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MONTHLY REPORT

HANFORD ATOMIC PRODUCTS OPERATION

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FOR  
NOVEMBER 1954

Classification Cancelled (UNCLAS)

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DS Jayko 5/21/92  
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Compiled By  
DEPARTMENT MANAGERS

December 20, 1954  
RICHLAND, WASHINGTON

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9	Atomic Energy Commission Hanford Operations Office Attention: V. B. Lewis
10	Atomic Energy Commission For: B. M. Fry, AEC, Washington
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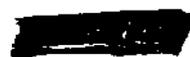
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MONTHLY REPORT  
HANFORD ATOMIC PRODUCTS OPERATION

NOVEMBER 1954

GENERAL SUMMARY

PRODUCTION OPERATIONS

The net production of 411 tons of acceptable slugs was 105 percent of the official forecast. On November 19, a new one-day production record of 5,575 slugs was established with five lines in operation. A critically low bare metal inventory existed the first half of the month, but increased receipts resulted in a workable inventory by the end of the month.

The reactor input plutonium production was 98 percent of the forecast. Lower than forecasted production was due principally to the outages at D and C Reactors for venturi installations and rear pigtail replacements respectively. These outages had been previously scheduled for other periods, and were not included in the November forecast.

There were no regular uranium slug failures during the month.

The Redox and T Plant production was 124 and 104 percent of the official forecast respectively.

ENGINEERING TECHNOLOGY

Results of an examination of operational data from D File indicate that present power-exposure limits based on expected slug rupture rates are conservative. A possible goal exposure of 850 MWD/T or higher at maximum tube powers of 800 KW without an excessive failure rate, was indicated.

Operation of the 16-inch diameter semiworks scale continuous calciner for  $UO_2$  manufacture was begun. The operability of the system is distinctly improved over the earlier 4-inch diameter unit.

Design activity on the LX Program continued to expand on a priority basis. Project proposals were completed during the month and have been submitted to the AEC for approval. These proposals will cancel Project CG-597, "Hanford LX Program," and divide the program into three projects as follows:

CG-603 - LX Program - Bismuth Phosphate Plants  
CG-613 - LX Program - Metal Conversion Plant  
CG-614 - LX Program - 300 Area

PERSONNEL AND SERVICES

Increased ground contamination near the Redox stack was noted. Recent emissions consisted of particles of lesser activity than previously encountered. Monitoring of construction and military personnel was begun at several locations.

An agreement was reached with the HOO-AEC Finance Division in November to charge the overhead allowance to production costs at HAPC and KAPL instead of carrying it as an overhead item on the consolidated financial statements.

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HW 33962 **DR**

STAFF

General Manager, Atomic Products Division . . . . . F. K. McCune  
General Manager, Hanford Atomic Products Operation . . . . . W. E. Johnson  
Counsel . . . . . G. C. Butler  
Manager, Finance . . . . . D. M. Johnson  
Manager, Employee and Public Relations . . . . . C. N. Gross  
Director, Radiological Sciences . . . . . H. M. Parker  
Manager, Engineering . . . . . A. B. Greninger  
Manager, Manufacturing . . . . . J. E. Maider  
Operations Research Study . . . . . B. F. Butler

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HANFORD ATOMIC PRODUCTS OPERATION  
NUMBER OF EMPLOYEES  
NOVEMBER 30, 1954

	EXEMPT		OTHER		TOTAL	
	11-30-54	10-31-54	11-30-54	10-31-54	11-30-54	10-31-54
<u>Counsel</u>	3	3	2	2	5	5
<u>Operations Research Study</u>	6	6	1	1	7	7
<u>Special Study</u>	4	4	3	2	7	6
<u>Employee &amp; Public Relations</u>						
General	9	8	1	1	10	9
Salary & Wage Adm.	11	11	12	12	23	23
Personnel Practices	14	14	36	37	50	51
Education & Training	7	7	45	47	52	54
Emp. Comm. & Pub. Rel.	9	9	40	38	49	47
Union Relations	5	5	2	2	7	7
Aux. Oper. & Plant Prot.	120	121	817	812	937	933
Community	129	129	287	283	416	412
Health & Safety	55	55	197	202	252	257
<u>Engineering Department</u>						
Advance Engineering	10	10	1	1	11	11
Technical	409	413	241	241	650	654
Design	177	179	123	123	300	302
Project.	245	249	156	155	401	404
Engineering Adm.	25	25	88	87	113	112
<u>Manufacturing Department</u>						
General	15	15	7	6	22	21
Reactor	289	284	1 294	1 251	1 583	1 535
Separations	283	282	1 358	1 338	1 641	1 620
Metal Preparation	102	102	525	510	627	612
Transportation	42	42	448	448	490	490
Purchasing & Stores	56	55	214	225	270	280
Electrical Utility	16	16	74	74	90	90
<u>Financial Department</u>						
General	9	9	3	6	12	15
Budgets & Measurements	4	3	3	4	7	7
Contract Cost	23	23	95	94	118	117
General Accounting	10	10	69	68	79	78
Property Accounting	16	16	44	43	60	59
Auditing	15	15	2	1	17	16
S. F. Accountability	8	8	21	20	29	28
Personnel Accounting	9	9	54	56	63	65
Procedures & Computing	27	27	54	54	81	81
<u>Radiological Sciences Department</u>						
Records & Standards	28	25	151	147	179	172
Biophysics	55	56	66	68	121	124
Biology	33	34	35	35	68	69
Engineering	6	6	1	1	7	7
Adm. & Communications	4	4	5	5	9	9
Grand Total	<u>2 288</u>	<u>2 289</u>	<u>6 575</u>	<u>6 500</u>	<u>8 863</u>	<u>8 789</u>

AREA PERSONNEL DISTRIBUTION  
NOVEMBER 30, 1954

	100-B AREA	100-D AREA	100-F AREA	100-H AREA	100-K AREA	101 AREA	200-E AREA	200-W AREA	300 AREA	700-100-3000 AREA AND PLANT GENERAL	TOTAL
<u>Engineering Department</u>											
Exempt	25	67	-	14	40	-	69	62	276	313	866
Other	12	32	2	58	11	-	21	30	223	220	609
Total	<u>37</u>	<u>99</u>	<u>2</u>	<u>72</u>	<u>51</u>	<u>-</u>	<u>90</u>	<u>92</u>	<u>499</u>	<u>533</u>	<u>1 475</u>
<u>Manufacturing Department</u>											
Exempt	67	56	67	65	37	-	36	259	101	115	803
Other	304	314	299	224	174	-	207	1 194	527	677	3 920
Total	<u>371</u>	<u>370</u>	<u>366</u>	<u>289</u>	<u>211</u>	<u>-</u>	<u>243</u>	<u>1 453</u>	<u>628</u>	<u>792</u>	<u>4 723</u>
<u>Financial Department</u>											
Exempt	-	-	-	1	-	-	1	2	5	112	121
Other	-	-	-	2	2	-	-	11	10	320	345
Total	<u>-</u>	<u>-</u>	<u>-</u>	<u>3</u>	<u>2</u>	<u>-</u>	<u>1</u>	<u>13</u>	<u>15</u>	<u>432</u>	<u>466</u>
<u>Employee &amp; Public Relations</u>											
Exempt	21	7	8	11	9	-	4	15	11	228	314
Other	51	49	87	47	70	13	33	119	111	902	1 482
Total	<u>72</u>	<u>56</u>	<u>95</u>	<u>58</u>	<u>79</u>	<u>13</u>	<u>37</u>	<u>134</u>	<u>122</u>	<u>1 130</u>	<u>1 796</u>
<u>Radiological Sciences</u>											
Exempt	2	-	34	-	-	-	2	19	57	12	126
Other	4	-	38	-	-	-	9	19	170	18	258
Total	<u>6</u>	<u>-</u>	<u>72</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>11</u>	<u>38</u>	<u>227</u>	<u>30</u>	<u>384</u>
<u>General</u>											
Exempt	-	-	-	-	-	-	-	-	-	13	13
Other	-	-	-	-	-	-	-	-	-	6	6
Total	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>19</u>	<u>19</u>
Total Exempt	115	130	109	91	86	-	112	357	450	793	2 243
Total Other	371	395	426	331	257	13	270	1 373	1 041	2 143	6 620
GRAND TOTAL	<u>486</u>	<u>525</u>	<u>535</u>	<u>422</u>	<u>343</u>	<u>13</u>	<u>382</u>	<u>1 730</u>	<u>1 491</u>	<u>2 936</u>	<u>8 863</u>

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MANUFACTURING DEPARTMENT

NOVEMBER 1954

METAL PREPARATION SECTION

The net production of 444 tons of acceptable slugs was 105 percent of the official forecast. On November 19 a new one-day production record of 5575 slugs was established with five lines in operation. A critically low bare metal inventory existed the first half of the month, but increased receipts resulted in a workable inventory by the end of the month.

The canning yield for November was 85 percent as compared to 83 percent for October. The increased yield is attributed to continued development in the slug out-gassing process.

There were four normal uranium slug autoclave failures during the month. One resulted from a pinhole in the weld, and the other three were apparently caused by defective cans.

Arrangements were being made during the month to start the canning of the cored uranium pieces in December.

A total of 940 acceptable C slugs were canned during the month with a canning yield of 87 percent.

REACTOR SECTION

The reactor input plutonium production was 98 percent of the forecast. Lower than forecasted production was due principally to the outages at D and C Reactors for venturi installations and rear pigtail replacements respectively. These outages had been previously scheduled for other periods, and were not included in the November forecast.

The time operated efficiency for the month was 81 percent, resulting from large amounts of outage time. These periods include such items as the D and C reactor outages, maintenance time required for rupture removal and process tube leak testing, and down time resulting from failure to recover from scrams because of vertical rod malfunctioning.

The plutonium output production was 84 percent of the forecast and was low because of the lower than forecasted discharge of metal at the C Reactor. A low operating efficiency of 67.5 percent at C resulted in failure to achieve goal concentration in forecast amounts of low concentration material. The raising of high goal concentrations, particularly at D Reactor, which resulted in metal remaining in the reactor longer than scheduled, also contributed to the below forecast output production. The tonnages of low and high concentration material discharge were 130 and 120 respectively.

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**DECLASSIFIED**REACTOR SECTION (Continued)

The maximum established reactor power levels were increased a total of 60 megawatts, 40 at B Reactor and 20 at D Reactor, during November. At B Reactor the increase is attributed to additional gains made possible by the 105 C effluent water temperature limit established in October, the seasonal decrease in inlet water temperature, and improved flattening. At D Reactor the increase is attributed to the increased effluent water temperature limit established in November, the increased flow of cooling water permitted by the November venturi installation, and the seasonal decrease in inlet water temperature.

There were no regular uranium slug failures during the month. However, a total of 24 other type slugs failed as follows: One Production Test slug at B Reactor, two J and 13 C slugs at C, five J slugs at DR, and three C slugs at H. A total outage time of 94.9 hours were required for the rupture removals.

During November, 17 reactor scrams occurred. Of these, 16 at all reactors were caused by normal Panellit system variables. The other scram occurred at B Reactor when a 190 B pump was tripped during a routine pump unit transfer. The total outage time resulting from these scrams was 101.1 hours. This outage time is unusually high as the result of failure to recover from two scrams at C Reactor, one because of insufficient reactivity and one because of the sticking of a vertical rod.

Process tube leak testing was done at C and F Reactors in November. At C Reactor, leak indications coupled with subsequent rupture indications enabled immediate detection of a leaking process tube containing a rupture. During the middle of the month, approximately 720 tubes were tested at F Reactor with two rear nozzle leaks detected. When water collection rates remained high, an additional 1200 tubes were tested with three leaking tubes found and several minor nozzle leaks found and corrected. At month end, water collection rates had returned to normal at C Reactor, but were still high at F Reactor, presumably because of residual water. Leak testing programs involved approximately 123 hours of outage time.

Horizontal rod difficulties continued in November with rods Nos. A and 4 at F Reactor removed from service because of leaking thimbles. At B Reactor, No. 4 thimble was replaced and the rod was returned to service. At H Reactor, No. 7 thimble was removed. Installation of a new thimble was not successful due to an obstruction in the channel.

An unscheduled outage at F Reactor, approximately 31 hours long, resulted when a leak developed in an expansion joint in the steel effluent line approximately 200 feet from Building 105-F.

At D Reactor, during a five-day outage, venturis or double orifices were installed on all tubes, 500 Panellit gages were reset and recalibrated, and equalization of tube flow from crossheaders was accomplished. An increase in reactor cooling flow of approximately 2000 gpm resulted from the reorificing program.

On November 27, C Reactor was shut down for an outage to replace the neoprene covered rear pigtails with aluminum pigtails. Concurrently with pigtail replacement, reorificing of fringe zones was done to provide greater economy of cooling water flow. The outage continued at month end.

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REACTOR SECTION (Continued)

The tritium and U-233 production programs continued throughout the month with input productions of 88 and 98 percent of the forecast respectively. The tritium input was low because of above forecast production in previous months resulting in earlier than forecast discharge and replacement with uranium. The U-233 was low due to the pigtail outage at C Reactor.

The charge-discharge activities associated with these two major special irradiation programs included the discharge (and replacement with regular uranium slugs), of 198 J-N tubes at DR Reactor and two J-N tubes at C Reactor, leaving a balance at month end of 538 and 80 J-N tubes at DR and C Reactors, respectively. At C Reactor, eight J-Q tubes were charged and one tube was discharged, giving a net increase of seven tubes under irradiation. The month end total of J-Q tubes being irradiated was 320, 160 each at C and H Reactors.

SEPARATIONS SECTION

The Redox and T Plant production was 124 and 104 percent of the official forecast respectively.

An operating rate of six to seven tons per day was maintained until November 2 when a shutdown of 43 hours was required to replace a first cycle feed pump along with the associated feed valve and rotometer jumper assembly. Following startup, the rate was increased to 8 tons per day, but steady operations could not be maintained due to partial loss of vacuum in the H-4 oxidizer.

On November 10, a head end shutdown for five hours was taken to attempt to restore proper vacuum, but the effort was unsuccessful. On November 12 the E-12 uranium product receiver to UNH storage pump failed, and a shutdown of 12 hours to replace the pump was required. This outage allowed an inventory increase of metal feed for a subsequent 8 ton per day feed rate. On November 15 the plant experienced an emergency shutdown as the result of the presence of emulsified hexone in the system. Fourteen batches of product contaminated with uranium had to be reworked. In order to improve the vacuum on head end treatment vessels the H-4 oxidizer fume line to H-5 was replaced. Enough vacuum was recovered to permit a steady 8 ton per day rate for the remainder of the month following start-up on November 19. The facility downtime for the month was 99.6 hours.

The uranium decontamination which has been poor since the Phase II equipment installation was greatly improved by the lowering of the 2D and 3D column interfaces into the scrub section of the column. During the last ten days of the month the final uranium product was within specifications, and at the end of the month the operation was returned to the backcycle flow sheet.

Although 3.5 days of production time was lost in the T Plant due to equipment replacements and reworking of wastes in 224-T Building, the production for the month exceeded the forecast. Efforts continued and progress was made toward reducing the overall plant time cycle.

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**DECLASSIFIED**SEPARATIONS SECTION (Continued)

The TBP facility production was 325 percent of the official forecast. This large percentage was due to the delay of the forecasted scheduled shutdown of the plant for series conversion. During November the A line remained down the entire month while the B line was down for the last 15 days in order that the equipment changes and new installations for the series operation could be made. At month end the entire job was 82 percent completed.

The UO<sub>3</sub> plant production was 107 percent of the official forecast. Production activities were curtailed for the major portion of the month due to a shortage of feed material. However, near month end the Redox Plant output enabled the facility to resume operation at a high level.

The 234-5 production for the fabricated smaller shapes was 100 percent. The production of the larger shape was discontinued for the month because the commitment was met the previous month. The commitment for the unfabricated pieces and the nitrate was also met.

There was no processing in the waste evaporators during the month.

Metal waste removal was curtailed because of the TBP Plant shutdown and the low availability of the older wastes. The scavenging of the TBP waste continued but the decontamination results were not up to expectations. Cribbing of this scavenged waste was temporarily suspended at month end.

GENERALPersonnel

Total on Roll November 1, 1954	4651
Net Increases	59
Total on Roll November 30, 1954	4710

*J. E. Maider*  
 J. E. MAIDER, MANAGER  
 MANUFACTURING DEPARTMENT

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MANUFACTURING DEPARTMENT

PATENT REPORT SUMMARY

FOR

MONTH OF NOVEMBER, 1954

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

TITLE

J. S. Corbett, Reactor  
Section

Improved Canvas Shoe  
Cover

*J. E. Maider*

J. E. MAIDER, MANAGER  
MANUFACTURING DEPARTMENT

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MONTHLY OPERATING REPORT

NOVEMBER 1954

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December 6, 1954

MANUFACTURING DEPARTMENT  
METAL PREPARATION SECTION

November, 1954

I. RESPONSIBILITY

There was no change in responsibility during this period.

II. ACHIEVEMENT

A. Operating Experience

I. Statistics

	<u>November</u>	<u>October</u>	<u>Year to Date</u>
Acceptable Pieces Canned (8") (Tons) Gross	415	417	2990
Acceptable Pieces Canned (8") (Tons) Net	414	415	2967
Canning Yield (8") (%)	85	83	81
Total Acceptable Pieces Canned (Tons) Gross	415	417	3120
Total Acceptable Pieces Canned (Tons) Net	414	415	3095
Total Acceptable Pieces Canned (% of Forecast)	105	111	97
Autoclave Frequency (8") (No./M)	.04	.01	.01
J-3 Slugs Canned (pieces)	0	0	35964
N Slugs Canned (pieces)	0	0	33177
Chem. 10-66 Canned (pieces)	261	0	7043
C-4 Slugs Canned (pieces)	1523	664	2187
Special Request (man hours)	508	711	6625
305 Routine Tests (man hours)	356	231	3620
305 Special Tests (man hours)	168	432	8269
Average Steam Generated (M lbs/hr)	42.8	39.1	
Maximum Steam Generated (M lbs/hr)	68.0	71.0	
Total Steam Generated (M lbs)	30,800	29,100	
Coal Consumed (Tons)	1,816	1,876	
Sanitary Water from 3000 Area (million gals.)	54.7	61.1	
Total Water from 3000 Area (Avg. Rate-GPM)	1,266	1,369	

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## 2. Activities

A net production of 414 tons of acceptable slugs was achieved which was 105 percent of the November commitment. On November 19 a new single-day production record of 5575 slugs was established with five lines operating on a full relief basis. This represents a production achievement of very near a theoretical limit for five lines with relief. A critically low bare metal inventory existed at the beginning of the month and by November 19th the total inventory of bare metal was less than one day's supply. Receipts over the weekend replenished the inventory and sufficient metal was received for the balance of the month.

An improvement in the canning yield to 85 percent in November from 83 percent in October was due primarily to the continuation of the out-gassing process developed last month to release hydrogen from the surface of the slug and thus minimize the poor bonds ("porosity") experienced in September. There was a slight increase in frost test rejects caused by non-wetting of cans. The reason for this has not yet been determined.

Three hundred fifty-two tons of the 485 tons canned for KW reactor start-up were shipped during the month with the remainder to be shipped in December. Delays in KW reactor start-up have increased canned slug inventory to the extent that pallet facilities and storage space have been filled nearly to capacity. The charging of KW reactor in December should relieve this situation.

Four eight-inch normal uranium slug autoclave failures occurred during the month. Two of these were complete failures. One was caused by a minute pinhole in the weld bead, the other appeared to have some defect in the can wall. The other two failures were caused by small blisters which formed about one and one-half inches below the weld bead. They have been attributed to internal defects in the cans. This experience equals in number the total eight-inch normal uranium slug failures experienced from January to October, 1954.

During the sluicing of ashes from boilers at the power house, the vapors given off with no ventilation to disperse them presented both a safety and maintenance problem. This condition has been greatly improved by installing grating in the operating floor deck plates to provide ventilation. This has eliminated the sweating and excessive corrosion to piping and steel work in this location and improves working conditions for operators.

## 3. Special Operations

Eight thousand cored slugs and a comparable supply of uranium plugs were received from Fernald. A sequence of operation has been established for the preparation and canning of this material and it is anticipated that production will begin in December. Seventy-five thousand cored slugs are scheduled to be canned in FY 1955. A number of process and operational problems were encountered in the assembly and canning of cored slugs but, by month-end, limited production was in progress.

A total of 940 acceptable "C" slugs were canned by the "C" process with a canning yield of 87 percent. Approximately 900 hot press diameter "C" slugs have been received to date and an additional 2500 slugs are expected in December. It is planned to start hot press canning operations upon completion of equipment modifications early in December.

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3. Special Operations - continued

A total of 2666 lead poison slugs were canned by the "B" process with a canning yield of 93 percent. Present production schedules require the canning of 200 lead-cadmium slugs every month through May, 1955.

The heat treating of untransformed uranium slugs in the salt bath facilities continued during the month. Unfavorable metal inventories made it difficult to effectively schedule and coordinate transformation and outgassing activities. In order that the quality of incoming Fernald heat-treated slugs could be monitored, a statistical sampling program was established based on the premise that slugs containing excessive hydrogen tend to form poor bond ("porosity") rejects during canning. In practice, a sample lot of 60 slugs is selected at random from each lot and canned without being outgassed. By comparing the poor bond experience of the pilot lot with that of the original outgassed lot, changes in Fernald heat-treating techniques which might eliminate the hydrogen pick-up can be detected. Reject data which have been recorded since the inauguration of the sampling program appear to substantiate this conclusion.

4. Schedule Variation

Acceptable canned slug production was 105 percent of forecast. The forecasted commitment was based on yields and efficiencies reflecting anticipated difficulties in the start-up of the new fuel preparation plant. The start-up of these facilities has been delayed.

B. Equipment Experience

1. Operating Continuity

The canning line efficiency remained at a very high 94 percent during the month, despite low inventory of bare metal. The ultrasonic transformation testing equipment failed and, while being repaired, caused a three-hour shutdown of the canning lines. Instrument maintenance is revising the electronic circuits in an effort to improve the operating performance of the Sonotest equipment. Improved methods of sealing the crystals have reduced failures caused by water leakage and additional guards are being installed on the crystal holders to prevent slugs from damaging the crystal faces.

This experience is significant in that it points out the type of problem that must be overcome to maintain continuity of operation in the new continuous flow fuel preparation plant. Programs are currently being prepared to establish sound preventive maintenance schedules designed to eliminate production outages.

2. Inspection, Maintenance and Replacements

During the month considerable progress was made in correcting operating difficulties experienced with the hot press canning equipment. New pilot valves were installed and all presses re-aligned. Eight new solid dies, together with sleeves, have been fabricated and are ready for use. Upon completion of a tank and duct work on the new component preparation line early in December, the hot press facilities will be ready for production use.

C. Improvement Experience

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1. Production Tests

## PT-313-41MT "Fabrication of Unbonded Uranium Slugs" (HW-32378)

The processing of eight-inch unbonded slugs by the "C" process for this test was completed. A total of 468 acceptable slugs was canned. This test included eight-inch solid slugs, nickel plated slugs, and cored slugs. All cap closures were fillerwelded which represents a substantial improvement in quality over the standard fusion weld. The finished slugs have been shipped to "C" pile for charging early in December.

## PT-313-47MT "Cored Slugs from Extruded Blanks and Rolled Rods" (HW-33189)

A production test was formally issued early this month for the evaluation of cored eight-inch slugs canned by the lead dip process. The slugs are currently being fabricated from both alpha rolled solid and alpha extruded hollow beta heat treated rods. To date a total of 8,750 cored slugs machined from alpha rolled rods have been received from Fernald. An additional 108 rods were alpha extruded by the Bridgeport Brass Company on November 16. Thirty-six rods from the first extrusion run in October have been beta heat treated and machined, with the exception of counterboring, at Fernald. Severe internal radial cracks have been observed in this material and are currently being investigated.

During this period, preliminary tests were made on the DC welding of end plugs into the ends of cored slugs. It was found that the tolerances between the plugs and slug counterbore diameters varied appreciably and were excessive. In order to obtain consistently satisfactory welds, it was necessary to increase the nominal diameter of the plugs three mils. Actual production of cored slugs will be initiated early in December.

2. Process Tests and Revisions

The lathe scrap recovery program initiated in September was continued during the month. It has developed that elemental silicon will alloy rather easily and uniformly with lathe scrap in the induction furnace. By alloying elemental silicon with turnings from the facing lathes and recycling the metal through the canning baths, an annual savings of \$35,000 is estimated, based on forecasted production for 1955. Plans have been made to use elemental silicon rather than silicon enriched AlSi to butt lathe scrap as soon as the present supply of enriched AlSi is consumed.

A pilot lot of slugs which had been produced from the reduction of simulated normal uranium hexafluoride or "sidestream metal" was received from Fernald. Test pile results indicated that the average reactivity of this unblended pilot lot was somewhat less than that of normal uranium. However, in the future, simulated normal uranium will be blended with natural uranium in the ratio of about 1:3. Improvements in reactivity can be expected since Fernald has reduced significantly the nickel content of production simulated normal uranium as compared to the pilot lot.

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Metal Preparation Section

HW-33962

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

An increase in yield and efficiency reduced labor costs approximately .005 per unit.

2. Material Variance

An increase in yield and reduced consumption of steel sleeves and AlSi resulted in a decrease in cost of .005 per unit.

3. Other

Other costs remain essentially the same.

E. Plant Expansion

1. Project Status

Project CA-514 "Expansion of 300 Area Production Facilities"  
Total funds authorized for the project remain at \$5,085,000. Project costs plus commitments total \$3,543,954 as of November 21. Over-all design is 99% complete and construction is 73% complete. Modification of the existing 313 Building (Phase III) is 55.5% complete. Installation of process equipment (Phase IV) is 57% complete. The general supporting facilities are 74% complete. The 313 Building fire alarm and telephone systems have been activated.

Alterations to the 3706 Building were started November 1. Buildings 3707-A and 3707-B are complete except for a few minor items.

Project CG-573 "Hanford 3X Program - 300 Area"  
Cost plus commitments total \$850,139. The project has been completed.

Project CA-601 "General Grounds Improvement - 300 Area"  
Budgeted cost is \$75,000. The Commission recommended that the project be split into two portions covering the Manufacturing Department's area and the Work Laboratory area. Scoping of the project has been completed. A re-estimate will be made and submitted to the Commission in approximately 30 days.

Project CG-610 "Replacement of the 313 Building Roof"  
Project authorized funds total \$55,000. This project was authorized by the Commission on November 22, 1954.

2. Plant Engineering

The Project Section requested assistance from the Manufacturing maintenance forces in getting the new building canning lines into operation. Difficulties with the air switches of the central control station have necessitated re-working some of the component parts.

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2. Plant Engineering - continued

Modifications were made to the automatic quench machine to allow for alignment of piston rods and allow ease in removing cylinders for servicing. The crank arms were changed and bronze bushings installed to replace stainless steel which galled in the stainless steel shaft. Tank drain, quench basket sleeves and splash guards were added.

Tooling on the Acme-Gridley lathes was changed to eliminate to a large degree tool breakage formerly encountered. More work remains to be done to prevent marred surfaces.

A shake-down of the canning equipment in the new building was started at month-end. In a series of initial tests aimed at evaluating the equipment, approximately 400 slugs were canned. During subsequent trial runs, regular production material will be used as much as possible.

The slit camera which is part of the underwater examination facility at 100-C area was completed and is being tested. This camera takes stereoscopic pairs of pictures of the slug surface by turning the film in synchronism with the slug at two positions, fifteen degrees apart. The resultant pictures are then viewed with a Wheatstone viewer which gives good relief depth perception. This unique device was completely engineered and built locally.

The smallest neutron-sensitive proportional counting tube made at Hanford was assembled, filled and tested. It is four inches long and 1/8-inch I.D. with a center wire one mil in diameter and filled with  $\text{BF}_3$  to 60 cm. This new tube has satisfactory thermal neutron sensitivity and because of its small size, introduces little perturbation of the neutron flux.

F. Significant Reports Issued1. Routine

<u>Number</u>	<u>Title</u>	<u>Author</u>	<u>Date</u>
HW-33677	Monthly Report, Process Sub-section, Metal Preparation Section, October, 1954	EW O'Rourke	11-4-54
HW-33557	Uranium Accountability in Metal Preparation Processes for Quarter Ending September 30, 1954	GF Yost	10-27-54
HW-33776	Monthly Cost Report, Metal Preparation Section, October, 1954	ES Krider	11-12-54

2. Non-Routine

HW-33703	Lot Designation - Cored Slugs	SM Gill	11-8-54
HW-33724	The Apparatus and Procedure Employed at Hanford Works for Determining Hydrogen in Metals	WG Hudson	11-10-54
HW-33807	Salt Bath Agitator	J Roslund	11-16-54
HW-33806	Reliability of Canning Loss Factor	GF Yost	11-11-54

**DECLASSIFIED**III. PERSONNELA. Organization

No change.

B. Force Summary

	<u>Start of Month</u>	<u>End of Month</u>	<u>Net Change</u>
Section General	2	2	0
Operations	190	205	+15
Power & Maintenance	324	325	+1
Process	84	84	0
Projects & Personnel Development	12	12	0
Section Total	612	628	+16

C. Safety Experience

There were no major or sub-major injuries during the month. Two near-serious investigations were held during November. During the operation of the crane in the 314 Building, the crane struck a raised cover on the top of the 101 canning machine. This incident was a result of failing to check clearances before operating over an area of limited clearance. A second incident occurred when the chains of the chain hoist in 303-K Building came in contact with batteries on charge, causing a short circuit and a small explosion. It was recommended that the chain hoist be replaced with an electric hoist to eliminate the chains.

D. Radiation Experience

No exposures in excess of 200 mrad were reported during the month.

E. Personnel Activities1. Visits and Visitors

K.V. Stave visited the University of Washington in Seattle as a part of the Company recruitment program.

E.W. O'Rourke visited New York City and Edgewater, New Jersey to attend the Fourth Annual Symposium on Statistical Methods and to discuss the quality aspects of aluminum components at Alcoa.

J.M. Holeman visited Rochester, New York to discuss the manufacture of special lenses for inspection equipment with Graflex, Inc., Eastman Kodak Company, and Bausch and Lomb Company.

W.W. Windsheimer and S.M. Gill visited Adrian, Michigan and Cincinnati, Ohio to observe extrusion at Bridgeport Brass Works and discuss production and quality control of uranium slugs at the National Lead Company of Ohio.

2. Meetings

Forty-eight Safety and Security meetings and sixty-four Round Table and Information meetings were held for exempt and non-exempt members of the Section.

Six exempt personnel attended four Training and Development Programs (W-10) during the month.

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Richland, Washington  
December 7, 1954

MANUFACTURING DEPARTMENT  
REACTOR SECTION  
MONTHLY REPORT  
NOVEMBER, 1954

I. RESPONSIBILITY

Responsibilities assigned to the Reactor Section were not changed during November.

II. ACHIEVEMENT

A. Operating Experience

Reactor time operated efficiency was 81.0 per cent in November, slightly lower than the 82.0 per cent efficiency in October. The low November efficiency resulted from a continued large amount of scheduled outage time, including the D Reactor venturi outage and the C Reactor rear pigtail replacement outage, maintenance outage time required for rupture removal and process tube leak testing, and outage time resulting from failure to recover from scrams because of vertical rod malfunctioning. This low efficiency, together with the shorter month, adversely affected November production.

Plutonium, thorium and total input productions were approximately 98 per cent of forecast, primarily because of the D Reactor venturi outage and the C Reactor pigtail outage, both of which had been scheduled at other times and had not been included in the November forecast. Mint input production was approximately 88 per cent of forecast, because above forecast input production in previous months, resulting from higher than forecast efficiencies, permitted achievement of goal concentration and discharge of J-N tubes ahead of schedule. Production charged to the Mint program

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**A. Operating Experience (Continued)**

at DR and C Reactors was 32.2 and 1.4 per cent, respectively. Production charged to the J-Q program at C and H Reactors was 7.9 and 8.7 per cent, respectively.

Output production was approximately 84 per cent of forecast, primarily because of the lower than forecast discharge of metal at C Reactor. A very low operating efficiency at that reactor in November, 67.5 per cent, resulted in failure to achieve goal concentration in forecast amounts of low concentration material. Raising of goal concentrations, particularly at D Reactor, resulting in metal remaining in the reactor longer than scheduled, also contributed to the below forecast output production.

Goal concentration is currently base goal plus 125 megawatt days except at D Reactor where a pilot concentration program of base goal plus 300 megawatt days is in progress, and at C Reactor where the low concentration program, approximately one-third base goal, is in progress. Tonnages of low and production concentration material discharged during November were approximately 130 and 120, respectively.

Maximum established reactor power levels were increased a total of 60 megawatts, 40 at B Reactor and 20 at D Reactor, during November. At B Reactor, the increase is attributed to additional gains made possible by the 105 C effluent water temperature limit established in October, the seasonal decrease in inlet water temperature, and improved flattening. At D Reactor, the increase is attributed to the increased effluent water temperature limit established in November as described under Activities, the increased flow of cooling water permitted by the November venturi installation, and the seasonal decrease in inlet water temperature.

November slug failure experience in November is tabulated below.

	<u>B</u>	<u>C</u>	<u>D</u>	<u>DR</u>	<u>F</u>	<u>H</u>	<u>Total</u>
Production Test	1*						1
"J" Material		2		5			7
"C" Material		$\frac{13}{15}$	$\frac{0}{5}$	$\frac{0}{5}$	$\frac{3}{3}$		$\frac{16}{24}$
Totals							

\*This failure occurred in an eight-inch slug charged under Production Test 105-313-27M, "Evaluation of Normal Uranium Produced from UF<sub>6</sub> Parent Material."



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A. Operating Experience (Continued)

The two suspected C material failures, reported during the previous two months as awaiting confirmation when C Reactor viewing facilities were repaired, were shipped to Arco, Idaho in November without confirmation to complete a shipment. These two slugs will be classed as failures. Reactor outage time required for removal of November slug failures was 94.9 hours.

A new high input production for B Reactor was achieved during November, exceeding by 10.4 per cent the previous record of June, 1954.

1. Statistics

	<u>B</u>	<u>C</u>	<u>D</u>	<u>DR</u>	<u>F</u>	<u>H</u>	<u>Total or Average</u>
Reactor Time Operated							
Efficiency (%)	88.6	67.5	75.2	89.7	70.2	94.5	81.0
Reactor Outage Time (Hrs)							
Plutonium Production	53.2	207.8	169.4	27.9	198.6	38.8	695.7
Special Irradiations and Tests	29.0	26.0	9.0	46.0	16.1	0.5	126.6
<b>Total</b>	<u>82.2</u>	<u>233.8</u>	<u>178.4</u>	<u>73.9</u>	<u>214.7</u>	<u>39.3</u>	<u>822.3</u>
Reactor Unscheduled							
Outage Time (Hrs)	82.2	157.4	4.8	2.7	154.9	0	402.0
Metal Discharged (Tons)	14.5	95.1	45.7	9.1	45.6	39.6	250
Water Quality (ppm Iron)							
Raw Water - Average	0.05	0.06	0.04	0.05	0.04	0.06	
Raw Water - Maximum	0.10	0.10	0.09	0.11	0.11	0.10	
Process Water - Average	0.004	0.006	0.004	0.003	0.006	0.005	
Process Water - Maximum	0.006	0.009	0.008	0.005	0.015	0.008	
Water Pumped (MM Gals)							
Bldg. 190 to Reactor	1897	2735	1776	1689	1598	2151	11846
Bldg. 182 to 200 Areas					356		356
Bldg. 181	5198		4265		2274	2463	14200
Steam Generated (MM Lbs)	155		208		122	112	597
Coal Consumed (Tons)	9039		12901		8013	7475	37428

2. Activities

Operation at all reactors was limited by temporary "trip-before-instability" outlet water temperature limits as specified in the new Process Standard 105-A-040, "Process Tube Outlet Water Temperature Limits - Trip-Before-Instability." These temporary limits, together with the changes from the limits reported last month, are, B Reactor 105 C - no change, C and F Reactors 100 C - no change, D Reactor 105 C - up 10 C, and DR and H Reactors 95 C - no change.

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A. Operating Experience

2. Activities (Continued)

A D Reactor, during a five-day outage, venturis or double orifices were installed on all tubes, 500 Panellit gages were reset and recalibrated, and equalization of tube flow from crossheaders was accomplished. An increase in reactor cooling flow of approximately 2000 gpm resulted from the reorificing program.

On november 27, C Reactor was shut down for an outage to replace the neoprene covered rear pigtails with aluminum pigtails. Concurrently with pigtail replacement, reorificing of fringe zones is being accomplished to provide greater economy of cooling water flow. The outage is continuing at month end.

Preparation for the operation of KW Reactor continued during the month. Detailed start-up procedures and instructions were issued. Standard Operating Procedures applicable to 100-K Area only are 60 per cent complete. Approximately 75 per cent of the metal for the initial loading has been received and inspected. Process dummy slugs and protective clothing have been transferred to the storage rooms.

Charge-discharge activities associated with major special irradiation programs included the discharge, without recharging Mint material, of 198 J-N tubes at DR Reactor and 2 J-N tubes at C Reactor, leaving a balance at month end of 538 and 80 J-N tubes at DR and C Reactors, respectively. At C Reactor, eight J-Q tubes were charged and one tube was discharged, giving a net increase of seven tubes under irradiation. The month end total of J-Q tubes being irradiated was 320, 160 each at C and H Reactors.

