.4 "Assignment of Landlord Responsibilities"
This Policy guide was revised to recognize the change in responsibility for North Richland and the reallocation of responsibilities in the White Bluffs area.
- 04.14 "Uniform Drafting Practices"
This Instruction was issued to create a standard drafting code at HAPO.
- 13.14 "Assistance to Families of Deceased Employees"
This Policy Guide was revised to bring nomenclature up to date and to make a clear statement of the policy.
- 18.9 "Distribution of Salary Checks and US Savings Bonds"
This Instruction was revised to bring nomenclature up to date and to change the method of distributing checks.
- 18.11 "Removal from Payroll"
This Instruction was revised to provide for the concurrence of the Manager - Employee and Public Relations in the case of discharge for cause of an exempt employee.
- 18.14.4 "Induction of New Employees"
This Policy guide was revised to bring nomenclature up to date.
- 18.14.5 "Employee Transfer and Payroll Status Change"
This Instruction was revised to establish directive policy and to make minor procedural changes.
- 18.16 "Payment to Non-Exempt Employees for Time Spent on Off-Site Travel"
This Instruction was issued to provide the criteria for determining payments to be made for non-exempt employees on off-site business trips.
- 19.1 "Company Negotiating Committee"
This Policy guide was revised to bring the membership of the committee up to date.
- 19.2 "Grievance Procedure"
This Instruction was revised to provide a more clear presentation of the procedure. No substantive changes were made.

ADMINISTRATIVE PLANNING (Continued)

- 24.3 "Reimbursement for Contaminated Personal Effects"
This Policy guide was revised to make a minor change in the form number used, and to authorize temporary issuance of clothing to employees whose personal clothing has been confiscated by the Company.

A report was made summarizing AEC transmittals received within HAPO during September, 1955.

A summary of Organization and Policy Guides issued during September was sent to all Section and Department managers.

Four complete OPG books were prepared, and a total of 807 extra copies of OPGs distributed.

A review has been initiated of all Organization and Policy Guides which will be affected by the proposed union agreements.

The following Organization and Policy Guides are currently being reviewed or revised:

- 04.1.1 "Performance of Project Work"
- 04.1.3 "Research and Development"
- 04.5 "Property Management"
- 04.5.2 "Property Management of Special Equipment"
- 04.6 "Capital Plant and Equipment Accountability and Control"
- 04.7 "Issue and Control - Protective Clothing and Equipment"
- 06.6 "Approvals Required for Work Incidental to or Related to that Authorized by the Prime Contract"
- 14.1 "Area Evacuation"
- 14.2 "Hanford District Civil Defense"
- 14.7 "Safety Shoe Purchase"

The following new OPGs are being prepared:

- "Issue and Control of Hand Tools"
- "Illegal Copying of Documents"
- "Reporting of Accidents to HOO-AEC"
- "Non-Defense Information"
- "Notice of Labor Disputes"

CONTRACT REIMBURSEMENTS

Information meetings relating to the proposed revised AEC-GE prime contract had been held or scheduled with personnel in four departments at the end of the month. This included the staffs of all section managers of the Employee and Public Relations Department; all of the key personnel in the Radiological Sciences Department; section managers of the Manufacturing Department; and section managers of the Financial Department, as well as all exempt employees in two sections of this department.

CONTRACT REIMBURSEMENTS (Continued)

The Commission's approval was obtained in six instances, as required by OPG 05.4 ("Work or Expenditures Which Require AEC Reimbursement Authorization or Letter Approval"), during October. Subjects were as follows:

Payment of the expense of moving a house trailer in lieu of household goods for a transferred employee.

Program of operations for School of Nuclear Engineering for 1955-56 term.

Attendance of HAPO employee at short course on corrosion at the University of California.

Payment of liability claim in case of Doris Hall vs. General Electric Company.

Attendance of HAPO employee at G.E. advanced management school.

Attendance of HAPO employee at motor vehicle maintenance course sponsored by Oregon State College.

A consolidation of the data included in the monthly "Summary of Disbursements" reports for the fiscal year which ended June 30 1955 was completed in October except for typing. It will show net cash expenditures of \$77,244,241 for the 12 months.

The September "Summary of Disbursements," transmitted to the Commission through the director of its Finance Division, showed net expenditures of \$6,954,980, summarized as follows:

Payrolls and payroll deductions disbursed	\$4 621 095
Materials (including orders placed on requirements contracts) and Freight	2 193 351
Subcontracts and agreements	102 325
Advances for traveling and living expenses	91 390
Miscellaneous	<u>295 259</u>
Gross Disbursements	7 303 420
Less: Revenue	<u>348 440</u>
Net Disbursements	<u>\$6 954 980</u>

"Miscellaneous" was comprised of 248 items.

The Contract Reimbursements group handled 10 inquiries on reimbursement matters in October, seven of which originated outside of the Financial Department.

Charges from HAPO against the overhead allowance in October were \$4,098, consisting of:

Nonreimbursable transfer expense	\$2 069
Travel and living expense variation	1 242
Conference expense	785
Nonreimbursable telegraph expense	<u>2</u>
TOTAL	<u>\$4 098</u>

CONTRACT REIMBURSEMENTS (Continued)

The Contract Reimbursements group was increased in October by the addition of a fourth reimbursement auditor.

GENERAL BOOKS UNIT

General Ledger Account 0618 - Plant and Equipment - Adjustments - Non Fund was established during October at the request of A. M. Waggoner, Director of Finance Division, HOO-AEC. This account will be used to record plant and equipment adjustments resulting from reconciliation of physical inventories and to record amounts representing additions of equipment acquired by research funds of prior years. Property Accountability Unit will be responsible for all entries to the account and will be accountable for closing the account to AEC in connection with fiscal year-end closings.

The amount of \$93,503 was received this month from the Guaranty Trust Company of New York representing interest income, less management and service fees, from collateral funds in the amount of \$10,500,000 on deposit with the Travelers Insurance and Travelers Indemnity Companies. This income was transferred by check to the Commission.

The Washington State Pension Awards bank account was credited this month with a cash deposit in the amount of \$157,560 representing income from the sale of U. S. Treasury Savings Notes, Series B, \$150,000 par value purchased September 15, 1953 and maturing September 15, 1955. The amount of \$7,560 represents interest income. This transaction results from our agreement with the State that excess funds in the Pension Award Reserve account be invested in government securities. It is expected that the cash received from the sale of these savings notes will be invested in other government securities in the near future by the State of Washington Treasury Department.

During October, 238 travel, living and conference expense reports were processed, representing an expenditure of \$65,143, as compared to 366 reports in September for a total of \$80,679. Expenditures during September and October were as follows:

	<u>October</u>	<u>September</u>
Travel and Living Expenses		
HAPO Business	\$56 902	\$68 823
Billed to Others	7 456	8 008
Expenses of two employees transferred to AEC-Washington	-0-	2 738
Conference Expense	785	657
Employee traveling for the Commission	-0-	340
Cost of Company-owned Cars	-0-	113
	<u>\$65 143</u>	<u>\$80 679</u>

Charges against the travel and living expense variation in October totaled \$1,265, which is only \$190 less than the total variation incurred during the First Quarter FY-1956.

GENERAL BOOKS UNIT (Continued)

Concurrent with the transfer of a Business Graduate to the Personnel Accounting Section this month, statement work was transferred to General Ledger and other work was reassigned, resulting in a reduction of one employee in General Books. The responsibility for financial statements has been assigned to a Financial Analyst in the Unit, with actual preparation of statements being done by General Ledger clerks.

The new procedure for handling store tickets was placed in operation during the month. General Books Unit has been relieved of all responsibility for stores tickets except the preparation of the monthly journalization and the preparation of correction distribution vouchers.

The revised Special Requests and Back Charges procedure was published in October and should clarify many steps in the handling of claims, the processing of supporting documents and the accumulation of applicable costs prior to billing.

The procedure for preparing Washington State Business and Occupation and Sales Tax Returns was completely reviewed and rewritten during the month, and will be issued in the forepart of November.

Other procedure write-ups and revisions are being worked on currently.

Endorsement No. 7, approved October 24, 1955, amending our contract with The Travelers Insurance and The Travelers Indemnity companies, was received this month. This amendment essentially makes funds available in settling claims in connection with property damage or personal liability from either fund at such time as one fund or the other may be depleted.

	<u>October</u>	<u>September</u>
Advances from AEC		
Balance at beginning of month	\$1 924 820	\$2 079 800
Advances received from AEC	6 800 000	6 800 000
Other cash receipts	457 316	348 440
	<u>9 182 136</u>	<u>9 228 240</u>
Less disbursements	7 271 915	7 303 420
Balance at end of month	<u>\$1 910 221</u>	<u>\$1 924 820</u>
Advances requested for subsequent month	<u>\$7 000 000</u>	<u>\$6 800 000</u>
Travel and Living Expenses		
Travel Advances to employees		
Balance at beginning of month	\$ 81 308	\$ 68 345
Advanced to employees	88 217	104 763
	<u>169 525</u>	<u>173 108</u>
Less:		
Travel, living, and conference expenses reported by employees	65 495	80 679
Cash refunded by employees	10 529	11 121
	<u>76 024</u>	<u>91 800</u>
Balance at end of month	<u>\$ 93 501</u>	<u>\$ 81 308</u>

GENERAL BOOKS UNIT (Continued)

	<u>October</u>	<u>September</u>
Outstanding Travel Advances to Employees		
Current	\$ 67 860	\$ 67 602
Outstanding over 30 days	<u>25 641</u>	<u>13 706</u>
Total	<u>\$ 93 501</u>	<u>\$ 81 308</u>
Number of expense reports submitted by employees	238	366

PERSONNEL ACCOUNTING SECTION
MONTHLY REPORT
OCTOBER, 1955

Requests for Reimbursement Authorizations were submitted to the AEC covering the Company's Five-Year "Better Living" Program. Reimbursement Authorizations numbered 248, 249, 250 and 251 were issued by the Commission covering the costs of the Program.

Payroll tax returns for the third quarter, 1955, for Federal income tax, Social Security tax, and State Unemployment Compensation were completed and forwarded to Accounting Services Division. Returns covering state and local income taxes for the third quarter, 1955, were forwarded to the proper state and local taxing authorities.

Lists of personnel on both weekly and monthly payrolls who have not taken 1955 vacations were prepared and distributed to all departments.

Organization and Policy Guide No. 18.9 was revised during the month. The revised Guide covers the new procedure for distribution of salary checks and U.S. Savings Bonds. The improved procedure which was placed into effect with checks distributed on October 20 provides a more efficient distribution of weekly salary checks and a more controllable system of receipting for salary checks.

An inserting and mailing machine was installed during the month in Personnel Accounting Section. The machine is used to insert weekly salary checks and earnings statements into envelopes. It is estimated that a reduction of 35 to 40 man-hours per week will result from use of the new machine in Personnel Accounting. The machine will also be used for work of other Departments.

The revised Insurance and Pension Plans were explained to employees of HAPO in a series of educational programs developed and presented in cooperation with Employee Services.

A method for collection of insurance premiums from weekly salaried employees on a weekly rather than a monthly basis, as will be required under the revised Insurance Plan, has been worked out in cooperation with Procedures and Computing.

A general information letter was sent to all supervisors explaining the procedures to be followed in surrendering custody receipts for U.S. Savings Bonds purchased under the Stock Bonus Plan in 1950 in order to receive the bonds and the stock bonus applicable to those bonds.

Special reports on personnel and overtime hours were furnished to various Units of the Contract Cost Section for use in the mid-year budget review.

Special Absence Frequency reports covering 164 nonexempt employees for the fiscal quarter ended October 2 were distributed to department and section managers. Improvement in controlling absences is indicated by a comparison as follows:

<u>Fiscal Quarter</u>	<u>No. of Reports</u>
Third -1955	164
Second-1955	186
First -1955	229
Fourth-1954	584
Third -1954	296
Second-1954	385

Employee communications meetings were held for all employees of the Section.