The following table indicates activities during November associated with special irradiations other than the Mint and J-Q programs noted above:

	<u>Tubes Charged</u>	<u>Tubes Discharged</u>	<u>Casks Shipped</u>
Production Tests	31	10	5

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## B. Equipment Experience

During November, 17 reactor scrams occurred. Of these, 16 at all reactors were caused by normal Panellit system variables. The other scram occurred at B Reactor when a Building 190-B pump was inadvertently tripped during a routine pump unit transfer. Total outage time resulting from these scrams was 101.1 hours. This outage time is unusually high as the result of failure to recover from two scrams at C Reactor, one because of insufficient reactivity and one because of the sticking of an insufficiently lubricated vertical rod, and one scram at B Reactor, because of failure of a vertical rod upper limit switch.

Process tube leak testing was done at C and F Reactors in November. At C Reactor, leak indications coupled with subsequent rupture indications enabled immediate detection of a leaking process tube containing a rupture. During the middle of the month, approximately 720 tubes were tested at F Reactor with two rear nozzle leaks detected. When water collection rates remained high, an additional 1200 tubes were tested with three leaking tubes found and several minor nozzle leaks found and corrected. At month end, water collection rates had returned to normal at C Reactor, but were still high at F Reactor, presumably because of residual water. Leak testing programs involved approximately 123 hours of outage time.

Horizontal rod difficulties continued in November with rods Nos. A and 4 at F Reactor removed from service because of leaking thimbles. At B Reactor, No. 4 thimble was replaced and the rod was returned to service. At H Reactor, No. 7 thimble was removed. Installation of a new thimble was not successful due to an obstruction in the channel.

An unscheduled outage at F Reactor, approximately 31 hours long, resulted when a leak developed in the steel effluent line expansion joint approximately 200 feet from Building 105-F. The leak was repaired by Minor Construction forces.

Considerable difficulty was experienced during November at B Reactor with effluent water backing up through the cushion chamber step-plug. Removal of loose pieces of timber and metal in the cushion chamber during an outage following a scram materially improved this situation.

Process water pump experience during November included:

1. Failure of Building 190-DR No. 6 800 HP pump motor during a routine start when the wye jumper burned open at a coil group splice.
2. No. 12 pump unit at Building 181-D failed due to the shearing of bed plate studs with the rupture of the impeller shaft resulting.

**DECLASSIFIED****B. Equipment Experience (Continued)**

3. Reduction gears reworked by the Puget Sound Naval Shipyard were installed in the No. 12 Building 190-H pump unit. Operation has been satisfactory, although a pronounced whine is detectable.
4. Process water pumping at Building 190-C was reduced from nine to eight-pump operation on November 3 to facilitate repairs to faulty pump seals on units Nos. 4, 5 and 8.

Reliability checks of Panellit systems during November revealed 77 faulty trips as detailed below.

	<u>High Trips</u>	<u>Low Trips</u>	<u>Total</u>
C Reactor	4	6	10
DR Reactor	5	10	15
F Reactor	19	1	20
H Reactor	<u>11</u>	<u>21</u>	<u>32</u>
Totals	<u>39</u>	<u>38</u>	<u>77</u>

No checks were made at B or D Reactors during November. Of the 32 failures at H Reactor, 19 were due to corroded pivots, indicating that early optimism relative to the effectiveness of watch oil in combatting pivot corrosion may have been premature. Additional evaluation of watch oil lubrication is being made.

**C. Improvement Experience**

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

- PT-105-7-MR (Irradiation of High Quality Production Uranium Slugs)  
 PT-105-539-E (Slug Exposure at a Concentration of 900 MMD/Ton)  
 Both of these tests continued at H Reactor during November without incident.
- PT-MR-105-24 (High Rate Water Treatment at Post CG-558 Flows)  
 Satisfactory operation under this test, with an average filtration rate of 6.1 gpm per square foot and 12 hour filter runs, continued during November.
- PT-105-506-E (Recirculation Studies)  
 Suppl. C Operation of recirculation tube 0961-H, a zirconium tube under evaluation, continued without incident or interruption of reactor operation during November.

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C. Improvement Experience (Continued)

PT-105-562-A (Slug Evaluation at Increased Levels for Tritium Production)

Two J-N tubes under this test at C Reactor were discharged during November in accordance with the test schedule. Irradiation of the remaining 10 test tubes continued without incident.

PT-105-567-A (Preliminary Irradiation of J-Q Columns)

PT-105-579-A (Quantity Irradiation of J-Q Columns)

Irradiation of the 12 remaining test J-Q columns at H Reactor continued without incident in November. At C Reactor, one J-Q tube was discharged because of "J" slug ruptures, and eight tubes were charged in the quantity irradiation program. Total J-Q tubes under irradiation at month end was 320, 160 each at C and H Reactors.

The Process Standards - Reactor manual, HW-28522, was reissued during November as document HW-33000, primarily to incorporate limits applicable to the K Reactors. A number of changes in the Standards also apply to the older reactors, including:

1. Addition of a requirement for a yearly spot check of individual tube water flow in thermal and biological shields, cooling flow requirements to be a function of fringe tube powers.
2. Deleted provisions permitting withdrawal of horizontal rods before vertical rods for hot start-up pending re-evaluation of hot start-up procedures.
3. Inclusion of process requirements in event of emergency evacuation.

A sub-critical neutron monitor was installed and successfully used for start-up at DR Reactor during November. A noticeable increase in reactivity was reported when the vertical rods were removed in preparation for start-up, and a period was plotted in advance of the first indication on the proportional counter. The periods noted on the sub-critical instrument and the proportional counter were in agreement. Additional application of this instrument as a start-up aid is planned.

The report of invention indicated below was submitted during August:

<u>Inventor</u>	<u>Invention</u>
J. S. Corbett	Improved Canvas Shoe Cover

**DECLASSIFIED****D. Events Influencing Costs**

Reactor Section costs were adversely affected by several factors during November. The shorter month, together with a relatively low time operated efficiency resulted in decreased production, approximately two and eight per cent below the October and first quarter FY 1955 average productions, respectively. Maintenance costs remained relatively high as the result of considerable process tube leak testing work at F Reactor, significant ruptured slug work, and continued horizontal rod problems. In addition, the D Reactor venturi installation outage is expected to add approximately \$35,000 to Reactor Section costs in November.

Reactor Section costs were beneficially influenced by decreases in coal and HAP0 freight costs amounting to approximately \$5,500, and by decreased water treatment chemical costs totalling approximately \$3,600.

Preliminary estimates indicate that both plutonium irradiation and total irradiation unit costs will be approximately two per cent higher in November as compared with October as the net result of the factors listed above.

Reactor Section charges to the expansion program for November continued to increase as additional manpower was added for the staffing of the 100-K Area facilities.

**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 J. E. Warren, dated November 19, 1954.

**CA-512 (100-K Facilities)**

Construction completion percentages for the K Reactors and Water Plants estimated by the AEC as of November 12, are:

KW Reactor	99.8	up 0.2
KE Reactor	94.0	up 4.6
General Facilities	95.3	up 2.6
KW Water Plant	99.9	up 0.7
KE Water Plant	95.5	up 2.7

The dynamic flow test of KW Reactor was rerun with special inserts in the rear nozzles to eliminate cavitation in the inlet venturi tubes, and with

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E. Plant Development and Expansion

1. Project Status

CA-512 (100-K Facilities) Continued

neoprene inlet connectors. Significant results noted included:

- a. Reduction of work area noise to a level comparable with other plants.
- b. Vibration of the process tube connectors was reduced significantly.
- c. Two neoprene inlet connectors failed.
- d. An unknown number of brass fittings on the neoprene connectors have been found cracked.

There is reason to believe that attempts to stop leaks from these cracked fittings may have damaged some connector adaptors and/or nozzles. This possible damage will be fully evaluated prior to installing new aluminum connectors.

The reliability of the resistance thermometer bulbs has been determined to be adequate for initial operation. Continued evaluation of performance will be made, and a program to develop an improved bulb for later installation will be carried out.

Permanent occupancy of the Buildings 1704-K and 1717-K has started. The Building 1717-K shop equipment is in the process of being installed.

Acceptance testing is estimated to be 75 to 80 per cent complete at KW Reactor.

At month end, five re-designed secondary process pumps had been received and were being installed in Building 190-KK. Four defective pumps have been removed from 190-KW and returned to the vendor for salvaging impellers, shafts and trim for the re-designed pumps. These pumps are being replaced with re-designed pumps.

CA-431 (100-C Plant)

Replacement of C Reactor neoprene covered rear face pigtails with aluminum connectors began on November 29, and was continuing at month end.

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

CA-431 (100-C Plant) Continued

The procurement problem on horizontal rods has improved. Reynolds Metals Company produced two 10 foot sections of outside extrusions for C Reactor rods which were dimensionally acceptable.

CG-558 (Reactor Plant Modification for Improved Production)

Scope design is estimated to be 96.9 per cent complete. A draft of the revised project proposal has been withdrawn from comment. Sufficient design and bid information is now available to develop more firm cost estimates. Design criteria for 100-F Area have been issued and are being studied for comment. The horizontal rod procurement problem has improved so that the first outages may be in March or April of 1955. General Electric Company will supply the main process pump motors, flywheels and gear speed increasers. The pump contract has been awarded to the DeLaval Pump Company.

CG-567 (Activated Silica-Alum Water Treatment Facilities, Phase I, 100-B, D, DR, F and H Areas)

Final acceptance papers, dated November 23, 1954, were signed completing this project which provided permanent activated silica-alum water treatment facilities at the subject areas in changing from the ferric sulphate method of water treatment.

**2. Plant Engineering**

A number of engineering and development studies were active in the Section during November. The studies are, in general, aimed at decreasing costs and/or increasing production. Details are given in document HW-34019. Several items of interest are reported below.

Studies of the possibility of detecting leaking process tubes by placing the tube, with cooling flow reduced to one gpm, under vacuum and utilizing the helium leak detector have indicated that neither a centrifugal pump, nor a syphon evacuator developed sufficient suction to meet the required conditions. Although technically feasible, the equipment necessary to accomplish this method of leak detection is considered to be uneconomical, and no further action on this subject is currently planned.

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E. Plant Development and Expansion

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2. Plant Engineering (Continued)

A portion of the material to be used in evaluating the pipe covering method of noise reduction in Building 190-C had been received at month end. Installation of the material is planned in December. Difficulties previously encountered in measuring the frequency of vibration of Building 190-C equipment components, piping and structural members were resolved in November, and photographs of vibration of these items were obtained. Vibration frequencies and amplitudes are being calculated to determine the additional noise attenuation that may be required in this location.

In the program of improving process tube removal methods, a revised process tube nozzle design which will permit replacing tubes without removing the front and rear nozzles has been developed, with preliminary mock-up tests confirming the feasibility of the basic idea. A new full scale laboratory mock-up is being fabricated for testing and demonstration purposes. The principle involved considers elimination of the gun barrel flange and use of a re-designed nozzle threaded to the gun barrel and having "O" ring type seals rather than the present Van Stone flange seal to prevent water and gas leakage.

Detailed plans have been completed, estimates made and a request for appropriation submitted for construction of a five gpm filter plant semi-works. The semi-works is designed to perform tests involving coagulation and filtration which presently require full-scale 100 Area Water Plants.

F. Significant Reports

1. Routine

Monthly operating reports issued for October were:

HW-33585-A	Reactor Section	J. H. Warren	11/5/54
HW-33713	Operations Sub-Section	R. O. Meham	11/1/54
HW-33620	Process Sub-Section	O. C. Schroeder	11/1/54
HW-33600	Projects and Personnel Development	F.A.R. Stainken	11/1/54
HW-33644	Radiation Monitoring Sub-Section	P. C. Jerman	11/3/54
--	Maintenance Sub-Section	E. E. Weyerts	11/3/54
HW-33630	Power Sub-Section	J.C. McLaughlin	11/3/54

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**DECLASSIFIED****F. Significant Reports****1. Routine (Continued)**

Other routine reports issued during November included:

HW-33883	"Monthly Progress Report, Reactor Section Expansion, November, 1954."	J. P. Langan	11/23/54
--	"Status of Reactor Section Projects, Informal Requests, and Budget Items."	F.A.R. Stainken	11/19/54
HW-33623	"Reactivity Balance and Asso- ciated Data - Period September and October, 1954."	R. E. McGrath	11/1/54

**2. Non-Routine**

HW-33000	"Process Standards - Reactor"	P. Thompson	11/54
HW-27155	"Process Standards - Reactor Rev. Cooling Water"	P. Thompson	11/54
HW-33735	"Installation of Acid Feed Equipment - 100 Areas"	T. H. Lyons	11/10/54
HW-33685	"A Possible Slug Rupture Mechanism"	W. E. Cawley	11/2/54
--	"Reactor Section Manual of Standard Costs"	J. H. Warren	11/1/54
--	"100 Areas Coal Utilization Standards Study, Supple- ment #2"	J. C. Baudendistel J. W. Ballowe	11/17/54
--	"Motor Load Study - 190-C Process Pump Drives"	E. J. O'Black	11/9/54

**III. PERSONNEL****A. Organization**

There were no appointments made in the Reactor Section during November.

Effective November 1, the Radiation Monitoring Sub-Section was reor-  
ganized into four area units, 100-B Unit, 100-D Unit, 100-F and  
H Unit and 100-K Unit.**SECRET**  
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HW-33962

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B. Force Summary

	<u>Beginning of Month</u>	<u>End of Month</u>	<u>Net Change</u>
Section General	2	2	0
Operations	343	357	14
Maintenance	555	578	23
Projects and Personnel Development	38	37	- 1
Power	467	482	15
Process	59	62	3
Radiation Monitoring	<u>77</u>	<u>76</u>	<u>- 1</u>
Section Total	1541	1594	53

Changes during November included 40 transfers into the Section, 12 transfers out of the Section, 28 new hires, five terminations, five reactivations, and three deactivations. Reactor Section force increases were the result of the addition of manpower to staff 100-K Area.

C. Safety Experience

No Major or Sub-Major Injuries occurred in the Reactor Section during November.

D. Radiation Experience

One Class I Radiation Incident, No. 392, occurred in the Reactor Section during November. On November 15, at B Reactor, irradiated aluminum dummies were washed out of a process tube onto the discharge elevator because of improper valving of cooling water in the process tube. An operator received an uncontrolled radiation exposure when he placed his hand over the end of the rear nozzle to prevent additional dummies from being washed out. This incident is described in detail in document HW-33907.

A signal light was installed in the work area at DR Reactor which will enable the charging supervisor to detect abnormal radiation conditions in the discharge area. In addition, a relay was installed in this light circuit which will de-energize the discharge area door solenoid circuit, and will prevent inadvertent entry when the radiation level in the discharge area is above normal. Installation of similar facilities at the other reactors will be considered.

E. Personnel Activities

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

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

During November, the Radiation Monitoring Sub-Section conducted a Radiation Training Program for Reactor Section exempt personnel. The program consisted of a series of two 90-minute sessions presented four times in each of the 100 Areas except 100-K Area, and was designed to provide a better understanding and appreciation of Radiation Monitoring Sub-Section problems. In addition, a preview of revised Radiation Protection Standards was presented. Sessions I and II were attended by 214 and 183 people, respectively.

One informal talk was made by Reactor Section staff members during November. On November 11, O. C. Schroeder addressed a Veteran's Day dinner attended by American Legion members and wives at Hepner, Oregon. The discussion of reactors was supplemented by a showing of "A Is For Atom."

F. A. R. Stainken, Superintendent, Projects and Personnel Development Sub-Section, assisted the Technical Recruitment Unit by recruiting technical personnel at Stanford University, University of California, University of Southern California, and University of California at Los Angeles during the period November 1 through 5.

J. T. Beavers and R. S. Hammond of the Process Sub-Section attended a meeting on the resistance temperature detector conducted by the T. A. Edison Company in Richland.

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Richland, Washington  
December 7, 1954

MANUFACTURING DEPARTMENT  
SEPARATIONS SECTION  
NOVEMBER, 1954

I RESPONSIBILITY

Responsibilities of the Separations Section were unchanged during the month of November.

II ACHIEVEMENT

A. Operating Experience

1. Statistics

a. Elemental Phosphate Operations

	<u>November</u>		<u>October</u>	
	<u>Normal</u>	<u>Acid Wash</u>	<u>Normal</u>	<u>Acid Wash</u>
Charges started in Canyon Bldgs.	81	1	81	1
Charges completed in Conc. Bldgs.	80	1	79	2
Special charges - Conc. Bldgs.	7		7	
Charges completed-Isolation Bldg.	379(298-S,81-T)		302(222-S,80-T)	
Average Waste Losses, %	3.57		3.07	
Special charges-Isolation Bldg.	54(45-Z,7-MRC,		44(37-Z,6-MRC,	
Material balance, %	99.8 1-AW,		101.5 1-AW)	
Yield through Process, %	96.24 1-RW)		98.45	
Average cooling time (days)	102		84	
Minimum cooling time (days)	73		60	

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b. Redox Operations

	<u>November</u>	<u>October</u>
Equivalent charges started	277.8	249.7
Charges completed	288.5	246.0
Tons Uranium delivered to storage	183.0	155.1
Average Production Rate per operating day, Tons	7.1	6.7
Average Daily Operating Rate for the month, Tons	6.1	5.0
Average yield, %		
Uranium	96.8	97.5
Plutonium	104.1	99.5
Total Waste Loss, %		
Uranium	0.80	1.45
Plutonium	0.67	0.58
Average cooling time, days	14.5	13.4
Minimum cooling time, days	107	101
Percent down time	14	26

c. 234-5 Operations

	<u>November</u>	<u>October</u>
Batches completed through Task II	152	127
Runs completed through Task III	149	121
Reduction yield, RM	98.2	98.3
Waste Disposal, units	1.8	3.7

d. UO<sub>2</sub> Operations

	<u>November</u>	<u>October</u>	<u>To Date</u>
Uranium drummed, Tons	230.45	296.88	7940.61
Uranium shipped, Tons	241.65	245.81	7884.77
Average cooling time, days (Redox)	151	140	
Minimum cooling time, days (Redox)	113	105	
Waste loss, %	.04	.02	

e. TRP Operations

	<u>November</u>	<u>October</u>	<u>To Date</u>
Tons received from Metal Removal	59.20	71.25	4698.75
Tons shipped to UO <sub>2</sub> Plant	64.88	72.59	4558.89
Average Production Rate per operating day, Tons	4.42	4.98	
Average Daily Operating Rate for the month, Tons	2.17	2.34	
Average yield, %	99.48	103.24	
Total Waste Loss, %	1.32	1.24	
Ratio Waste Volume returned to Volume removed	1.28	1.73	
Percent Down time	75.55	52.99	

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Separations Section

HW-33962 DEL

f. Power

	<u>200 East</u>	<u>200 West</u>
Raw water pumped, gpm	1 130	7 352
Filtered water pumped, gpm	538	887
Steam generated, lbs/hr	52 508	145 038
Maximum steam generated, lbs/hr	59 488	192 792
Total steam generated, M lbs.	39 066	107 908
Coal consumed, tons (est.)	2 618	6 879

h. Waste Storage

	<u>Equivalent Tons U</u>	
	<u>Nov.</u>	<u>Oct.</u>
Metal Waste reserve storage capacity-T Plant	427	551
1st Cycle reserve storage capacity-T Plant	718	819
Metal Waste reserve storage capacity-B Plant	917	1097
1st Cycle reserve storage capacity-B Plant	74	74
Redox Waste reserve storage capacity	1366*	1210

	<u>Gals. of Feed</u>	<u>Gals. of Bottoms</u>	<u>Gals. of Cond.</u>	<u>% Vol. Red.</u>
242-B	0	0	0	0
242-T	0	0	0	0

2. Activities

a. Redox Processing

The Redox plant produced at a rate of 6-7 tons of uranium per day until November 2 when a shutdown of 42.5 hours duration was required to replace the faulty first cycle feed pump, the feed valve and the rotameter jumper assembly. After startup, rates were increased to 8 tons/day but steady state operation could not be maintained due to loss of vacuum in the H-4 oxidizer vessel which seriously curtailed head-end capacity. On November 10th a short (5 hour) shutdown was taken in a futile effort to restore the vacuum. On November 12 the E-12 uranium product receiver to UNH storage pump failed and the 12 hour shutdown somewhat relieved the metal feed shortage and rates were increased from 5 to 8 tons/day. A crash shutdown was effected on the 15 as the result of the presence of emulsified hexone in the system. Several higher than normal (approximately 2% Pu) wastes had to be discarded and 14 batches of plutonium product contaminated with uranium either had to be reworked in Redox or accorded special treatment at the 231 Building. At this time it became apparent that the oxidizer vacuum trouble had to be corrected if an 8 ton rate were to be maintained and on November 19 a 24 hour shutdown was taken to replace the H-4 to H-5 scrubber fume line and the caustic

\* Redox waste volume changed from 4150 gallons per ton to 3300 gallons per ton.

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

scrubber pump which was found to be leaking at the tank flange. The new pump, however, did not correct the condition for a reason not clearly evident at the time and the old pump had to be replaced. Enough vacuum was regained in replacing the fume line to permit startup and operation for the remainder of the month at a steady 8 ton per day rate. It has since been determined that the design of the teflon gasket on the pump flange provides an inadequate seal and that a thicker neoprene gasket will remedy this trouble.

Uranium product quality improved markedly this month with gamma ratios of less than one times that of natural uranium being routinely achieved at month-end.

b. Metal Recovery Processing1) TBP Processing

"A" Line remained down all month and "B" Line was shut down November 18 in order to allow work to progress in connecting the equipment to series operation. This work should be completed early in December.

2) UO<sub>3</sub> Processing

Production activities were curtailed for the major portion of the month due primarily to a shortage of feed material from the TBP Plant. At month-end, however, the Redox plant's increased output enabled the UO<sub>3</sub> plant to resume production at a high level.

Some difficulties were encountered in pot caking and in obtaining reproducible conditions of operation using the automatic temperature control on Luckey Pot #20. Powder produced, however, continued to be of good quality and the backlog of metal feed was maintained at a low level all month.

3) Waste Metal Removal

Tank farm feed material consisted mainly of sludge and supernate from 104-BX where approximately 40 tons of the last of the aged material remains. Efforts to process blends consisting of 10 per cent of 2.5 (minimum) year supernate were not too successful, and consequently the processing of approximately 1100 tons of 2.5 year material available will not be undertaken until series conversion work is completed early in December.

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3) Waste Metal Removal (Continued)

Efforts are being made to complete clean-out activities of 104-BX early in December. TEP waste scavenging continued during the month but results of Strontium<sup>90</sup> decontamination were disappointing. Strontium<sup>90</sup> activities of 5 to 6 uc/cc preclude the cribbing of supernatants from tanks 107-BY and 108-BY, until additional crib area can be made available. Conferences have been held with Radiological Sciences and Technical Section personnel to determine necessary action to decrease Strontium<sup>90</sup> activities to 0.1 uc/cc.

c. Isolation and Metal Fabrication Processing

Operations were essentially normal in the Isolation and Metal Fabrication facilities. With an uninterrupted flow of feed material, a new production record was established in the Isolation Building, exceeding the former record set in March 1954 by 8 per cent. In Metal Fabrication, one female L10 component was fabricated from controlled low MWD material and tested for neutron count and exposure. This material together with the remaining low MWD scraps was shipped off site as part of Z Plant low MWD commitment.

d. T Plant Processing

Approximately 3½ days of processing time were lost in T Plant due equipment replacements and reworking of a C-8 neutralized waste in the 224-T Concentration building. In spite of this, production of low enrichment product exceeded the amount committed by approximately 4%.

Efforts were continued and progress made toward reducing the overall T Plant time-cycle. Elimination of one displacement wash in the first and second decontamination cycle product sections and increasing the centrifugation temperature in the extraction sections realized a savings per run of approximately 30 and 20 minutes respectively through these sections.

A revised metathesis cake washing procedure which was tested during October was adopted as standard procedure this month. A savings of approximately one hour and forty minutes in processing time per run has been realized in the metathesis section.

Work for Activation of the third extraction unit is expected to be completed early in December which will permit increased production through the extraction cycle.

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3. Special Operationsa. Waste Evaporators

There was no processing in 242 T or B Waste Evaporators during this month. All maintenance work connected with the coil replacements in 242 T facility was completed, and tests of the equipment are in progress. This facility is scheduled for T Plant first cycle waste next month. The 242 B facility has been shut down until further results of scavenged waste have been determined.

b. Plutonium Recovery, Metal Fabrication

Recovery of skulls was satisfactory during the month. The Powder Recovery operation was re-established to reduce the existing powder recovery backlog. This operation had been curtailed to assist the Redox Plant in reducing the number of variables in their process. Quantities processed are still very limited as availability of sufficient RC Cans to continue both the skull and powder recovery operations continues to be a problem. Operations were shut down on several occasions to permit more recycle cans to be available for continued operation of the Isolation Building.

4. Schedule Variance

Production was maintained according to established schedule or exceeded in all Separations Plants. In Redox a new one-week production record of 56 tons of processed uranium was established during the latter part of the month. T Plant exceeded its forecast by 4 per cent. In the Isolation Building, production exceeded the previous high by 8 per cent. All commitments were met in Metal Fabrication.

Uranium recovery production exceeded forecast as the TBP Plant attained 325% and  $UO_2$  Plant 107% of forecast. A total of 7 carloads of  $UO_2$  powder was shipped in November.

B. Equipment Experience1. Operating Continuity

Redox down time totaled 99.6 hours to effect repairs to equipment. The major portion of the down time was attributed to replacement of the first cycle feed pumps, the feed valve and the rotameter jumper assembly, starting on November 2.

TBP Plant down time totaled 30 days for "A" Line and 15.3 days for "B" Line for change over to series operations.

Down time was experienced in the Isolation Building in three occasions due to failures of the hydraulic jacks which are used to elevate the filter boats, however, this did not seriously effect overall operating continuity. There were no equipment problems of serious consequence to interfere with production in the Metal Fabrication Building.

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1. Operating Continuity (Continued)

The continuity of operations in the Concentration Building of T Plant was affected by both mechanical and operating difficulties, and 86 hours of down time resulted.

2. Inspection, Maintenance and Replacementa. First Cycle Feed Pump - Redox

The 1A feed pump (P-F-7) was replaced on November 2, 1954, because of reduced capacity. This pump, a single stage unit, had been in service approximately three months. A five stage, gas purge bearing seal pump, put in service in this position, is expected to deliver improved performance. The control valve assembly jumper associated with this pump was also replaced when a leak developed at the valve.

b. Oxidizer Off-Gas Equipment - Redox

Of major concern during the month was the lack of adequate vacuum in the H-4 off-gas system. One source of trouble, a leak in the flexible section of the H-4 to H-5 vapor line jumper, was corrected by replacing the jumper. The other major source of air in-leakage, the ruthenium scrubber (H-5) caustic recirculation pump flange, has not been eliminated. After replacement of the pump did not solve the problem, the original pump was reinstalled. Since it appears that the teflon gasket does not provide an adequate seal, a thicker neoprene gasket will be used.

c. 60 Ton Crane - Redox

Repairs to the canyon crane during the month consisted of replacement of the right hand auxiliary festoon cable, upper limit switch and cable repair on the left hand impact wrench, and installation of new variable power sources for both impact wrenches.

d. Series Ruthenium Scrubber Installation - Redox

The remainder of the J-2 scrubber jumpers were installed this month and the scrubber put into full use for the first time. Operation with 50% caustic appears to be drying the air stream, which, in turn, is effective in reducing the moisture in the J-3 filter.

e. Hydraulic Jacks - Isolation Building (Z Plant)

The filter boat jacks in Cells 2 and 3 failed on three occasions during the month as a result of corrosion of the hydraulic cylinders and other moving parts. Since the carbon steel, of which this equipment is made, is particularly sensitive to dilute nitric acid, a trial installation, using stainless steel for the hydraulic cylinder is being fabricated

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**DECLASSIFIED**e. Hydraulic Jacks - Isolation Building (Z Plant) (Continued)

in the Machine Shop. This new cylinder and jack will be tested as soon as installation is completed. The test will include the use of water instead of oil as the hydraulic fluid, since the oil which escapes from the hydraulic system is objectionable in the recycle.

f. E-1 Agitator - Concentration Bldg (T Plant)

Seventeen hours of lost time were experienced in "E" Cell November 23 and 24, when the agitator paddle assembly came off the shaft. Corrosion and wear to the two 7/8" pins, which secure the assembly to the shaft, caused pins to loosen and work out. The unit was returned to service after replacing two damaged dip tubes and securing the paddle assembly to the shaft.

C. Improvement Experience1. Process Tests and Revisionsa. Uranium Decontamination - Redox

The poor uranium decontamination experienced since the Phase II startup was greatly improved by lowering the 2D column interface about three feet into the scrub section of the column. (Done on 10-28-54) The immediate effect was masked early in the month by presence of green metal in a dissolver charge and the consequent high U<sup>237</sup> content in the final product. On November 22, 1954, the 3D column interface was similarly lowered with further beneficial effects being apparent. Uranium gamma ratios in the final uranium product were routinely around 0.5 at month's end. The explanation for the improvement appears to be that the three feet of packed column above the interface acts as a de-entrainment section for aqueous liquid and solids in a superior manner to the unpacked upper section of the column. Whether this improvement will be permanent or whether a build up in crud in this section will nullify the good effects, remains to be proven by experience.

b. Backcycle of 3 DW to 2 DF - Redox

With the production of in-specification uranium, Redox operations returned to the backcycle flow sheet, involving the backcycling of third uranium cycle waste to the second cycle as a feed additive. With backcycling in effect, it is estimated that there will be savings of approximately \$200/ton uranium processed.

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Separations Section

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c. Pot Caking - UO<sub>3</sub>

A severe caking condition in the electric pots on 11-15-54 had made it necessary to discontinue sulfamic acid additions until the cause could be determined and preventive measures taken. High sulfates (300 ppm/U) in the RCU feed material was responsible for the caking. Sulfamic acid additions were resumed on 11-17-54 at 0.03 Wt. % and finally increased to 0.05 Wt. %. Six anti-caking tests, using pot additives, were conducted during the month, however, results were not encouraging. A special anti-caking agent (Petrol AA, an alkyl aryl sodium sulfonate) is currently being tested on a laboratory scale and will be tried in a production basis if the results are favorable.

d. Waste Scavenging

TBP waste scavenging continued during the month but results of Strontium<sup>90</sup> decontamination were disappointing. Strontium<sup>90</sup> activities of 5 to 6 uc/cc precluded the immediate cribbing of supernatants from tanks 107-BY and 108-BY. Conferences have been held with Radiological Sciences and Technical Section personnel to determine how the necessary improvement can be realized. At month end it was agreed that cribbing of the scavenged supernatants, although requiring more crib area than was originally estimated, should be continued since it was half as costly as disposal by evaporation. In the meantime Technical will continue to work on the problem in the hope that corrective measures may be taken rather immediately since it would not be feasible to continue building cribs on a long term basis. T Plant production test, "Scavenging of First Cycle Waste" was continued. Analytical data from one series of samples tends to substantiate the experimental data that coating waste and first cycle waste should not be mixed if the most effective scavenging of strontium is to be obtained. Work is continuing on this problem.

2. Inventions or 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

November total expenditures for the Separations Section are expected to reflect an increase of approximately two per cent over October expenditures.

The increase in November's costs is the result of increased essential material requirements associated with the increased Redox production and increased labor costs associated with additional personnel being hired for training prior to the staffing of new Separations facilities.

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D. Events Influencing Costs (Continued)

Return to the backcycle of the 3rd uranium cycle salt waste stream to the 2nd uranium cycle concentrator (F-2) for use as 2D column scrub will again enable the plant to effect a \$200/ton savings in essential materials and waste storage space.

E. Plant Development and Expansion

1. Project Status

a. Project CA 513-A Purex

Construction advanced approximately 5 per cent during the period, and the ready-for-full-operation date remains at September 1, 1955. Repair work to correct the poor welds found in some vendor fabricated equipment has been satisfactorily completed, however a major problem remains in being able to achieve adequate removal of the debris from within this equipment. At present water flushing is being attempted.

Detail design work on the G. E. portion of Project CG-598, Vacuum Acid Fractionator, is progressing satisfactorily. Negotiations with the Lummers Company to design and fabricate the fractionation equipment have not yet been completed.

b. Project CG 551, 234-5 Expansion

Fabrication, mock-up and testing of Task III equipment in the 272-W shops continued during the month. Only minor difficulties have been experienced during testing operations. Site preparation in the 234-5 Building is proceeding. The removal of the old Task III equipment from the 234-5 Building will be delayed from January 1, to February 1, 1955 in order that Plant production commitments may be met. It is planned to continue run-in of the new equipment in the shop to evaluate it as a production unit and to develop operating procedures.

c. Project CG-535, Redox Expansion, Phase II

1. Waste Concentrator System

Insulation of the D-12 pot, tower and steam jumpers is 85% complete. Final mockup and ready-for-use date on the system will be December 17, 1954.

2. 233-S Concentration Building

Process and service piping in the control room is about 95% complete and in the PR loadout room about 75% complete. Installation of process piping and control valves in the process cell is 85% complete. Instrument piping constitutes

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~~SECRET~~2. 233-S Concentration Building (Continued)

the majority of the work to be done in the process cell. Preparations are being made for flushing and testing the process and service piping from the pipe trench to the control room and process cell. The ready-for-use date of February 1, 1955 still appears feasible.

3. ANN Storage Tank

Application of the fiber glass insulation has been completed and the transite cover started. The scheduled ready-for-use date is December 24, 1954, but it appears that a seven to day day improvement in that date can be expected.

4. Silica-Gel Treatment

Excavation for the silica gel cell was completed and forms for pouring the cell pad were erected. The completion date of March 1, 1955 appears possible.

d. Project CG-588

The chairman of the project committee is drafting a letter to the design council recommending that the D-8 scrubber and jumpers be fabricated and installed, since plugging of the J-5 filter and the sand filter could result from ammonium nitrate being formed in this system. Additional time has been requested for further study of the stack problems to determine the need for dissolver scrubbers.

e. 4X Program

Scope of work for B Plant reactivation (Phase I) was approved by AEC; scope of work to enhance production and operability at T Plant was approved by the Design Council for G. E. and by the AEC. The project proposal covering the above scoped work was approved by appropriate individuals for General Electric and at month-end was awaiting action by AEC. Immediately upon receipt of the directive authorizing additional funds minor construction forces will begin work at B Plant. To date purchase requisitions, totaling approximately \$340,000 have been committed. Preliminary checking of B Plant equipment by plant forces is about 90 per cent complete and should be completed during the first week of December.

Work continued on the T Plant third extraction cycle and was essentially completed at month-end except for some minor checking.

B Plant reactivation and T Plant production improvements were both incorporated in one project and assigned project number CG-603. In the past the B Plant portion has been referred to as project CG-597.

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## 2. Manufacturing Engineering

### a. Standards

The issuance of the revised direct labor standard for the 234-5 Operations Unit is being held in abeyance pending the completion of other Z Plant direct labor components. The re-engineering of the labor standards at the other plants is continuing. The analytical service standard for the UO<sub>3</sub> Plant was revised and the revised calculated steam standards for the 202-S and 231 Buildings were issued.

### b. Work Simplification and Cost Reduction

The second series of the Work Simplification Round Table conferences is 60% complete for the 31 conferees involved. Fifteen projects were added to the list of operations or procedures under study for improvement.

A detailed analysis of the office records and reports used by the three units of the Power and Maintenance Sub-Section has been initiated to determine the clerical requirements. A preliminary survey has been completed on the proposal to dry clean and reuse leather gloves, making use of the equipment released by the shutdown of the 700 Area Laundry. Annual savings of \$6,097 appear possible, following a one-year payout period. The cask car study is continuing, with several ideas for prevention or control of contamination being studied for development during the coming month.

### c. Engineering Assistance

Due to the large number of failures and operational difficulties sustained with the present agitator equipment, an extensive investigation of this equipment is being carried on. At present two designs are being considered.

Final shipment of the industrial television equipment for Redox is expected early in December. The bulk of the material is on hand and final design of the assembly has started.

Determinations were made for Operations on extent of replacement of Cambridge filters from the RMA Line. Detail procedures were set up for removal of hoods from the 234-5 Building RG Line, involving difficult control problems during removal and transfer of some transmitters and controllers for Task III remodification. A re-survey of the Redox ventilation system was completed. Initial ventilation system checks were made to effect adoption of Work Simplification Proposal #8, involving a reduction of relative humidity and steam consumption in the Redox plant.

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d. Property Management

Disposal of the 200 East, West and North Area security towers has been completed. The decontamination of the tower search-lights, which are to be excessed, is progressing satisfactorily and is scheduled for completion during December.

The Separations Section assumed responsibility for the operating machinery and equipment in the 2101-M Building. All catalogued machinery and tools were physically inventoried. The areas where the equipment is stored will be winterized and placed in a standby condition.