STATISTICS

Personnel Accounting Section

<u>Number of NAPO Employees</u> <u>Changes during month</u>	<u>Total</u>	<u>Monthly Payroll</u>	<u>Weekly Payroll</u>
Employees on payroll at beginning of month	9 264	2 258	7 006
Additions and transfers in	128	13	115
Removals and transfers out	(71)	(23)	(48)
Transfers from weekly to monthly payroll	-	16	(16)
Transfers from monthly to weekly payroll	-	(5)	5
Employees on payroll at end of month	<u>9 321</u>	<u>2 259</u>	<u>7 062</u>

	<u>October</u>		<u>September</u>	
<u>Overtime Payments During Month</u>	<u>Number</u>	<u>Amount</u>	<u>Number</u>	<u>Amount</u>
Weekly Paid Employees	7 061	\$165 140-a)	8 277	\$161 720-b)
Monthly Paid Employees	440	35 966	422	29 672
Total	<u>7 501</u>	<u>\$201 106</u>	<u>8 699</u>	<u>\$191 392</u>

	<u>October</u>		<u>September</u>	
<u>Gross Payroll Paid During Month</u>				
Engineering	\$ 768 525		\$ 836 992	
Manufacturing	2 541 462		2 957 324	
Other	1 133 090		1 333 401	
Total	<u>4 443 077-a)</u>		<u>5 127 717-b)</u>	

- (a- Payments to weekly paid employees are for four week periods.
(b- Payments to weekly paid employees are for five week periods.

<u>Employee Benefit Plans</u> <u>Participation in Benefit</u> <u>Plans at Month End</u>	<u>Number Participating</u>		<u>Percent Participation</u>	
	<u>October</u>	<u>September</u>	<u>October</u>	<u>September</u>
Pension Plan	8 182	8 125	98.5%	98.5%
Insurance Plan				
Personal Coverage	9 386	9 350	99.5	99.5
Dependent Coverage	6 601	6 566	-	-
U. S. Savings Bonds				
Stock Bonus Plan	4 978	4 958	53.4	53.5
Savings Plan	1 050	1 051	11.3	11.3
Both Plans	5 460	5 441	58.5	58.7

<u>Pension Plan</u>	<u>October</u>	<u>September</u>
Number retired	6	9
Number who became eligible for participation	126	80
Number who applied for participation	106	74
Number who elected not to participate	20	6
Replies not received	-	-
 <u>Insurance Plan - Number of Claim Payments</u>		
Employee Life Insurance	2	3
Employee accident and health insurance	427	454
Dependent accident and health insurance	408	488
Total	<u>837</u>	<u>945</u>
 <u>Good Neighbor Fund</u>		
Number participating	6 567	6 570
Percent of participation	70.5%	70.9%
 <u>Suggestion Awards</u>		
Number of awards	4	100
Total amount of awards	\$1 270	\$1 305
 <u>Preferential Rates</u>		
Number (eliminated) or added	1	(2)
Number currently in effect	536	535
 <u>Number of Military Allowance Payments</u>	3	3

PROCEDURES AND COMPUTING SECTION
MONTHLY REPORT - OCTOBER 1955

GENERAL

The first meeting on integration of reactor data processing was held on September 29, 1955. The following groups were represented: Reactor Section, Pile Technology Section, Advance Engineering Section, Statistics Unit, SS Accountability Section and the Procedures and Computing Section. Detailed lists of data processing requirements were received from Pile Technology and Reactor Sections, and similar lists promised from the remaining groups participating in the program. These lists will be summarized, and copies sent to the originators to insure that all facets of this integrated system have been covered.

The first phase of converting Stores inventory control to an electronic data processing system is in progress. Stores orders filled after October 19, 1955 will be punched into IBM cards by Central Stores. The cards will be transmitted to Procedures and Computing where the issues will be priced and a weekly summary of issues by stock number will be prepared for Central Stores. This weekly summary of issues will be posted to the inventory record card rather than each individual stores issue.

Monthly reports were processed, balanced and delivered to customers on or before schedule even though the present level of machine operators is under the existing work load.

PROCEDURAL ANALYSIS

Forms control reviewed 463 orders during October covering 820,365 forms; 50 orders, amounting to 55,700 forms, were rejected; 103 new forms designed; 17 forms were obsolete.

The necessary programming and testing to produce retroactive payroll calculations is 90% complete at month's end. This entailed development of logic for three separate passes through the 702 to update and develop control totals necessary to make the retroactive payments when requested.

The program for EDPM processing of Savings Bond purchases is in the process of programming and is now 40% complete.

Salary Cost Distribution is being studied for conversion to EDPM. Analysis of the problem is 30% complete and programming will be started in November. Retroactive Salary Cost Distribution programs are complete and have been tested for use.

Conversion of APV's and store order punched-card systems to EDPM continued during October. Flow charts for Pass 3 were developed and testing of Pass 1 was completed.

A punched-card procedure was developed to facilitate the purchase and distribution of Safety Awards to employees of Community Section of Employee and Public Relations Department.

The conversion of monthly vehicle procedure was completed during October. Procedures work consisted of coordinating the programming and testing of the problem, preparing the printed output reports, and balancing the control totals for EDPM processing.

Procedures work performed for monthly payroll during October consisted of production of updated Salary Administration and College Graduate Decks of IBM cards for use in Schenectady. A work request was prepared and procedurized for the listing of exempt pension retroactive payments summarized for August, September and October of 1955.

An EDPM procedure was developed, assembled and tested for production of a proof listing of Machine Tool Data cards produced on paper tape by means of IBM type 884-046 machines.

The physical inventory of General Supplies in stores was processed by EDPM in October. The inventory quantity and book quantity were priced and a variance was computed for each inventory tag. This information was printed on lists for inventory accounting to be used for checking discrepancies. This eliminated hand calculations and the mental comparisons formerly required to detect discrepancies.

Logic and flow charting have been completed for Pass 3 and 4 of office machine procedure. Expected completion date for the conversion to EDPM processing is the latter part of November, 1955.

A large card handling job was performed for Classified Files to remove all cards identified as Yellow File accountable copies from the files of Computing Operations Unit after matching with cards representing the original transmittal documents. These were then forwarded to Classified Files for reconciliation with their records. Correction routines will be prepared as the error types become known to permit integration of Yellow File records with all other records in the conversion to EDPM.

Programming, systems, and logic for the Classified Files principal daily business operation was completed in October. Testing and corrections remain to be done prior to conversion to EDPM. The two remaining passes necessary to complete the system have been analyzed and the systems and logic work completed. Programming will continue on this phase during November. New card forms for use in EDPM processing have been received and put in use by Classified Files.

A representative of Procedural Analysis Unit attended the Eighth Annual Meeting of the Systems and Procedures Association held in Detroit, Michigan. During the meeting, contacts were made with other companies who have or will have an IBM Model 702 EDPM in use in the near future. In conjunction with this, trips were made to the Chrysler Corporation, the Schenectady office of General Electric Company and to Commonwealth Edison in Chicago. Contacts were established with these organizations for exchange of information pertaining to the operating techniques used on the machine.