F. Reports Issued

1. Routine

<u>Number</u>	<u>Title</u>	<u>Author</u>
HW-33992	Separations Section Redox Plant Sub-Section Monthly Report - November 1954	R.T. Jessen
HW-33959	Separations Section Metal Recovery Plant Sub-Section Monthly Report - November 1954	V.R. Chapman
HW-33980	Separations Section T Plant Sub-Section Monthly Report - November 1954	C.T. Groswith
HW-33961	Separations Section B Plant Sub-Section Monthly Report - November 1954	T. Prudich
HW-33989	Separations Section Z Plant Sub-Section Monthly Report - November 1954	W.N. Mobley
HW-33970	Separations Section Analytical Sub-Section Monthly Report - November 1954	L.M. Knights
HW-34001	Separations Section Radiation Monitoring Sub-Section Monthly Report - November 1954	A.R. Keene
Official Use Only	Separations Section Projects & Personnel Development Sub-Section Monthly Report - November 1954	O.V. Smiset
Official Use Only	Separations Section Power & Maintenance Sub-Section Monthly Report - November 1954	C.P. Cabell
HW-33923	Monthly Progress Report - Plant Expansion-Projects and Personnel Development Sub-Section - Separations Section - November 1954	F.A. Hollenbach
HW-33544	Separations Section Waste Status Summary for November, 1954	D.E. Peterson
HW-33664	Essential Material Consumption for Redox Plant, Month of November, 1954	G.E. Cooper
HW-33663	Essential Material Consumption for TBP Plant, Month of November, 1954	G.E. Cooper
HW-33721	Essential Material Area Report to Cost and Purchasing, November 1 to November 31, 1954	G.E. Cooper
HW-33662	Essential Material Consumption for T Plant, Month of November, 1954	G.E. Cooper
HW-33665	Essential Materials ordered December 1 to December 31, 1954	G.E. Cooper

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2. Non-Routine

<u>Number</u>	<u>Title</u>	<u>Author</u>
HW-33745	Reduced Storage Volumes for Bismuth Phosphate Uranium Waste	C.R. Anderson by R.A. Schneider
HW-33579	Precision of U <sup>235</sup> Determination	L.M. Knights
HW-33722	High U <sup>237</sup> Level in Redox Feed	D.F. Shepard
HW-33627	Bismuth Phosphate Process Changes	C.T. Groswith/W.G. Browne
HW-34059	Radiation Incident, Class I, No. 397	G.E. Backman
None	Steam Standards for the Redox Plant, Manufacturing Engineering Report No. 11	R.H. Silletto
None	Steam Standard for the 231 Building, Manufacturing Engineering Report No. 13	R.H. Silletto
None	Standard Analytical Services For 224-U, Manufacturing Engineering Report No. 14	R.H. Silletto
None	Preliminary Economic Survey-Dry Cleaning of Manufacturing Department Leather Gloves, Manufacturing Engineering Report No. 12	R.S. Himmelright

III. PERSONNEL

A. Organization

There were no significant organization changes in Separations Section in November.

B. Force Summary

	<u>Start of Month</u>	<u>End of Month</u>	<u>Net Change</u>
Section General	2	2	0
Redox Plant Sub-Section	229	229	0
Metal Recovery Plant Sub-Section	280	275	-5
Z Plant Sub-Section	186	185	-1
T Plant Sub-Section	205	205	0
B Plant Sub-Section	8	19	+11
Power & Maintenance Sub-Section	330	333	+3
Projects & Personnel Development	73	77	+4
Analytical Sub-Section	160	162	+2
Radiation Monitoring Sub-Section	<u>145</u>	<u>147</u>	<u>+2</u>
Section Total	1618	1634	+16

C. Safety Experience

There were no major or sub-major injuries in the Separations Section in November.

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D. Radiation Experience

One Class II and four Class I radiation incidents occurred and involved: (1) localized over-exposure of an estimated 10 rads to the hand of a pipefitter who received glove contamination while working in the B Plant without proper monitoring (No. 84); (2) sudden gas and contaminated liquid evolution from the 003-BXR blend tank when agitator equipment failed to adequately blend process solutions (No. 390); (3) the failure of an unencased underground process waste line (transporting first cycle waste) with resultant cave-in and run-off and high ground surface dose rates (No. 393); (4) exceeding the operating limit for batch size control in the D-1 tank (224-T Building) by 47% (No. 391); and (5) failure to secure any monitoring while obtaining a process sample in B cell, 224-U Building (No. 397).

Visible particulate contamination was emitted on several occasions from the Redox stack. The size of these particles ranged from 1/8 inch brown droplets to 1/2 inch crusty yellow dry matter. Activity levels ranged from a few thousand c/m as typically detected with GM meters to 20 rads/hr. Almost without exception the fallout occurred within a 300 foot radius of the stack. These emissions were detected by fiber-glass mats placed on the ground around the stack. This small-scale program had been in effect for some time as a support to the stack sampling program. When the stack samplers failed to detect these particulate emissions, this fallout sampling program was expanded and used as a primary sampling system. Analyses of the particles indicated ruthenium of an age which related to the January 1954 emissions. Some inert elements present indicated the probability of old ruthenium being emitted from the jets inlet mixing chamber in the stack breeching.

At month's end on November 29 and 30, abnormal emission from the stack again occurred, however, the radioactive material was not associated with any visible particulates and was deposited on the ground as a "rain" immediately around the stack. The glass fiber mats were actually wet with a clear fluid, presumably water. The fallout occurred for about 24 hours and again subsided without known reason to low-level intermittent emission on December 1. The most striking deviation from recent emissions was the predominance of Ru103 which indicated "current" material as the source. Verification of these initial analyses and determination of the source of this current ruthenium is being vigorously pursued. The general radiation level on the ground around the Redox stack is approximately 25 mrad/hr at one inch.

The activity level of the U swamp continued to be extremely high for a surface disposal system. Concentrations as high as those in the old Redox swamp were indicated by laboratory analyses. The steam chest in the 8-1 feed concentrator showed a definite leak, when it was pressure-tested during the parallel to series operations shut-

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**DECLASSIFIED****D. Radiation Experience (Continued)**

down. The possibility of rerouting the steam condensate from the feed concentrator is being explored as a temporary measure until a replacement vessel, currently being fabricated, can be installed. Inability to resolve the contamination of the U swamp will necessitate an underground condensate and cooling water disposal system similar to Redox.

**E. Personnel Activities****1. Personnel, Programs and Training**

G.E. Selection Program evaluation was completed for eight Operations Unit personnel. Six supervisors completed Conference Leading Training, nine completed Supervisors Safety Training program, and twenty-eight exempt and Chief Operators attended the third meeting of first line Separations Section Information meetings. Sixty non-exempt personnel attended training programs which included Process and Equipment, Radiation Monitoring, Instrument, Safety and Security Orientation.

A program for giving welding instructions is being prepared and will be underway by the first of the year.

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December 4, 1954

ELECTRICAL UTILITY SECTION

MONTHLY REPORT

November, 1954

ACHIEVEMENT

Operating Experience

Power Statistics (see attached sheet for details)

Plant Contract

Probable time of November Peak Demand . . . . .	November 9, 10-11 a.m.
Probable Demand Peak for November . . . . .	112,500 KW*
Comparative Demand Peak for October . . . . .	113,448 KW
Billing Demand. . . . .	116,767 KW
Date Billing Demand established . . . . .	May 28, 1954

\*As indicated by telemeter totalizer

The Contract Demand figure of 158,000 KW previously predicted for November was revised to 115,000 KW and was accepted by Beauveville Power Administration.

Test Power Contract

Power used at both KW and KE during the month was measured at test power rates; the metering point being retained at KW.

X X X X

During high winds on November 26 at 5:16 p.m., the emergency supply line to 182 and 183 Buildings in 100-F Area became short circuited. Associated breakers in the Power House opened and fuses in the normal Power House supply blew. The line was patrolled for operability, fuses were replaced, and normal power restored at 8:40 p.m. Repairs to the burned conductors will be made when an outage can be arranged. No production loss was sustained.

X X X X

On November 28, a break in an underground water line endangered the operation of the 105-F Area fence lighting circuit. One pole and the line it supported was temporarily removed from service pending completion of repairs on the following day.

X X X X

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Voltage taps at Hanford substation were changed to maximum position in order to reduce the 66 KV line voltage at 100-K T.C. substation.

X X X X

Trouble from various causes on the Bonneville Power Administration System were reflected to the HAPO system with no adverse effect to plant operation.

On November 4, and 23, the Midway-Coulee No. 1 line relayed out causing surges on our system; the first from unknown cause, the second time from trouble near Coulee.

On November 24, trouble in the Portland General Electric System at Portland caused a surge.

On November 29 at 1:49 a.m., system frequency dropped to 59.38 cycles for two minutes. The trouble was due to the failure of a 230 KV transformer bushing at Bonneville Power Administration's substation at Albany, Oregon. Extensive damage to the station bus and structures also resulted from the oil fire which followed the bushing failure.

X X X X

#### Equipment Experience

The failure of the 230 KV bushing at the Bonneville Power Administration substation at Albany, Oregon has prompted some concern regarding similar type bushings in service at HAPO. Request has been made of the G.E. engineers in the Pasco office for a more conclusive report of the investigation by factory engineers. Maintenance checks on the bushings now in service have shown no potential deficiency.

X X X X

While performing maintenance checks on transformers at 181-D, a grounded 2300 V secondary cable between the substation and 181-D Building was discovered. Replacement will be made by Reactor Maintenance.

X X X X

Full advantage was taken of the down time of the various areas to perform power factor and D.C. high voltage tests on installed equipment, particularly underground cable.

X X X X

The application of soil sterilizing chemical in the substation grounds was completed in the 100 Area stations. This treatment has proven to be quite effective in the control of weeds.

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HW-33962

As a service to Separations Maintenance at the 202-S Building, power factor and high voltage D.C. tests were made on the 5000 V cable which had been exposed to water in the flooded man-hole and duct runs in the building.

X X X X

A report of erratic voltage readings at 184-F at approximately 6:05 p.m. on November 29 was investigated and the cause was found to be a blown fuse in the normal supply to the emergency bus in the 184 Building. The fuse had apparently been fatigued at an earlier date. Normal conditions were restored at 9:01 p.m. In the interim, loads were carried by the emergency generator.

X X X X

#### Improvement Experience

A Property Disposal Request was initiated for disposal of approximately 5.7 miles of 7200 V line and attached distribution transformers located generally along the east side of the Columbia River opposite old Hanford. The property being retired is the major portion of what is commonly known as the Ringold line. The portion still in service is the river crossing at Hanford and a line to a transformer at the east ferry landing.

X X X X

Portions of the old 66 KV 3000 Area--Hanford transmission line were removed at road and railroad crossings. Wind broke poles off at three other locations. No additional removal is anticipated at this time.

X X X X

#### Events Influencing Costs

Overtime hours expended were approximately 1% of total regular hours worked.

X X X X

November's attendance at approximately 98.1% was a distinct improvement over October and was more nearly in line with normal practice.

X X X X

Process power demands previously predicted for November were revised to suit construction schedules. BPA power billing will be made on the previously established billing demand instead of the much greater Contract demand figure.

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The procurement and use of 2" letters and numerals cut from scotchlight sheeting for making up switch and equipment identification signs are proving very effective and will also result in future savings. It would seem there may be other effective applications on the plant.

X X X X

Plant Development and Expansion

Full operation and maintenance of Section responsibilities at 100-KW were assumed on November 15, 1954

X X X X

Procurement specifications on 13.8 KV switchgear for 151-D on Project CG-558 were reviewed.

X X X X

High voltage D.C. proof tests on the 5000 V aerial cable installed for 2300 V emergency power supply to Purex located a potential fault in the cable. Following repairs by Construction forces, the installation was accepted and tied into the plant system.

X X X X

The improper operation of the tap changer on the No. 2, 5000 KVA, 13.8 KV/4.16 KV transformer at 151-KW will be investigated further with the manufacturer by field engineers.

X X X X

Phase checks of the 230 KV and 13.8 KV system at 100-K Areas were completed on November 26. Power for forthcoming tests in 100-KE will be supplied from 100-KE substation and metered at test power contract rates. As long as load conditions in KW permit and until Critical Power requirements become effective; 100-KW power will also be supplied from KE.

X X X X

  
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ORGANIZATION AND PERSONNEL

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Force Summary

November

Exempt personnel	16
Dispatchers	5
Electricians	12
Linemen	23
Substation Operators	29
Secretary	1
Stenographer	1
Clerk	1
Storekeeper	1
Draftsman	<u>1</u>
	90

No change during the month.

Safety Experience

There were two minor injuries during the month; each involving a cut on the hand. One man was wearing gloves.

Personnel of this Section participated in the Separations Safety Stampede.

Radiation Experience

No over exposures occurred.

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ELECTRICAL UTILITY SECTION

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HW-33962

**POWER STATISTICS  
ELECTRICAL UTILITY SECTION  
FOR MONTH ENDING NOVEMBER 30, 1954**

	ENERGY - MW HRS.		MAXIMUM DEMAND-KW		LOAD FACTOR-%	
	Last Month	This Month	Last Month	This Month	Last Month	This Month
<b>230 KV System</b>						
A-2 Out (100-B)	29300	26000	47200	45400	83.4	79.5
A-4 Out (100-D)	15920	14770	23800	24600	89.9	83.4
A-5 Out (100-H)	7730	9940	15150	15150	68.6	91.1
A-6 Out (100-F)	10190	8700	14400	14300	95.1	84.5
A-7 Out (100-KW)	6720	4128	51500	21000	17.5	27.3
A-8 Out (200 Area)	5940	5810	9900	9700	80.6	83.2
TOTAL OUT	75800	69348	161950**	130150**	62.9	74.0
MIDWAY IN	76597	70283	148000*	124800*	69.6	78.2
<b>115 KV System</b>						
EB1-S3 (Tie)	2043	2286	4230*	4545*	64.9	69.8
Richland	9894	10526	22400*	25600*	59.4	57.1
EB3-S4 Out (300 Area)	2320	2272	4240*	4240*	73.5	74.4
TOTAL OUT	14257	15084	30870**	34385**	62.1	60.9
<b>66 KV System</b>						
B9-S11 Out (100-K)	546	366	1440	960	51.0	52.9
B7-S10 Out (W. Bluffs)	243	288	742	878	44.0	45.5
Hanford Out	47	49	300**	300**	21.1	22.7
TOTAL OUT	836	703	2482**	2138**	45.3	45.6
HANFORD IN	845	706	2300*	1800*	49.4	54.4
<b>Project Total</b>						
230 KV Out	75800	69348	161950**	130150**	62.9	74.0
115 KV Out	14257	15084	30870**	34385**	62.1	60.9
66 KV Out	836	703	2482**	2138**	45.3	45.6
TOTAL OUT	90893	85135	195302**	166673**	62.5	70.9
230 KV In	76597	70283	148000*	124800*	69.6	78.2
115 KV In	14257	15084	30870**	34385**	62.1	60.9
66 KV In	845	706	2300**	1800**	49.4	54.4
(1)TOTAL IN	91699	86073	181170	160985	68.0	74.2

\*Denotes Coincidental Demand

Average Power Factor - 230 KV System 89.3

\*\*Denotes Non-Coincidental Demand

(1)Includes 100-K metered test power

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MANUFACTURING DEPARTMENT  
PURCHASING AND STORES SECTION  
MONTHLY REPORT - NOVEMBER 1954

I - Responsibility

Plans were made to close 100-B and 100-D Area Stores on a trial basis and replace their function with two additional daily deliveries from Central Stores. This plan of supplying areas direct from Central Stores is working well in the 300 Area where Supervision is pleased with the new service.

The responsibility of ordering, receiving and transporting liquid nitrogen to the various areas on prearranged schedules was transferred to Stores.

A contract with International Business Machines Co., covering IBM equipment presently in use on the plant, together with our forecast requirements was completed. This transaction has always been handled by A.E.C., however, they requested that General Electric handle it and save administrative expense.

II - Achievement

All automotive parts previously warehoused in buildings 716, 1125 and 1131 have been moved to the New Transportation facility. This move was accomplished without interrupting service to the Transportation Section.

Surplus material sold during the auction sale in October has been moved from the Excess Yard.

The physical inventory of Spare Parts and Equipment was completed on schedule. By changing the methods of preparing for and taking the physical inventory an estimated savings of \$3000 was realized by not working overtime or hiring additional personnel.

As shown under "Statistics" issues of General Supplies were at a high level and back orders increased. Both of these items were influenced to a large extent by stocking of shops in 100-K Area.

Status of Essential Material Contracts being processed:

- a. Aluminum Nitrate Nonahydrate - supplemental contract sent to the vendor for signature.
- b. Nitric Acid - supplemental contract being prepared.
- c. Liquid Chlorine - contract approved by vendor and ready for G.E. approvals.
- d. Caustic Soda - record of purchase approval has been obtained from the Commission for award of one-half our requirements to Hooker Electrochemical Company and one-half to Pennsylvania Salt Mfg. Company of Washington. Contracts are being prepared.
- e. Liquid Aluminum Sulphate - requests for quotation have been sent to vendors.

Consolidation and expediting of the Replacement Horizontal Rod Program, Project CG-558 was continued. Of the three major firms involved, Asco Sintering Co. and Pacific Oerliken Co. are now producing at an acceptable rate. The Aluminum Co. of America has completed about 50% of our aluminum extrusion requirements.

The emergency order placed with Ilco Tube Bending Works for replacement pig-tails for the 100-K Areas was increased from 3500 to 7600 on November 9 and to 14,900 on November 23. The vendor performed exceptionally well as final shipment of the 7600 pigtails was made Nov. 27 with delivery of the balance scheduled for completion by Dec. 24, 1954.

Orders placed for Project CG-558 included those to De Lavel Turbine Pacific Co. for 10,400 GPM pumps, to General Electric Co. (AEC procurement) for 4500 H.P. motors, and to Panellit Inc., for special gages.

Under the Nitric Acid contract with General Chemical Company their delivered cost of ~~Anhydrous~~ Ammonia determines the cost to us of Nitric Acid and A.N.N. Analysis of the freight rates on Anhydrous Ammonia from Tacoma, Washington to Hedges, Washington revealed that they were out of line and as a result of our recommendation, the General Chemical Company proposed a reduction in the rate resulting in a decrease of 9¢ cwt. effective November 15, 1954. This reduction will reduce the delivered cost of Nitric Acid 30¢ per net ton and 50¢ per net ton on A.N.N.

Effective November 10 and November 13 respectively the Freight Forwarders and the Trans-continental Truck Lines have made the Tri-City Area a rate basing point which will eliminate arbitrary rates, which were formerly assessed up to as much as \$1.65 cwt.

The present organization of the buying units (organized by commodity categories) should allow a greater degree of combining of requirements, which should result in better unit prices due to increased quantities, and economies in shipping due to larger lot sizes. The entire problem of coordination of the activities of the Purchasing Sub-Section is being approached from the angle of greatest possible efficiency and lowest costs consistent with careful and proper handling of all purchasing transactions.

#### STATISTICS

##### Traffic Unit

	November 1954	Sept. 1, 1946 to Date
<u>Savings</u>		
Rate Reductions	\$ 2,910	\$ 1,780,053
Freight Bill Audit	907	132,742
Loss & Damage & overcharge claims	1,213	140,788
Ticket Refund Claims	713	43,467
Household Goods Claims	-	17,642
	<u>\$ 5,743</u>	<u>\$ 2,114,692</u>

Traffic Unit (Con't)

Work Volume

Travel Requests	152
Reservations Made	488
Expense Accounts Checked	228
Shipments Traced	34
Quotations Furnished-Rates & Routes	502
Freight Bills Approved	1,705

<u>Carload Shipments</u>	<u>CMSTR&amp;P</u>	<u>NP</u>	<u>UP</u>	<u>Total</u>
Inbound	393	192	593	1,178
Outbound	-	-	-	-
	<u>393</u>	<u>193</u>	<u>593</u>	<u>1,178</u>

Stores Sub-Section

Inventory Account

	<u>General Supplies</u>	<u>Spare Parts</u>
Store Orders processed	29,062	1,193
Value of issues by store order	\$311,558	\$ 70,805
Value of cash sales	\$ 230	
Value of payroll deductions	\$ 2,701	
Total Value of disbursements	\$314,489	\$ 70,805
Line items in account	28,023	25,170
Back orders on hand	372	203
Out of stock items	235	159
Percent of line items out of stock	.8	.6
Shipments received	6,484	
Receiving Reports Issued	5,196	
Shipments off-project	217	
Excess Material & Equipment		
Received	\$32,031	
Issued for project use	\$ 5,642	
Shipped off-project	\$35,644	
Revenue from scrap & surplus sales	-0-	
A.E.C. Shipping Orders:		
On hand 10-30-54	71	
Received	190	
Completed	103	
On hand	158	
Oldest date	9-23-54	
Requisitions Screened	660	
Items Furnished	198	

Purchasing Sub-Section

<u>Requisitions</u>	<u>On Hand</u> <u>10-31-54</u>	<u>Received</u>	<u>Placed</u>	<u>On Hand</u> <u>11-30-54</u>
General Supplies Unit	448	1,798	1,726	520
Process Equipment Unit	310	332	437	205
Essential Material Unit	29	50	62	17
A.E.C.	248	401	391	258
Total	1,035	2,581	2,616	1,000

<u>Number of Purchase Orders Placed</u>	<u>HW</u>	<u>HWC</u>	<u>Total</u>
General Supplies Unit	1,467	199	1,666
Process Equipment Unit	118	114	232
Essential Material Unit	34	-	34
Local Purchase	16	-	16
Total	1,635	313	1,948

<u>Value of Purchase Orders Placed</u>	<u>HW</u>	<u>HWC</u>	<u>Total</u>
General Supplies Unit	\$ 441,874.89	\$ 54,471.66	\$ 496,346.55
Process Equipment Unit	63,166.95	674,320.20	737,487.15
Essential Material Unit	1,034,798.75	-	1,034,798.75
Local Purchase	163.90	-	163.90
Total	\$ 1,540,004.49	\$ 728,791.86	\$ 2,268,796.35

<u>Purchase Order Alterations Issued</u>	<u>HW</u>	<u>HWC</u>	<u>Total</u>
Number	110	53	163
Gross Value	\$ 33,112.41	\$ 34,737.30	\$ 67,849.71

<u>Expediting</u>	<u>HW</u>	<u>HWC</u>	<u>Total</u>
Orders on hand 10-31-54	1,373	465	2,338
Orders received	1,436	277	1,713
Orders Completed	1,600	359	1,959
Orders on hand 11-30-54	1,709	383	2,092

III - Organization and Personnel

During the month the Section was reorganized resulting in the following structure.

Purchasing and Stores Section

Budget and Cost Analysts

Contracts Analyst

Traffic Unit

Stores Sub-Section

General Supplies Warehousing Unit

Records and Surplus Sales Unit

Receiving and Operations Shipping Unit

Spare Parts Unit

Inventory Standardization Unit

Excess-Surplus Warehousing and Shipping Unit

Area Stores Unit

1201945

Organization and Personnel (Con't)

- Purchasing Sub-Section
  - General Supplies Unit
  - Process Equipment Unit
  - Essential Material Unit
  - Claims and Market Research Unit
  - Expediting Unit
  - Procurement Status Unit
  - Purchasing Liaison Unit

Force Summary:	<u>10-31-54</u>	<u>11-30-54</u>	<u>Change</u>
Employees on roll	279	271	-8

**Safety Experience:** Four minor injuries were experienced during the month. Stores personnel suffered three cuts caused by opening packages. The fourth injury, classified as contusion of the back, occurred in the Purchasing File Room when a clerk moved from a tall stool to a lower one, misjudged its height and fell back against the file cabinets. First Aid released the employee.

**Personnel Activities:** A lunchroom was set up in Central Stores which, although not large enough, is fulfilling a long felt need. Meetings within units of the Purchasing Sub-Section were held frequently during the month as problems of organization and coordination were discussed and solved. In addition, staff meetings were held weekly for information and discussion purposes.

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TRANSPORTATION SECTION  
MONTHLY REPORT  
November 1954

Transportation Section personnel forces increased from 490 to 491 by five new hires, one transfer in, one reactivation - personal illness, one termination, four transfers out, and one deactivation - personal illness.

The new Consolidated Transportation Facility is approximately 99% complete; however, it is fully occupied and operative except for the body repair and paint shop which should be finished within two weeks. A number of other minor exceptions are in the process of being corrected. Major exceptions still exist with respect to heating and ventilating where operating and maintenance expenses to date have been excessive and preclude the possibility of full acceptance in the immediate foreseeable future. The transfer of bus operations to the new terminal was made without disrupting schedules. Passenger volume has increased considerably, especially with respect to shuttle service. This presented some difficulty and has required increased overtime to provide satisfactory service. The output of the several repair shops was somewhat below normal during the first half of the month because of the move, but regular schedules have since been re-established.

Completed detailed estimates and required supporting narrative justifications on personnel, overtime, materials, overhead costs, community bus costs, inventories, projects, shop equipment, HO equipment, and the 600 Area for the FY 1955 Midyear Budget Review.

Section representatives attended a second meeting on November 16 at H. A. Carlberg's office regarding the administration of landlord expenditures. Considerable effort has been devoted toward developing suitable accounting and reporting methods for the new Consolidated Transportation Facility. Further meetings with departmental landlord representatives are scheduled for December 6 and 9. It is anticipated that a fully developed program will be operative by the beginning of the January cost month.

The physical inventory of Road Materials (0420-930) was completed on November 4 as scheduled. The preliminary report indicates only a very nominal variance in physical quantities; however, there is a difference between the physical inventory recorded value and the general ledger debit value which is yet to be resolved. This difference is primarily attributable to unit prices and seasonal factors. Additional meetings are planned to discuss this problem before the final status report can be completed.

Completed arrangements for the transfer of charges incurred in the repair of factory defects on 110 Chevrolet sedans. Maintenance costs were credited and the Commission is to backcharge the General Motors Corporation.

Nineteen units of HO equipment are being furnished to the Richland, Pasco, and Kennewick post offices during the Christmas season as requested by the Commission.

Effective November 22 the scheduled hours of work for the straight day shift at the new Consolidated Transportation Facility were changed to 7:48 a.m. to 4:18 p.m. with a thirty minute lunch period. Previous work hours were from 8:00 a.m. to 4:45 p.m. with a forty-five minute lunch period. The change was arranged following a request from an overwhelming majority of both unit and non-unit people.

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Transportation Section

Preparatory work is in progress for the forthcoming physical inventories of Antifreeze (0420-933), Automotive and Heavy Equipment Parts (0420-931), and Railway Equipment Parts (9420-932) which are scheduled for December 14, 15, and 16 respectively.

Commercial rail traffic during November increased by 2.06% over October as receipts of coal and essential material were slightly higher. The following recapitulation indicates the distribution of commercial cars handled:

<u>Carload Movements</u>	<u>Loads In</u>	<u>Empties In</u>	<u>Loads Out</u>	<u>Empties Out</u>
General Electric Company	1179	23	22	1129
AEC - Kaiser (cement)	8	0	0	6
Blaw Knox	32	0	0	30
L. H. Hoffman	3	0	0	3
Kaiser Engineers	6	0	0	6
Sound Construction Co.	1	0	0	1
U. S. Army	<u>15</u>	<u>0</u>	<u>0</u>	<u>13</u>
	1,244	23	22	1,188

Railroad process service during November increased 16.1% over October and required 481 overtime hours. Scheduling difficulties from the increasing work load are becoming more pronounced due to the continued delay in the release of empty cars and obtaining monitoring service.

Total car movements including process service totaled 2,889 in November compared to 2,763 in October; 2,649 in September; 2,293 in August; 1,361 in July; 2,667 in June; 3,110 in May; 2,267 in April, 2,482 in March; 2,624 in February; and 2,545 in January.

Effective November 8 a seventh train crew was established to provide more adequate coverage for the increasing work load. This was accomplished without increasing personnel by reducing the strength of existing crews.

Special movements of vessels from the 272-E Shop to the Purex Facility were made on November 9 and 18. A series of these movements will continue through December and early January.

Arrangements have been completed whereby Security Patrol personnel will furnish pickup and delivery service on film badges and pencils for work being performed on regulated equipment in the new railroad shop. Radiation Monitoring personnel from the 300 Area are providing survey services. Some difficulty was experienced in obtaining personnel for decontamination work; however, it now appears that the Metal Preparation Section will be able to supply this need.

Routine inspection-maintenance services were performed on November 3 for the U.S. Army car operated off-plant for the Atomic Energy Commission. Extensive repairs were made on the trucks, couplers, draft gears, brakes, and wheels during the last trip off-plant. These repairs had been recommended by our maintenance people some time ago.

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Transportation Section

Completed weed control spraying operations for the 139 miles of permanent railroad trackage. This required 3,550 pounds of soil sterilizing chemical to prevent seed germination and 296 man-hours.

Inspected the 6.9 miles of new railroad trackage for the 100-K Area and submitted the punch list of exceptions.

The Plant Bus System transported 9.32% more passengers in November than in October. The following statistics indicate the magnitude of service rendered:

Passenger Volume	154,540
Revenue - Bus Fares	\$ 7,626.02
Earnings - Transit Advertising (October)	\$ 158.45
Bus Trips	6,702
Bus Miles - Passenger Carrying	183,792
Passenger Miles	4,761,018

Scheduled bus service to Riverland was discontinued concurrent with the transfer of railroad operating and maintenance personnel to the new Consolidated Transportation Facility.

Special bus service was provided on November 5 for a tour of the Plant Areas by the Military Liaison Committee.

The Richland Bus System transported 18.11% more passengers in November than in October. The following statistics indicate the volume of services rendered.

Total Passengers Including Transfers	12,503
Revenue - Bus Fares	\$ 757.63
Earnings - Transit Advertising (October)	\$ 7.20
Bus Trips	1,194
Bus Miles - Passenger Carrying	6,328
Passenger Miles	35,820

Off-Plant chauffeured automobile trips (Company business and/or official visitors) totaled 140 which were rendered to the following locations:

Benton City, Washington	7
Grandview, Washington	6
Hinkle, Oregon	12
Kennewick, Washington	18
Pasco, Washington	62
Pendleton, Oregon	13
Prosser, Washington	2
Richland Y, Washington	2
Sunnyside, Washington	6
Walla Walla, Washington	3
West Richland, Washington	3
Yakima, Washington	6

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Transportation Section

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

	<u>Gasoline</u>	<u>Diesel Fuel</u>	<u>50 Cetane</u>	<u>Kerosene</u>	<u>White Gas</u>
Stock at Start of Month	28,100	14,140	8,000	2,380	130
Received During Month	131,661	30,500	26,000	6,729	212
Disbursed During Month	96,461	19,755	27,000	3,384	58
Stock at End of Month	63,300	24,885	7,000	5,725	284

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

Motor Overhauls	50
Class A Inspections and Repairs	85
Class B Inspections and Lubrications	1152
Weekly Inspections - Fuel Trucks and Off-Plant Vehicles	51
Semimonthly Inspections - Buses	137
Monthly Inspections - Railroad Rolling Stock	7
Other Routine Maintenance Repairs and Service Calls	2113
Accident Repairs and Paint Jobs	38
Tire Repairs	577
Wash Jobs	<u>301</u>
	4,511

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

<u>Code</u>	<u>Type</u>	<u>No. of Units</u>	<u>Total Mileage</u>
1A	Sedans	338	544,863
1B	Buses	113	200,273
1C	Pickup Trucks	438	218,111
1D	Panel, Carryall, Station Wagon	159	137,257
1G	Jeeps	2	537
1H	Power Wagons	50	19,758
1R	Armored Cars	3	100
68 Series	Trucks	216	79,982
		1,319	1,200,881

The new service station was placed in service on November 11 for gasoline only. Diesel pumps were not operating satisfactorily for several days and this necessitated 150 overtime hours for fueling buses from a tank truck.

Fifty-four units of equipment and ten transformers were decontaminated at the 200-West facility during the reporting period. The shed formerly used to house the steam cleaner at Riverland was moved and set at the 269-W location. Separations Section personnel are burying the waterline to the cleaner and electricians are completing necessary wiring to the shed to provide heat for the cleaner. This will eliminate nightly draining of the entire unit and piping.

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Transportation Section

Material handling following the auction on October 11 and 12 has been completed. This involved the loading of 27 carloads, 517 trucks, and moving 200 vehicles which required approximately 2,900 man-hours and 1,000 equipment hours.

The dismantling and loading of York Refrigeration equipment in the 100-D and 100-F Areas for off-plant shipment was begun during November. This work is approximately 30% complete and has required approximately 600 man-hours to date.

The program of decontaminating grounds in the 200-West Area continued in progress during November and required 1,051 man-hours for the plowing and seeding of open areas and the covering of surfaced roadways and parking areas.

Installed 500 radiation control signs in the 600 Area requiring 318 man-hours. This work is approximately 75% complete.

Maintenance of roads and production of road aggregate materials required 1,542 man-hours during November.

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

	<u>MC 3</u>	<u>MC 5</u>
Stock at Start of Month	44.20	26.89
Received During Month	38.94	0
Used During Month	40.	3
Stock at End of Month	43.14	23.89

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

	<u>3/4" to 0 Pre-mix Tons</u>	<u>1/2" to 0 Pre-mix Tons</u>	<u>5/8" Chips Cu. Yd.</u>	<u>1/4" Crushed Rock Cu. Yd.</u>	<u>3/4" Crushed Rock Cu. Yd.</u>	<u>2" to 3/4" Railroad Ballast Cu. Yd.</u>
Stock at Start of Month	86	224	1,583	1,426	850	0
Made During Month	375	230	1,033	0	200	1,140
Used During Month	53	14	527	143	238	10
Stock at End of Month	408	440	2,089	1,283	812	1,130

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ENGINEERING DEPARTMENT

NOVEMBER 1954

TECHNICAL SECTION

Hanford is continuing to get material with a high hydrogen content from both Fernald and Mallinckrodt sources. There appear to be two reasons for this: (1) The large bob bomb used at Fernald and Mallinckrodt to produce derbies for the seven-inch ingot does not permit the charge to attain the same temperature as the smaller diameter bomb previously used. As a consequence, the hydrogen containing compounds, HF and H<sub>2</sub>O, are not as effectively volatilized; (2) Fernald has not yet changed to a salt which is free of hydrogen contamination for the beta heat treating operation.

Two tubes of slugs discharged with ruptures at H Pile during October were examined. Those pieces near the control rods (as determined from weasel and film data) showed more diametric distortion than other slugs of similar material which have been irradiated to exposures of 600 to 1200 MWD/T. It is believed that this distortion is due to internal cracking of the uranium rather than dimensional change.

Recurrence of the tube damage at C Pile (reported in August by Pile Technology, HW-32800) was indicated from visual examination of six "C" metal ruptures. The failures and companion pieces showed definite evidence of cocking and/or chattering.

The two tubes of four-inch cored slugs and two tubes of solid companion pieces charged at C Pile have now reached an approximate exposure of 525 MWD/T. The same number charged at F pile are at 330 MWD/T.

One tube of a total of fifteen tubes of hot-pressed slugs was discharged at an exposure of 278 MWD/T. The remaining tubes have exposures varying from 280 to 360 MWD/T.

One natural uranium slug failed at 810 MWD/T during the month. This was a failure at B Pile of a piece of UF<sub>6</sub> parent material. Difficulty has been encountered with C slug chattering at C Pile with a subsequent increase in rupture frequency (five ruptures).

Results of an examination of operational data from D Pile indicate that present power-exposure limits based on expected slug rupture rates are conservative. A possible goal exposure of 850 MWD/T or higher at maximum tube powers of 800 KW without an excessive failure rate, was indicated.

The Redox Plant demonstrated a marked improvement in uranium decontamination performance. Concurrently the processing rate was increased to a new maximum of 8.0 t/d and waste losses of plutonium and uranium attained satisfactorily low values of less than 0.5 percent. Of major importance in

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achieving these improvements was a revision in the column operating condition wherein the organic-aqueous interface is maintained below the disengaging chamber instead of midway into the disengaging section as was the practice in the original packed column contactors. During the latter part of the month backcycling of the third uranium cycle aqueous waste stream to the feed stream of the second uranium cycle was employed with highly satisfactory results.

Laboratory and semiworks scale studies on the removal of ruthenium from uranium product streams by volatilization with ozone-air mixtures were resumed with material produced in the Redox Plant by simple dichromate head-end oxidation. The results are encouraging and do not indicate any unforeseen problems. Arithmetic decontamination factors of at least 4.0 were observed for a six hour reaction period at 90 C employing one percent ozone at low sparge rates (one volume gas/volume of liquid/four minute interval). There was no observed accumulation of ruthenium dioxide in the process equipment.

Operation of the 16-inch diameter semiworks scale continuous calciner was begun. The operability of the system is distinctly improved over the earlier 4-inch diameter unit. Product quality of the material produced in the early operation was unsatisfactory (reactivity of 0.70); however, no concerted effort has been made to define optimum conditions for production of maximum reactivity in the product,  $UO_3$ .

The temperature coefficient of Hanford-type piles as a function of neutron exposure has been calculated using fission cross-section data obtained recently from the crystal diffraction spectrometer. This study indicates that high exposure graphite reactors operating on a uranium-plutonium cycle will suffer from severe reactivity transients. A memorandum, HW-33789, was issued to point out this effect. The effect itself is associated with the neutron energy dependence of the plutonium-239 cross-section.

Theoretical calculations predict that a production reactor with an 8-3/8" lattice spacing will show a reactivity loss of 176 in-hours when fully loaded with slugs of standard dimensions except cored to give a 1/2" diameter void. Experimental verification is planned.

A uranium tensile specimen irradiated to 620 MWD/T was vacuum annealed at 700 C for 15 hours, then subjected to a room temperature tensile test. Ultimate tensile and yield strengths were not appreciably affected by the anneal but a six-fold increase in ductility occurred, a factor of four greater than was observed several months ago on annealing an irradiated specimen at 400 C. However, the ductility after the 700 C anneal was still shy 12% of that of the unirradiated metal.

#### DESIGN SECTION

Distribution of Design Section effort for the month was approximately as follows:

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Design Development Programs	27%
1952 Hanford Expansion Program	18%
Reactor Plant Modifications for Increased Production	17%
4X Program	9%
Other Projects and Design Orders	29%

The 4X Program continued to accelerate during November with corresponding reductions in effort on CG-558, Reactor Plant Modifications for Increased Production, and 1706-KER Recirculation Facilities.

The 1952 Hanford Expansion Program design work in support of construction continued at a steady rate. Purchase orders were placed for aluminum "pigtail" connectors for the KE and KW reactors following successful testing of the first connectors received. Design continued to resolve problems associated with equipment failure resulting from final acceptance testing of the 100-KW reactor plant. The principal item involved was failure of some of the resistance thermometers on the 105-KW temperature monitoring system. Design is progressing on the development, with the vendor, of an improved thermometer for replacement of thermometers being installed.