RECORDS OPERATIONS

Quantity of records received, processed and stored:

Employee and Public Relations Department	67	Standard Storage Cartons
Engineering Department	52	" " "
Financial Department	140	" " "
Manufacturing Department	129	" " "
Radiological Sciences Department	13	" " "
	401	

RECORDS OPERATIONS (continued)PROCEDURES AND COMPUTING SECTION

Records Retention and Disposal Schedule Number 219, "Reactor Projects and Personnel Development Records" consisting of thirty-two individual records was developed and submitted for internal approval. Records Retention and Disposal Schedule Number 218, "Reactor Operations Records" consisting of fifty-three individual records was submitted to the Atomic Energy Commission for approval.

Forty-eight reels of microfilm consisting of 215,314 images were completed during the month. A total of 168 reels of microfilm consisting of 724,141 images have been completed by Recordak Corporation to date.

NUMERICAL ANALYSIS

Report is included in Secret Document HW-39751-W.

COMPUTING OPERATIONS

During the month of October the following non-routine assignments were completed for customers:

Employee and Public Relations	3
Engineering	7
Financial	24
Manufacturing	2
Radiological Sciences	1
	<u>37</u>

Service charges for the month amounted to \$66 696. Services, by customer, were as follows:

Atomic Energy Commission	\$ 708.72	01%
Employee & Public Relations	555.26	*
Engineering	15 851.21	24
Financial	39 251.05	59
Manufacturing	3 093.25	05
Operations Research	6 388.11	10
Radiological Sciences	848.40	01
	<u>\$66 696.00</u>	<u>100</u>

*less than 1%

PROPERTY ACCOUNTING SECTION
MONTHLY REPORT - OCTOBER 1955

PROPERTY ACCOUNTABILITY UNIT

Report of physical inventory and reconciliation covering motor vehicles was issued during the month and is recapped as follows:

Motor Vehicles - Balance Prior to Inventory 6-30-55	\$5 030 093
Items inventoried not on record	1 400
Items on record not located by physical inventory	<u>(118)</u>
Total value after reconciliation	<u>\$5 031 375</u>

Reconciliation and inventory of railroad rolling stock indicated no discrepancies between physical plant and detail records. Report issued during the month indicated no discrepancies or adjustments necessary.

Meetings were held with Stores and Inventory Accounting personnel preparatory to the physical inventory of Spare Equipment which is scheduled for November 28, 29 and 30.

The reconciliation of physical inventory of heavy equipment is nearing completion and the report of findings will be issued during November.

Reconciliation of uninstalled equipment inventory of the 200 Areas is approximately 50% complete. Four people are actively engaged in this reconciliation. It will be necessary to curtail this action during November in order to conduct physical inventory of Spare Equipment.

Listing of ranges and refrigerators recorded in Community facilities was completed during October. Approximately 11,000 items were recorded by reviewing 5000 individual residence leases. In addition to ranges and refrigerators located in residences, physical inventories were taken of dormitories, stock rooms and repair shops. Arrangements have been made to have these items recorded by IBM. After recording by IBM, a reconciliation will be made to property records and the values of this equipment established as a cataloged item. The individual accountability of ranges and refrigerators is being established at the request of AEC in that they required the status of these items to be changed from uncataloged to cataloged property. In order to maintain location data on these items the supervisor of Tenant Relations has been established as the property control custodian.

A review of installed detail records was completed during the month preparatory to conversion and application to a new functional coding system of detail records. A complete review of detail records was not possible at this time and only discrepancies which required little or no investigation were corrected. Following the application of the functional coding system, plans are under way to completely review and prepare installed records for conversion to IBM operation. Application of IBM procedures to installed detail records is estimated to start in July 1956.

PROPERTY ACCOUNTABILITY UNIT (Continued)

A steady increase in the number of plant and equipment transfers, property disposal requests, and excess declarations was noted during the month. The investigation, processing, and assurance that property records are adequately relieved of this property have therefore increased due to the lack, in many cases, of documents containing sufficient information to properly book or relieve records. Currently a three-week backlog exists.

CAPITALIZATION AND DEPRECIATION UNIT

A program to establish accountability and control for equipment purchased with Research and Development funds was started during October. The control procedures being established are in accordance with OPG 04.13. This program is scheduled for completion by June 30, 1956.

Extensive revision has been effected in the procedure for unitizing construction projects. In the past certain projects were assigned to the Project Cost Control Unit, Project Section, for unitization and certain projects were unitized by the Capitalization and Depreciation Unit. Since both Accounting and Engineering functions are involved in all unitizations, based on our past experience under this procedure, it is evident that overlapping of responsibility and duplication of effort are required to make this system produce acceptable results. In order to preclude this overlapping and duplication, we have developed a method of unitization that separates the Engineering and Accounting functions. In the future the Engineering functions will be performed by Engineering personnel and the Accounting functions performed by Financial personnel.

A rough draft of a study on allocation of depreciation expense has been completed. The prime considerations in this study are the methods to be used and the bases for allocating depreciation expense to end activities.

The first draft on Investment per Employee per Megawatt of Capability has been submitted. Both the concept and presentation are being carefully examined to determine the feasibility of further development.

The monthly depreciation charge for October was \$3,936,000, as compared to \$4,124,000 for the previous month. The reduction of \$188,000 was brought about by fluctuations in quantities of waste stored and material processed through TBP.

During October, 800 purchase orders, work orders, and other transfer documents were classified for a total of \$332,030.

Unitization Reports were distributed during October for the following projects:

IR-184	Expansion of Facility for Testing Fuel Elements by Induction Heating	\$ 17 910
CG-543	Replacement of Sanitary Tile Fields, 200-U and Administration Areas, 200 West Area	41 227
CG-535	Redox Capacity Increase, Phase II	2 839 206
CG-562	Waste Metal Recovery Plant Modifications	252 629
CG-609	Charge-Discharge While Operating - Test Facility	52 856

INVENTORY ACCOUNTING UNIT

The annual inventory of automotive and railway equipment parts and antifreeze in the custody of the Transportation Section was conducted on October 24, 25 and 26, 1955. Materials inventoried were physically located in the 100 Areas, 200 Areas, 700 Area, 1100 Area and Riverland. The reconciliation of the physical inventory value with the book value is in progress and the final results should be reported in November.