Total design for Project CG-558, Reactor Plant Modifications for Increased Production, advanced on schedule to 47% complete. Scope design is 97% and detailed design 42% complete.

Activity on the 4X Program continued to expand on a priority basis. Project proposals were completed during the month and have been submitted to the AEC, for approval. These proposals, which, if approved, will cancel Project CG-597, "Hanford 4X Program," divide the program into three projects as follows:

- CG-603 - 4X Program - Bismuth Phosphate Plants
- CG-613 - 4X Program - Metal Conversion Plant
- CG-614 - 4X Program - 300 Area

Design scope for all phases of the program is in progress. Detailed design has started on CG-603 only and is presently 25% complete.

Work was started on esdesign to provide a vapor manifold system for the nine tanks at the Redox 241-SX Tank Farm which were not provided with a vapor system as part of the CA-539 construction contract. The design required for lump-sum construction is being expedited in order to complete a bid package in January 1955.

#### PROJECT SECTION

At the end of the month construction completion status of major projects was as follows:

<u>Project No.</u>	<u>Title</u>	<u>Completion</u>	
		<u>Scheduled</u>	<u>Actual</u>
CG-496	Recuplex	90%	86%
CA-512	100-K Area Facilities		
	KW - Water Plant	100	99.9
	Reactor and Building	100	99.9

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Engineering Department

HW-33962 DBL

<u>Project No.</u>	<u>Title</u>	<u>Completion</u>	
		<u>Scheduled</u>	<u>Actual</u>
	KE - Water Plant	100	96
	Reactor and Building	100	95
	General Facilities	100	94.4
CA-513	Purex Facilities, Part "A"	97	85
	Part "D"	100	100
CA-514	300 Area Expansion	78	72
CG-535	Redox Capacity Increase Phase II	87	84
CA-546	Fuel Element Pilot Plant		42
CG-558	Reactor Plant Modifications	2	1

The estimate for beneficial use of KW Reactor is December 11, 1954. This appears to provide ample time for completion of contractors' work. New connectors have been installed on the outlet face, and about 30 rows were installed on the inlet face. Re-run of the Dynamic Flow Test of KW was essentially completed on November 11. All process tubes have been dried out, following the re-test which was completed November 22. The final gas test was completed on the process unit, and acceptance testing was being completed on pile control systems and area switchgear. At 190-KW four secondary pumps were returned to the vendor and are to be replaced by pumps with new casings. The 181-KE river pumps have been run eight hours or more and are being used for testing KE Water Plant. At 190-KE, the last two primary pumps and the fourth secondary pump were installed. Tests are being run on boilers and two turbine-generator sets at 165-KE. The Dynamic Flow Test has been started for KE Water Plant, and work was being directed toward using KE Water Plant to back up KW during start-up. At 2101-M Building, work was completed on graphite for both the Physical Constants Test Reactor and the Thermal Test Reactor. Fabrication equipment was placed on lay-away status on November 22, 1954.

Purex design work as originally established has been completed, but work is being done on revisions to the project, review and approval of vendors' drawings, bid reviews, and "as-builts." Shipment of Purex vessels and engineered items was accelerated during the month. Repair of concentrators in mock-up was essentially completed. Of total major equipment received, 32 pieces have been completed through mock-up and delivered to 202-A Building. Jumper fabrication was about 60% complete, there being 817 welded, 709 framed and balanced, and 678 tested. Total jumper installation was 74 in the cells. Acceptance testing was started on the remote crane and one pulse generator assembly. Hot Waste Lines were accepted on November 3; the cribs were completed, and saturation tests are being performed.

ORGANIZATION & PERSONNEL

Total on Roll, November 1, 1954	1,482
Accessions	18
Separations	29
Total on Roll, November 30, 1954	1,471

*A. G. Greninger*  
 A. G. GRENINGER, MANAGER  
 ENGINEERING DEPARTMENT

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ENGINEERING ADMINISTRATION SECTION

NOVEMBER 1954

The annual listing of Company-sponsored memberships in trade and professional societies was compiled for the approval of the Subscriptions Committee in Schenectady. Each Department Manager approved the memberships held by personnel in his Department. The final listing was forwarded to the Manager - Finance, who will transmit it to the Subscriptions Committee in Schenectady.

The distribution list for Scientific, Technical and Engineering Information was brought up to date by circularizing all Departments. The revised listing reduced the Plant-wide distribution of Schenectady publications from 125 to 90 copies. The appropriate offices at Schenectady have been advised of this change. Two new Schenectady publications, Manufacturing Services Bulletin and The Specialist, are utilizing this list for their HAPO distribution.

The Plant-wide inventory of classified documents seems to be running more smoothly in its fourth month. The inventory clerks are able to handle the returned lists promptly, and it has not been necessary to work overtime to check discrepancies. During November, 1,287 inventory listings were mailed out to document holders. In addition, the monthly Files inventory (a spot check made up of 564 documents) was completed and all copies accounted for.

During the month, document HW-27116, unclassified, a revised edition of "Preparing Formal Reports; a Guide for Hanford Authors" was issued. To date, 380 copies have been requested for plant use. Another unclassified document entitled "Readying Papers for Publication; a Guide for Hanford Authors and Speakers" was issued as HW-28965.

A paper entitled "New Techniques for Life-Testing" was presented by J. L. Jaech on November 16 in New York City at the General Electric Company's Fourth Annual Symposium on Statistical Methods sponsored by the General Engineering Laboratory. The paper was presented in the panel which considered research on new methods. It dealt with the statistical distribution theory underlying the work reported in HW-32687, "Reactor Fuel Elements--Progress Report #1." In this paper it was indicated how the reported techniques could be applied to problems of a nature similar to the problem on reactor fuel elements.

During the month the following major contract activities were handled:

1. Lease Agreement No. L-2 between General Electric and the Richland Softball Association was executed by the Softball Association November 15.
2. Special Agreement No. G-49 between General Electric and the University of California at Los Angeles covering the use of University-owned seam welder was returned by the University for revision. The revised document was sent to the University for execution November 26.

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3. The proposed agreement between General Electric and the Richland Yacht Club covering moorage of the river survey boat operated by the Radiological Sciences Department has been dropped since the Richland Yacht Club is moving to another location.
4. Special Agreement No. G-51 between General Electric and Haughton Elevator Company providing for the modification of "C" elevators in 100-B, D and F Areas was sent to Haughton for execution November 19.
5. Modification No. 1 to Special Agreement G-32 between General Electric and Givens, May and Milliken for the license to use additional film was extended one year. The modification was sent to Givens, May and Milliken for execution November 24.
6. Modification No. 5 to Subcontract G-107 between General Electric and the Swedish Hospital covering an exchange of radiological information was extended for a period of one year. The modification was sent to the Commission for approval November 26.



R. J. SCHIER, MANAGER  
ENGINEERING ADMINISTRATION SECTION

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PILE TECHNOLOGY SUB-SECTION

MONTHLY REPORT

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File Technology Sub-Section

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## VISITORS AND BUSINESS TRIPS

- D. M. Wilsey is visiting here from Knolls Atomic Power Laboratory, Schenectady, New York, August 31 through December 31, for consultations on KAPL-120 loop.
- R. C. Nelson, T. Ropitzky, and H. K. Ruhl visited here from Knolls Atomic Power Laboratory, Schenectady, New York, November 2 through 25, to discuss proposed irradiations.
- D. F. Babcock, R. L. Menegus, and W. M. Heston visited here from the duPont Savannah River Plant, Aiken, South Carolina, November 2 through 5, to discuss fuel problems.
- R. Fillnow and R. T. Jones visited here from Westinghouse Atomic Power Division, Pittsburgh, Pennsylvania, November 4 and 5, to discuss irradiation facilities.
- N. E. Huston visited here from North American Aviation, Inc., Downey, California, November 15 and 16, to discuss reactor safety device program.
- T. J. E. Glasson, D. H. Cornell, and J. H. Holmes visited here from Knolls Atomic Power Laboratory Schenectady, New York, November 18 and 19, for consultations on in-pile loop facilities.
- R. W. Coyle, H. Miller, and R. L. Lee visited here from GE-ANP, Cleveland, Ohio, November 22 through 24, to discuss in-pile experiment proposed for the GE nuclear propulsion project. Mr. Lee returned November 30 for additional consultations on the above subject.
- J. A. Berberet recruited technical personnel at Washington State College, Pullman, Washington, and the University of Idaho, Moscow, Idaho, November 10 through 12.
- L. P. Bupp went to the University of Delaware, Wilmington, Delaware, and Pennsylvania State University, State College, Pennsylvania, November 2 through 12, to recruit technical personnel. He also went to Oregon State College, Corvallis, Oregon, November 15 and 16, for the same purpose.
- R. L. Dickeman recruited technical personnel from the University of Washington, Seattle, Washington, November 8 through 10.
- M. Lewis and W. C. Riley visited Battelle Memorial Institute, Columbus, Ohio, November 10 and 11, to discuss development work being carried out by Battelle for HAP0.
- R. Neidner attended the American Society of Mechanical Engineers' Annual Meeting in New York City, New York, November 29 through December 3.
- R. S. Paul recruited technical personnel at the University of Oregon, Eugene, Oregon, and Oregon State College, Corvallis, Oregon, November 9 through 12.
- J. H. Rector was at the Asco Sintering Company, Los Angeles, California, September 7 through November 2, for consultations on fabrication of boron carbide rings.
- P. H. Reinker went to the University of Minnesota, Minneapolis, Minnesota, and the University of Wisconsin, Madison, Wisconsin, November 29 through December 3, to recruit technical personnel.
- L. A. Wilson attended the AEC Shielding Information Meeting at GE-ANP, Cleveland, Ohio, November 15 and 16.

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ORGANIZATION AND PERSONNEL

	<u>October</u>	<u>November</u>
Administrative	5	3
File Development	60	59
File Engineering	72	73
Special Irradiations	25	25
Technical Liaison	<u>2</u>	<u>2</u>
Total	167	165

Administrative: One Technical Graduate was re-assigned to File Engineering.

File Development: One Junior Engineer terminated.

File Engineering: One Engineering Assistant 12 was hired, one Technical Graduate was re-assigned from File Technology Administrative, one Junior Engineer transferred to Reactor-Process, and one Technical Graduate-Rotational transferred to Design-Process Engineering.

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PROCESS TECHNOLOGYPower Level Limits

During November the power levels of the DR and H Piles continued to be limited by an arbitrary maximum tube outlet temperature of 95 C. The B and F Piles were similarly limited by 105 C and 100 C, respectively. At the D Pile, after completion of a tube reorificing and rear header orificing program, the maximum tube outlet temperature was raised from 95 to 100 C. The C Pile continued to be limited by low reactivity.

Process Changes

Revised Process Specification 27.00 covering the handling of irradiated enriched slugs was approved.

The limit established by Specification 26.01 b., called the "Ruptured Slug Limit", was increased 200 kilowatts per tube for a period of one month. A re-evaluation of the limit is in progress.

C Slugs Chattering

On 11-18-54, C Pile shut down to locate a water leak. The leaking tube, 2594, had been charged 12-18-53 with 30-C metal and 5-regular metal. Examination of the slugs and the tube showed evidence of slug chattering with serious damage to both tube and slugs. The chattering indications were identical to those found on tube 1794 - a leaker on 7-16-54. At present, there are 77 tubes in C Pile which have had C metal charges in them for the same period of time as the two leakers. An evaluation is currently being made of the probable extent of damage in the 77 tubes and methods for preventing chattering are being developed.

As one means for minimizing cocking and chattering of C slugs and other low density slugs, a specification has been prepared which requires all slug charges except uranium to be seated to the rear before the water pressure is raised.

Slug RupturesUranium Failures

One failure occurred in a uranium slug this month. This was the failure, at B Pile, of a piece of  $UF_6$  parent material. The tube was charged under PT 313-105-27-M, had been scheduled for irradiation to 1000 MWD/T exposure, and failed at 810 MWD/T. The ruptured piece exhibited swelling, with cracks in the jacket wall.

Al- $U^{235}$  Alloy Failures

"C" metal failures occurred in five C Pile tubes. These failures were characterized by grooves in the jacket and worn areas at the ends of the pieces. In several instances damage extended into the active core of the slug. As many as nineteen pieces from one tube were found to be damaged to some extent. It is believed that the ruptures occurred because of wear through the can wall caused by slug chattering.

A suspected rupture was discharged from a "C" metal tube at H Pile, but the metal has not yet been inspected.

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Pile Technology Sub-Section

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"J" metal failures were discharged from four DR Pile tubes. These pieces all exhibited cracks, or tears in the jacket wall. One piece gave a burned appearance along the crack.

A "J" metal piece failed in a "J-Q", thorium irradiation, column at C Pile. The piece was canned as soon as possible, without being inspected, because it was emitting radioactive gases.

#### Re-evaluation of Slug Rupture Limit

Results of an examination of operational data from D Pile indicate that present power-exposure limits based on expected slug rupture rates are conservative. A possible goal exposure of 850 MWD/T or higher at maximum tube powers of 800 KW, without an excessive failure rate, was indicated.

#### Economics of U<sup>233</sup>-Pu Production Using Enriched Uranium Slugs

A cost analysis has been made for the product Pu and U-233 from irradiated thorium and enriched uranium slugs. The uranium fuel slugs are considered with U-235 from 0.8 to 5.0 per cent.

It has been concluded that the cost of U-233 from such an irradiation may be reduced as much as 40 per cent from conventional irradiation costs in which U-235 aluminum alloy slugs are used as fuel elements. The most economically attractive irradiations are those of long tube exposure in which the products of irradiation are U-233 and Pu of higher isotope content than 200 MWD/T quality.

#### Irradiation of New Fuel Slugs

Cored Slugs - Production Test 105-570-A - This production test authorizes the irradiation to failure of 4 tubes of cored-uranium lead-dip slugs and 4 tubes of standard control slugs at both high and lower tube powers. Four tubes charged at C Pile have operated for four months (475-500 MWD/T) without incident. The four tubes charged in F Pile September 14, have reached 280-300 MWD/T without incident.

Mechanically Bonded Slugs - Point Pressure Closure - Production Test 105-575-A - Two tubes each containing two four-inch, mechanically-bonded, point-pressure-welded slugs centered with normal uranium pieces were charged in D Pile. One tube scheduled for 200 MWD/T has been discharged. Post-irradiation examination has been completed and no evidence of diffusion or interaction between can and core could be found. The remaining tube, scheduled for 600 MWD/T is currently at 425 MWD/T.

Powder Metallurgy Slugs - Production Test 105-576-A - This test authorizes the exposure of 5 control tubes at C Pile, 10 control tubes at F Pile, and about 40 supplementary tubes at F Pile. Two ruptures will be incurred in C Pile, and all slugs in F Pile will be discharged at normal goal exposure, 675-775 MWD/T. The C Pile tubes have operated without incident for two months and have reached 230-260 MWD/T. The F Pile tubes were charged November 8.

Unbonded Slugs - Production Test 105-578-A - This production test authorizes the irradiation to failure of "C"-process-canned solid and cored uranium slugs, and of nickel plated "C"-process-canned solid uranium slugs. A total of 16 tubes will be charged, and 5 of these will be irradiated to rupture. The slugs have been canned and will be charged December 5.

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Hot-Press-Canned Slugs - Production Test 105-577-A - This production test authorizes the irradiation of solid slugs with fusion and diffusion welds, cored slugs with fusion welds; and control-slugs. Fifteen tubes were charged, and four of these will be irradiated to rupture. Current exposure is about 300 MWD/T.

Unbonded Slugs - Point Pressure Closure - Production Test 105-580-A - A total of 8 four-inch pieces, spaced with normal slugs, were charged in three tubes during September and are to be irradiated to 200, 400, and 675 MWD/T for metallurgical examination. A fourth tube, containing 4 unbonded cored enriched pieces centered by 18 unbonded cored pieces and solid aluminum dummies will be charged later and irradiated to rupture. Post-irradiation examination of the tube irradiated to 200 MWD/T shows the slugs to be in good condition.

Development Tests 105-582-A, 105-581-A, and 105-592-A, Irradiation of IQS-7, 8, and 9 Metal - The metal under these tests came from rods which were rolled from ingots which differed slightly from the ingots from which standard production metal rods are rolled. Pre- and post-irradiation measurements will be obtained. No ruptures are anticipated. All 16 tubes were charged in H File on November 26.

Unbonded and Mechanically Bonded Point-Closure Slugs - Production Test 105-584-A - A production test to authorize irradiation of unbonded and mechanically bonded point-closed slugs has been written, approved and distributed. Lead-dip control slugs will also be irradiated for comparison. Three tubes of each of three slug-types will be charged. Irradiation will continue until one rupture has occurred in each of the three types of metal. Charging is planned for mid-December.

Production Quantities of Cored Slugs - Production Test 105-591-A - Approval has been received for this test which authorizes the charging and irradiation of production quantities of cored slugs (both extruded and drilled) until 100 and 300 Area process specifications have been issued. The first cored rods arrived in October. They are being machined and canned. Charging is planned for January.

Irradiation of Extruded Cored Slugs - Evaluate Process Development - Development Test 105-588-A - Approval has been received for this test which authorizes charging three control tubes for metallurgical inspection from each month's supply of cored slugs received at HAPO during the development period of cored slug production. One tube of extruded cored slugs, already available, was charged November 5. Equal numbers of drilled cored slugs, when available, will be charged in the same tubes. Exposure will be limited to 900 MWD/T and no slug failures are expected.

Irradiation of Extruded Cored Slugs - Test Ultimate Performance by Irradiation to Rupture - Production Test 105-590-A - This test has been approved and authorizes 4 tubes of extruded cored slugs and 4 tubes of standard production metal to be charged in C File. (The 4 tubes of standard production metal will probably be dropped from the test to spare two ruptures.) Irradiation will continue until both types of metal experience two ruptures.

Uranium Silicon Alloy - Production Test 105-586-A - Approval has been received for this test which authorizes the irradiation of silicon alloy solid slugs from ingots (1 tube) and from Dingots (4 tubes) also silicon alloy cored slugs (3 tubes). The four tubes from Dingot stock will be irradiated until two ruptures occur. Standard production metal (4 tubes - 2 ruptures) will serve as control. The cored slugs will be irradiated to 900 MWD/T. One tube of preliminary metal will be charged into B File and irradiated to 900 MWD/T.

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Internally and Externally Cooled Slugs - Production Test 105-587-A - Approval is being requested for this test which authorizes irradiation of 7 tubes of I and E slugs in C Pile. Three tubes will be discharged at exposures up to 1200 MWD/T. Four tubes will be irradiated until 2 ruptures occur. It is planned to measure outlet water temperatures in the core and in the annulus. The first tube will be charged in December.

#### Manufacture of Other Products

Preliminary Irradiation of J-Q Columns - Production Test 105-567-A - A third scheduled discharge of one column from the H Pile J-Q block loading will be made soon at about 110 MWD/tube.

A second revision to the exposure plans for the remaining eleven columns is necessary to meet AEC requirements, and Supplement A (revised) will be issued in December. It is planned that ten tubes will be exposed to about 175 MWD/tube.

Quantity Irradiation of J-Q Columns - Production Test 105-579-A - There are now 160 J-Q columns in H Pile and 160 J-Q columns in C Pile under this test. Exposure revisions at the request of the Commission have resulted in many changes to the original test and Supplement A. These will be recalled and replaced by a revised test during December.

High Exposure Thorium - Production Test 105-551-A - This test has been discharged and the final report has been written (HW-33324). Data on heat generation versus exposure for thorium slugs are given in the report. The report concludes that B process canning is unsatisfactory for high exposure thorium.

#### PILE PHYSICS

##### KW Pile Startup Program Planning

Preparations for the experiments to be performed at the startup of KW Pile are nearly complete. During the past month, the startup crews were selected and were given instruction on the particular job assignments, and administrative arrangements were made regarding transportation, clearances, and overtime. The special equipment necessary for the various tests has been procured and fabrication is nearly complete, permitting pre-test installation to begin as soon as the building is turned over to Reactor Section. Forms for the proper tabulation of the data have been printed and are now on hand. Preliminary calculations and derivations required in interpreting test results are continuing; calculations to date indicate that the xenon transient during the dry temperature coefficient test will be on the order of 10 inhours, a relatively small effect in relation to the expected 300 inhour temperature transient.

##### KE Pile Startup Program Planning

The startup program at KE Pile as now formulated will provide basic dry critical lattice information and empirical information on the number of control elements required to hold the fully loaded dry pile sub-critical. Because interpretation of results of the test proposed for measuring the control strength in a small flattened pile was somewhat uncertain, the time required for the special loadings required was not considered to be justified; the present KE loading schedule therefore does not include any special experimental tests which are not directly related to the pile startup.

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Considerable emphasis has been placed on these studies during the past month because of their importance in presenting the picture of Hanford safety to the Advisory Committee on Reactor Safeguard which will meet here during December.

Calculations for the time dependence of the flux in a Hanford reactor have been carried out for a number of cases following instantaneous and complete loss of water pressure in the reactor piping system during pile operation. The numerical evaluation of the series expansion solution for the pile power transient as a function of variable reactivity has been completed for part of the cases by IBM machine; coefficients in the solution relating boilout time to specific power have been derived from work done by the Heat Transfer Sub-Unit.

The range of cases investigated include parameters of specific tube power from present 600 kw conditions to postulated 1200 kw conditions, instantaneous reactivity gain on total loss of water from 240 inhours assumed for an existing hot pile to 900 inhours for the cold C File, water boilout rates from a "best guess" 100 psi back-pressure condition to the worst conceivable case of no pressure buildup, and safety circuit timing from the present VSR system to that of an accelerated system. The results of these studies will be made available for presentation to the ACRS and will later be summarized in a document to serve as reference material for Hanford safety studies and operating specifications.

Product Quality Studies

Two n/g-s values for plutonium prepared from the C File discharge of July 2, 1954, having a weighted exposure of 221 MWD/T were reported by Separations Technology. The first value of 20.5 n/g-s was obtained from a button. The second value of 19.9 n/g-s was obtained from a shape fabricated from the re-refined button material; this latter value is slightly under the value predicted by HW-31952. A report entitled, "Current Status of the Isotopic Purity of Hanford Plutonium," HW-33874 was prepared during Nov.

Long Term Reactivity Studies

Plans are being made to follow the long term reactivity transients of the K Piles after startup in a joint effort with Process Physics and Production Scheduling. A procedure has been devised whereby the various calculations desired from temperature traverse data can be calculated on the IBM 602-A punched card calculating machine operated by Production Scheduling. The data to be calculated include the relative individual tube heat generation rates to the first three powers, the absolute tube power, tube exposure, tube reactivity residual, and pile reactivity residual. It is planned to make a trial run on a card deck from one of the old piles to check out the system and to establish the time per run, presently estimated to be about 6 1/2 hours for 3200 tubes.

The second tube of slugs from the long term gains test authorized by PT 105-553-A were discharged at about 500 MWD/ton exposure from tube 0682 F and are now cooling in the F basin. The first slugs from tube 0672 F which were irradiated to about 100 MWD/ton are being shipped to H Area to be air-weighed. Daily calculations of the power output of the remaining tubes of the test are continuing.

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Process Assistance - Thorium Irradiation

A combined final report on PT 105-516-A, "Effects of Irradiation on Thorium Slugs," and PT 105-551-A, "High Exposure Thorium," was issued as HW-33324.

The second special shipment to ORNL of thorium slugs irradiated in J-Q columns under PT 105-567-A was made on 11-8-54; exposure details have been presented in HW-33678.

Gamma Escape Calculations - Special Irradiations Facility

An experiment proposed for the A test hole high pressure facility at H Pile would consist of irradiating a highly enriched assembly of ribbon fuel elements suspended in liquid coolant. Calculations were made to determine the amount of energy which would escape from this facility into the graphite; the results of these calculations were forwarded to the Heat Transfer Sub-Unit as the basis for performing graphite temperature calculations.

Special Shielding Problems

The lead-polyethylene "K-Rashield" plugs designed for the K Pile experimental facilities were found by the Special Irradiations Unit to decompose and evolve hydrogen under pile irradiation. It has been recommended that a combination of iron and graphite plugs be used to replace the "K-Rashield" plugs; the iron-graphite combination will provide comparable shielding effectiveness and will eliminate the gas evolution problem.

HW-33877 was written to summarize the results of measurements made to ascertain the thickness of water required to adequately shield a bucket of irradiated slugs. The specific measurements were made in support of a 200 Area storage problem.

Shield Damage Studies

Neutron attenuation measurements are now in progress on magnetite-limonite concrete shielding slabs. As soon as these measurements are made, the first three of four heating and attenuation measurement steps on magnetite-limonite and iron-limonite concretes will have been completed. These steps include attenuation measurements made on fresh concretes, measurements on concretes heated to 100 C for three weeks, and on concretes heated to 175 C for three weeks. A work order has been issued to modify the large oven to permit heating to 350 C as the fourth step in these experiments; this latter temperature is in the range which may be encountered in a dual purpose pile.

HEAT TRANSFERCooling-by-Boiling Studies

Continued analyses were made of the cooling-by-boiling data obtained in past months and the following approximations were reached. Tube exit qualities at burnout are about four times as great at 1500 psi as at 200 psi based on extrapolated data and for all other conditions being fixed. The exit quality at burnout for a 30 foot cosine charge would be about 150 per cent more than that for a 15 foot charge for a given tube power and pressure. The quality at burnout for a 500 KW cosine tube

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would be about 60 per cent greater than that for a 1000 KW tube for a constant tube length and pressure. The effect of inlet temperature on permissible quality appears to be small. These approximations will be verified in the coming weeks when the experimental equipment is returned to use. They apply only to standard Hanford geometry.

#### Equipment Procurement and Installation

Installation of the new generator in 189-D is nearing completion, and the remaining work consists essentially of installation of the current-carrying bus. It is estimated that the mock-up equipment and generator will be back in normal use by the middle of December.

The design efforts necessary to permit a major modification to the full scale process tube mock-up are essentially complete. Most of the necessary items of equipment are on order and reasonable delivery is expected on everything except valves. Considerable delay has been encountered with the latter, and efforts are being made to expedite their procurement.

A minor modification is being made to the mock-up which will permit performance of tests at 1500 psi. These tests will be of a preliminary nature only due to equipment limitations, but they will assist in evaluating the importance of pressure in cooling-by-boiling. The parts for this minor modification have been promised by the middle of December.

Much necessary effort has been devoted to developing better methods of fabricating heater tubes, of mounting thermocouples on the tubes and of fabricating associated components. This work is progressing satisfactorily.

#### Present Pile Outlet Piping Temperature Limits

Studies are being continued to determine the effects of high pile bulk outlet temperatures on flow through the pile and on pressures in the outlet piping. A method of analysis was developed which should result in numerical prediction of gain that can be made by various schemes. Essentially, the method ties together the bulk outlet temperatures with crossheader temperatures, Panellit settings and rear face pressurization. This study will be continued.

#### Steam Loss to Primary Pumps

At very high tube outlet temperatures, a steam power loss at the old piles could result in unstable boiling in the process tubes with subsequent damage to the slugs. Plans are being made and equipment is being assembled to permit an experimental determination of the maximum tube outlet temperatures at which no slug damage would result.

#### KER Loop Studies

An analysis was made of the need for an electrical flywheel arrangement on the pumps of the KER loop to guard against possible, periodic, 1/2 second losses in pump pressure. It was concluded that boiling in the loop tube would be unlikely if the pressure did fall. In addition, even if steam were formed in the tube, it would be quickly swept out with no damage to the slugs. The recommendation will be made that the flywheel is not needed, and this action is expected to result in significant savings since the flywheel is relatively expensive.

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Response Rate of K Pile Temperature Monitor

Experimental tests were performed on the full scale mock-up to determine the rate at which the K Pile temperature monitor will respond to a tube flow decrease. Uniform tube powers of about 500 KW with equilibrium outlet temperatures of about 90 C were utilized. The tests consisted essentially of (a) reducing the tube flow suddenly from normal flow to various values ranging from 0 per cent to 80 per cent of normal flow and (b) measuring the time required for the monitor to respond. It was found for all the tests that the initial indication of temperature rise occurred in about 4 to 5 seconds after the flow was decreased. An additional 3 to 4 seconds were required for the temperature of the monitor to increase 5 C above its equilibrium temperature. Many conclusions can be drawn from these tests; one is that a Panellit would be much more effective toward preventing pile damage than a temperature monitor in the event of a severe tube flow reduction.

Consequences of Loss of Coolant

"Consequences of Loss of Cooling Water to a Single Process Tube," W.F. Ekern, HW-33452, 10-18-54, was issued. It contains the values currently considered as the most probable time sequence of events which would follow an instantaneous loss of water to a single process tube.

Work is progressing on the study of the consequences of sudden loss of water to an entire pile. Four cases are being considered: loss of water during equilibrium operation and loss of water 30 seconds, 30 minutes, and 24 hours after shutdown.

Hydraulics Laboratory Studies

Tests are being performed to re-evaluate the flow increases which would result on H Pile if the old CG-482 pigtailed were installed. It is expected that these data will result in either the use or the discarding of the pigtailed.

"Pressure Drop-Flow Characteristics of PT 105-587-A, Internally-Externally Cooled Slugs for Use in C Pile," H.H. Greenfield, HW-33625, 11-2-54, was issued. It was found that 33 per cent of the total tube flow will go through the hole and the remainder through the annulus. The flow in the pile tube with this charge will be about 6-1/2 per cent greater than that in the adjacent tubes and the  $\Delta t$  across the annulus is expected to be about 19 per cent greater than that across the hole. Plans are being made to install thermocouples in the tube containing these slugs in order to increase the  $\Delta t$ 's across the hole and annulus and thus confirm the calculations.

Slug Problems

The temperature distribution in a PT 105-297 slug was calculated for Fuels Technology personnel. This slug was charged in a pile to determine experimentally the effect of thermogalvanic corrosion.

The thermal conductivity of a particular type of ceramic was determined for Fuels Technology personnel. The ceramic will be used in many types of experimental slugs.

General Studies

The temperatures to be expected in an in-pile, gas-cooled process tube were calculated for Special Irradiations personnel.

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Efforts are being made to estimate the graphite temperature to be expected adjacent to the "A" test hole in H Pile when the hole is charged with an offsite fuel element.

### EXPERIMENTAL PHYSICS

#### Prototype Physical Constants Test Reactor

The layup of the graphite components for the reactor was completed satisfactorily at the 2101 building. The reactor has been disassembled and prepared for shipment to 189-D early in December for extended tests of the mechanical and electronic components while awaiting completion of the reactor building - 305-B - which is under construction in 303 Area. Modifications to the 189-D building, including the reactor pad, have been completed. The vertical safety system is now ready for test in the stacked reactor, the horizontal system is complete with the exception of the mounting steelwork which is being fabricated as are the remainder of the mechanical components. The circuitry is either on site or under fabrication and will be complete next month. Work on detailed aspects, such as control panel and electrical system layout, are progressing satisfactorily. The 305-B building, which will house both the prototype Physical Constants Test Reactor and the Thermal Test Reactor, is being provided as Project CA-566 and is two to three weeks behind schedule. Occupancy is not now expected prior to February 1, 1955.

Negotiations are still in progress regarding fabrication of the Pb-UO<sub>2</sub> fuel elements; Metal Controls Corporation is performing exploratory work prior to submitting a firm statement regarding costs and timing. Oak Ridge will deliver the control rod fuel and the aluminum-U<sup>235</sup> alloy elements next month. Reactor hazards will be discussed with the Advisory Committee on Reactor Safeguards next month.

#### Slug Rupture Detection

Preliminary prints of the gamma spectrometer units to be provided under projects CG-578 and 579 were submitted on schedule by Radiation Counter Laboratory. Although numerous corrections were recommended on detailed items the overall ideas appeared sound and it is concluded that the necessary technical assistance to ensure adequate units will be given RCL rather than initiate action at this time to negate and re-negotiate the contract.

The prototype gamma monitor continued to operate satisfactorily at H Pile. There have been no failures of any components since "industrialized circuits" were installed for test in July. The rupture detector installed in the Hanford fuel element test facility at the Materials Test Reactor has performed satisfactorily.

Consideration has been given to calibrating the gamma spectrometer units in terms of absolute rate of fission product activity release to the effluent as a means of monitoring the drinking water contamination at downstream locations. Radiological Sciences believes that such monitoring will be required as effluent holdup times in the retention basins are reduced to accommodate the increased flow rates to be obtained under project CG-558. A cooperative program has been established wherein Technical and Radiological Sciences personnel collaborate in accomplishing the desired calibrations.

#### Neutron Economy Studies

Metal temperature coefficients obtained through test pile measurements have been corrected to account for the modified lattice cell in which the heated slugs were

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placed. The corrected values for the measured coefficients are as follows:

<u>File Loading</u>	<u><math>\frac{1}{K} \frac{dK}{dT} \times 10^5</math> per °C</u>
Uranium	-1.46
Thorium	-1.14
"E" metal (Uranium with 1.75% U-235)	-1.14
"J" slugs (7% U-235 in Al)	+0.83
"C" slugs (4% U-235 in Al)	+0.36

The measured relative values are difficult to interpret in light of existing methods of analysis and attempts at interpretation are continuing. The values for "J" and "C" slugs are positive and include the effect of the aluminum as well as the U-235. The J-N slug assembly demonstrates a zero coefficient as both slug types are heated to the same temperature. A direct comparison of the results obtained with natural uranium and "E" metal suggests that the coefficient for U-235 may be slightly positive. Although the above results are the best available to date, it should be cautioned that the interpretation of the measurements has not yet been demonstrated to be completely free of ambiguity.

#### K File Startup Planning

The instrumentation for the monitoring of the approach to critical, post-critical reactivity measurements, and the measurements of neutron distributions during KW File startup is complete. The approach to critical will be monitored with neutron ion chambers and Beckman DC amplifier systems as well as neutron proportional counters. At least two of the ion chamber systems and the low level period monitoring system will be in the scram circuit at all times. Augmentation lengths will be measured with both foils and neutron proportional counters.

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can be observed in the highly sub-critical pile, (3) an absolute calculation between instrument response and degree of sub-criticality under actual in-pile conditions, and (4) a method of using the system to refine reactivity predictions. Experience over several startups at DR File should accumulate the data required to specify a refined system for installation at all piles.

The K Reactor technical specifications have been modified to permit an interim period of operation until adequate safety system controllers are installed. Operation is temporarily authorized with the recorder trips set within three major divisions of the existing signal at all times and the pens removed from the recorders. Adequate electronic controllers are to be provided by Design in the near future.

#### Test Pile - Routine Tests

Regular metal testing proceeded routinely with Mallinckrodt bare slugs showing better reactivity characteristics than Fernald metal; the reactivity differences are consistent with those determined prior to slug fabrication through billet egg tests. Twenty-nine Fernald billet egg lots yielded TDS values ranging from 12 to 16; 28 Mallinckrodt billet egg lots yielded TDS values ranging from 10 to 13. The U-235 content of a billet egg from material recycled through the gaseous diffusion plant, and which yielded a TDS of 59, was determined to be  $0.7009 \pm 0.0015$  per cent which agrees quite well with that calculated from the reactivity values. Test results did not correlate well with U-235 concentrations as determined by Manufacturing in several groups of slugs fabricated from recycle material, however.

Forty-six lots of "C" slugs were tested with  $k_{eff}$  values ranging from 7.44 to 8.22 with the average at 7.80.

#### Recycle Material Specifications

The effect on 105 pile operations of varying U-235 content in the uranium was reviewed. In particular a one per cent change in U-235 concentration is expected to be reflected as a 200 inhour change in a fully loaded 105 pile. Hence, wide variations in the U-235 content of recycled metal can not be permitted without introducing severe complications in reactor operation. The U-235 content of the uranium, as taken from the diffusion plant in 10 ton lots, can be controlled at  $0.7115 \pm 0.01$  per cent. It appears feasible to approach close tolerances by the blending of appropriate 10 ton lots and a still closer tolerance should be maintained as the blended diffusion plant material is further blended with virgin uranium; blending during the processing steps appears much more economical than blending slug lots on the basis of Test pile results. It is recommended that the U-235 content be maintained at  $0.7115 \pm 0.001$  per cent for lots greater than 100 tons,  $0.7115 \pm 0.002$  per cent for lots between 30 and 100 tons, and  $0.7115 \pm 0.005$  per cent for lots smaller than 30 tons with the composite of smaller lots meeting the specification for the composite lot size. These specifications will confine the uncertainty in pile reactivity at a startup following metal charging to less than 10 inhours from this cause.

#### MECHANICAL DEVELOPMENT

##### Charging and Discharging Studies

Modifications were completed to two of the expanding splines to be used on segmental discharge work. Testing of the splines is awaiting completion of alterations being made to the nine-tube flow mock-up.

The mechanical holding slugs for segmental discharge work are being tested in 305 File for reactivity effects. Flushing tests for these devices are also delayed pending completion of the modifications to the nine-tube mock-up.

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Development continued during the month on the fluorescent paint to be used for the segregation of ruptured slugs. No satisfactory marking material has been formulated as yet.

#### Horizontal Rod Studies

The engineer who was providing technical assistance to the Los Angeles concern fabricating the boron-carbide rings for the horizontal control rod replacement program returned early this month. He indicated that all of the technical problems in fabricating the rings have been solved and that the company was going into production. Latest information at month's end indicates a production rate of rings sufficient to produce approximately five rods per week. Several of the rods have been satisfactorily assembled by the vendor handling that phase of the work.

The first production sample of the seal to be used on the new horizontal rods was tested last month and was found to seal properly; however, further examination has indicated that too much interference exists between the rod and the seal to permit extended use. Measurements indicate that the problem is the result of the seal being on the high side of the tolerance limit and the sleeve on the low side of its tolerance limit, these things adding to give the unusual interference.

The three replacement rods installed at B, H, and F all continue to function properly.

The ribbed sphincter seal installed on the "A" rod of C Pile also continued to operate with no leakage.

#### Vertical Rod Studies

Test work at the White Bluffs Test Tower on the functional testing of the Ball 3X system and vertical system for the K Piles is now essentially complete. Minor modifications continue to be made to items such as the ball check valves and 3X tie-in switches. Preparation of the final report for this test has been started.

#### Supplemental Control

The document on the re-assessment of disaster control systems was revised during the month and is being published. Revisions were made to include information obtained on cooling rate and water distribution rates from laboratory mock-ups of a graphite wetting system.

Information is being assembled for presentation to the Advisory Committee on Reactor Safeguards which is scheduled to meet here early in December. Heat transfer and reactivity information for various conditions of tube power and time after water loss are being prepared in graph form. The various systems being investigated for use under disaster conditions will also be presented and discussed.

Additional rolling techniques were perfected during the month for the boron poison splines. The twisting problem has been eliminated by stretching the spline after it has been rolled. Samples of the spline have been submitted to the Experimental Physics Sub-Unit and the Special Irradiations Unit to obtain exposure information, shielding requirements, and reactivity data.

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Laboratory work on the  $\text{BF}_3$  supplemental control system was finished during the month and further development of this system for on-pile use will be delayed pending more detailed analysis of corrosion rates, burnout characteristics, and reactivity effects. The system appears to be feasible from a mechanical standpoint and additional information with respect to these items must be obtained before further testing can be accomplished.

#### Process Tube Assembly and Piping

Production samples of the new aluminum connectors of proper heat treatment were tested during the month. Failures were obtained at the flares and short bends, but all at cycles in excess of 6000.

Additional tests were performed on the Resistoflex teflon connectors of K Pile configuration. To date no failure has occurred under any test conditions except bursting. An examination of the two connectors which are installed on C Pile under PT 105-585-A indicates satisfactory operation.

Two stainless steel connectors of a simplified K Pile configuration have been obtained and will be tested in the next few weeks.

Some of the material being purchased for the high pressure test loop for flange thermal shock evaluation have now been received and assembly will commence. A small section of the induction heater is being mocked up to determine heat-load characteristics.

Shop work is essentially complete on the new flexible connector test facility and final assembly is being made.

#### Physical Constants Testing Reactor

The horizontal control-safety rods and the vertical safety system for this reactor are now complete except for minor parts and revisions. Moderator fabrication and lay-up is complete and the graphite will soon be moved to the 189-D building for mock-up. All concrete for the 305-B building has been poured and interior finishing, foundation back filling, and shielding berm construction are progressing.

#### Other Engineering Development Work

A confidential-undocumented document is being issued presenting the results of the survey of instrumentation requirements for a boiling pile. It is believed that instrumentation can be developed to permit measurement of outlet steam quality.

The sub-critical monitoring device was completed during the month and installed in the C Hole at 105-DR. Satisfactory operation was obtained and the system found to be functioning properly. The installation and initial operation of this device revealed several modifications that would be desirable should a standard installation be made.

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PILE COOLANT STUDIESProduction Tests

The first tube of metal to go to high exposure under PT 105-539-E was weighed and inspected. This metal was irradiated to a calculated average concentration of 850 MWD/T at an average outlet temperature of 76 C. No serious localized attack was observed on any of the slugs. The maximum corrosion rate was 0.13 mg/cm<sup>2</sup>/day, which agrees with the theory that the corrosion rate tends to be higher than average for long exposure metal.

The far side of D Pile has operated throughout the month without incident under PT 105-542-E which authorizes 0.5 ppm of sodium dichromate in the water to one-half pile. This test has now been in effect for five months.

A 63-S, 72-S clad, process tube was installed in F reactor November 24, 1954, under PT 105-543-E. One additional tube is ready for installation under this test at F reactor and two tubes are ready for installation at D reactor.

Corrosion Monitoring

Seven and one-half process tubes were examined during the month. Except for two leaking tubes, 3174-C and 2594-C, no new or unusual corrosion was observed. The leak in 3174-C appeared to have been caused by mechanical damage, probably the result of discharging a ruptured slug in a previous charge. Tube 2594-C was found to have been damaged internally by chattering of the C-metal slugs.

The number 4, rubber lined tank in 190-D Building was inspected and found to be in excellent condition. Although one inch of sludge was found on the floor of the north clearwell at 183-D, an inspection revealed no attack on the concrete. Admiralty brass tubes removed from the deaerator heat exchanger at 184-D Power House were in very poor condition with numerous large holes. Sections removed from the 225 pound steam line in 190-DR Building were in very good condition. Sections from the 15 pound steam line in 190-DR Building had a one inch strip of mild corrosion on the bottom of the pipe, probably caused by condensate in the line.

Fourteen rear Van Stone flanges at 105-F Pile and ten at 105-D Pile were inspected first with the modified Boreoscope and then directly after the nozzles were removed. As good, or better observations could be made with the Boreoscope as by direct examination. This modified Boreoscope can be used as a valuable tool to assess the condition of the rear Van Stone flanges without removing the nozzles.

Laboratory Corrosion Studies

The weighed tube mock-up was discharged after two months operation at 90 C. The tube corrosion rate (72-S layer) at this temperature was 1.0 mil/mo. Enough data should be available soon to establish a good ex-pile tube corrosion curve.

Data from the test to determine the effect of large and small grain size on the corrosion characteristics of the aluminum slug jackets have been obtained after 20 and 36 days of operation at 110 C. The small grain jackets corroded ten times

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faster (0.8 mil/mo.) than the larger grain jackets (0.08 mil/mo.). There appeared to be a slight difference in the quality of autoclave coat on the two types of jackets; however, this difference would not explain the large difference in corrosion rates.

Various aluminum alloys that hold promise as possible tube materials are being corrosion tested in the 105-D Flow Laboratory minitube apparatus. The alloys under tests are: 61-S, 63-S, 66-S, 56-S, A54-S, M257, and M276 (AFMP alloys), Lurium 5 and Lurium 10 (99.99 per cent Al Base-Mg Alloys, and M329 (Hanford Canning Alloy). These alloys are being tested at 115 and 135 C in pH 7.0 process water and at 115 C in pH 7.65 process water.

Operation of the minitube mock-up in the 100-D power house was continued during the month. A test of 2-S aluminum corrosion in pH 7.3 softened water containing 2 ppm dichromate is in progress. Data are being obtained at 115, 135, 155, and 175 C.

Preliminary tests of the aluminum-brass couple which results from the use of brass fittings on the rubber pigtaills proposed for use at K Pile shows no attack of the aluminum.

The 70 C and 95 C portions of the test to determine the corrosion rate of aluminum in alum process water of pH 7.65 and 2 ppm dichromate were completed during the month. The slug weight loss as a function of time can be represented by the linear equation  $W = a + bT$  where  $W$  is weight loss in grams/4" slug and  $T$  is time in days.  $a$  and  $b$  are constants depending upon temperature and corrosion state, (accelerated or steady). The constants determined were:

<u>Temperature</u>	<u>Corrosion State</u>	<u>a</u>	<u>b</u>
70	Accelerated	-----	----
70	Steady	-16.9	1.52
95	Accelerated	-69	8.66
95	Steady	219	1.97

At 70 C the corrosion proceeds at a steady rate of .045 mil/month after about 15 days. At 90 C the corrosion rate reaches a steady rate of .0586 mil/month after about 40 days.

## WATER PLANT DEVELOPMENT

### Recirculation Studies

The in-pile loop at 100-H operated continuously during the month with an average outlet temperature of 180 C. Water quality was maintained at 2.0 megohm-cm. Activity readings on the clean-up ion exchanger increased to 3.8 rad/hour after seven weeks' operation. Replacement of the resin is planned before its activity interferes with normal operation of the loop. The test of aluminum slugs in a zirconium tube in ELMO-2 at 185 C has been in operation for 63 days of a scheduled 70 day run. A similar test in ELMO-4 at 260 C has accumulated 6 days operating time.

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Construction of the 1706-KEE in-pile testing facility was stopped while further investigations of cost estimates are being made. A review of available zirconium strength data resulted in a decision to increase the KEE process tube wall thickness; further, the tube will be extruded without ribs, and provisions made for installation of ribs of varying height to provide flexibility in testing fuel elements of varied diameters. To expedite fabrication of ELMO-5, welder qualification procedures were prepared and negotiations conducted with maintenance forces to assure fabrication of the loop under applicable safety codes. Procurement of off-site test loops continued.

#### Boiling Studies

A mock-up test in ELMO-3 to determine the effects of a slug rupture under boiling conditions was completed. A perforated slug was exposed at 175 C to ten per cent quality steam at 90 fps. After about 24 hours, a rupture occurred which completely stopped flow and bulged a standard gun barrel. No change in water quality was observed and very few particles were collected on a 50 mesh screen. Only a small fraction of the uranium in the slug entered the water.

Tests of aluminum corrosion effects in 40 per cent quality steam were initiated. A study was begun to determine possible methods of in-pile boiling in a one-pass system using facilities of the 1706-KE Water Studies Semi-Works.

#### Flow Laboratory

Operation of the five in-pile Flow Laboratory tubes at 105-D continued. Four charges of slugs were discharged, one exposed to process water at pH 7.3, 0.2 ppm dichromate, one at pH 7.0, 0.2 ppm water, and two to unfiltered water at pH 7.0 and 5 ppm dichromate. Examination of these slugs and of two replaced tubes is progressing. New in-pile tests started up include pH 7.0, 6.6, and 6.2 with all 2.0 ppm dichromate; correlating mock-up tube data at 120 and 150 C is also being obtained.

A test to determine the scale-out temperature of reduced pH water was completed, showing that at pH 6.5 scale-out temperature is in the range 170 - 190 C. Results of steel coupon corrosion tests demonstrated the pronounced effect that dichromate exerts as a corrosion inhibitor; at 90 C, more corrosion was observed in water at pH 7.7 without dichromate than at pH 7.0 with 5.0 ppm. Evaluation of pH and dichromate on steel corrosion is continuing.

Construction of 1706-KEE Semi-Works continued. Preparation of the operations manual and training of laboratory operators proceeded.

#### Plant Tests

The plant test at 100-F to evaluate the use of pH 7.3 process water continued. Four charges of slugs were discharged and are awaiting examination. No significant data have been obtained from the test at 100-D to evaluate reduced dichromate concentrations.

A test was completed to determine the hydraulic limits of the 183 KW filter plant. Results showed the plant has a hydraulic capacity of 270,000 gpm, corresponding to a process water flow of more than 240,000 gpm. Investigation of filter rates corresponding to such high flows will be made in the test filters at 1706 KE Semi-Works.

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GRAPHITE STUDIES

PT 105-546-E, Effect of Helium on D Pile Distortion

The status of this production test has remained essentially unchanged. The details of operation and limit specifications have been agreed upon by members of Manufacturing Department and Pile Technology Sub-Section. The final draft was submitted to Manufacturing Department for final formal approval on November 11. The reorificing and venturi installation along with other changes has been accomplished. The production test should begin after the December shutdown.

High Temperature Burnout Experiment

It was anticipated that a full pile high temperature burnout experiment would follow, if optimistic burnout rates at local high temperatures were obtained from PT 105-536-E. The data obtained to date from this production test indicate burnout rates <3 per cent per 1000 days for temperatures of 550 to 600 C. A rough draft of a full pile production test was prepared authorizing test conditions of 600 C maximum graphite temperature with localized exceptions up to 680 C. Such an increase in maximum graphite temperature has been calculated to require about five per cent decrease in exposure in order to maintain the same product purity ( $\text{Pu}^{240}$  concentration). The current exposure limit at C Pile is 210 MWD/T. It is the general opinion that an exposure of 200 to 205 MWD/T at the increased graphite temperature would be adequate for the same product purity. The rough draft of the production test is now being revised to evaluate an increase in metal cost and include an experimental check of the actual vs. theoretical effect of neutron temperature on  $\text{Pu}^{240}$  concentration.

Preparations have been made, as part of the above postulated production test, to discharge one half of the bars in the "D" test hole and recharge with bars 4" x 4" x 12" that have been carefully weighed on a precision balance.

A furnace has been fabricated and is now being tested which will be used as an ex-pile follower control. The temperature of the furnace will be controlled by the emf output of thermocouple 59-6-5 of C Pile. The atmosphere of the furnace will be taken from the pile gas system. Thus a comparison of burnout rates of samples exposed in the pile in channel 2785-C and samples in the furnace will yield a direct measure of the effect of radiation.

In the event that the high temperature test at C Pile cannot be justified, a supplement to PT 105-536-E will be written authorizing the installation of the follower furnace.

Oxidation Studies

A series of runs to determine the reaction rate of  $\text{CO}_2$  plus graphite as a function of temperature has been completed. A typical CSF virgin sample was oxidized in the standard manner in the temperature range 850 to 1025 C. The activation energy for the reaction was determined to be 61.5 kcal/mol. A similar sample of CSF graphite previously irradiated to 1100 MD/CT was also run. The activation energy of this reaction was 51.5 kcal/mol. Extrapolation of these data indicates the following burnout rates for thermal activation of the reaction  $\text{CO}_2 + \text{graphite}$ .

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<u>Temperature °C</u>	<u>Rate - %/1000 Days</u>	
	<u>Virgin</u>	<u>Irradiated</u>
500	0.0006	0.033
600	0.061	1.57
700	2.35	33.5
800	46.2	404

These rates do not include any effects attributed to the presence of radiation in the reaction. Previous data indicate that the activation energy of the radiation induced reaction of CO<sub>2</sub> + graphite is about 2-3 kcal/mol. Thus these rates would be somewhat higher if the reaction occurred within an operating pile.

Preliminary data obtained from a prototype model have indicated that inpile conditions might be simulated with a glow discharge for the study of the effect of ionization of the gas atmosphere in oxidation reactions in graphite. Of particular interest is the possibility of precise data on the temperature coefficient of such reactions. The technique consists of initiating a glow discharge in a partial pressure of CO<sub>2</sub> utilizing a small current and high voltage (10 ma, 1600 V) with graphite electrodes. The initial data show a weight loss of 6.34 x 10<sup>-4</sup> gr/coulomb. This indicates that positive ion bombardment of the graphite anode is highly effective in gasifying the carbon electrode.

Empirical Correlation of Graphite Properties

An empirical correlation has been obtained for many molded graphites between the physical expansion under low temperature irradiation and crystallite "c" dimension measured prior to irradiation. According to this relationship, a crystallite size of about 30 Å units should be characteristic of a dimensionally stable graphite.

An empirical relationship between thermal conductivity measured at room temperature and crystallite "a" dimension at various temperatures of graphitization is indicated. This relationship will be checked by measuring the conductivity of a single piece of graphite after graphitization to successively higher temperatures.

Thermal Annealing of Damaged Graphite

A study has been undertaken to determine the kinetics of the thermal annealing process of neutron-damaged graphite. The sample is heated in an optical furnace while the rate of annealing is followed by the change in "c" spacing of the crystal. Preliminary tests of the apparatus show that the sample may be rapidly heated to greater than 800 C in less than two minutes. Temperatures can be held constant to ± 0.3 C over the range 30 to 600 C.

Effect of Pile Operation On Graphite, PT 105-1-P

The data from cold test hole irradiations of all types of pile graphite are being plotted to maximum exposures as indicated in the table below:

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<u>Graphite Type</u>	<u>Crystallite Orientation</u>	<u>Maximum Exposure MWD/CT</u>
CSF	Perpendicular	3450
CSF	Parallel	3450
CS-GBF	Perpendicular	3686
CS-GBF	Parallel	3686
KC	Perpendicular	2608
KC	Parallel	3911
WS-GBF	Perpendicular	2151
WS-GBF	Parallel	2439
TS-GBF	Perpendicular	2700
TS-GBF	Parallel	2700

Irradiation of these graphites is being continued in four cold test holes at D, F, and H Piles.

The density series of five Texas graphites with apparent density from 1.52 to 1.83 g/cc was discharged after irradiation to 2638 MWD/CT. The maximum expansion was observed in the 1.72 g/cc graphite. This confirms data at lower exposures.

#### GEH-2 Program, MTR Irradiations

Because of the difficulty encountered in the MTR operation which is causing reduced power level, the Battelle E201, Speer SGBF comparison has not achieved the desired exposure in the L45 position. The irradiation is being continued.

#### High Temperature Irradiation Facility

Design and development work continued on the equipment for the planned high temperature facility for the L42 position of the MTR. A prototype heater was fabricated which appears to be satisfactory. The construction of a mock-up of the sample and heater assembly was started for the purpose of testing its thermal and mechanical characteristics. An electronic position-sensing relay control coupled with a Brown strip chart controller which operates an electronically driven powerstat has been chosen for the temperature control system.

#### File Graphite Sampling Device

An attempt to remove a graphite core from F File was unsuccessful because of a failure in the drive mechanism of the re-built core borer. A slight modification was made in the coupling to prevent the recurrence of this failure. The device will be used to obtain cores from F File early in December.

#### Dimensionally Stable Graphite

A conference was held at Battelle Memorial Institute to determine the future course of the cooperative program to develop a dimensionally stable graphite. It was agreed that:

1. Battelle Memorial Institute will prepare extruded Korite coke graphite with both standard pitch binder and Korite asphalt binder.

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2. A survey will be made on the availability and cost of the phenol-formaldehyde resin from which a dimensionally stable graphite was prepared.
3. Battelle Memorial Institute will prepare graphites with other binders as part of their search for possible binders that will provide improved physical properties of dimensionally stable graphites.

Details of the conference can be found in Trip Report, HW-33956, dated November 30, 1954.

#### SPECIAL IRRADIATIONS

Fuel elements exposed for the determination of the energy release in a single process channel (Bluenose 0706-84) were discharged November 1, with an accumulated exposure of 578 MWD. Final calibrations of all temperature and flow sensing elements show that all remained constant within the limits of experimental error during the entire exposure.

Design activities in support of the modification of the KAPL-120 loop are 90 per cent complete. Placement of orders for procurement of loop items is 80 per cent complete. The major components of the loop will be installed on the X-level with additional minor components being installed in other locations as is most convenient. A major departure from conventional loop design will be made through the employment of an air-cooled heat exchanger.

Removal of all obsolete components of the old KAPL-120 loop external to the pile has been completed. Equipment auxiliary to the removal of the in-pile tube is now being installed.

A study is in progress to determine the feasibility of irradiating SIR and SAR fuel elements enclosed in a stainless steel vessel with NaK. Irradiations of this type currently being made in the MTR would be made in process tubes in the Hanford piles.

A similar study pertaining to the irradiation of fuel elements for the aircraft reactor (GE-ANP) is in progress to evaluate the problems relative to installing an air-cooled facility in a thru hole in C Pile. Preliminary tests to predict flux perturbations, reactivity effects, and graphite heating in C Pile caused by this facility and its fuel elements will be performed in the 305 Pile beginning December 6.

Control instrumentation for the experimental assembly designed to measure the reaction between pile gas impurities and zirconium alloys (HAPO-105) has been completed. The assembly will be charged at the next shutdown of F Pile.

Ceramics and cements have been irradiated to test their integrity for use in in-pile experimentation. In particular, these will be applied in the construction of experimental equipment for determining the stability of thermocouples under irradiation (HAPO-136).

Equipment pertinent to the program aimed at determining the cross section of Np-240 is being installed in the Snout I facility at H Pile. This equipment, consisting primarily of an hydraulically operated rabbit, will be used for irradiating purified neptunium. Irradiations are scheduled to commence in December.

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Thermal neutron fluxes were made in the E test hole facility at F Pile using 6 mil gold foils as monitors. Foils were gamma counted using a scintillation detector. Data obtained is lower than that previously obtained by other investigators.

Liaison in support of the experimental facilities in the K Piles has continued. Recommendations have been made for the removal of K-Rashield pieces from the general purpose test holes to avoid potential explosions that might arise from the release of hydrogen by irradiation damage from fast neutrons to this material. Iron and canned graphite have been substituted for these pieces. Tubes in the front to rear test holes at KW Pile were collapsed when excessive pressures were applied. Collapsed tubes are being removed. Permanent plans call for the installation of much heavier walled tubing in these facilities.

The pneumatic facility is currently being installed in KE Pile. Testing of facility operation and performance of pneumatic carriers of different materials will commence at the completion of the installation.

All piping and instrumentation for the water supply system for the C Pile test holes have been installed. Acceptance testing of the instrumentation and final acceptance of the project will be completed in the coming month.

Isotope production continues as scheduled. Extended assistance has been given in support of numerous research and development programs in the performance of in-pile irradiations.

TECHNICAL LIAYSON

Project CG-558

Scoping of this project has continued as reflected by the following completion figures:

<u>Area</u>	<u>Per Cent Completed</u>
100-B	98
100-C	100
100-D	100
100-DR	100
100-H	96
100-F	94

The procurement of major items has progressed to the point of awarding contracts. It has been determined that the motors and drives will be supplied by General Electric and the pumps by DeLaval.

Project CA-512-R

No Project Representatives meetings were held.

The final decision has not yet been made as to the permanent modifications to be made to the No. 1 safety circuit. The results of a study by the Design Section have not been received to date.

Assistance was given the Process Engineering Unit in evaluating the magnitude and effect on pile operation of the faulty temperature sensing elements.

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In conjunction with design and technical groups, a preliminary discussion was held to examine the feasibility and justification of a reactor test assembly to simulate disaster effects arising from power excursions. Based on very rough cost estimates of exceedingly simple assemblies available from previous study of the subject, it was concluded that, while such assemblies could be built, (1) the expected amount of useful information secured from any inexpensive apparatus is difficult to determine with precision, and (2) interpretation of test results and application to piles now built or contemplated would be most difficult and of questionable accuracy.

Process Analysis

A preliminary study is being made of the feasibility of operating dual-purpose (high water temperature) reactors with pile gas systems differing from those in use heretofore. Examination is being made of ambient gas pressures less than atmospheric.

The study of the effect on fuel exposure and allowable reactor capital costs of the various elements determining the total cost of nuclear power production has been completed.

Preliminary analysis is being made of the effect of fuel element geometry and heat generation rate on the stresses in fuel slugs. Because of complexities in solution of slug stresses taking plastic deformation into account, the preliminary analysis will consider elastic stress solutions only.

Joint studies with Design Section personnel to ascertain the operational feasibility and economic incentive for in-pile boiling are of two sorts. Effort is being made to correlate available data on burnout to enable estimation of the effects of pressure and other variables on burnout conditions. Thus far, simple methods of correlation have not been satisfactory. Other studies have been initiated to explore the operational aspects of in-pile boiling on the basis of modest extrapolation of existing data from the full scale process tube mock-up apparatus. It has been jointly agreed to consider a case of 400,000 KW net electrical output in a 25 foot active zone, and to base expected achievable qualities on considerations of burnout, tube power instrumentation, flux distortion, reactivity differences between green and ripe tubes, and effect of tube power variations in tube flow rate.

INVENTIONS

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. 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.



R. B. Richards, Manager  
Pile Technology Sub Section

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SEPARATIONS TECHNOLOGY SUB-SECTION

MONTHLY REPORT

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VISITORS AND TRIPS

W. G. See visited here from Minneapolis Honeywell Co., Minneapolis, Minnesota, November 5 to inspect equipment.

L. Burris and D. Hampson visited here from Argonne National Laboratory, Lemont, Illinois, November 10 and 11 to obtain information on techniques and equipment for remote and automatic operation of high temperature furnaces: on the disposal of waste gases and materials; on personnel hazards which are involved and pre-cautionary measures for personnel safety.

V. P. Calkins visited here from G. E. - A.N.P., Cincinnati, Ohio, November 11 to discuss fuel element development work.

E. P. Galbraith visited the University of Utah, Salt Lake City, Utah, November 4 and 5 recruiting technical personnel.

V. R. Cooper visited University of California, Berkeley, California and Stanford University, Palo Alto, California, November 1 through 3 recruiting technical personnel and University of California, Berkeley, California, November 2 and 3 for consultations on separations chemistry.

ORGANIZATION AND PERSONNEL

	<u>October</u>	<u>November</u>
Administrative	2	2
Contact Start-Up Engineering	4	4
Chemical Development	82	83
Plant Processes	48	48
Analytical Laboratories	33	33
<b>Total</b>	<b>169</b>	<b>170</b>

Chemical Development: One Senior Engineer was hired and two Secretary "C"s were promoted to Secretary "B"s.

Analytical Laboratories: One Laboratory Assistant "A" was hired and one Laboratory Assistant "A" was terminated.

PUREX DEVELOPMENT

Chemical Engineering Development

Pulse-Column Studies. Seventeen 3-inch-diameter Purex pulse-column studies were carried out with "cold" uranium for the purpose of investigating further the capacities of the A-type column scrub sections and of the IB Extraction Column. Purex Flowsheet HW #3 was used as the basic chemical flowsheet, with some indicated experimental modifications. The IA Column scrub section and IB Extraction Column capacities determined were substantially greater than those found earlier (reported last month, in Document HW-33650). The reasons for these capacity variations are not yet understood, and the phenomenon of anomalous IA Scrub and IB Extraction Column capacity variations is being investigated further.

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**DECLASSIFIED**Technical Manual

On November 25 the preparation of the Purex Technical Manual was approximately 60% complete.

Mechanical Development

Pump Development. P-19-7, a TBP production plant 5 stage deepwell turbine pump equipped with five different types of impregnated teflon bearings was inspected after pumping 60% nitric acid for 181 hr. at 21 gal./min. against an 80 ft. head. Failure of the throttle bushings permitted nitric acid to leak out of the torque tube and pump housing and necessitated shut down at this time. The vapor throttle bushing had worked out of its housing and failure was due to this movement, rather than material failure. The test was not of sufficient duration to be too definitive but did show that teflon filled with carbon-coke flour, grade MI-406-C5, is not suitable as a bearing for nitric acid service. Fiber-glass-filled teflon, grade MI-411-C5, appeared to be the best of the other varieties tested. The pump has been reassembled with new bearings.

Continuous Fuel Element Dissolution

A 2-in. diameter by 15 ft. high experimental continuous dissolver has been operated in countercurrent flow, with nitric acid entering the bottom and flowing up, while unirradiated uranium slugs are charged at the top and pass downward. Initial results using 60% nitric acid to dissolve 8-in. de-jacketed uranium slugs demonstrated a maximum uranium dissolution rate of 6.2 kg./hr., giving a product solution which can be diluted to 1.35 M U + 2.0 M HNO<sub>3</sub>. Approximately 3.7 moles of nitric acid were required to dissolve a mole of uranium.

Bubble Cap Efficiency

The Murphree plate efficiency of wide-slot 3-in. O.D. bubble caps (6 slots 5/8 in. wide by 9/16 in. high) was compared to that of standard 3 in. O.D. caps (20 slots 3/16 in. wide by 9/16 in. high). The fractionator was operated at total reflux with 60% nitric acid in the reboiler, and at an operating pressure of 100 mm. Hg absolute at the top. The wide-slot caps showed a plate efficiency of 50%, compared with 60% for the standard caps.

Submerged Combustion

The installation and shakedown testing of a one-million Btu./hr., propane burning, submerged combustion unit in the 321 Building tank farm have been completed. Several faulty parts and the need for more safety devices was observed during the shakedown. These items were corrected and the unit is ready for performance tests under various simulated plant process conditions which now employ heat-transfer surfaces for evaporation duties.

Materials Testing

Gasket Testing. Twelve pairs of 2-in. i.p.s. four-bolt, screwed flanges were assembled with various gasket materials and were irradiated in the F-Pile basin.

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Following irradiation the flange units were installed in a test stand in which the conditions were continually cycled between water at 60°F. and 50 lb./sq.in. gage pressure (for 30 min.), and steam at 300°F. and 120 lb./sq.in. gage (for 60 min.). A pneumatic vibrator maintained the flange units under vibration throughout the test. While not complete, the results indicate that neither teflon nor glass-filled teflon is a satisfactory gasket material in high radiation zones. When removed from the test, the three teflon gaskets which failed after exposure to approximately  $10^7$  roentgens were very brittle, had numerous radial cracks running from the O.D. to the I.D., had cracks radiating from the points where they touched the bolts, and had swelled to some extent. Blue African asbestos gaskets passed the above tests without failure even after exposure to  $6 \times 10^7$  roentgens.

#### HOT SEMIWORKS PUREX STUDIES

Conversion to Purex. The project of converting the Hot Semiworks facilities to Purex process operation is complete except for a few start-up items. One large item involves the rearrangement necessary to interchange the functions of the vessels originally designated as the No. 1 Waste Concentrator, the Acid Absorber and Fractionator, and the Acid Receiver Tank. Shakedown tests have indicated that the No. 1 Waste Concentrator and Tower (formerly the Waste Concentrator for Redox studies) refluxes all the acid when operating at normal Purex flowsheet rates.

Testing, flushing, run-in of equipment and calibration of flow control equipment is still in progress, along with fairly extensive maintenance and adjustments required on both new and old equipment. A consistently reproducible procedure for demagnetizing and zeroing flow transmitters and recorders, and the elimination of drift in the interface recorder-controllers during column pulsing, are two of the more difficult equipment shakedown items. Preliminary tests indicate that the newly-installed hydraulic pulse generators will function satisfactorily.

#### REDOX DEVELOPMENT

##### Hot Semiworks Redox Tail-End Studies

One-thousand gallons of Redox plant concentrated 3EU, processed with the Redox Plant employing a sodium dichromate head-end treatment was received at the Hot Semiworks on November 17 and a series of tail-end ozone sparging runs for the removal of ruthenium was started immediately. Difficulty has been experienced in obtaining ruthenium analyses from the samples because of the high Zr-Nb content (71 per cent) of the fission product activity in the 3EU uranium solution. The presence of this relatively high gamma background from Zr-Nb, has limited the measurement of the decontamination factor to approximately 5 to 6. However, some preliminary results from a ruthenium distillation analysis procedure indicate that the Ru D.F. may have been as high as 10-fold after sparging for 6 hours.

No appreciable induction period is indicated before ruthenium volatilization starts. To date no appreciable build-up or deposit of ruthenium, as determined by survey instruments, has been noted in any part of the system.

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URANIUM RECOVERY DEVELOPMENTProcess Chemistry

Caking During Calcination. Laboratory studies have been initiated to determine the effect of additives on caking during the calcination of uranium solutions. An electrically-heated 4-in.-diameter calcination pot is being used with a charge of 500 g. of uranium added as a 2 M UNH solution. Runs thus far show that the caking phenomenon experienced in 224-U Building as a result of sulfamic acid addition can be duplicated in the laboratory equipment, the threshold amount of  $\text{NH}_2\text{SO}_3\text{H}$  being between 0.1 and 0.25 weight per cent (U basis) at an agitator speed of 100 rpm. Future work will include a search for additives which produce a reactive powder without the caking associated with sulfamic acid.

Continuous Calcination

Installation of a 16-in. diameter by 8-ft. long agitated-trough calciner for continuously denitrating UNH to  $\text{UO}_3$  powder was completed during November, and three short shakedown runs (1-1/2 to 8 hr. duration) were made. Preliminary performance was promising, with no indications of severe lumping or caking in the agitated trough. Although the runs were too short to produce representative  $\text{UO}_3$  powder, the  $\text{UO}_3$  product was of good visual appearance. Typical analytical values were: reactivity ratio 0.7, nitrate 0.2 wt.%, bulk density 4.0 g./cc., and packed density 5.0 g./cc.

MISCELLANEOUS SEPARATIONS PROCESS DEVELOPMENT

Increased Bismuth Phosphate Plant Dissolver Capacity. Laboratory-scale studies with synthetic solutions have determined that the Bismuth Phosphate process product extraction precipitation step will not suffer increased plutonium losses if the sodium ion content of the initial metal solution is increased. Application of this principle permits terminating the uranium dissolving at a higher free nitric acid content (thereby shortening the time cycle appreciably) using caustic and/or sodium sulfate to adjust to optimum hydrogen ion and sulfate ion concentrations for the subsequent  $\text{BiPO}_4$  precipitation. A saving of 30% in metal dissolving time is indicated to be possible.

REDOX PROCESS TECHNOLOGYProcess Performance

A marked improvement in the overall uranium decontamination factor was achieved during the month as a result of a five to ten-fold increase in the Second Uranium Cycle decontamination factor. On October 28 the 2D Column interface position was lowered out of the large disengaging section into the packed section of the column. Although aqueous phase is still being entrained in the 2DU stream, apparently a mechanical effect has minimized the accumulation of activity in this aqueous phase, and thus the adverse effect of entrainment has been significantly reduced. On November 23, the 3D Column interface was similarly lowered but with less effect because of the lower activity levels present.

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Plutonium decontamination has continued to excel. Both uranium and plutonium recoveries have been normal. The following table summarizes the decontamination performance achieved during a sustained period of smooth operation:

Period covering November 19 to 25; processing approximately 152-day "cooled" metal at a rate of 8 tons of uranium per day with permanganate oxidation of IAF and partial scavenging with manganese dioxide.

Cycle	Gamma Decontamination Factors (dF)		Per Cent to Waste	
	U	Pu	U	Pu
Head-End-First Cycle	3.8	3.6	-	-
Second Cycle	2.1	2.8	-	-
Third Cycle	<u>0.6</u>	<u>1.2</u>	-	-
Overall	6.5	7.6	0.4	0.6

For reasons discussed below, however, performance throughout the month has not been consistently as good as that indicated above:

- (1) On October 25 the 3D Column interface was displaced to the 3E Column because of an error in interface instrument calibration, and approximately 7.6 tons of uranium contaminated with aluminum required rework through the Metal Recovery Plant. In addition, high uranium losses (estimated at 800 pounds) resulted.
- (2) Because of difficulty in controlling the 2D Column interface position at the lower level, the column was operated with a high interface for sustained periods, during which times the 2D Column decontamination factor was generally at its former low value (i.e., ca. DF = 10 to 20 vice >100).
- (3) From October 31 to November 8, approximately 43.7 tons of uranium were processed with high U-237 content, resulting from the charging of "green" metal to the Redox B-2 Dissolver on October 27.
- (4) Two batches of IAF were oxidized by sodium dichromate (vice potassium permanganate) and processed between November 14 and 16 in order to produce uranium product solutions high in ruthenium content for continued development work in the Hot Semiworks and in the laboratory on the ozone tail-end volatilization and codecontamination flowsheets.
- (5) Because of an inadequate decant of water from a hexone batch following a routine caustic wash, a "crash" shutdown of the Redox Plant was made on November 15. Although no column interfaces were overflowed and no significantly increased losses resulted, excessive amounts of uranium (up to 8 times specification) entered the plutonium product solutions which required special processing.

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Feed Preparation

Following the charging of the remainder of the 900 MWD/T metal at the end of October, the dissolvers were charged with uranium having an average pile exposure of 619 (359 to 724) MWD/T and "cooled" an average of 141 (107 to 173) days. Not included in these figures is a charge to B-2 Dissolver on October 27, having an average age estimated at  $32 \pm 7$  days. (HW-33722)

With the exception of two IAF batches, the permanganate head-end treatment procedure using chromic nitrate as the reductant and partial scavenging with manganese dioxide was employed for IAF oxidation. Z Plant recycle solution processed through head-end primarily included only supernates, filter boat cleanouts, reprocessed filter boat cleanouts, and sample can cleanouts. Two IAF batches were oxidized with sodium dichromate (vice potassium permanganate).

Stack Activity

Although routine stack sampling has indicated radio-ruthenium emissions concurrent with processing to be consistently less than 0.1 curie per day, considerable deposition of particulate activity within a 300 ft. radius of the ventilation stack has been observed on several occasions during the month. A significant (but less than two-fold) increase in deposition rate was also noted during the period from November 2 to 3 within a 3000 ft. radius of the stack. Complete reports of the measurements are being made by Radiological Sciences and Radiation Monitoring personnel. Efforts of Process Technology personnel have been directed towards correlation of the depositions with process performance, stack and connecting line flushes (made on November 7, 15, and 23) and vent system studies. A report is in preparation. Briefly, large particles which have been analyzed are primarily iron and calcium nitrates, containing old ruthenium (determined as approximately one year or longer from pile discharge) and significant amounts of plutonium. No source of the iron and calcium from the process has been found, and it is presumed that these originate from concrete. Since the ruthenium is old, the particles have apparently been held up in the ductwork downstream of the filters, and as yet attempts to define the exact source have been unsuccessful. However, the suspected area is the plenum chamber into which the vent jet discharge gases enter prior to mixing with the ventilation air from the sand filter. A positive and thorough flushing of this chamber is to be done. The major source of the plutonium was found to be the J-6 Condensate Vent system (venting the PR Cage). It was discovered that the E-17 Plutonium Concentrator recirculation jet (gas-operated) was causing an entrainment of plutonium into the vent system and that the Fiberglass filter had failed. Thus, the use of this recirculation jet has been discontinued in order to reduce the emission of plutonium from the vent system, and the filter is to be replaced.

Process Chemistry

Entrainment in U Cycle Organic Streams. Laboratory work was continued in the search for causes and cures for the entrainment of solids and aqueous phase in the Redox uranium cycle organic streams. The variations in the fission product activity of the final uranium product (E-12) corresponded to the entrainment observed in samples examined in the laboratory, and to changes in plant operation. Recent laboratory findings are summarized below:

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Examination of plant samples of IAP, IBU, 2DU, and 3DU, was continued intermittently to determine the amount of entrainment. The volume of aqueous phase in the IAP and IBU streams remained about the same (0.01 to 0.2%), and on removal gave average arithmetic decontamination factors of 10 for IAP and 4 for IBU. The average volume entrained in 2DU was 0.5 per cent, and decontamination factors for this month's samples of 1.1 to 8.6 were obtained by removing this aqueous (compared to the range of 3 to 84 for last month). The removal of "solids" found in the uranium product solution (E-12) samples by filtration gave gamma decontamination factors of from 1.5 to 12 (compared with factors of 2 to 5 last month).