Several pre-inventory meetings were held and notification issued of forthcoming physical inventory of maintenance materials located on service trucks. The physical inventory will include telephone materials which are stored on eighteen service trucks in the custody of the Telephone Sub-Section physically located at the BY Telephone Exchange and the 744 Building and eight service trucks in the custody of the Administrative Area Maintenance Sub-Section physically located at the 716 Building.

The inventory tags disclosing the results of the physical inventory of general supplies in the custody of the Purchasing and Stores Section conducted on September 23, 29, and 30, 1955 have been extended and tabulated. The tabulation is presently being reviewed and Stores' kardex records verified.

The initial of three steps in the conversion from a manual to a machine method of maintaining kardex records was effected in the key punching and verifying of store orders by Central Stores personnel rather than by Procedures and Computing.

Quarterly reports to the AEC were completed and distributed during the month.

PROPERTY MANAGEMENT UNIT

In accordance with a request from the Commission, the Office Services Unit and the Property Management Unit are currently conducting a survey of ditto and mimeographing machines.

A review is being made of certain special electrical equipment such as pumps, welders and compressors. These are currently classified as construction or heavy duty equipment under OPG 04.5. Some difficulty has been experienced in controlling these items as special equipment. The study is to determine whether they should be controlled as ordinary shop equipment rather than special equipment.

An extensive property management evaluation survey of the various departments of the Plant was completed during the month and a composite evaluation of each department prepared.

A total of 167 Property Disposal Requests were initiated during the month.

APPROPRIATIONS UNIT

In an effort to gain a clearer concept of the changes which may be required at HAPO in order for the Commission's budgeting practices to become more nearly like those of other federal agencies, contact was made with the Seattle office of the U.S. Corps of Engineers and arrangements made to contact the N.W. District Office in Portland.

At project planning meetings held during the month, projects reviewed included: Effluent Water Monitoring Improvements - 100-C; Graphite Machining Facility; and Zone Temperature Monitoring.

APPROPRIATIONS UNIT

The following Plant and Equipment projects were processed through the Appropriations Unit during October. GE and AEC approval action was as indicated below.

<u>Project Number</u>	<u>Title</u>	<u>Amount of This Request</u>	<u>Total*</u>	<u>Date to AEC</u>	<u>Disposition</u>
CA-555 Rev 3	Graphite Hot Shop & Storage Facility, Building 3730	-	-	9-22-55	AEC-52, Mod. 2, dated 10-6-55 authorized requested change in scope. Work Authority dated 10-11-55 authorized GE \$36,000.
CG-599	Hanford 4X Program - 100 Areas	Decreased to \$	76 000	9-23-55	HW-337, Mod. 2, dated 10-4-55 authorized \$76,000.
CG-600 Rev. 1	100-C Alterations	\$ 275 000	1 000 000	8-5-55	HW-343, Mod. 1, dated 10-24-55 authorized GE \$675,000.
CA-601 Rev. 1	General Grounds Improvements - 300 Area	96 000	96 000	2-7-55	AEC-61, dated 8-15-55 authorized AEC \$60,000. Work Authority dated 10-12-55 authorized GE \$5000.
CG-613 Rev. 3	Hanford 4X Program - Metal Conversion Plant	1 000 000	4 000 000	10-25-55	AEC agenda 11-10-55.
CA-615	Mechanical Maintenance Shop Centralization - 100 Areas	92 000	92 000	7-18-55	Pending AEC - Washington approval.
CG-621 Rev. 2	Redox Contamination Control Facilities	215 000	765 000	10-19-55	Deferred by AEC 10-28-55 for further study.
CG-630	Alterations to Minor Construction Shops - White Bluffs	93 000	93 000	7-25-55	HW-362 dated 10-13-55 authorized GE \$93,000.
CG-631	Crib Replacement Facilities - 241-T Tank Farm	-	-	10-26-55	HW-357, Mod. 1, dated 10-28-55 authorized change in scope.
CG-638	Alum-Activated Silica Water Treatment Facilities	275 000	275 000	9-27-55	HW-363 dated 10-20-55 authorized GE \$275,000.

APPROPRIATIONS UNIT

<u>Project Number</u>	<u>Title</u>	<u>Amount of This Request</u>	<u>Total*</u>	<u>Date to AEC</u>	<u>Disposition</u>
CA-639	Painting the 100-DR Water Plant Structures	\$ 75 000	\$ 75 000	9-23-55	AEC-67 dated 10-13-55 authorized AEC \$75,000.
CA-640	Noise Reduction Program - 300 Area	45 000	45 000	10-19-55	Deferred by AEC 10-28-55 for further study.
CA-641	Street Extensions - Hains, Gaillard, Harris	25 000	25 000	9-27-55	AEC-68 dated 10-18-55 authorized AEC \$26,900. Work Authority dated 10-25-55 authorized GE \$3500.
CA-642	Continuous Charge Discharge Equipment - C Reactor	200 000	200 000	10-31-55	AEC agenda 11-10-55.
CA-643	Redox Capacity Increase, Phase III	500 000	500 000	9-30-55	HW-364 dated 10-18-55 authorized GE \$500,000.
CA-645	Plutonium Fabrication Laboratory Building 231	85 000	85 000	10-4-55	HW-361, Mod. 1, dated 10-13-55 authorized GE \$85,000.
CA-646	Modifications to Picking Machines - 313 Building	12 500	12 500	10-17-55	HW-365 dated 10-25-55 authorized GE \$12,500.
CA-647	Back-Up Radiiodine Removal Facilities, Pures	60 000	60 000	10-20-55	Deferred by AEC 10-28-55 for further study.
CA-648	Auxiliary Radiiodine Removal and Nitric Acid Recovery Facilities, Redox	60 000	60 000	10-20-55	Deferred by AEC 10-28-55 for further study.

* Total previous authorizations plus this request.

SS ACCOUNTABILITY SECTION
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Metal Preparation Area

In conformity with our standard procedure we have delayed revisions of the Metal Preparation SS Accountability controls during the period of major process change. The final process status is now emerging and the conveyor belt system of operation is currently scheduled for operation some time after December 1, 1955. We are therefore working with Metal Preparation Section in the establishment of a completely revised SS Accountability procedure in which reduction in material balance areas and condensed transfer forms appear to be the factors offering the greater opportunities for improvements.

We have experienced constant difficulty with the time cycles associated with recovery of normal uranium pick up by the process solution. In the past it has been almost impossible to line up charges and credits for recovery. Our procedure has been on the best available data which generally presented some small percentage of out of phase accounting. The Metal Preparation Area has now revised their manufacturing schedules with the result that direct comparison of recovery can be made to the throughput which controls charges to the Process solution account. This marks a very definite improvement in the status of this account.

Our standard transfer form governing the SS transfers from production to technical activities and for transfers within technical units has been assigned to Stores as a Store Stock Item. We are advised that delivery is scheduled for 11-12-55. We plan immediate application.

Fourteen drums of UO_3 processed in the 321 Bldg. by the continuous calcination process have been shipped to Oak Ridge, Tennessee. It is noted that the average uranium assay is 1 to 2% less than our current production.

Under previous reports we noted the SS Accountability problems associated with the inventory of the Radiometallurgy Unit. As a follow-up on the investigations numerous obstacles to the release of this material have now been overcome and an over-all reduction in inventory of approximately 40% has been affected.

Reactor Area

Adjustments of records to reflect the application of fission loss to pile discharge material have been completed. Other scheduled revisions involving enriched uranium accounts have been temporarily delayed due to the fact the low level of activity in these accounts does not warrant present consideration.

In compliance with A.E.C. requests, a procedures manual is being developed for use by Reactor Area accountability personnel.

Our representative, D. L. Haynie, reports that no meetings were scheduled for study of the feasibility of using electronic data equipment for Reactor Area controls during October. However it has been reported that considerable review of the requirements for potential consolidation purposes have been performed by Procedures and Computing.

Separations Section

Production status items of particular interest are provided as follows.

SS ACCOUNTABILITY SECTION
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Redox - Operation on low MWD material throughout the month. High production rates maintained with scheduled shift to High material to be made early in November.

T-Plant - Low production rates which are to continue indefinitely.

Purex - Dissolvers have been charged with D-38 material.

RMA Line - Processed low MWD material at high rate of throughput. This necessitated storage as inventory of Recuplex material which was on high MWD program.

In compliance with A.E.C. survey recommendations a double entry system has been developed for the Bismuth Phosphate Process and is now being tested. It is anticipated that the November report will be prepared from the double entry system.

During the period of Recuplex start-up we experienced the normal difficulties with inventories, process vessel hold-up and imprecisions of flow measurements common to startup conditions. In contrast, the October operation was relatively free of special cases and is now moving in the direction of a routine operation.

Survey reports covering Redox and Isolation process have been reviewed and action is being taken to apply the recommendations agreed to under the Survey procedure. Up to the present, custodian cooperation has been particularly satisfactory.

An inactive item of interest has been the trailer spill material which has now been subjected to leaching operations. No recovery data is as yet available.

SS Accounting Unit

We were in receipt of a letter from the HOO-AEC announcing that Survey #12 would conclude with a verification of Normal Uranium and Mint inventories. We held two meetings for scheduling of survey teams, custodian location and inventory scheduling. Up to the present, the unofficial reports indicate general and continued progress.

The revisions in Metal Fabrication process associated with Task I and Recuplex have now given indications of stabilization. We have therefore started review of SS Accountability procedures in Metal Fabrication using both the accounting procedures and audit approach. A marked improvement in procedures is expected as the result of these surveys.

SS Measurements

A trip report was issued covering Rocky Flats processing measurements, statistical control system accounting and container processing. These items have specific application to Shipper-Receiver variance problems. The report (HW-39505) has been well received and follow up conferences are scheduled at HAPO among operations-process and SS Accountability for purposes of defining HAPO contributions to the cooperative action recommended.

The abnormal discards at Metal Fabrication were further investigated and found to be due to old line hold-up removed by caustic from the Recuplex scrubbers. There has been no recurrence.

SS ACCOUNTABILITY SECTION
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SS Measurements - cont'd.

Beginning with the November report the Bismuth Phosphate location chart will be used. This includes measurement points and the basis of inventory. The procedure is directed towards the improvement of inventory control.

We reviewed the progress on Radiological Sciences development work for secondary controls of Al-Si. Reports indicate they have formulated testing procedures employing chlorine which they hope will concentrate contaminants and thereby establish the feasibility of radiation control. A request for samples has been received from Reynolds Aluminum Company who are reported to have the manufacture of auto parts under consideration. No action has been taken on this request due to the lack of secondary controls. Verbal discussions with the A.E.C. indicate no action has as yet been taken on our proposal for processing by the Bureau of Mines at Albany, Oregon.

FINANCIAL DEPARTMENT PERSONNEL AND ORGANIZATION

OCTOBER, 1955

	<u>Current Month</u>	<u>Prior Month</u>
<u>Personnel Changes During Month</u>		
Employees at beginning of month	487	498
Additions and transfers in	15	13
Removals and transfers out	(9)	(24)
Employees at end of month	<u>493</u>	<u>487</u>
<u>Personnel by Unit at Month-End</u>		
<u>General</u>	<u>10</u>	<u>10</u>
<u>Auditing Section</u>	<u>16</u>	<u>16</u>
<u>Budgets and Measurements Section</u>	<u>15</u>	<u>13</u>
<u>Contract Cost Section</u>		
General and Consolidations Cost Unit	12	11
Engineering Cost Unit		
General	3	3
Design Cost	9	9
Project Cost	20	20
Technical Cost	11	11
Employee and Public Relations Cost Unit		
General	2	2
Plant Activities Cost	10	10
Community Cost	5	5
Medical Cost	3	3
Manufacturing Cost		
General	2	2
Financial Representatives	12	12
Budgets and Control	18	18
Reports and Records	15	15
Analysis and Studies	<u>4</u>	<u>4</u>
	<u>126</u>	<u>125</u>
<u>General Accounting Section</u>		
Accounts Payable Unit	24	23
Accounts Receivable Unit	20	21
General Books Unit	17	17
Administrative Planning	3	3
Contract Reimbursements	<u>6</u>	<u>5</u>
	<u>70</u>	<u>69</u>