The silicon content of some process streams was determined spectrographically. The results are shown in the following tabulation:

<u>Stream</u>	<u>Silicon, Parts per 10<sup>6</sup> Parts of U</u>
IAP	210 (E.g., 0.1 g. Si/l., or 63 ppm. parts of IAP solution)
IAP	50
IBU	20
2DF (F-1)	20
2DU (Organic)	20
3DF (F-4)	20
3DU (Organic)	10
2DU (Aqueous) 10-21-54	20
2DU (Aqueous) 10-27-54	100

The presence of the above concentrations of silicon as colloidal silicic acid could easily explain the recently-experienced entrainment and emulsification in the Redox Plant. Additional analyses are being obtained to confirm the above silicon values.

2D scrub stage distribution coefficients were determined to establish the value of additional scrub stages for increasing decontamination. The stage-wise data obtained by laboratory batch contacts of Redox Plant 2DF indicate that gross gamma distribution coefficients after one extraction and two scrub stages are such that additional scrub stages above two would be of little benefit. It was further determined that the contact of a plant 2DU sample with either a 1.3 M UNH 2DA or a 2.5 M ANN 2DS gave no additional decontamination of the 2DU, thus confirming the belief that the solvent extraction performance as such is satisfactory, and that the recent loss of decontamination in the Redox Plant has been due only to entrainment.

De-entrainment in U Cycle Organic Streams. The laboratory study of possible means of coalescing and separating the entrained aqueous phase from organic streams was continued. Of several schemes investigated (e.g., vibration, passage through stagnant aqueous, and passage through various packed beds), only passage through glass fiber appears to offer hope for a plant-scale installation. (Studies employing centrifugation, which is known to work, have also recently been reactivated in the laboratory.)

BISMUTH PHOSPHATE PROCESS TECHNOLOGYReduction in Time Cycles

One of the two 500 pound wash water rinses was eliminated from the precipitator tanks in both first and second cycle product section. No abnormal processing difficulties were encountered and the overall time cycle for these sections was reduced by approximately thirty minutes.

The processing time in the extraction sections was reduced twenty minutes by starting centrifugation at 60 C. rather than at the normal 50 C. The data from 27 runs indicate that the waste loss increased slightly from 1.19 per cent of a standard run to 1.30 per cent. This change eliminated approximately twenty minutes of the overall time cycle of twelve hours in extraction.

Production Test -- 221-T-18, "Scavenging of First Cycle Waste"

Preliminary data on this test indicate that maximum removal of Sr<sup>90</sup> and Cs<sup>137</sup> cannot be obtained in first cycle waste scavenging by mixing the coating waste and the first cycle waste in underground storage. The Sr<sup>90</sup> is approximately 70 to 80 times the proposed concentration of 0.1 microcurie/ml., and Cs<sup>137</sup> is approximately two to three times the proposed 0.1 uc./ml. limit. One sample of first cycle scavenged waste before mixing with coating waste indicates that the above limits can be met.

URANIUM RECOVERY PROCESS TECHNOLOGYMetal Removal

Three tank farms were operated to produce about 82 per cent of the gross feed uranium processed through the solvent extraction, TEP, Plant. A net 4850 gallons of stored waste, with this volume increased an additional 5800 gallons by sluicing water, were removed by standard sluicing operations, for each ton of uranium processed. Feed uranium, in general, was aged a minimum 3.1 or 3.2 years from pile discharge after irradiation to 459 or 371 MWD/T. About two per cent of the feed uranium, processed in test operations, was aged a minimum 2.5 years from pile discharge after irradiation to 582 MWD/T.

Feed Preparation

Routine acidification, followed by an average 70 volume per cent boiloff, gave 4.3 M titratable nitric acid in concentrated Tank Farm feed, using about 14,030 pounds of 100 per cent nitric acid per ton of uranium. Non routine feed preparation included the acid butting, and concentration, where required, of rework uranium solutions to give one pound of uranium (0.5 M), and two pounds of nitric acid (3.8 M) in each gallon of rework feed.

Waste Handling

All salt waste produced was treated with nickel-ferrocyanide, formed in the alkaline pH range, to scavenge long lived Cs<sup>137</sup>, and Sr<sup>90</sup>. Approximately 10,020 gallons of scavenged salt waste, containing about 1.7 per cent of the new feed

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uranium, at an average pH of 8.9, were returned to storage for settling in 107, and 108-BY. Careful control of the pH of all waste solutions transferred, irrespective of the routing to the WR-001 receiver, resulted in elimination of the earlier reported anomalous discrepancies between 11-6, Neutralizer, and underground storage tank pH values. The first 560,000 gallons of scavenged waste supernatant, containing about 1500 beta curies of Sr<sup>90</sup>, was cribbed. Subsequent data, from 107-BY, the second tank filled, show that Sr<sup>90</sup> residual activity is about 2.5 microcuries per milliliter. The cause for this high activity retention is not known, and current laboratory efforts are being directed toward improving the Sr<sup>90</sup> scavenging performance. All Cs<sup>137</sup> values obtained to date confirm early production test data, averaging about 0.02 microcurie per milliliter.

About 16,000 gallons of low activity waste, containing 0.03 per cent of the new feed uranium, were routinely cribbed for each ton of new uranium processed.

### Solvent Extraction

#### Operating Conditions

The "A" line was shut down on October 24, and the "B" line on November 18 for conversion to series operation. The earlier "A" line shutdown reflected a shortage of aged dilute feed. Operations were carried out under essentially TBP HW #4 flowsheet conditions modified to the use of 20 volume per cent TBP in hydrocarbon diluent as organic phase, RCX and RAF at  $55 \pm 5^\circ\text{C}$ ., 4.3 M vice 2.7 M titratable nitric acid in RAF, 6 M vice 4 M nitric acid in RAIS, and three weight per cent sodium carbonate as organic wash.

Nominal instantaneous single line processing rates ranged from 100 to 175 per cent of nominal design input rate. Of the total uranium processed 81.6 per cent was tank farm feed, 12.0 per cent was Redox rework, 5.9 per cent was RCU rework, 0.4 per cent was 224-U rework, and 0.1 per cent was 221-U rework from process wastes and sump materials. The tank farm feed gamma activity averaged 0.42 curie per gallon of concentrated RAF, equivalent to  $5.7 \times 10^6$  per cent of aged natural uranium gamma.

#### General Performance

RAW losses were 0.5 and 0.9 per cent of the feed uranium in "A" and "B" lines, respectively. The "A" line, operated for only a minor portion of this report period, exhibited some instability due to organic phase in the RAF Tank prior to shutdown. The "B" line losses ranged from 0.005 to 12 per cent with losses generally commensurate with operating conditions. The high transient losses of 10 to 12 per cent, occurring generally during periods of misadjustment of uranium feed rates, resulted in the high average "B" line losses experienced.

RCW losses averaged 0.07 and 0.06 per cent in "A" and "B" lines, respectively. The "A" line losses include generally unstable operating periods, corresponding to the RA Column instability, and the "B" line losses include highs of up to 0.25 per cent during periods of RAF rate misadjustment.

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Gamma decontamination factors were 4.2, and 4.3 for "A" and "B" lines, respectively, when processing tank farm feeds. The average RCU shipped, including batches from rework processing, was 190 and 240 per cent of aged natural uranium gamma from "A" and "B" lines, respectively. The accuracy of calculated gamma dF's, and of the reported average RCU gamma analyses is somewhat doubtful since activity entrainment led to differences of up to four-fold between initial and later samples. Plutonium, nitric acid, and total metallic (Fe plus Na) impurities in RCU averaged five parts per billion parts of uranium, 0.06 pounds per pound of uranium, and 85 parts per million parts of uranium, respectively.

#### Solvent Treatment

No new solvent treatment processing conditions were employed. With only "B" line operating, using one wash stage in the ROO tank, 18-1, average  $E^0/a$  and residual gamma values in RAX rose from 0.005 and 20 microcuries per gallon to 0.014 and 90 microcuries per gallon, respectively. These higher values occurred during low inventory, i.e., short contact time, operation and were reduced to 0.009 and 40 microcuries per gallon after one week of normal organic inventory operation prior to shutdown.

Laboratory data have shown that at least 15 minutes of contact time are required to attain a satisfactory solvent contaminant removal, and these limited plant data may confirm the requirement for a maximum available single-stage contact time. Neither laboratory nor plant data have indicated that two similar stages are better than one provided that the one stage has an adequate contact time. Solvent consumption, for the period, included three gallons of TBP, and ten gallons of diluent per ton of uranium processed. Only 12 per cent of the gross uranium processed was handled by "A" line, from which solvent is known to be lost to the feed system, and the consumption figures represent essentially "B" line losses.

#### Project CG-562 (Changeover to two cycles)

Since plant shutdown on November 18, 1954, and including preparatory work carried out on "A" line, and in Section 8, Intercycle Stripper-Concentrator, it is estimated that conversion has been 80 per cent completed as of November 30.

At month's end hydrostatic testing of the feed and intercycle evaporators, using permanganate ion to indicate leakage from the steam to the process side, has shown E-7-1 Feed Evaporator to be leak-free, and E-8-1 Intercycle Evaporator to have a measurable leak. Feed Evaporator E-6-1 showed evidences of a very minor leak.

#### URANIUM CONVERSION PROCESS TECHNOLOGY

Of the uranium calcined, 51.5 per cent was received directly from the Redox Plant, 6.2 per cent was Redox source uranium reworked in the TBP Plant, and the remainder was of tank farm origin. Total metallic impurities, fission product gamma activity, and plutonium in product  $UO_3$  averaged 124 parts per million parts or uranium, 116 per cent of aged natural uranium gamma, and less than four parts per billion parts of uranium, respectively. Except for the last two carloads,

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all carloads were produced using 0.05 weight per cent sulfamic acid in the original charge. Caking troubles resulted in 28 per cent of Carload 243 and nine per cent of Carload 244 being produced without sulfamic acid. The remaining 72 per cent of 243 and 91 per cent of 244 were produced with 0.05 and 0.03 weight per cent sulfamic acid, respectively. The average reactivity ratio for all carloads was 1.18.

Thirty-two Luckey pot runs were made using the single available pot. Continued use of the Luckey pot helped to ascertain an improved heating cycle. During the first week, the average heating cycle was an unsteady 7.67 hours and the last week average was a steady 6.16 hours.

Test operations included (a) resumption of the anti-caking program using secondary additives (none successful as yet), (b) variation of nitric acid in the pot charge to alleviate caking (only initial tests have been made), (c) final evaluation of agitator torque testing in the electric pots which established a 30 rpm. agitator as an optimum "anti-caking" speed, and (d) HF flush of one of the electric pots to give a 40 per cent reduction of radio-activity.

The T-A-1, 53 per cent nitric acid absorber test operated for three weeks. Results indicated that the Luckey pot upset the T-A-1 tower everytime a "gassing" period occurred, the upset being aggravated by a new variable, introduction of E-A-2 Cooler acid to the T-A-1 fourth plate. Throughout E-A-2 feed introduction to the fourth plate the T-A-1 bottoms averaged approximately 50 per cent nitric acid and the overhead loss was estimated at 30 to 50 pounds of nitric acid per ton of uranium. It is believed that both the Luckey pot "gassing" and the E-A-2 variable side stream can be minimized by recycling approximately three gallons per minute of the E-A-2 cooler bottoms back through E-A-2.

Equipment highlights were (a) cleanout of the E-D-6 secondary concentrator with two successive HF flushes using a surface active agent, (b) installation of a new liner and new type agitator in electric pot No. 2, and (c) final installation of a 12-inch diameter replacement section in Luckey pot No. 19.

Routine steam stripping operations, using E-D-1 and auxiliary steam, resulted in a condensate loss of approximately 0.026 per cent of the uranium processed through the stripper.

Nitric acid recovery operations, using the 53 per cent test arrangement, led to recovery of approximately 940 pounds of 100 per cent nitric acid per ton of uranium calcined. The nominal 40 per cent acid was returned, along with 0.71 per cent of the uranium calcined, to tank farm blending operations.

## Z PLANT PROCESS TECHNOLOGY (ISOLATION, PURIFICATION AND FABRICATION)

### Isolation (231 Building)

A uranium purification factor of about 1,000 was realized from processing high uranium content (seven per cent uranium) 3BP solution through two peroxide strikes. Although normal 3BP solution processing does not include a peroxide strike, this step is employed when abnormal uranium contamination is known to be present.

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Poor strikes (high losses and presence of fines) have been experienced recently when AT solution is reworked by peroxide precipitation to reduce the impurity content. Low acid normality and sulphate ion concentration are suspected as the cause, and adjustment of these quantities prior to peroxide strike has been suggested.

Liquid nitrate product specification revisions have been made to (1) simplify the data sheets, (2) apply specifications on a lot basis where applicable, and (3) include Engineering Department shipment approval as required by O. and P.G. 03.3.

#### Hydrofluorination and Reduction (Tasks II and III)

Based upon fluoride powder color, 40.5 per cent of the runs entering Task II required rehydrofluorination. This compares to 25.2 and 26.1 per cent for September and October, respectively. Double batches accounted for 79 per cent of the runs processed. An increased oxygen to hydrogen fluoride flow ratio was utilized during the month and may have caused the increased rehydrofluorination rates but, on the other hand, improved fluoride quality as determined by visual inspection (pink powders) was in evidence for accepted powders. The average reduction yield was 98.3 per cent as compared to 98.6 and 98.5 per cent for September and October, respectively. Smooth, better-formed buttons were obtained as fluoride powder quality improved.

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**DECLASSIFIED**IN-LINE INSTRUMENTATION

Drawings and photographs of a pipeline gamma monitor proposed for use in control of the silica-gel tail-end treatment of Redox product uranium were furnished to plant and Design personnel.

Activities at the TBP Plant during the report period were mainly concerned with the establishment of a retraining program to insure continued understanding and proper maintenance of in-line analytical devices in spite of the rotation of trained personnel to other duties. Pictorial and mechanical training aids are being prepared to assist this program.

Tests were conducted to determine the feasibility of increasing, by a factor of ten, the range of the first-cycle-product gamma monitor at U Plant. Of the several methods available for achieving such a range increase, collimation and sample size reduction appear to be the most inexpensive, but the associated difficulties of distorted response and loss of sensitivity must be minimized for satisfactory results.

Chemistry Unit and plant instrument maintenance personnel completed a study of the pH control system at U Plant. This study culminated in a proposal for an inexpensive high-and-low-limit system for automatic control of waste neutralization.

UO<sub>3</sub>-Plant personnel were furnished installation instructions and wiring diagrams for the calcination-pot-feed monitor. The gamma probe and probe storage chamber for the instrument were shipped to Oak Ridge for installation of a Cs-Ba<sup>137</sup> gamma source having a specified radiation intensity of ten R. per hour at two inches.

234-5 DEVELOPMENTOxalate Precipitation and Supernatant Treatment

Preliminary work with the Kimco drum filter, which was purchased for the study of the continuous filtration of plutonium (IV) oxalate, indicates that, as hoped, the filter cake can be dried on the filter under an infrared heater. Necessary modifications for future work are now being made.

Laboratory studies were made of the gas evolution to be expected from unkilld, plutonium (IV) oxalate supernatants, with these results: 1) oxygen consumption by an unkilld sample of 231 Building recycle solution exactly balanced evolution of carbon dioxide, yielding a zero, net pressure change; 2) the maximum gas evolution from a sample of killed, 231 Building recycle occurred during the first day, and corresponded to a release of 0.72 liter of gas from 45 liters of solution; and, 3) on the otherhand, somewhat greater amounts (ca. twice as much) of gas were released from an unkilld, laboratory, Task I-type filtrate. These results show the feasibility of handling unkilld, 231 Building recycle in FR cans.

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Laboratory observations that the oxalic acid in Task I supernatants (at acidities of 2.5 M or greater) can be destroyed quickly and quantitatively at temperatures as low as 10°C., by reaction with permanganate, have led to the recommendation that the necessary reagent-addition facilities for killing supernatants be installed in Task I. This would then eliminate the possibility of post-precipitation of oxalate.

#### Continuous Hydrofluorination

Cold testing of the prototype Task II, continuous calcination and hydrofluorination reactors has been completed, using cerium as a stand-in for plutonium. About 1000 grams of cerium trifluoride was produced at a volume rate through the hydrofluorination reactor equivalent to a plutonium production rate of about 300 kg. per month. All equipment performed satisfactorily. Plutonium tests will be started as soon as the reactors have been cleaned and the hood panel installation completed.

Preliminary studies of the conversion of "blue" plutonium fluorides to pink plutonium tetrafluoride have demonstrated the importance to the reaction of the oxygen concentration. The results suggest that the gas streams should contain 25 to 35 volume per cent oxygen for quickest conversion.

#### Reactive Plutonium Metal

The laboratory study of the factors contributing to the formation of excessively reactive plutonium metal in the reduction step has continued. It has now been shown that the presence of either nitrogen or oxygen (but not argon) plus water in the reduction bomb may produce a highly reactive, rough, black skin on the button. Under these conditions, the presence of nitrogen results in more reactive buttons than the presence of oxygen.

#### Recuplex Development

Seven grades (A, C, D, E, K, M, V) of Sparkler filter paper were tested for use in the filtration of 72 per cent aluminum nitrate monohydrate solution. Grades "C" and "V" gave the best results, passing 47 to 50 gallons per square foot before the rate dropped to 7.5 GPH./sq.ft. All the papers except grade "M" gave satisfactory clarification.

Brady pipe markers and Seal-Tite electrical cable covering were exposed to the vapors expected to be present in the Recuperex hoods. The pipe markers proved to be non-resistant to either nitric acid or carbon tetrachloride vapor, while the cable covering possesses a high resistance to both.

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Nickel Carbonyl Coating

Carbon dioxide gas was successfully used in place of nitrogen to purge the experimental coating unit system prior to X-gas admission. Preliminary observations suggest that coats produced at higher temperatures (e.g. 130°C.) are less brittle when the system is purged with carbon dioxide than when purged with oil-pumped nitrogen. Further experiments are now in progress to determine the advantages, if any, of using carbon dioxide.

RECUPLEX CONSTRUCTION

Construction of the Recuplex facilities in Rooms 221 and 337 of the 234-5 Building is approximately 85 per cent completed. All the vessel agitators and the submerged regenerative turbine pumps have been installed. Hydrostatic testing of the process and service piping has been commenced by Minor Construction personnel. Instrument calibration has been started by plant forces.

A potentially short service life is presently anticipated for the in-line process pumps fabricated by the Chempump Corporation due to the presence of a corrosion-sensitive 10-mil stainless steel liner which will be exposed to process solutions. An investigation has therefore been initiated to procure substitute pumps and minimize use of the Chempump units during start-up of the facility.

ANALYTICAL LABORATORIES

General Chemical Laboratory. Through the use of dish holders (see October report), separating the fluorophotometer dishes during the cleaning operation, it has been possible to clean all dishes satisfactorily with 1:5 hydrochloric acid and distilled water. Only 2 to 3% of the dishes remain contaminated in excess of  $3 \times 10^{-9}$  g. U/dish, with an average of less than  $1 \times 10^{-9}$  g. U/dish.

As little as 10 ppm. of nitrogen in zirconium metal was readily determined by employing a Kjeldahl procedure following dissolution with hydrofluoric acid. About four (4) determinations can be made per day.

In the determination of low level chloride ion, using the Fisher Nephfluorophotometer, the most significant precision and accuracy factor is reproducibility of the silver chloride suspension. The color of the solution does not appear to have any effect. A study has shown that  $10 \times 10^{-6}$  g. of chloride ion may be determined  $\pm 50\%$ .

Radiochemical Laboratory. The Plutonium Fission Counter has been subject to some instrumental difficulties. At month end, operation is satisfactory. A 2.68% Pu-240 standard was found to have 2.64% Pu-240. A 5% error is considered normal.

A procedure has been developed for iodate determination occurring in concentrations as low as 0.01 g./l. in 6M nitric acid and containing iron, calcium, magnesium, aluminum and traces of iodine. Preliminary extraction with carbon tetrachloride removed iodine. Reduction of iodate to iodine with hydroxylamine, extraction with carbon tetrachloride, and thiosulfate titration in the organic phase served to separate and measure the iodate.

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Mass Spectrometer Laboratory. A series of pile gases were run on both the G.E. and C-N (Consolidated-Neir) Mass Spectrometers. The sample "pairs" were not true duplicate samples as it was necessary to take one sample for the G.E. followed immediately by a sample for the C-N; consequently there is a real possibility that air gases were different in individual "pairs". Typical analyses were as follows:

	<u>CO<sub>2</sub></u>	<u>A</u>	<u>O<sub>2</sub></u>	<u>N<sub>2</sub></u>	<u>CO</u>	<u>He</u>	<u>H<sub>2</sub></u>
G.E.	69.16	L.01	L.01	.40	.45	29.80	.19
C-N	<u>65.19</u>	<u>.01</u>	<u>.05</u>	<u>.30</u>	<u>.78</u>	<u>33.41</u>	<u>.27</u>
Difference	3.97	-.01	-.05	.10	-.33	-3.61	-.08

The average difference for twelve pairs was as follows:

<u>CO<sub>2</sub></u>	<u>A</u>	<u>O<sub>2</sub></u>	<u>N<sub>2</sub></u>	<u>CO</u>	<u>He</u>	<u>H<sub>2</sub></u>
2.43	-.002	-.02	-.39	.10	-2.06	-.07

These results show sufficient agreement to handle the pile gas analysis on the C-N Mass Spectrometer during the move of the G.E. Mass Spectrometer to the 325 Building (now scheduled for Dec. 8).

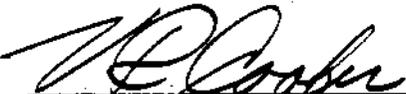
Water Quality Laboratory. As indicated in previous reports the Batho-phenanthroline procedure for the determination of iron in aqueous solution is extremely sensitive. However, to date little progress has been made in adapting this method to 100 Area process water. It appears that the failure of the method is due to the state of the iron in the "as received" water. The method is still under investigation.

Work volume statistics for the Analytical Laboratories are as follows:

	<u>October</u>		<u>November</u>	
	<u>Number of Samples</u>	<u>Number of Det'ns.</u>	<u>Number of Samples</u>	<u>Number of Det'ns.</u>
<u>Research &amp; Development</u>				
Applied Research	903	2156	1274	2381
Pile Technology	206	1992	120	1447
Fuel Technology	112	1038	111	1081
Sep. Technology	445	807	291	637
<u>Process Assistance</u>	56	223	35	374
<u>Other Customers</u>	<u>99</u>	<u>2595</u>	<u>98</u>	<u>1427</u>
Total	1821	8811	1929	7347

INVENTIONS

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. Such persons further advise that, for the period covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

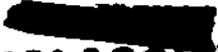
  
V. R. Cooper, Manager  
Separations Technology Sub-Section

December 6, 1954

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APPLIED RESEARCH SUB-SECTION

MONTHLY REPORT

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Applied Research Sub-Section

VISITORS AND BUSINESS TRIPS

- R. T. Jones and R. H. Fillnow, WAPD, Pittsburgh, Pa., visited HAPO November 4-5 to discuss hot laboratory facilities.
- C. S. Slenning, Minneapolis-Honeywell Company, visited HAPO November 4 to inspect equipment.
- D. Durrill, GE-ANP, Idaho Falls, Ida., visited November 8-9 at Hanford for technical consultations.
- J. B. Sampson, KAPL, spent November 8-19 at Hanford discussing reactor physics problems.
- V. P. Calkins, GE-ANP, Cincinnati, Ohio, visited HAPO November 11 to discuss fuel element development work.
- W. R. Smith and S. H. Bush spent November 1-5 in Chicago, Illinois, attending the National Metals Congress.
- S. H. Bush spent November 8-9 at BMI, Columbus, Ohio, to attend a meeting regarding tensile testing.
- J. L. Daniel spent November 7-8 at the GE Lamp Division, Cleveland, Ohio, for an employment interview and November 9-11 at ANL, Lemont, Illinois, to discuss the use of the interferometer-spectrograph combination.
- F. J. Leitz spent November 8, 10-11 at the University of Chicago, Chicago, Illinois, and November 9 at the Illinois Institute of Technology, Chicago, Illinois, recruiting technical personnel.
- G. W. Anthony visited ORNL, Oak Ridge, Tennessee, November 17-30 for instructions on the use of the Oracle computing machine for HAPO physics problems.
- W. R. Smith visited at Southwest Engineering, Los Angeles, California, November 15 to direct fabrication of tube bundles for Purex.
- M. J. Sanderson spent November 18-19 at Carnegie Tech, Pittsburgh, Pa., and November 22-23 at the University of Illinois, Champaign, Illinois, recruiting technical personnel; November 24 at WAPD, Pittsburgh, Pa., November 26-29 at KAPL, Schenectady, and November 30 at Chalk River, Canada, discussing fuel element technology.
- J. E. Faulkner spent November 19 at the University of Washington, Seattle, Wash., recruiting technical personnel.
- W. J. Ozeroff spent November 29-30 at the University of Texas, Austin, Texas, recruiting technical personnel.

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ORGANIZATION AND PERSONNEL

Personnel totals as of November 30 were as follows:

	<u>Exempt</u>	<u>Technical Graduates</u>		<u>Non-Exempt</u>	<u>Total</u>
		<u>Permanent</u>	<u>Rotational</u>		
Physics Unit	25	0	0	7	32
Metallurgy Unit	43	2	0	25	70
Chemistry Unit	49	1	0	15	65
Administration	<u>1</u>	<u>0</u>	<u>0</u>	<u>4</u>	<u>5</u>
Total	118	3	0	51	172

PHYSICS

Lattice Physics

The first of a series of measurements to check the effect of slug coring on the reactivity of a lattice was carried out on a wet 10 3/8" lattice loaded with standard Hanford slugs that had been cored to give a 1/2" diameter void. The measured value of 12 ± 2 microbucks is to be compared with the solid slug value of 26 microbucks. Theoretical calculations based on the solid slug value predicted that the 1/2" cored slug would give roughly 10 microbucks, in reasonable agreement with the experimentally observed value. Similar theoretical calculations predict that the 8 3/8" lattice will show a reactivity loss of 175 in-hours for a pile fully loaded with cored slugs. It will be another six weeks before this prediction can be checked experimentally.

Reactor Physics

The temperature coefficient of Hanford-type piles as a function of neutron exposure has been calculated using fission cross-section data obtained recently from the crystal diffraction spectrometer. This study indicates that high exposure graphite reactors operating on a uranium-plutonium cycle will suffer from severe reactivity transients. A memorandum, HW-33789, was issued to point out this effect. The effect itself is associated with the neutron energy dependence of the plutonium-239 cross-section.

In connection with the temperature coefficient calculation discussed above, an experimental program is being planned to measure the temperature coefficient of a 7 1/2" graphite lattice fueled with special slugs made up from natural uranium, depleted uranium, and plutonium. Four sets of slugs are planned. Their concentrations of U-235, U-238, and Pu-239 will correspond to natural uranium slugs irradiated to 0, 1000, 2000, and 4000 MWD/T. This work is scheduled as the first experiment in the PCTR following start-up experiments.

A new method has been devised for averaging the regeneration factor,  $\eta$ , over a slug. This method incorporates the effects of spectral hardening within a slug. For a Hanford uranium slug spectral hardening reduces  $\eta$  by 0.7 percent at room temperature. This new averaging also increases the magnitude of the temperature coefficient of  $\eta$ .

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Calculations were carried out to determine the effect of a water leak on a pile which loses reactivity on losing water from the cooling annulus. This calculation was done to see if there would be a dangerous gain in reactivity accompanying the leak of water out into the graphite, assuming the water annulus to remain full. The calculations assumed that the water distributed uniformly throughout the graphite, as would be the case if it were changed to steam on contacting the graphite. The configuration assumed was a 4.5" lattice fueled with a hollow slug having a 0.9" OD and 0.3" ID. The calculation showed that there would be no gain in reactivity, and by the time the water volume (liquid) amounted to two percent of the graphite volume, there would be an appreciable loss in reactivity due to the poison effect of the water. If there were a void space about the process tube and this space were to fill with liquid water before the above amount of steam had permeated the graphite, a small reactivity gain might be observed. Its size would depend on the value of the water coefficient and the amount of steam in the graphite.

The detailed exit neutron spectrum from a uranium slug has been calculated. This distribution is raised seventy-five degrees Centigrade above an entering Maxwellian distribution at room temperature.

In view of what appeared to be an unusually large fraction of fission events being produced by epi cadmium neutrons in an experiment performed in the Test Pile by M. V. Davis, an independent experiment is under way which should lead to a value of the integral of the U-235 fission cross-section over a pile neutron spectrum above 0.5 ev. This experiment should provide a check on the interpretation of the Test Pile measurement.

Nuclear Physics Experiments

Data was received from Argonne National Laboratory on the change in isotopic content of a lithium sample used as flux monitor in the C-12 absorption cross-section measurement. The change in isotopic content of the carbon sample remains to be measured at ANL.

In connection with the Np-239 cross-section measurement, an experimental determination of the ratio in counting rates of a Zn-65 calibration source relative to the pile background radiation was made. From this determination it appears that the initial counting rate due to Np-240 activity should be about seven times the counting rate due to pile background.

The Bi-Be powder compacts, which are being developed as possible low cost neutron source material, have been discharged from a production pile and are now in the 327 Building being cleaned up prior to measurement of their neutron emission. If calculations assuming perfect mixing are correct, these sources should be ten times as strong as the BiF<sub>3</sub> compacts previously irradiated.

A small BF<sub>3</sub> counter being developed for cell traverse measurements has shown encouraging plateau lengths and stability. The counter is 1/8" ID, 4" long, and has a 0.001" stainless steel center wire. It is filled to 60 cm pressure of BF<sub>3</sub>. Tests show that it has a 150-volt plateau with a slope of less than 5% per hundred volts. The operating voltage is about 150 volts. Tests on long-term stability are now under way.

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Physics Problems Connected with Plant Operation

A study was made of the nuclear safety aspects involved in adding mechanical supports to three "critically safe" columns in the Purex plant. This study resulted in an approved set of supports.

Consideration is being given to several nuclear safety problems arising from the introduction of a new PR can which has a 5.7" inside diameter compared to the 18.5" diameter of the old transfer vessels. The type of problems being considered are a) how much Pu can be placed in these new cans if they are to be stacked together, and b) what spacing must be maintained between cans as a function of the load in the cans.

A theoretical study of the nuclear chain reacting properties of high concentration plutonium solutions has been initiated. This study will cover the range of concentrations between  $H/Pu = 50$  and  $H/Pu = 0$ , where  $H/Pu$  is the ratio of H atoms to Pu atoms in the system under study.

CHEMISTRY

Purex

The effectiveness of nitrite in suppressing ruthenium volatilization in Purex nitric acid recovery has been shown to extend to the lower acid concentrations approximately HW#3 Flowsheet. Addition of 0.05 M  $NaNO_2$  to 8 M  $HNO_3$  spiked with dissolver solution to simulate IWV increased the ruthenium decontamination factor (bottoms/distillate) to greater than  $10^4$  as compared to a value of only 110 obtained in the absence of nitrite. These decontamination factors were determined in closed system distillations using an Othmer equilibrium still and are the steady state values which were attained within 20 hours. Factors higher than  $10^4$  could not be defined due to analytical limitations and also because entrainment is of this order according to cesium tracer measurements. The nitrite concentration found in both distillate and bottoms after prolonged reflux was substantially lower than that added. While the explanation for this is not fully known, it suggests that only very small concentrations of nitrite are required to suppress ruthenium volatilization. In further investigations, minimum nitrite requirements for this purpose will be sought in the 8 M to concentrated nitric acid range.

Calculations were made on the effect of backmixing in Purex and Uranium Recovery plant column scrub sections (HW-33824). Although these calculations were only approximate, they indicate that 1) any scale-up effect tending to increase backmixing will result in greatly decreased decontamination, and 2) if backmixing is an important factor, decontamination will improve greatly with processing rate. It was recommended that scale-up effects on backmixing be investigated in prototype equipment. Mathematical techniques were developed for investigating the problem in large-scale equipment.

Little  $UX_1$  decontamination is expected across the 2A column under HW#2 conditions; a decontamination factor of 1.7 was calculated and 1.3 observed in Mini runs. One effective way to increase this decontamination factor is to introduce an intermediate scrub stream, 2AIS, of the same composition and flow as the 2AS. A Mini

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run employing only  $UX_1$  activity resulted in a decontamination factor of 19, or more than ten-fold improvement. By increasing the LEX acidity to 0.5 M  $HNO_3$ , an additional decontamination factor of five can be realized. Thus, an overall  $UX_1$  decontamination factor of ca. 3500 is to be expected, and plutonium (2BP) specifications should easily be met.

A set of standard solvent "quality" tests are under development and will be utilized in solvent degradation tests. Eventually it is expected to correlate these tests with plant operation. The tests measure uranium distribution ("C" contact), rate of uranium extraction, dispersion coalescence time, and decontamination. The "C" contact is shown to be quite sensitive to solvent quality at 1 g/l UNH, but relatively insensitive at 5 g/l. The rate of extraction test is most sensitive at 20 percent TEP. The extraction rate constants vary appreciably from day to day, but the ratio to a standard sample is constant.

Various solvent and diluent samples are being contacted with HAFS solution (non-radioactive) for extended periods of time at 35 C, to investigate the rate of solvent deterioration. The systems are Spray Base, TEP, 30 percent TEP in Spray Base, and 30 percent TEP in carbon tetrachloride. With respective contact times of 240, 545, 547, and 240 hours accrued, no appreciable deterioration is evident. The tests are applied after washing and making up to 30 percent TEP, and consist of the "C" contact, rate of extraction, and dispersion-coalescence time measurement. These results to date indicate that chemically induced solvent decomposition will be unimportant in the Purex plant.

The effect of 2.25 M  $HNO_3$  attack at 71 C on various diluents was measured by the "C" contact values obtained from the resulting nitrated diluents made up as solvent and washed. After 195 hours Soltrol 170 and Bajol "D" were found to be more resistant to chemical attack than Shell diluent by factors of four and two, respectively. The presence of four percent aromatics in Shell diluent results in high coloration but a barely significant increase in the "C" value.

Further experiments clarified the effect of nitrite on the nitric acid attack of Shell diluent. Nitrite strongly catalyzes the reaction, but in the absence of nitrite, or with a nitrite suppressor, no attack is observed at 70 C. At 25 C very little attack is observed even with 0.1 M  $NO_2^-$  and five percent aromatics in the diluent.

To obtain the relation between irradiation dosage and solvent decomposition, air-free dried samples of 30 percent TEP in carbon tetrachloride, 30 percent TEP in isooctane, 30 percent TEP in Soltrol, 40 percent TEP in carbon tetrachloride and pure TEP have been irradiated from  $10^4$  R to  $10^8$  R in the 100-F pile basin. The samples are being examined for free chloride where pertinent, and for DEP, butyl alcohol and physical behavior. Data obtained at present indicate good agreement with the sample previously exposed at  $10^7$  R for the 30 percent TEP-carbon tetrachloride system. The production of free chloride was 0.0076 g/l and 10 g/l at  $10^4$  R and  $10^8$  R, respectively. The DEP yield varied from 0.03 g/l to 80 g/l in the same solutions. Butyl alcohol (reducing power) has been determined by reacting with 0.02 M dichromate in 3 M  $H_2SO_4$  and determining the Cr(III) produced optically. Preliminary indications are that the alcohol concentration does not build up proportional to the radiation and that the amount is much less than the DEP yield would indicate.

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Thorex

The dissolving rate of thorium slugs has been determined as a function of added fluoride catalyst concentration. A fluoride concentration as low as 0.03 M gives a dissolving time of 10 hours when dissolving to a 200 percent heel and giving a solution ca. 2 M in both thorium and nitric acid. Dissolving rates decrease rapidly at lower fluoride concentration and also if aluminum nitrate is present at 0.5 M, the concentration resulting from dissolving slug jackets with the thorium. Thus, separate dissolution of thorium is indicated if maximum dissolution rate at minimum fluoride concentration is desired.

Head-end removal of protactinium by manganese dioxide scavenging continues to look promising (DF >> 20). The effect of thorium, nitric acid, and fluoride concentration, the amount and mode of addition of manganese dioxide, digestion temperature and time are under investigation.

Additional studies of phosphate's effect on protactinium extractability into 50% TBP-Amsco gave results not entirely consistent with those previously obtained with a different fluoride-free tracer. It now appears that a phosphoric acid concentration of ca. 0.1 M may be necessary to insure good protactinium decontamination in a high-acid IA column. This concentration does not cause thorium precipitation at acidities of 4 M or higher; however, thorium losses to AW have not been established.

Batch countercurrent test of simultaneous U-Th partition and U concentration was attempted, approximating conditions suggested for the UA column of study flowsheet #7 (Cf. HW-31687). Unfortunately, a second organic phase formed during operation at 25 C. The experiment is being repeated at 70 C to avoid this three-phase formation. Alternatively, a flowsheet substituting carbon tetrachloride as diluent or using a higher organic to aqueous flow will be investigated.

Waste Treatment

Nickel ferrocyanide scavenging of Uranium Recovery waste is continuing in the plant, with the supernatant liquid from two tanks having been cribbed to date. Cesium decontamination has been excellent, but the residual strontium content unexpectedly proved higher than the ca. 0.1 uc/ml desired and thus limits the volume of waste which may be discharged per crib. The bulk of the supernatant liquid from the first and second tanks had strontium contents of 0.2 and 1.0 uc/ml, respectively. However, very high concentrations near the sludge at the bottom of the tanks raised the averages for the cribbed liquid to 0.7 and 2.7 uc/ml, respectively.

On investigating the role of ferrous and ferric salts formed when synthetic RAW is neutralized, strontium decontamination was found to pass through a minimum near pH 10, an unexpected effect most pronounced with the ferric salts. However, it has not been shown definitely that this phenomenon is responsible for the poor plant results. In fact, when plant RAW samples were scavenged at pH 10 in the laboratory, strontium decontamination much greater than that observed in the plant or on synthetic RAW was obtained, viz., ca. 0.05 uc/ml residual. Further work planned on this problem includes comparison of plant and laboratory reagents, mode of reagent addition, investigation of the effect of ferric to ferrous ratio and desorption of strontium as a function of contact time.

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The deleterious effect of high intensity beta radiation on the scavenging of cesium from Uranium Recovery RAW appears to reach a steady state within about ten days, thus alleviating concern about decontamination deteriorating further on standing in underground tanks. Nickel ferrocyanide scavenging of synthetic RAW followed by standing of the resulting slurries yielded cesium decontamination factors for an unirradiated control and for irradiated material of  $900 \pm 200$  and  $230 \pm 40$ , respectively, for exposure periods ranging from 10 to 40 days. The beta radiation source intensity was  $1.5 \times 10^6$  ergs/ml-hr, approximately that calculated for fresh RAW but only 15 percent that of settled sludge. If fresh material from B and T plants should be processed during the 4X program, supernatant solution cribbed after scavenging RAW should be carefully monitored. Excessive cesium content may call for rapid separation of the highly active carrier precipitate or a two-step scavenging procedure, i.e., alkaline sludge removal for the bulk of the activity followed by nickel ferrocyanide scavenging for cesium removal.

Flurex Process

Additional runs of the Flurex process were made, and the cause for the previously observed poor current efficiencies with the new type cell was found. The poor efficiencies are caused by the lack of proper stirring which has a profound effect on the reduction of the uranium at the mercury cathode. The study of this and other variables on the process is being continued. A bomb reduction test of a sample of sodium uranic fluoride made by the process was carried out. The trial run gave a poor yield of small uranium shot; the failure is believed due to lack of sufficient booster in the charge to the bomb, and to the presence of water adsorbed on the salt.

Isotope Separation

Two solvent extraction runs employing uranium(IV) chloride and tributylphosphate-carbon tetrachloride have been performed to determine possible isotope separation effects. To date, insufficient mass spectrometer analytical data are available to permit an evaluation of this method.

The use of uranium(IV) nitrate in the solvent extraction method for the separation of uranium isotopes is also being investigated since 1) the nitrate system may show a greater isotope separation effect than the chloride system, and 2) a nitrate system offers advantages from an engineering and plant operation standpoint. To be practical for plant operation, uranium(IV) nitrate solutions must be stable for the period of time they will be in process. In the absence of nitrite suppressors, such as urea and sulfamic acid, uranium(IV) nitrate in nitric acid solutions is rapidly oxidized to uranyl nitrate. In the presence of an initial concentration of 0.05 M urea, uranium(IV) nitrate solutions containing one and three molar nitric acid have shown no oxidation of the uranium in over 21 days; either in closed bottles or with exposure to air. In similar solutions made up to contain an initial concentration of 0.02 M urea, the uranium remained unoxidized for 17 days, then became completely oxidized in less than one day. This result can be explained by the loss of the urea by hydrolysis. The results of these experiments show that aqueous solutions of uranium(IV) nitrate can be stabilized against oxidation of the uranium for long enough times to allow plant processing. The stability of organic solutions of uranium(IV) nitrate will be investigated.

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Two thermal diffusion experiments employing the uranyl nitrate-water system have been completed, and one run is now in progress using the pure uranium(VI)-TRP organic complex. In all cases, samples have been submitted for mass spectrometer analysis, but results are not yet available.

Neptunium-239 Capture Cross-Section

The equipment for the Np-239 experiment has been installed at 100-E and is currently being tested. It is anticipated that the first actual experiment will be in progress at or near midmonth (December) pending approval of the production test.

Analytical Development

In continuing the study of an ion exchange method for the concentration of the trace impurities in pile water, analyses are being performed by the porous cup spectrographic method. After optimizing the resin column conditions, a concentration factor of 50 was easily obtained with about 90 percent yields for copper and aluminum. With 20-50 mesh Dowex-50 resin in a 150 by 9 mm column, optimum flow rates are 20 ml/min for adsorption and 1.5 ml/min of 8 N HCl for elution. About 20 ml are required for elution.

In order to gain information relating to the radiation stability of tributylphosphate, a study was made of the mass spectrum of TRP and of the appearance potentials of the prominent ions. The data show that the TRP molecule is most easily ruptured by low energy electron bombardment at the carbon-oxygen bond of the butoxy group, yielding butyl and phosphate radicals as the prominent residues. Although the conditions in the mass spectrometer are quite unlike those in a process solution, the data support the belief that ionizing radiation in TRP solutions have the sole effect of accelerating hydrolysis to butyl alcohol and phosphoric acid.

In order to provide better procedures for plutonium-240 analyses, design and experimentation with a new type of fission counter employing gas scintillation was initiated. The possible advantages of the planned instrument over present equipment are in simplicity, cost, maintenance, and less critical operating characteristics. The first prototype shows considerable promise in initial tests.

Miscellaneous activities in support of analytical control of HAPO operations include assistance in developing firm construction specifications for the Purex x-ray photometer, the preparation for the Methods Unit of Separations Section of a recommended procedure for plutonium in the F-10-P sample by x-ray photometry, and the preparation of a procedure and calibration curve for the determination of plutonium valence states.

In response to a request for recommendations, a study of possible method of detecting an inadvertent introduction of high MWD/T metal into the T and B plants was made. It was found that the routine determination of americium plus curium in the dissolver sample provides a sufficiently sensitive means of detecting such an incident. It was shown that actual Am-Cm values of low MWD/T metal average  $6 \pm 3 \times 10^{10}$  c/m/ton (range given), whereas current high MWD/T metal (greater than 500 MWD/T) is at least a factor of 10 higher in Am-Cm. The cooling times and the radiation levels have only a secondary influence. Gross gamma measurements on undissolved slugs would be unreliable unless carefully interpreted in terms of cooling time.

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The standard sample program involved 45 determinations in 200 and 300 Area service laboratories. These included a simulated RCW for uranium, an F-10-P sample for acidity, a  $UO_3$  sample for three trace impurities, and a low level waste sample for uranium. In all but one case, two different laboratories submitted results on the test samples, and agreement with make-up was excellent in all cases except for slightly high results for silicon in  $UO_3$ .

In-Line Analysis

During the month the assembly and testing of the solutions flow lines for uranium photometric, polarographic and pH monitors for the Hot Semi-Works were completed, and these units were installed in the plant. The electrical wiring for the instruments in the 201-C Building is now about 85 percent complete and the monitor plumbing, consisting of solution flow lines, cells, hold-up cups and degassers is about 95 percent complete. The gamma and pH consoles have been delivered to the plant and the pH polarograph console has been tested in conjunction with its associated master programmer. The uranium photometer console, except for a single chassis which is now being designed, has been checked in mock-up operation, and all photometer sensing units are tested, calibrated, and ready for installation. For convenience sake, adjustments were made in the consoles to cause the calibration curves of all photometer sensing units to coincide. These sensing units showed a short term drift of only  $\pm 0.5$  percent and a long-term drift (40 hours) of about  $\pm 1$  percent of the uranium value in steady operation. The effect of intermittent usage, which increases the magnitude of the drift, is being studied. The sensing units have a sensitivity of 0.005 M uranium per chart division and of 6 ppm of turbidity (polystyrene standards) per chart division. A variation of the indicated uranium concentration from the true value will not exceed three percent for feeds having temperatures as high as 75 C.

Several buttons of pure thulium metal were received, and a test irradiation established the suitability of the metal for the gamma absorption photometer sources for the Hot Semi-Works plutonium monitor. A suitable source (Tm-170) is ready, the source holder has been designed, and a detailed design of the plutonium photometer sensing unit has been completed. An ionization chamber rather than a scintillation counter is used for the detector in order to increase stability and decrease the amount of electronic parts needed. This substitution is possible because of the high source intensity available from thulium.

The use of ball and socket connections for in-line sensing units to minimize radiation exposure time during replacements raised the question of leakage of process sample at the joint. A laboratory test was made of simulated uranium photometer installation with ball joints connections of stainless steel to stainless steel, stainless to Teflon, and stainless to polyethylene. Various greases were used and in one case each of stainless steel to the plastic joint, no grease was used. In nearly a million simulated jetting cycles no leakage occurred, and the evidence indicates that a properly assembled ball joint (free of grit and held by a spring clip) is reliable.

A laboratory model uranium photometer sensing unit with accessible and replaceable parts has been fabricated for developmental work. It is being used to make studies which will optimize the cell parameters such as cell thicknesses, and light collimator dimensions as well as to determine the extent and cause of sensitivity drifts which occur in operation at higher temperatures, and upon intermittent usage.

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During the month an amalgamated gold electrode was tested for polarographic monitoring of the Metal Recovery Plant waste. The electrode failed after a very short time, and a subsequent evaluation of the data showed that the failure was due to the presence of considerable ferric iron (greater than 0.001 M) in the plant RAW. The reason for the interference is not understood. Similar tests with the Purex system are planned.

Other in-line monitoring activities include completion of the pH monitoring design for Purex and the publication of a scheme for automatically controlling waste neutralization in the Metal Recovery plant as reported in HW-33948.

Decontamination and Waste Disposal

The stainless steel drain valve on one of the 5000-gallon crib waste trailers developed a leak necessitating its replacement. Examination showed extensive corrosion and pitting. Since the tank portion of the trailer is made of Amer-coated mild steel, it is believed that corrosion to the tank may be more extensive.

In an effort to limit corrosion, sources of crib wastes are being examined with the view of further segregating, for concreting, solutions containing halogens. In addition, an excess of caustic will be kept in crib waste receiving tanks. Neutralization will be carried to a pH of greater than 12 before crib waste is pumped into the trailer. In the past, neutralization to a pH of 7 to 8 has been standard.

Approximately 200 lead bricks were transferred from the Radiometallurgy Building to the Radiochemistry Building. These were decontaminated for use in laboratory Purex hot facilities. Use of these bricks saves about \$1000 in material charges for this equipment.

Four highly radioactive ball bearings which had been irradiated in the pile were disposed of by concreting. These were discarded at the request of the Instrument Development Design group of Radiological Sciences.

One slug cut-off box waste catcher from the Radiometallurgy Building was concreted at the 300 North Burial Ground. Survey readings on each of these units were approximately 500 R/hr.

Temporary radiation zones were established approximately 40 feet east and west of the 300 North (Technical) Burial Ground. This was necessary because of high readings experienced at the Burial Ground fences. Rope barricades have been erected, and the area has been properly posted.

Sixty-thousand gallons of "cribbing" waste were transported to 200 West Area and discarded to 200 SL cribs. Processing crib waste in volumes 60,000 to 80,000 gallons per month requires 16 to 18 man-days' time for decontamination personnel.

One million gallons of "retention" level waste were processed to 300 Area ground.

The catalog file which has been maintained by the Chemistry Unit was transferred to the custody of the Technical Information Section. It is now located in 3760 Library Building.

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All other decontamination, laundry, building service functions were accomplished in a routine manner.

## METALLURGY

### Irradiation Effects

Two uranium tensile specimens irradiated to 620 MWD/T have been vacuum annealed at 700 C for 15 hours. The first specimen annealed was found to be bent on post-anneal examination. The 0.01-inch eccentricity observed has been attributed to the specimen's creeping under its own weight or to warping at the taper between the shoulder and the gage length. The second specimen was supported in the gage length by a ceramic pedestal, and no bending was observed during the post-anneal examination. The first specimen will be reserved for a 700 C tensile test where a slight misalignment should not result in premature breaking in the shoulder. The room temperature tensile test on the second specimen was carried out and the following results obtained: Ultimate tensile strength - 65,000 psi, yield strength (0.1% offset) 52,000 psi, yield strength (0.2% offset) 55,000 psi and elongation two percent. These results are essentially the same as those for the as-irradiated and 400 C anneal (previously reported) insofar as tensile and yield strengths are concerned, but a six-fold increase in ductility occurred compared to the as-irradiated and a four-fold increase compared to the 400 C anneal. However, the ductility is still only about 12 percent of that of the unirradiated material, which indicates that considerable loss in ductility has been suffered which is not recoverable by a beta phase anneal. Possible explanations of this definite though limited increase in ductility compared to the as-irradiated or 400 C annealed specimens could be the recovery of irradiation damage analogous to cold work as contrasted to damage due to fission products, or to a redistribution of some of the fission products to the grain boundaries resulting in an increase in unit grain ductility, assuming the failure is transgranular. Conceivably both factors may contribute to this increase. The value of two percent compared to the unirradiated value of about 16 percent is believed to be due to the fission product concentration still existing in the specimens.

Five assemblies from the study relating preferred orientation with dimensional stability have been opened by Radiometallurgy personnel. The examination prior to opening revealed a previously undetected split type rupture in the can. Examination of the specimens in the split can after opening disclosed that severe deformation had occurred in the uranium, promoting the split type rupture in the aluminum. Four of the five specimens in this can had a very high (010) orientation, which would cause growth when irradiated. Measurements on samples in the other assemblies revealed that those specimens with a high (010) orientation increased as much as 85 percent in length while decreasing in diameter. These measurements are being taken to establish a quantitative relationship between dimensional stability and preferred orientation.

A continuation of the study to determine the nature of the damage in uranium irradiated for short times at low temperatures (30-50 C) by re-examining the specimens, reveals that any irradiation damage that may have occurred has been completely eliminated by a recovery process occurring at room temperature. Additional samples are being irradiated which will be examined as soon as possible

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after discharge in an attempt to confirm or deny the initial results where damage was observed by x-ray diffraction shortly after discharge with this damage completely disappearing in time.

#### Metallurgical Techniques

X-ray diffraction studies of the diffusion interface area of a uranium-aluminum couple have revealed the presence of  $UAl_2$  on the uranium side where very little diffusion was believed to have occurred. In addition,  $UO_2$  and  $UAl_3$  were identified as being present.

A re-examination of a cathodically vacuum etched specimen of beta heat treated uranium six months after the etching revealed a very limited oxidation of uranium as indicated by the occurrence of an oxide film. Some grains did appear to be somewhat rougher, possibly due to preferential oxidation. This apparent lack of surface oxidation has been attributed to a surface passivation somewhat dependent on grain orientation where the cathodic vacuum etching causes this passivation, or to the formation of a thin, tenacious film during replication and after cathodic etching which is resistant to further attack.

A specimen of beta heat treated uranium previously cathodically vacuum etched was vacuum annealed. Metallographic examination revealed that the hydrides present had decomposed and marked grain growth had occurred. Many grains contained what appeared to be surface cracks. These "surface cracks" still remained after 10 seconds of electropolishing. This will be studied further after replicas have been prepared for electron microscopic examination.

A reticulate structure observed near the surface of salt bath beta heat treated and quenched slugs is being examined optically and with the electron microscope. In addition, an attempt is being made to identify this material by transmission electron diffraction.

The existence of a cruciform structure in high alpha rolled uranium has been reconfirmed by removing the previous surface then reetching cathodically. The orientation of the grains across the cross and in areas adjacent to the cross is being determined to see if a correlation exists between microstructure and orientation.

#### Fuel Element Studies

In order to test the versatility of the room temperature point closure canning technique, a magnesium-uranium matrix slug and an aluminum dummy slug were canned by this method. The only modification of the technique previously employed on uranium cores was the addition of a zirconium wafer at the top of the slug in order to insure closure without distortion of the soft core material. No difficulty was encountered in canning either material. These tests demonstrate that the point closure canning method is applicable to all fuel materials charged into the Hanford reactors.

In the development of a satisfactory point closure, it was found necessary to roughen the slug end and to drill a one-eighth inch diameter by one-eighth inch deep hole at the center of the slug end in order to prevent flow of oxides

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across the surface of the slug and into the final closure region. As a result of limited studies, it appeared that a satisfactory closure could be obtained without the axial hole in the slug. On this basis twenty cored slugs without the axial hole were canned and tested for PT-105-580A. Of the twenty slugs autoclaved, five were obvious failures although no can walls ruptured in the autoclave. Additional failures were discovered on stripping the remainder of the slugs. In the approximately 500 slugs canned by Applied Research and Fuel Technology personnel having the axial hole in the slug, no autoclave failures have occurred. Thus, it appears mandatory that an axial hole be used in the end of a slug in order to achieve a sound closure.

Nineteen insulated slugs have been canned by the modified cold closure technique employing an anodized layer as the insulating medium. The slugs have been bubble tested and autoclaved. Twelve of the slugs will be irradiated in Hanford piles under production test now in draft form. One cored natural slug insulated by four mils of  $Al_2O_3$  has been charged in a B-block for irradiation in the MTR fuel testing facility. In the location in which the test is scheduled, an Al-Si canned solid Hanford slug would operate at 65 kw/ft fission heating and 10 kw/ft gamma heating. The following operational conditions have been calculated for the insulated cored slug: 62 kw/ft fission heating, 9 kw/ft gamma heating, 100 C aluminum surface temperature, 420 C uranium surface temperature, and 860 C maximum uranium temperature.

The rupture resistance of fuel elements may be increased by departure from Hanford's present cylindrical geometry. In order to obtain some comparative measure which may be used in initial investigations of various fuel element geometries, a table of the temperature drops and maximum elastic surface stress has been formulated and will be published as a secret document HW-33966 entitled "Elastic Analysis of the Thermal Stresses in Plate, Rod, and Hollow Fuel Elements" by K. R. Merckx.

The two remaining four-inch mechanically bonded fuel elements canned by the room-temperature point closure technique and which are being irradiated in the central zone of D Pile under PT-105-575-A have reached an integrated exposure of approximately 575 MWD/T. One four-inch mechanically bonded fuel element canned by the room temperature point pressure-weld closure technique and having 0.35-inch end caps has been included in the third loading for the MTR slug testing facility. This piece is scheduled for irradiation at approximately 75 kw/ft. A goal exposure of about 600 MWD/T is currently planned for this piece.

Unbonded slugs, canned by the room temperature point closure technique, are being tested to determine their rupture resistance and further to determine whether a jacket to uranium bond is essential for heat transfer under Hanford conditions. PT-105-580-A authorized the irradiation of two unbonded solid slugs to 200 MWD/T, two to 400 MWD/T, and four to 625-750 MWD/T. As previously reported the two 200 MWD/T slugs were charged in C Pile September 16, discharged October 26, and showed no evidence of damage as viewed in the basin. These slugs are awaiting transfer to the Radiometallurgy facility. The 400 MWD/T slugs and the 625-750 MWD/T slugs were charged in H Pile September 30. The tubes are operating normally, the slugs having accumulated exposure of 260-300 MWD/T.

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Uranium particles dispersed in a matrix of magnesium - 1 percent silicon alloy are expected to provide superior irradiation stability. The one percent of silicon acts as a wetting agent to help eliminate voids, increase fluidity, and increase corrosion resistance. It is proposed to charge twenty-four such slugs, twelve of natural uranium and twelve of uranium enriched in U-235 to 1.75 percent, into a Hanford pile to test these elements to high burn-up. The slugs will be cold closed in aluminum cups which have been impact extruded from sheet aluminum by Alcoa to completely eliminate the possibility of oxide stringers through the base parallel to the longitudinal axis of the fuel element. Flow lab tests of the behavior of the matrix material in contact with 100 C water will precede actual pile charging. Most of the production test slugs should be cast during the month of December.

#### Fuel Materials Studies

Investigation of the thorium-uranium alloy system has continued. It has not as yet been possible to identify the uranium phase in the thorium - 3 percent uranium alloys. This difficulty is attributed to the solid solubility of uranium in thorium. However, the presence of a large amount of impurities in the normal reactor grade thorium and the pickup of additional impurities during melting has contributed immensely to the difficulty. A source of high purity thorium and data as to the solid solubility of uranium in thorium are being sought. Several attempts have been made to identify the uranium in the thorium-uranium alloys by micro-auto-radiographic techniques. One of these techniques involved the use of a polished specimen and a nuclear track emulsion sensitive to fission fragments. The Pile Physics Sub-Unit has exposed this film-sample assembly in the 305 Pile neutron flux, but this technique has not as yet delineated the uranium in the thorium. Further attempts will be made to utilize this technique.

Due to operational difficulties at the MTR, the uranium-magnesium capsules have not accrued any additional exposure. These difficulties are being corrected, however, and irradiation will be resumed in the near future. Two 0.880-inch diameter uranium-magnesium fuel elements have been completed and are awaiting shipment to the MTR. These slugs are four inches long and were made with uranium shot which packed to 64 volume percent uranium. They were sized into Zircaloy-2 cans with a 0.023-inch can wall. Caps were welded in the vacuum gloved box to insure a ductile weld. Autoclave for 120 hours in 100 psi steam showed no adverse effects. Reactivity measurements have been made on the slugs in the test pile, but the results have not yet been calculated. It is planned to irradiate the two slugs to 5000 MWD/T. At the end of this exposure, one will be examined metallographically and, also, for dimensional stability. If the investigation of the first element indicates satisfactory performance, the second slug will be irradiated for a longer period.

#### Uranium Reduction Studies

In the electrolytic reduction of a molten uranium salt bath to the metal, the most severe problem is that of discovering a suitable container for the bath. It is proposed to eliminate the drastic corrosive action by providing a solidified layer of salt immediately adjacent to the tank to act as a corrosion barrier. It is entirely feasible to keep the salt molten once the electrolysis has started, but the achievement of the initial molten condition still remains unsolved. A self-contained internally heated molten salt bath was designed in such a manner as to furnish a molten pool of salt surrounded by non-molten salt. To achieve this

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condition, a graphite strip heater has been built. Initial tests of the heater indicated that there was insufficient heat being developed in the strip to melt the sodium chloride used as stand-in material. After modification, the strip heater was positioned in the brass box and surrounded by 40 pounds of sodium chloride. No top insulating lid was used, but the strip was covered with salt. At the end of the test period the current was shut off and the strip removed. A mass of solidified salt clung to the strip indicating that some four pounds of salt had melted forming a pool five inches in diameter and four inches deep. In a subsequent experiment performed after grinding the solidified salt, the graphite strip cracked. This fragility will necessitate a new design which is now under way.

An alternate scheme would envisage a bath heated from above, the molten salt contained again in non-molten material. A test of this design was moderately successful when a nichrome wire heater was used, but the design of a heater which would be adequate during actual electrolysis has not been completed. The problem is to make a heater of sufficient capacity yet sufficiently small so as to leave adequate space for electrodes.

### Zirconium Metallurgy

A sensitive method of detecting the loss in ductility and impact energy of Zircaloy-2 specimens containing various percentages of oxygen has been developed. An unnotched specimen of zirconium or Zircaloy-2 when containing small quantities of oxygen will show a decrease in bend angle at fracture in a stiffness test, compared to a specimen with negligible oxygen content. The specimen with oxygen nil can be bent through 90°, while 0.15 weight percent oxygen reduces the angle to 44° and 1.46 weight percent reduces it to 26°.

Ex-pile tests on the weight gain of zirconium and Zircaloy-2 when heated in air have been extended to include two parameters in addition to gas velocity. The two additional variables are temperature (500, 600, 700 C) and the degree of cold work of the material. It has been conclusively proven that the weight gain of both zirconium and Zircaloy-2 sheet is independent of gas velocity over the temperature range of 500 to 700 C and velocities from 0 to 23 ft/min.

An examination of the weight gain-time curves at 500-700 C where these variables are related by an equation: weight gain equals a constant times time to a power  $n$ , reveals that there is an induction period where  $n$  is approximately equal to 0.4. This shifts to a linear rate with  $n = 1$ . In every instance the induction period was shorter for Zircaloy-2 than for zirconium. As anticipated, an increase in the temperature decreases the induction period.

A comparison of the reaction rates of annealed and 65 percent cold worked specimens revealed no difference at 600 or 700 C; a somewhat surprising result was observed at 500 C where the induction period was longer for the cold worked material than for the annealed. Induction periods varied from greater than 500 hours at 500 C to 70 hours at 700 C for zirconium; induction periods for Zircaloy-2 ranged from 55 hours at 500 C to less than two hours at 700 C.

A correlation has been observed between transition temperatures of annealed Zircaloy-2 when determined from the points of inflection of impact energy-temperature curves of V-notch Charpy specimens or from bending moment at

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fracture-temperature curves of notched specimens. In both instances the transition temperature was 180-200 C. The angle at fracture versus temperature is also satisfactory for determining the transition temperature. This favorable correlation means it may be possible to eliminate impact testing since the data will be available from the bend tests on notched specimens. This is advantageous because more data are obtained from a bend test, less zirconium is used, and machining costs are eliminated.

MTR Fuel Element Testing Facility

At the end of the month the MTR was still not operating normally. Since the week of October 10, operation of the reactor has been intermittent and generally at reduced power while attempts were being made to find the fission break and to control the spread of contamination. During October all experiments but those with an independent cooling system were removed from the reactor. The reactor is now operating at full power with new fuel elements but the activity of the water is too high to permit work in the tank. It is planned to continue operation until the activity level drops to a safe level. It is hoped that by the middle of December the experiments may be charged back into the reactor and normal operation resumed.

The three Hanford slugs (solid AlSi canned, cored AlSi canned, and solid hot-press canned) have remained in the reactor because, with an independent water system and monitor, it was known that the Hanford slugs were not responsible for the fission product activity in the process water. By November 23 the exposure of the three slugs was about 670 MWD/T. An estimated 630 MWD/T was accumulated at a specific power of 55-58 kw/ft and the remainder at one-third power or about 20 kw/ft. There has been no indication of fission product activity in the effluent water.

During the month a second B-block was fabricated, loaded with specimens and shipped to the MTR. This third charge includes a mechanically bonded, cold closed solid slug, a solid AlSi canned slug, and an insulated, cold closed cored slug. It is planned that on cycle 45, the second cycle after normal operation is resumed, the notched slug experiment will be charged into position B-3 and irradiated to failure or 700 MWD/T. The power generation in B-3 is estimated at 65 kw/ft from fission heating alone plus 10 kw/ft of gamma heating. The second B-block will be charged when irradiation of the notched specimens has been completed.

Radiometallurgy Examination

One slug which had a meandering indent in the side of the can was selected from Tube 3056-H as representative of many of the defective slugs observed in one location of the pile during October and delivered to Radiometallurgy for more detailed examination. A transverse section, taken at the center of the slug, showed a crack extending to the axis of slug, directly beneath the necked down portion of the can wall. A hardness survey did not indicate that the slug had been heated into the beta phase. Another slug, from Tube 3058-H, has been received to evaluate the theory that this rash of ruptures (22 in 17 tubes) could have been created by operational difficulties which caused a very local region of uranium to heat into the beta phase. Attempts to obtain process tubes from H Pile were unsuccessful.

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Preliminary examinations of the thorium slugs which failed on April 22 and September 20, 1954, have not shown any obvious defects resulting from the canning process. Sections of the thorium have shown many cracks which were not believed to be associated with the gross formation of corrosion product that caused the failure to be detected. Samples of thorium were cut for future metallurgical examination and 9.4 to 20.6 gram samples were prepared for chemical research investigations. Hardness values of from 66 to 68 Rockwell B were obtained on the irradiated thorium. Non-irradiated, hot-rolled thorium metal showed average hardness values of from 49 to 57 Rb.

The metallographic examination of two of the caps from unruptured hot pressed J slugs revealed that the corrosion was intergranular in nature. Pit depths of from 18 to 21 mils were measured. It should be pointed out that some of this corrosion may have been created by their long water storage in the basins at 105 and 327.

### Radiometallurgy Facilities

The remote metallograph was improved by replacing the damaged objectives, by re-aligning the light path, and by simplifying the sample placement and removal from the stage. A new stage holder for 1/4-inch diameter samples was also provided. The cathodic etcher was installed in the metallographic cell and is now being tested. One of the lapping machines was modified to accomplish coarser grinding and thereby enable faster removal of the metal as a preliminary surface preparation for metallographic study. The electro chemical macro etching equipment including the 40 percent NaOH recirculating liquid gas scrubber that will remove the noxious fumes before entering the normal air exhaust system is being tested for installation. A vacuum furnace assembly for making rare gas analyses on irradiated uranium was received from Fuel Technology. A three-ton cask was received from Western Gear Company that will facilitate the movement of freshly discharged uranium from the 100 Area and within the Radiometallurgy Building. Another storage can sealer has been placed in operation to improve the speed with which investigations can be accommodated.

### Separations Plant Corrosion Studies

A program to determine the corrosivity of synthetic 2WW Purex waste acid concentrate on types 304L, 347, and 312 stainless steel and type A-55 titanium is in progress. Preliminary quantitative data reveal that the attack upon wrought type 304L stainless steel exhibited a corrosion rate of 0.0137-inch penetration per month after sixteen days' exposure to the solution when the temperature of the stainless steel was maintained at 145 C and the temperature of the liquid was approximately 114 C. These data also indicate that the corrosion rate of wrought 304L stainless steel under the conditions of the test is increasing with time in a serious and unpredictable manner. Tests of longer duration now in progress will resolve the uncertainty in the long time behavior of the material.

The factorially designed static corrosion test included as parameters:

(1) material, (2) nitric acid concentration, (3) chloride ion concentration, and (4) temperature. The first batch of samples has been removed from the ovens and are being photographed and cleaned. While a complete picture of the corrosive effects of the system is not yet available, several observations can be made.

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Titanium is virtually unaffected by the environments of the system. Vapor phase corrosion of the stainless steels seems quite severe at 170 C, but the corrosion products form as a scale and until the samples have been cleaned, no definite conclusions can be drawn. Corrosion of the stainless steel samples in the liquid phase appears to be markedly affected by solution composition and temperature, whereas vapor phase corrosion appears to be particularly sensitive to temperature. The results of the examination of the first batch of 192 specimens should be available by January 1, 1955.

### Welding Studies

Further experimenting with various weld joint geometries for butt welding pipe has resulted in a joint design that produces an excellent root pass on a flat or vertical position joint. The joint is flush and smooth inside the pipe with no pinholes, laps, or seams and has complete penetration. Some difficulty is being encountered in welding a joint in the horizontal fixed position without having the weld material sag at the bottom of the pipe joint. The sag is less in the new joint design than that experienced in a conventional bevel joint, and indications are that the problem will be solved with slight additional changes in geometry of the joint.

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### INVENTIONS

All Applied Research Sub-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 November, 1954, 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

R. E. Connally  
M. B. Leboeuf  
L. F. Miller

#### TITLE

A Dual Function System for Automatic Monitoring of Gamma Radiation of Solutions in a Separations Plant for Processing Spent Nuclear Fuel.

*F. W. Albough*

Manager, Applied Research  
ENGINEERING DEPARTMENT

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RICHLAND, WASHINGTON . . . . . HANFORD ATOMIC PRODUCTS OPERATION

December 6, 1954

This document consists of  
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\_\_\_\_\_ copies. Series A.

3 MONTHLY REPORT

FUEL TECHNOLOGY SUB-SECTION

NOVEMBER, 1954



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<u>Name</u>	<u>Date</u>	<u>Address</u>	<u>Purpose</u>
D. W. White C. E. Weber	11/11,12	KAPL, Schenectady, N.Y.	Discussions of fuel element technology
<u>Name</u>	<u>Date</u>	<u>Place Visited</u>	<u>Purpose</u>
H. L. Libby	11/1,6	American Society for Metals, Chicago, Ill.	To attend professional society meeting
		ANL, Chicago, Ill.	Testing problems
E. A. Smith	11/1,8	ANL, Chicago, Ill.	Discussions of aluminum cans and zirconium tubes
		Superior Tube Co., Norristown, Pa.	Same as above
W. T. Kattner	11/6,14	BMI, Columbus, O.	Discussions of uranium quality
		Nat'l. Lead Co. of Ohio, Cincinnati, O.	Same as above
		ORNL, Oak Ridge, Tenn.	Same as above
P. D. Wright	11/13,20	Bridgeport Brass Co., Adrian, Michigan	Observe extrusion
D. F. Snoeberger	11/13,20	du Pont, Aiken, S.C.	Thorium Working Com- mittee meeting
		Fernald, Cincinnati, O.	Same as above
G. E. McCullough	11/13,23	KAPL, Schenectady, N.Y.	Discussions of fuel element technology
A. G. Blasewitz	11/28,30	Chalk River, Ontario, Canada	Discussions of fuel element technology
		KAPL, Schenectady, N.Y.	Same as above
		BMI, Columbus, O.	Same as above
		Ames Lab., Ames, Iowa	Same as above
A. T. Taylor	11/30	Harvey Machine Co., Los Angeles, Calif.	Technical liaison for component order

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ORGANIZATION & PERSONNEL

Personnel totals as of November 30 were as follows:

	<u>Exempt</u>	<u>Technical Graduates</u>		<u>Non-Exempt</u>	<u>Total</u>
		<u>Permanent</u>	<u>Rotational</u>		
Fuel Assembly Unit	19	--	--	12	31
Fuel Element Development Unit	12	1	2	13	28
Fuel Evaluation Unit	11	--	--	13	24
Coatings & Corrosion Unit	10	1	--	7	18
Testing Methods Unit	7	--	--	3	10
Technical Shops Unit	4	--	--	24	28
Administration	<u>1</u>	<u>--</u>	<u>--</u>	<u>4</u>	<u>5</u>
Totals	64	2	2	76	144

FUEL COMPONENT DEVELOPMENT

URANIUM QUALITY

Studies of hydrogen in uranium continue to confirm previous indications that hydrogen pickup by uranium in the beta phase is less from chloride than from carbonate salt baths. Hanford is continuing to get material with a high hydrogen content from both Fernald and Mallinckrodt sources. There appear to be two reasons for this: (1) The large bomb used at Fernald and Mallinckrodt to produce derbies for the seven-inch ingot does not permit the charge to attain the same temperature as the smaller diameter bomb previously used. As a consequence, the hydrogen containing compounds, HF and H<sub>2</sub>O, are not as effectively volatilized and they remain in the uranium probably in the form of hydrides. This is evidenced in material prior to heat treatment at HAPO in slug form. (2) Fernald has not yet changed to the use of a salt which is free of hydrogen contamination for the rod beta heat treating operation. This is evidenced in rod treated material from Fernald.

A sampling procedure has been set up cooperatively with the Process Unit of the Metal Preparation Section. Studies of the routine slug samples secured in this program will provide information both for process control and for better comparisons between pre- and post-irradiation data on production material.

Reactivity measurements on side stream material (UF<sub>6</sub> parent material), withdrawn from the cascades at Paducah, Kentucky indicate a 360 ih/105 old pile charge loss due to a low average U<sup>235</sup> content. New specifications prepared by Pile Physics require U<sup>235</sup> concentration limits equivalent to a maximum variation of less than plus or minus 7.5 inhours (105 pile) for a one-fourth pile charge amount of uranium.

Further study on the quenching of uranium in the heat treating operation confirms previous indications that the more drastic the quench the stronger the (200) orientation becomes. These studies have also shown that the variation in orientation from the center of the length of a slug to the end is lower with the less drastic quenches.

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All of these metallurgical data point to the need for a slower quench than the ones presently used at Fernald and Hanford in the heat treating operation.

#### URANIUM DEVELOPMENT

The development of an extrusion process for producing hollow rods for ultimate use as cored slugs was accelerated during the month of November. A development extrusion was performed to test the effect of as-cast billet surfaces and holes on the ultimate rod surfaces. Preliminary examination indicates no difference in the outer rod surfaces between cast and machined billets but the hole is somewhat rougher when a cast billet hole is used. Two pilot plant extrusions, one of 36 billets, and one of 108 billets were performed. Considerable difficulty with rod straightness was encountered during each run. The warp of the rod has been attributed to non-support during quenching and asymmetry of the quench. A total of 700 slugs has been machined from rods extruded during earlier development runs. About 75 per cent of the slugs had acceptable hole diameters and concentricity. The grain size was uniform and there were few rejects for fabrication defects. One tube charge of cored slugs from the first Adrian extrusion was charged in C pile for irradiation to 900 MWD/T.

One tube charge of uranium-silicon alloy slugs from rod extruded at Adrian has been prepared for pile irradiation. Tensile properties obtained on material after canning showed an increase of 100 per cent in yield strength and about 50 per cent in ultimate strength over unalloyed uranium. However, woodsplitter tests gave contradictory results. Severe cracking was noted at the interface between the grains that had been in the beta phase and those which had not exceeded the alpha phase during woodsplitter cycling.

Tests on slugs clad with zirconium by direct casting of uranium into zirconium cans showed a very brittle bond in contrast to the strong ductile bond of earlier samples. Production of slugs for corrosion testing was delayed pending modifications to the melting furnace and determination of optimum casting conditions.

#### JACKETING COMPONENTS AND PROCESS TUBES

##### Cold Closure

The cold pressure weld canned fuel elements for production testing (approximately 400 pieces, four-inches long) were tested in the autoclave; all passed the test. The processing yield and the overall yield were 98 per cent and 90 per cent, respectively, as compared with 86 per cent and 77 per cent, respectively, for the lead dip control elements. Pile charging is scheduled for November 27. The preparation of these slugs is described in report HW-33866, November 29, 1954.

##### 63S Cans

Some 350 eight-inch fuel elements were prepared, using "L" lot material, "F" process, and 63S components. After autoclaving, 94 per cent of the fuel elements were covered with a white flaky oxide. Investigations are being conducted to determine the cause of this corrosion.