	<u>Current Month</u>	<u>Prior Month</u>
<u>Personnel Accounting Section</u>		
Payroll Planning and Analysis Unit	6	7
Weekly Payroll Unit	17	17
Monthly Payroll Unit	12	11
Benefit Plans Accounting Unit	13	12
Payroll Reports Unit	6	7
Weekly Payroll Records Unit	8	7
	<u>62</u>	<u>61</u>
<u>Procedures and Computing Section</u>		
Computing Operations Unit	22	22
Numerical Analysis Unit	9	9
Procedural Analysis Unit	15	15
Scheduling Unit	23	22
Records Unit	8	8
	<u>77</u>	<u>76</u>
<u>Property Accounting Section</u>		
Appropriations Unit	5	5
Inventory Accounting Unit	12	12
Plant Accounting Unit	28	46
Property Management Unit	4	4
Capitalization and Depreciation Unit	21	0
	<u>70</u>	<u>67</u>
<u>SS Accountability Section</u>		
Reactor Area - SS Accountability Unit	4	4
Separations Area - SS Accountability Unit	19	17
Metal Preparation Area - SS Accountability Unit	7	7
SS Accounting Unit	5	6
SS Measurements Unit	8	10
	<u>43</u>	<u>44</u>
<u>Rotational Trainees</u>		
	<u>4</u>	<u>6</u>
	<u>493</u>	<u>487</u>

PROCEDURES AND COMPUTING SECTION
MONTHLY REPORT - OCTOBER 1955

GENERAL

The first meeting on integration of reactor data processing was held on September 29, 1955. The following groups were represented: Reactor Section, Pile Technology Section, Advance Engineering Section, Statistics Unit, SS Accountability Section and the Procedures and Computing Section. Detailed lists of data processing requirements were received from Pile Technology and Reactor Sections, and similar lists were promised from the remaining groups participating in the program. These lists will be summarized, and copies sent to the originators to insure that all facets of this integrated system have been covered.

The first phase of converting Stores inventory control to an electronic data processing system is in progress. Stores orders filled after October 19, 1955 will be punched into IBM cards by Central Stores. The cards will be transmitted to Procedures and Computing where the issues will be priced and a weekly summary of issues by stock number will be prepared for Central Stores. This weekly summary of issues will be posted to the inventory record card rather than each individual stores issue.

Monthly reports were processed, balanced and delivered to customers on or before schedule even though the present level of machine operators is under the existing work load.

PROCEDURAL ANALYSIS

Forms control reviewed 463 orders during October covering 820,365 forms; 50 orders, amounting to 55,700 forms, were rejected; 103 new forms designed; 17 forms were obsoleted.

The necessary programming and testing to produce retroactive payroll calculations is 90% complete at month's end. This entailed development of logic for three separate passes through the 702 to update and develop control totals necessary to make the retroactive payments when requested.

The program for EDPM processing of Savings Bond purchases is in the process of programming and is now 40% complete.

Salary Cost Distribution is being studied for conversion to EDPM. Analysis of the problem is 30% complete and programming will be started in November. Retroactive Salary Cost Distribution programs are complete and have been tested for use.

Conversion of APV's and store order punched-card systems to EDPM continued during October. Flow charts for Pass 3 were developed and testing of Pass 1 was completed.

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DECLASSIFIEDPROCEDURAL ANALYSIS (continued)

A punched-card procedure was developed to facilitate the purchase and distribution of Safety Awards to employees of Community Section of Employee and Public Relations Department.

The conversion of monthly vehicle procedure was completed during October. Procedures work consisted of coordinating the programming and testing of the problem, preparing the printed output reports, and balancing the control totals for EDPM processing.

Procedures work performed for monthly payroll during October consisted of production of updated Salary Administration and College Graduate Decks of IBM cards for use in Schenectady. A work request was prepared and procedurized for the listing of exempt pension retroactive payments summarized for August, September and October of 1955.

An EDPM procedure was developed, assembled and tested for production of a proof listing of Machine Tool Data cards produced on paper tape by means of IBM type 884-046 machines.

The physical inventory of General Supplies in stores was processed by EDPM in October. The inventory quantity and book quantity were priced and a variance was computed for each inventory tag. This information was printed on lists for inventory accounting to be used for checking discrepancies. This eliminated hand calculations and the mental comparisons formerly required to detect discrepancies.

Logic and flow charting have been completed for Pass 3 and 4 of office machine procedure. Expected completion date for the conversion to EDPM processing is the latter part of November, 1955.

A large card handling job was performed for Classified Files to remove all cards identified as Yellow File accountable copies from the files of Computing Operations Unit after matching with cards representing the original transmittal documents. These were then forwarded to Classified Files for reconciliation with their records. Correction routines will be prepared as the error types become known to permit integration of Yellow File records with all other records in the conversion to EDPM.

Programming, systems, and logic for the Classified Files principal daily business operation was completed in October. Testing and corrections remain to be done prior to conversion to EDPM. The two remaining passes necessary to complete the system have been analyzed and the systems and logic work completed. Programming will continue on this phase during November. New card forms for use in EDPM processing have been received and put in use by Classified Files.

A representative of Procedural Analysis Unit attended the Eighth Annual Meeting of the Systems and Procedures Association held in Detroit, Michigan. During the meeting, contacts were made with other companies who have or will have an IBM Model 702 EDPM in use in the near future. In conjunction with this, trips were made to the Chrysler Corporation, the Schenectady office of General Electric Company and to Commonwealth Edison in Chicago. Contacts were established with these organizations for exchange of information pertaining to the operating techniques used on the machine.

RECORDS OPERATIONS

Quantity of records received, processed and stored:

Employee and Public Relations Department	67	Standard Storage Cartons
Engineering Department	52	" " "
Financial Department	154	" " "
Manufacturing Department	129	" " "
Radiological Sciences Department	13	" " "
	<u>401</u>	

Records Retention and Disposal Schedule Number 219, "Reactor Projects and Personnel Development Records" consisting of thirty-two individual records was developed and submitted for internal approval. Records Retention and Disposal Schedule Number 218, "Reactor Operations Records" consisting of fifty-three individual records was submitted to the Atomic Energy Commission for approval.

Forty-eight reels of microfilm consisting of 215,314 images were completed during the month. A total of 168 reels of microfilm consisting of 724,141 images have been completed by Recordak Corporation to date.

NUMERICAL ANALYSIS

Machine testing of the TBI limits calculation is approximately 90% complete. The temperature instability curves used in the formulation of the problem have been changed, and the new curves will be incorporated into the program at the earliest possible moment.

Discussions have been held with the problem originator in connection with the Power and Exposure Studies calculation, which is being converted to the 702. Present plans call for obtaining flow data from the TBI procedure, temperature data from maps, and charge lists from the customer as before. Frequency distribution of tubes by accumulated exposure and forecasted exposure will be made monthly for each metal type and charge date.

Program testing of the reactivity accounting calculations for H-reactor is continuing. A request was received to extend the calculations to C-reactor. Because of certain features peculiar to the latter reactor, a certain amount of re-programming was necessary.

The preparation of programs for the five-year weather study is nearing completion. To facilitate program testing, the problem has been divided into four parts, each capable of producing a report. Further simplification will result by restricting the programs to the processing of one year's data at a time. Accumulated data will be edited using conventional punched card methods and then transcribed to tape for input to the new programs.

Work was completed on the solution of four 139 x 274 systems in connection with the operations research study of production scheduling. Two attempts at solution failed because the conditions imposed were such that no feasible solution existed. A third set of conditions was imposed, and a feasible solution obtained.

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NUMERICAL ANALYSIS (continued)

The work was carried out on a high-priority basis. Considerable experience in the behavior of the program was gained in the latest run, and will be used to advantage in future runs.

Calculations pertaining to a radically new slug design were undertaken and completed this month. This slug is both internally and externally cooled, and the slug cell is divided into seven regions. A program was written to calculate the average flux and disadvantage factor in each region, and the migration area, thermal utilization and resonance escape probability of the cell. Also included in the program are the calculation of the fast effect, effective reactivity, and collision probabilities. The program is sufficiently general to treat the internally-cooled-only and externally-cooled-only slugs as special cases, thus encompassing all previous work of the same type. The work was carried out on a top-priority basis, to make the results available in time for the issuance of a special report. Twelve cases in all were run; the machine time for each case required on the order of ten minutes. Additional cases are to be run.

Additional cases have been requested in connection with the problem of determining the flux response to a step change in reactor reactivity. A certain amount of reprogramming has been necessitated due to an unforeseen change in problem formulation for certain parameter values. A total of 720 cases will be run.

Further work was done on the three dimensional pile control problem. An analysis indicated that it will be more economical to generate the N^6 factors required in the variational procedure directly by fixed-decimal calculations, than to generate only the unique ones, copy, and sort. A program for generating these factors has been written and tested.

Analysis and 702 programming of the non-linear isotope buildup problem have been completed. The work was carried out jointly by a Numerical Analyst and the originator from the Advanced Engineering Section. Testing of the program is pending the preparation of problem data.

As part of the continuing study of process type corrosion and replacement, a request was received to compute the present tube wall thickness of all tubes in 6 Hanford reactors, and to predict the same wall thicknesses at one-month intervals for the coming year. The predictions were made for three different operating conditions: the present operating condition, and conditions resulting from lowering power to reduce tube outlet temperatures 10 and 20 degrees below present temperature. Frequency distribution of tubes by wall thickness and a complete listing of all tubes were made. The results of this calculation are being used in planning a tube replacement program to minimize loss due to tube leakage.

Investigation of the corrosion problem is also being carried out along two other lines. In one approach, the average corrosion temperature for each reactor is to be computed from individual tube outlet temperatures, in order to correlate the average corrosion temperature with the bulk outlet temperature. Data from the Power and Exposure studies will be used. In the other approach, corrosion rates of slugs sampled since startup are to be computed. Programming is underway on both of these problems.

SECRET

NUMERICAL ANALYSIS (continued)

Additional calculations on the backmixing phenomenon in a separation column were carried out. The formulation used was the fourth version of the problem to be investigated, and required reprogramming of the original formulations. Calculations were made using the same parameter values as before. The programming and running were completed in four days.

General purpose developments this month consisted of the development of floating-decimal sub-routines for the Bessel functions K_0 and K_1 . These functions appear repeatedly in physical problems with cylindrical geometry.

A series of training sessions on the 702 has been initiated for all machine operators. Included in the present group are a technical graduate assigned to the Computing Operations Unit, and a representative of the Physics Research Sub-section who will be doing incidental programming for members of her group.

COMPUTING OPERATIONS

During the month of October the following non-routine assignments were completed for customers:

Employee and Public Relations	3
Engineering	7
Financial	24
Manufacturing	2
Radiological Sciences	<u>1</u>
	<u>37</u>

Service charges for the month amounted to \$66 696. Services, by customer, were as follows:

Atomic Energy Commission	\$ 708.72	01%
Employee & Public Relations	555.26	*
Engineering	15 851.21	24
Financial	39 251.05	59
Manufacturing	3 093.25	05
Operations Research	6 388.11	10
Radiological Sciences	<u>848.40</u>	<u>01</u>
	\$66 696.00	100

* Less than 1%

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OPERATIONS RESEARCH STUDY

MONTHLY REPORT
OCTOBER 1955

The following is the month end summary of personnel:

	<u>As of 9-30-55</u>			<u>As of 10-31-55</u>			<u>Net Change</u>		
	<u>Ex</u>	<u>Non-Ex</u>	<u>Total</u>	<u>Ex</u>	<u>Non-Ex</u>	<u>Total</u>	<u>Ex</u>	<u>Non-Ex</u>	<u>Total</u>
General	1	1	2	1	1	2	0	0	0
Operations Research Analysts	5	0	5	5	0	5	0	0	0
TOTAL	6	1	7	6	1	7	0	0	0

Mr. C. A. Bennett visited the Atomic Energy Commission - Idaho Operations Office and the Phillips Petroleum Company at Idaho Falls, Idaho during the month.

Mr. L. W. Smith, Jr., met with personnel of the Operations Research & Synthesis Service, Management Consultation Services Division with regards to Operations Research. Mr. Smith also presented a paper at the Second National Meeting of the Institute of Management Sciences in New York City, October 20-21.

Planning and Scheduling of Capital Improvements

Work was continued on the background necessary to the correct formulation of the Planning and Scheduling of Capital Improvements Operations Research. In addition to the specific projects approved or under consideration, some time was spent in investigating areas of operation and technical development which appear to be pertinent to the problem. In particular, the limiting nature of the present knowledge of radiological factors is being considered.

Data Processing

The Data Processing Operations Research Program has now progressed to the point where a report can be prepared. It is expected that this will be accomplished during November.

END

**DATE
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9/23/92**