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Zirconium Tubes

Two full length H-pile zircaloy tubes were produced by Superior Tube Company. These tubes, in addition to some short lengths, will be shipped to HAPO in the next two weeks.

Development work by Bridgeport Brass Company on K-R size tubes has been set aside at the request of Design and Pile Materials personnel that wall thickness requirements may be reviewed.

FUEL ASSEMBLY DEVELOPMENT

Slug Outgassing

Preliminary canning results indicate that increased immersion times in the salt bath during the outgassing procedure are not particularly effective in further reducing porosity upon canning. The actual hydrogen content and its distribution are being determined in selected slug cores.

Zirconium Jacketing

Trials of available jacketing methods for canning bonded and unbonded zirconium jacketed slugs were continued. Only about 20 per cent of the Zircaloy 2 cans received appear to be of satisfactory quality for canning. Direct cold sizing of the cans onto slug cores has been unsatisfactory in that close and uniform fittings have not been achieved. Preliminary trials of a BMI zirconium brazing technique have been tried and zirconium coupons successfully wetted with Al-Si.

Internally and Externally Cooled Fuel Elements

A total of 300 hot pressed nickel plated internally and externally cooled fuel elements were canned for pile irradiation. Sub-quality uranium core material and rejects due to canning and subsequent handling operations reduced the number available for pile charging to slightly more than one hundred. It was originally planned to irradiate these pieces (three tubes of material) to 400, 800, and 1200 MWD/T. However, inconsistent closures detracted from the potentialities of enough of the hollow fuel element so that only the 400 MWD/T will be charged. This tube will be irradiated primarily to measure the effluent bulk water temperatures in the annulus and hole.

A total of 427 internally and externally cooled fuel elements were shipped to K pile for reactivity measurements during start-up tests. Seventy-eight of this number were nickel plated, the remainder were unplated.

Insulated Slugs

Two types of insulated fuel elements have been successfully hot press canned. The first type used an aluminum foil sprayed with ceramic as an insulating barrier. This material was wrapped around the uranium core, then assembled, sized, and pressed in typical hot

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press fashion. The second type used an aluminum can in which the interior had a two mil anodized coat. The sizing and pressing operation did not appear to compromise the insulating effect of the anodized layer.

#### Corrosion of Large Grained Aluminum

A production test has been scheduled to determine the effect of pile environment on the corrosion of large grained aluminum cans. Approximately one hundred fuel elements have been hot press canned for selection of representative samples having jacket grain sizes in three categories:  $\leq 0.010$ -inch diameter,  $\leq 0.250$ -inch diameter, and  $> 0.250$ -inch diameter. One tube containing at least ten fuel elements of each type will be exposed to about 600 MWD/T.

#### Hot Press Bonding of Zirconium

Studies of the feasibility of hot press bonding of zirconium alloys to uranium indicate that the most direct approach is to plate both the zirconium and uranium surfaces. The study is being made using plated wafers of zirconium and uranium. Zircaloy 2 - copper or nickel - uranium bonds have shear strengths in excess of 15000 psi. This value can be compared with aluminum - nickel - uranium at 8000 psi and aluminum - Al-Si - uranium at 760 psi.

#### Fuel Element Pilot Plant

The lump sum portion (interior construction) of the Fuel Element Pilot Plant is about 82 per cent complete. Scheduled completion date is January 1, 1955. At this time, Minor Construction will start moving contaminated equipment from 3730 Building into the Pilot Plant. Layout studies and detailed design continue on equipment and facilities for producing semi-production quantities of fuel elements by either the hot press or the cold closure process. Both processes are expected to be ready for operation in the semi-works portion of the Pilot Plant during May, 1955.

#### FUEL EVALUATION

Reoccurrence of the tube damage reported by Pile Technology (HW-32800) in August at C pile was indicated from visual examination of six "C" metal ruptures. The failures and companion pieces definitely showed evidence of cocking and/or chattering.

Two tubes of slugs discharged with ruptures at H pile during October were examined. Those pieces near the control rods (as determined from weasel and film data) showed more diametric distortion than slugs of similar material examined to date which have been irradiated to exposures of 600 to 1200 MWD/T.

As an early indication of the behavior of lead-dip slugs, about 150 tubes have reached exposures of 600 to 700 MWD/T, with no failures exclusive of those which occurred last month in the H pile region of general failure. For comparison, at the failure rate of the production test 25-M material, between two to three failures could be expected within this amount.

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Measurements were made of the transverse temperature distribution in a bare uranium slug while being thermal-cycled in the woodsplitter. During the heating cycle, a maximum temperature exists at approximately one-fourth inch in from slug surface. The center of the slug approaches this value within 20 to 30 seconds. During cooling, as expected, the temperature distribution is parabolic except for end effects, with a maximum at the slug center.

Tests to determine the effect of coolant temperature on the cycles-to-failure in the woodsplitter indicated slightly higher resistance to splitting using 50 C water than with 18 C.

Exploratory tests were carried out to determine the relative degree of uranium slug quality differentiation achieved by cycling the core into the alpha, the beta, or the gamma temperature ranges. About the same average ratio of cycles-to-failure between good and poor slugs was obtained within each of the three temperature ranges. Gamma-phase heating reduced by one-half the number of cycles required to produce failure as compared to beta-phase cycling, but results were more difficult to interpret.

TESTING METHODS

MIZ-1 - Al-Si Penetration Test

New Model of MIZ-1 was installed in the 313 Building this month, and used to test 1578 slugs. Although the calibration is not yet correct, in that the instrument rejected too many slugs with wall thickness greater than 20 mils, the stability appears to be good enough for extended runs between standardizing shutdowns. Some difficulty remains with the switching system which is used to suppress signals received at the end of the slug.

Sonobond - Bond Test Equipment

Several truck loads of slugs were run through the Sonobond equipment. Subsequent examination of rejects indicates that two problems remain to be solved before the equipment can be used for production. First, there were excessive porosity rejects. These were undoubtedly due to a highly porous condition of the bonding layer with the unbonded areas too small, individually, to be indicated by the Frost test. It was recognized at the time of the first test of this method with experimental equipment that extensive porosity would cause such rejects, but the degree of porosity now, because of the hydrogen problem, is much above that which was seen in the first group of slugs run in May. Second, about two per cent of slugs with rejectable voids detectable by the Frost test were not seen. Of the two, this seems to be the most serious problem. Although recent experiments indicate that it is probably a matter of getting correct adjustment of the equipment, intensive effort is continuing to solve these problems and provide Manufacturing Department with an operating Sonobond before the startup of the new 313 facilities.

MIZ-2 - Crack and Inclusion Detector

An attempt to use the MIZ-2 to detect hydrogen in slugs taking advantage of the paramagnetic properties of  $\text{UH}_3$  below its Curie point of -80 C did not succeed. It was indicated that  $\text{UH}_3$  was not present in sufficient concentration to be detectable with the technique used. 1202026

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Results returned from woodsplitter test of slugs, which had passed zygo and pickle inspection for surface defects and were then tested with MIZ-2, indicate a definite correlation between the categorization by MIZ-2 and the number of thermocycles required to induce splitting.

MIZ-2 is now undergoing stability tests in the laboratory in preparation for a production scale test.

#### Sonic Vibration

A hypothesis based upon the data obtained from sonic vibration tests appears to offer an excellent method of measuring type and degree of preferred orientation which correlates quite well with x-ray diffraction data. The results appear as a set of three numbers for each slug which are qualitative indications of the average percentage of crystallites having each major axis aligned in the rolling direction. In the absence of accurate values for the elastic constants of uranium single crystals, the index numbers are based on estimates and must be regarded as qualitative rather than quantitative, although the correlation with x-ray data in some cases suggests that the estimate is not greatly in error.

### COATINGS AND CORROSION

#### Secondary Corrosion Resistance

More hot-pressed slugs having a nickel or iron barrier layer have been tested to determine the effectiveness of the nickel or iron as corrosion-resistant layers. In these tests, the nickel was much more effective than the iron. The slugs with a 1.0 mil nickel deposited on a smooth uranium surface lasted much longer than those with a rough uranium surface. These results corroborate those obtained from previous experiments, but are still being checked.

#### Undercutting Resistance

The nickel-plated hot-pressed slugs as prepared at present resist undercutting much more effectively than all hot-pressed slugs tested previously. They are about as satisfactory in this respect as all other types including Al-Si dip slugs. The dependence of undercutting on various factors such as surface of uranium, inclusions, pressure and temperature during pressing, and hydride formation is being studied.

#### Tests of Diffusion Bond

Some hot-pressed I & E slugs were tested to determine the effectiveness of the diffusion bond. In several cases, there was not bonding in small areas at the top and bottom and the only protection against water entry was the fusion weld. This condition resulted probably from unsatisfactory cleaning procedures. Newer, more effective cleaning methods are being evaluated.

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Fuel Technology Sub-Section

HW-33962 High Temperature Corrosion of Magnesium

Some samples of magnesium and magnesium-silicon alloy were exposed to water at temperatures varying from 230 C to 325 C. The magnesium and the alloy rapidly disintegrated at these temperatures. At 230 C, the corrosion rate for magnesium was greater than 130 mg/cm<sup>2</sup>/hr. An extrapolation of data for corrosion of magnesium at lower temperatures gives a rate of about 0.01 mg/cm<sup>2</sup>/hr, which is off by a factor of 10<sup>4</sup>. This indicates a change in mechanism of corrosion and illustrates vividly the danger of extrapolation of rates over wide ranges of temperature. In preliminary experiments, coupling with zirconium did not protect the magnesium.

Regeneration of Electrolytic Etch Solution

After several slugs have been etched in the hydrochloric acid-phosphoric acid solution, the bath is not as effective as when first prepared and is usually discarded. A method has now been developed to regenerate this solution by precipitating uranium by addition of oxalic acid. This should result in considerable savings in operation and uranium recovery.

INVENTIONS

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. 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.

*H. M. McCullough*  
Manager - Fuel Technology  
ENGINEERING DEPARTMENT

GE McCullough:acj

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**DECLASSIFIED**MONTHLY REPORT  
DESIGN SECTIONVISITORS AND BUSINESS TRIPS

R. W. Cordell of Panellit, Inc., Skokie, Ill., visited Hanford October 25th through November 30th to perform testing of the 100-K temperature monitor system.

R. D. Brooks of the General Electric Company, Schenectady, N. Y., visited Hanford October 29th to discuss sealed motors.

M. F. Parr and Herbert Vendetti of the Foxboro Company, San Francisco, California, visited Hanford November 1st through 6th, and Don Combs of Bumstead-Woolford, Seattle, Washington, visited Hanford November 1st and 2nd for calibration of 105-KE power calculator system, investigation of the 105-KW power calculator temperature well breakage, and consultation on the power calculator problems at the 105-B and 105-C buildings.

J. J. Gately of Instrument Laboratory, Inc., Seattle, Washington, visited Richland Nov. 4th to inspect Kieley and Mueller Inc. valves.

C. S. Slanning of Minneapolis-Honeywell Regulator Company, Brown Instrument Division, Philadelphia, Pa., visited Hanford November 8th and 15th to 19th to inspect and service Brown instruments.

A. F. Sperry of Panellit, Inc., Skokie, Ill., visited Hanford November 11th through 15th, and W. J. Faller of Panellit, Inc., Skokie, Ill., visited Hanford November 13th through 30th for consultation and work on the pressure monitor systems in the 100 Areas.

J. Mohondro of the Hallidie Machinery Company, Spokane, Washington, visited Richland November 14th to discuss fuel element fabrication problems.

H. C. Donelson of Tower Equipment Co., Mercer Island, Washington, visited Richland November 15th through 30th to assist on the repair of the pressure monitor switches for 105-KW.

M. F. Parr of the Foxboro Company, San Francisco, Calif., is visiting Hanford November 22nd through December 14th for calibration of the 105-KE power calculator system and investigation of 105-KW power calculator temperature well breakage.

W. Vasil of Perine Machinery and Supply Co., Seattle, Washington, and E. F. Shepherd of American Tool Works Co., Los Angeles, Calif., visited Richland November 22nd to discuss fuel element fabrication problems.

R. L. Tower of Tower Equipment Co., Mercer Island, Washington, visited Hanford November 22nd through 26th to investigate trouble encountered on the pressure monitor priming elements.

R. A. Anderson of Panellit, Inc., Skokie, Ill., visited Hanford November 23rd through 27th to investigate temperature monitor difficulties of 100-K and installations at 105-B and 105-C.

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O. Rodstrom of Dawson Machinery Co., Yakima, Washington, visited Richland November 24th to discuss fuel element fabrication problems.

C. K. Shanks of Pacific Scientific Co., Portland, Oregon, visited Hanford November 30th for consultation on operation of 105-C gas analyzer.

B. R. Elder visited the Tube Bending Works, Los Angeles, California, October 21st through November 9th and G. A. Newell visited November 7th through 19th to review 105-K connector problems.

E. See Day, Jr., visited Panellit, Inc., Skokie, Ill., November 4th through 9th to investigate engineering status on orders for Projects CA-512-R and CG-578.

A. J. McCrocklin and G. R. Hosack visited and consulted Babcock & Wilcox Co., Akron, Ohio, November 8th regarding boilers and heat exchangers; GrisCom Russel, Massillon, Ohio, November 9th regarding heat exchanges; Combustion Engineering, New York City, N.Y. regarding boilers, heat exchangers and pumps; the General Electric Co., Schenectady, N.Y. regarding steam and gas turbines.

S. F. Schure visited the General Electric Co. at Lynn, Mass., November 14th through 16th and at Schenectady, N.Y. on November 17th to 18th for liaison regarding technical personnel.

E. L. Armstrong, W. L. Pearl and L. E. Foster visited ANL, Lemont, Ill., November 15th to 16th and ORNL, Oak Ridge, Tenn., November 17th to 18th for consultation on reactor design.

L. E. Foster visited the National Advisory Commission of Aeronautics, Cleveland, Ohio, November 19th for analog design consultation.

R. F. Coffman visited the Western Gear Works, Seattle, Washington, November 22nd to witness pulse generator test.

G. F. Ehlers visited Bumstead-Woolford, Seattle, Wash., November 22nd to 23rd to examine and approve instrument panel boards.

ORGANIZATION AND PERSONNEL

Personnel Statistics:

	<u>October 31</u>			<u>November 30</u>		
	<u>Exempt</u>	<u>Non Exempt</u>	<u>Total</u>	<u>Exempt</u>	<u>Non Exempt</u>	<u>Total</u>
Design Management	1	1	2	1	1	2
Process Engineering Sub-Section	68	13	81	69	14	83
Design Planning Unit	18	11	29	16	12	28
Design Engineering Sub-Section	84	11	95	84	10	94
Design Drafting Unit	8	86	94	8	86	94
Total Section Personnel	179	122	301	178	123	301
Technical Graduates (Rotational)	-	5	5	-	5	5
TOTAL	179	127	306	178	128	306

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Accessions - 4  
Separations - 4

GENERAL

Design Section engineering and drafting effort for November was distributed approximately as follows:

	<u>Engineering Man Months Expended</u>	<u>Drafting Man Months Expended</u>	<u>% of Section Effort</u>
1952 Expansion Program	33.9	12.7	18.5
Reactor Plant Modification for Increased Production	24.3	21.1	17.4
4-X Program	16.3	5.4	8.7
Design Development	55.1	11.7	27.1
1706-KER Recirculation Facilities	7.4	7.4	5.7
Other Projects and Design Orders	<u>28.5</u>	<u>30.7</u>	<u>22.6</u>
	165.5*	89.0	100.0

\*Equivalent man months expended includes 3.6 months of engineering overtime. Approximately 4.8% of the Section personnel worked a six-day week. This effort was concentrated on field liaison in support of 100-K Reactor and Water Plant construction program.

The drafting production for the month was 291 new drawings, six charts and graphs and 313 revisions.

The midyear review of the Fiscal Year 1955 Construction Budget was prepared during the month.

DESIGN DEVELOPMENT

Statistics:

The total number of engineering and drafting man months expended on research and development during November was distributed as follows:

	<u>Engineering</u>		<u>Drafting</u>	
	<u>Man Months</u>	<u>% of Total</u>	<u>Man Months</u>	<u>% of Total</u>
Metallurgical Design Development	3.8	6.8	0.9	7.7
Reactor Plant Design Development	23.4	42.5	3.0	25.6
Separations Plant Design Development	25.0	45.4	4.4	37.6
Chemical Processing and Reduction Design Development	1.2	2.2	0.6	5.1
234-5 Design Development	<u>1.7</u>	<u>3.1</u>	<u>2.8</u>	<u>24.0</u>
	55.1	100.0	11.7	100.0

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**DECLASSIFIED**Metallurgical Design Development

During the month work was done on the process equipment layout of the semi-works in the Fuel Element Pilot Plant. Material was obtained for scale layouts of manufacturing plants for hot press and cold closure canning. These layouts will be used to establish plant and operating costs for each process. A design study was started on specialized equipment for automation of the cold closure pressing and subsequent machining operations.

Reactor Plant Design Development

A study was completed on the possibility of continuous operation of a high pressure recirculating loop following a fuel element rupture. Preliminary results indicated that continued operation would be possible. Further studies and experiments are necessary for complete evaluation.

Additional study of in-pile boiling was continued to obtain correlation of data. An economic study was initiated to determine the gains which would be achieved with various degrees of boiling.

A testing program was started to study the effects of high temperatures on heavy aggregate shielding materials. Test blocks of limonite have been treated and tested to obtain strength characteristics. Results will be summarized when the test series is complete.

Work was started on design considerations which might minimize the graphite temperature coefficient effect in the irradiation of long-exposure fuel elements. Other development studies included consideration of: ultrasonic cleaning of fuel element dummies; mechanized handling, sorting and conveying of slugs and dummies in the reactor discharge area and storage basin; remotely operated process tube cutter; and a hot ball separator for the Ball 3X safety system.

Separations Plant Design Development

Study continued on the best means for obtaining specified production for the short range 4X Program. The Bitrex Plant evaluation was essentially completed, and a summary report is being prepared. A direct comparison of THX, BPX, Bitrex and an entirely new separations plant, to select a possible substitute for the Bismuth Phosphate Plants, was made. The comparison indicates that for the currently specified production schedule for the short-range 4X Program the proper course of action is the reactivation of the B Plant and operation of the B and T Plants as Bismuth Phosphate Plants.

Continued emphasis was placed on the study of the ruthenium contamination problem at the Redox Plant. The trend of the study points to short-range modifications to the Redox Plant to provide for in-cell ozonization, increased capacity of the ventilating system, facilities for continuous canyon cleanup, and replacement of contaminated process vessels.

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The study of Purex Facility capacity limitations was completed, and a rough draft of a report was prepared. Testing of percolation rates for cribs was continued.

Fabrication of the prototype in-line alpha monitor was completed by the vendor, and was shipped to Hanford early in the month. Alterations which had been planned previously are being made. The electrical control equipment is nearly complete, and it is planned to start test runs next month.

The results of a study of buried stainless steel process lines have led to an interim report which recommends that the use of cathodic protection be maintained on all buried stainless steel process lines, whether incased or directly buried. Further study of specially coated lines is continuing.

Other separations design development work was performed on a column interface monitor, centrifuge wobble meter, and means and methods of mechanical de-canning.

#### Chemical Processing and Reduction Design Development

Field tests were conducted on check valves, mist separators, and alarms which might be used in the Task II furnace off-gas lines. Results were satisfactory, and the design for modification of equipment was completed.

#### 234-5 Design Development

Development work is proceeding on the RMA Line conveyor system. Six study drawings were started and are in the check-print stage.

#### Engineering Standards and Materials Development

Cost to date for development of engineering standards for the current fiscal year is \$36,271.

The following standards were completed and issued during the month:

D-2-54a	"Clearances on Poles", pages 1 and 2
D-7-101	Type "B" Transformer Structure
D-7-102	Type "C" Transformer Structure
D-7-103	Type "D" Transformer Structure
D-6-101	Single Phase Primary & St. Ltg. Loop Tangent
D-6-161	3-Phase Primary & St. Ltg. Loop Tangent
D-10-80	3-Phase Primary Tangent

Work on standards and studies during the month is as follows:

- a. Revision of the existing standard specifications HW-5301-S, HW-5302-S, HW-5303-S and HW-5304-S, for Austenitic Stainless Steels is 70% complete, an advance of 30% during the month.
- b. The preparation of a new standard specification for Austenitic Stainless Steel Piping was started, and is 35% complete.

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- c. Revisions to existing standards on name plates, steel ladder cage, radiation barricade, and stairway construction were advanced 35% during the month to 85% complete.
- d. Work on revising standards on standard pipe encasements is 60% complete, an increase of 10% during the month.
- e. Work on HWS-5766-S, "Standard Specification for Radiographic Spot Examination of Welded Joints", was advanced 5% during the month to 95% complete.
- f. Preparation of standard design criteria is as follows: Four electrical sections are 95% complete, and the sub-section on auxiliary signalling communications systems is 90% complete.
- g. A study has been started to investigate the feasibility of using cathodic protection for the large steel retention basins. Preliminary results indicate that aluminum anodes show deep pitting, while graphite anodes are relatively unaffected.

DESIGN PROJECTS

Statistics:

Design engineering and drafting effort of the Section on projects for the month of November was expended in the following categories:

	<u>Engineering</u>		<u>Drafting</u>	
	<u>Man Months</u>	<u>% of Total</u>	<u>Man Months</u>	<u>% of Total</u>
1952 Expansion Program	33.9	30.7	12.7	16.4
4-X Program	16.3	14.8	5.4	7.0
Reactor Plant Modification for Increased Production	24.3	22.0	21.1	27.3
1706-KER Recirculation Facilities	7.4	6.7	7.4	9.6
Other Design Projects	7.4	6.7	5.4	7.0
Miscellaneous Design Orders	<u>21.1</u>	<u>19.1</u>	<u>25.3</u>	<u>32.7</u>
	110.4	100.0	77.3	100.0

CA-512 - 100-K Area Facilities

Design activities on 100-K Reactor Facilities consisted mainly of the following items in support of construction: bid review, drawing revisions, review of vendor drawings, the preparation of construction as-builts, and design liaison with the field. New aluminum connectors are being installed on both faces of the 105-KW Reactor, following successful testing of the first connectors received. The Design Section continued to resolve equipment failure problems resulting from final acceptance testing of the 100-KW reactor plant. The principal item involved was failure of some of the resistance thermometers on the 105-KW temperature monitoring system. Design is progressing on the development, with the vendor, of an improved thermometer for replacement of the thermometers being installed.

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Design work on the 1706-KER Recirculation Facilities was reduced to a minimum level during the month, pending completion of cost estimates for alternate scope revisions. These studies are aimed at reducing the cost of the development facility, while retaining necessary features for planned test programs. Twelve drawings were issued for approval, and design was advanced to 67% complete, an increase of 5% during the month.

CA-513 - Purex Separations Facility

Design of the revisions to the condenser design for the Purex Tank Farm is 99% complete. The sampler arrangement drawing was submitted for approval. Design of the ammonia scrubber and jumpers was continued, and the seven required drawings were issued for comment. The review of emergency power requirements of the 200-E Area was completed, and a report was prepared and issued.

CA-514 - 300 Area Expansion

Design of the 300 Area Expansion Program is 99% complete. Design of alterations to the 3706 and 3703 Buildings was completed. Design of the ultrasonic bond test equipment was advanced 45% during the month to 95% complete.

CA-539 - Additional Waste Storage Facilities for Redox

Work was started on design to provide a vapor manifold system for the nine tanks at the 241-SX Redox Tank Farm which were not provided with a vapor system as part of the CA-539 construction contract. The design required for lump sum construction is being expedited in order to complete a bid package in January, 1955. Other work included consists of additional jumpers with valves, and an emergency water supply system.

CG-558 - Reactor Plant Modification for Increased Production

Total design of modifications to existing reactor plants for increased production is 47.2% complete, an increase of 4.6% during the month. Detail and design scope were advanced 4.3% and 5.9%, respectively, during the month to 41.7% and 96.9% complete.

Design is proceeding on the basis of a decision that the 190-B, D, and DR Building annex shells would be built under three separate lump-sum contracts and the installation of the process pumps in all three buildings would be done under one mechanical contract. Drawings are being revised in order to indicate division of work between various contractors. This work is receiving concentrated effort in order that a bid package for the 190-B Building annex may be prepared in January, 1955.

Some consideration was given to the possibility of re-designing the nozzles to permit removal and replacement of the tubes without removal of the nozzles. A test is in progress to determine whether or not a tube can actually be withdrawn from a reactor through a front face nozzle and replaced by the method proposed. Studies are being made relative to the effect on the biological

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shield when it is freed from the tubes which act as tie rods. Requisitioning of nozzles of the present design will be delayed pending completion of the studies.

CG-562 - Waste Metal Recovery Plant Modifications

The work originally scheduled for this program has been completed, but several additional jumper drawings are needed for additions and changes now being processed. These changes include provisions for second cycle re-work of REU and changes in instrumentation for control of the intercycle concentrator.

CG-574 - Hanford 3X Program - Irradiation

Detail design is approximately 82% complete, an advance of 30% during the month. Of twelve required drawings three have been approved, two are ready for approval and five have been issued for comment.

CG-578 - Effluent Water Monitoring Improvements, 100-B, D, DR, F, and H Areas

Design was advanced 9.5% during the month to 67.5% complete. Of a total of 63 drawings, 25 are approved for design, 23 are issued for comment, and six are in the check print stage.

CG-579 - Effluent Water Monitoring Improvements, 100-C Area

Design was started during the month and is approximately 3% complete. Five drawings are in the check print stage.

CG-596 - Central Mask Washing Station Building 2723-W - Separations

Detail design, of the facilities for a central mask washing station in the 200-W Area, was advanced to 35% complete. Four drawings were issued for comment.

CG-597 & CG-603 - Hanford 4X Program - 200 and 300 Areas

Project proposals were completed during the month and were submitted to the AEC for approval. These proposals will, if approved, cancel Project CG-597, "Hanford 4X Program - 200 and 300 Areas," and divide the project into three projects as follows: CG-603, 4X Program - Bismuth Phosphate Plants; CG-613, 4X Program - Metal Conversion Plant; CG-614, 4X Program - 300 Area.

Design activity on the 4X Program continued to expand on a priority basis. Scope design for Phase I of the B and T Plants is 95% complete while detail design was advanced 10% during the month to 25% complete. Fourteen scope drawings were prepared for use in scope documents. The Part II document covering items under study and additional items found necessary for the reactivation of the B Plant and modifications of the T Plant is being prepared. A 38 page cell diagram booklet showing modifications, new jumpers and regasketing required for the 221-B canyon cells was completed. Approximately 30 piping drawings were revised to the as-built condition while four jumper drawings for T Plant first cycle waste scavenging were issued for comment.

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Scoping of the expansion of the Metal Conversion Plant is approximately 25% complete on the basis of utilizing three continuous calciners in addition to the 224-U Building. Plot plans, architectural layouts, process flow diagrams, engineering flow diagrams, and a design layout of the continuous calciners have been started.

Scoping of the 300 Area portion of the 4X Program was advanced to 40% complete. It was decided that the required production level can be met with the process equipment installed on Project CA-514 except for the addition of welders and autoclaves. Preparation of purchase requisitions for advance procurement of four additional welding stations and eight autoclaves was started. Scope completion was delayed by the consideration of the installation of induction furnaces for recovery and conditioning of bonding material, and the proposed installation of a mechanical conveying equipment between the quench station and the cutoff machines.

CG-598 - Purex Vacuum Fractionator

Work on detail design in connection with a vacuum fractionator for Purex is inactive pending negotiation of a purchase contract for a "design and fabricate" package for the fractionator and associated tankage.

CG-599 - Hanford 4X Program - 100 Areas

Scope and detail design for the 100 area portion of the 4X Program were advanced 25% and 10%, respectively, during the month to 75% and 60% complete. The preparation of a scope document and a project proposal will be held in abeyance until firm information can be established.

CG-600 - 100-C Alterations

Detail design was advanced to 26% complete during the month. One drawing is approved and two drawings have been issued for comment.

CG-608 - Redox Crane Viewing Room

Authorization was received during the month for design of a viewing room on the existing Redox crane maintenance platform. Detail design had been completed previously on authorization from the Manufacturing Department and appropriate cost transfers will be made.

CA-612 - Alteration of Building 713 for Electronic Data Processing Machine

A project proposal was prepared and is ready for approval. Authorization for detail design was received at the end of the month and detail design was started.

D.O. 100754 - Modification of the 189-D Process Tube Mock-Up

Design is approximately 95% complete, an advance of 5% during the month.

D. O. 100757 - "As-Built" Area Maps

Drafting is continuing on the revision of Hanford Maps to bring them up-to-date and is approximately 60% complete, an increase of 10% during the month. Work has started on 64 of 84 electrical maps and 239 of 303 civil maps.

D. O. 100825 - Silica Gel Tail-End Treatment - Redox Phase II (CG-535)

Design was advanced 2% during the month to 97% complete. Seven drawings were approved during the month to make a total of 50 drawings completed of the 54 required drawings.

D. O. 100890 - Yakima River Pump Station and Feeder Line

Design was advanced 30% during the month to 50% complete on the facilities to provide water for the Wellsian Way Recharge Basin.

D. O. 100930 - Graphite Hot Shop and Storage Facility - 3730 Building

Detail design of the renovation and addition to Building 3730 for use as a hot shop is approximately 90% complete, an advance of 10% during the month.

D. O. 100946 - Foxboro Dewcel Moisture Monitoring System (CG-583)

Detail design of a moisture detection system for the 100 areas was advanced 10% during the month to 60% complete. Five drawings have been approved and nine drawings are at the comment stage.

D. O. 100963 - Floor Loading Stress Survey, 325 Building

All calculations were completed for the 325 Building floors under proposed loading. Remaining work involves preparation of a plan showing allowable floor loadings in certain areas of the building.

D. O. 101015 - De-jacketing and Ultrasonic Equipment, 105-C Bldg. (CG-589)

Design of a slug stripper and ultrasonic grain size determinator was advanced to 55% complete, an increase of 15% during the month. Of 29 required drawings, three were approved and 15 are in the comment stage.

D. O. 101035 - Installation of Car Pullers, 100-B, D, F, and H Areas

Design for the installation of car pullers is 100% complete, an advance of 10% during the month.

D. O. 101036 - Moisture Monitoring System, 105-C Building (CG-584)

Detail design of a Foxboro dewcel moisture monitoring system to be installed at the 105-C Building was advanced 15% during the month to 35% complete.

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D. O. 101039 - H-4 Oxidizer Redesign

Major revisions to the original scope were received. These changes include a reduction in the size of the tank to provide for more adequate handling clearances. Seven jumpers will also be required.

D. O. 101041 - Additional Air-Drying Facilities - Building 234-5

The project proposal for additional air-drying facilities for the 234-5 Building was revised to present additional justification and the securing of approvals was started.

D. O. 101045 - Discharge Area Television Viewer, 105-B (CG-593)

Detail design for the 105-B closed circuit discharge area television viewer was advanced to 56% complete, an increase of 20% during the month. The purchase requisitions for the monorail equipment and the closed-circuit television chain were issued.

D. O. 101051 - Carbon Dioxide System - Building 234-5

A project proposal draft was completed for this proposed project.

D. O. 101052 - Redox Stack Sampler - Project Proposal

Work was continued on scoping of a Redox stack sampler and two drawings are ready for approval. The preliminary scope is approximately 95% complete.

D. O. 101062 - HNO<sub>3</sub> Decontamination Facilities - 100 Areas - Project Proposal

The work in connection with nitric acid facilities for decontaminating fuel element dummies is being curtailed pending the results of testing of alternative methods of decontamination.

D. O. 101063 - Alum-Activated Silica Water Treatment Facility, Phase II - Project Proposal

The design scope is currently in preparation for Phase II of the alum-activated silica water treatment facilities with an estimated completion date of January, 1955.

D. O. 101067 - Remote Sampling Equipment - Hot Semiworks

Design was advanced to 100% complete, an increase of 20% during the month. Sixteen drawings were completed for the job.

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D. O. 101100 and 101105 - Fuel Element Pilot Plant Equipment Design and Installation (CA-546)

Detail design was continued on the semi-works equipment until late in the month. Work was then suspended at the request of the Technical Section until such time as an evaluation of the fuel element development program can be completed.

D. O. 101101 - New VSR Test Tower (CA-548)

Work was started on design of the modification of the VSR Tower to make it weatherproof and improve operating conditions.

D. O. 101125 - Installation of Acid Feed Equipment - Project Proposal

Work was started on scope and a project proposal for the installation of acid feed equipment in the 100 areas. A letter proposal requesting interim authorization of funds is being circulated for approval.

D. O. 101126 - Laboratory and Instrument Shop, 105-KW

Design was started on a monorail which is to be added in the shop.

Design Section Work Completed During November

- D. O. 100852 - Cement Pad for Grain Storage Bins, 100-F
- D. O. 100961 - (CA-516) Gable - Butte RR
- D. O. 101073 - Redox Instrument Jumper
- D. O. 101081 - Jumper Racks - 221-T
- D. O. 101083 - Variable Spread Diversion Box Jumpers, 221-T
- D. O. 101107 - Column Interface Jet-Out Jumpers, 202-S
- D. O. 101108 - Jumper J-2 to J-3, 202-S
- D. O. 101112 - Jet Jumper G-5 to H-2, 202-S

INVENTIONS

All persons in the Design Section engage 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.

*R. B. Beaton*

Manager, Design  
ENGINEERING DEPARTMENT

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DESIGN SECTION WORK STATUS  
ENGINEERING MAN MONTHS

PROCESS ENGINEERING SUB-SECTION

Description	Work Time		Backlog Start of 1952	Sch'd Dur. Mo.	Spent % of Total Effort Mo.	Backlog End of Month	Scheduled FY 1955					Bal FY55 And Later	Total
	Dur. Mo.	Mo.					Dec.	Jan.	Feb.	Mar.	Apr.		
1952 Exp. Program***	62.1	25.0	16.3	23.8	70.8	15	13	11	8	7	5	11.8	70.8
CG-558	15.7	8.0	3.5	5.1	20.2	3	3	2	2	2	2	6.2	20.2
CG-598	2.8		.6	.9	2.2	.5	.5	.5	.5	.5			2.2
4-X Program	41.1		3.5	5.1	37.6	5	6	6	6	5	5	4.6	37.6
Reactor D&D	194.5		18.9	27.7	175.6	19	20	21	22	23	24	46.6	175.6
Sep. D&D	143.4		18.2	26.6	125.2	18	18	18	18	18	18	17.2	125.2
Met. D&D	14.1		2.0	2.9	12.1	2	2	2	2	2	2	.1	12.1
234-5 D&D	13.9		.4	0.6	13.5	.5	.5	1.5	1.5	1.5	2	6.0	13.5
Weapons D&D	8.2		.6	0.9	7.6	1	1	1	1	1	1	1.6	7.6
Other Proj. & Misc.	30.1		4.4	6.4	25.7	4	4	4	4	4	4	1.7	25.7
Anticipated Fut. Work												6.0	19.0
TOTALS	525.9	33.0	68.4	100.0	490.5	68.0	68.0	68.0	68.0	68.0	68.0	101.8	509.5

DESIGN ENGINEERING SUB-SECTION

1952 Exp. Program***	78.4	25.8	18.1	23.0	86.1	16	14	12	10	9	8	17.1	86.1
CG-558 & 600	196.3		19.1	24.2	177.2	19	19	19	19	19	18	64.2	177.2
CG-578 & 579	15.4		1.3	1.6	14.1	2	2	2	2	2	2	2.1	14.1
CG-598	23.9		.5	0.6	23.4	1	4	6	6	4	1	1.4	23.4
4X Program	95.6		10.1	12.8	85.5	13	15	14	13	11	8	11.5	85.5
D.D. PGM'S Other Proj's	91.4		10.1	12.8	81.3	10	10	11	11	12	13	14.3*	81.3
Minor & Misc.	93.9**	12.0	19.8	25.0	86.1	17	13	11	9	8	7	21.1	86.1
Ant. Future Work						1	2	4	8	12	18	20.0*	65.0
TOTALS	594.9	37.8	79.0	100.0	553.7	79	79	79	78	77	75	151.7	618.7

Present Total Backlog is distributed over the five engineering branches in terms of man months as follows:

	Authorized Projects	Anticipated Future	Totals
Arch & Civil	116	8	124
Mechanical	152	18	170
Electrical	90	22	112
Instrument	145	11	156
Standards	50	6	56
TOTALS	553	65	618

\*Bal FY 55 Only  
\*\* Backlog Adjusted to Exclude CA-546 & Partial 4X

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MONTHLY NARRATIVE REPORT - NOVEMBER, 1954

PROJECT SECTION

I. SUMMARY

A. ORGANIZATION AND PERSONNEL

Following is a summary of personnel changes in Project Section during the month:

	<u>October 31, 1954</u>	<u>November 30, 1954</u>	<u>Net Change</u>
Employees on Payroll	403	396	-7
Tech. Grad. - Rotational	6	7	+1

The end-of-month status involved these changes:

	<u>Project Section</u>	<u>Tech. Grad. - Rotational</u>
Payroll Additions	4	
Payroll Removals	4	
Transfers into Section	2	1
Transfers from Section	9	
Transfers within Section	1	

B. SCOPE OF ACTIVITIES:

At the end of the month construction completion status of major projects was as follows:

<u>Project No.</u>	<u>Title</u>	<u>Completion</u>	
		<u>Scheduled</u>	<u>Actual</u>
CG-496	Recuplex	90%	86%
CA-512	100-K Area Facilities		
	KW - Water Plant	100	99.9
	Reactor and Building	100	99.9
	KE - Water Plant	100	96
	Reactor and Building	100	95
	General Facilities	100	94.4
CA-513	Purex Facilities, Part "A"	97	85
	Part "D"	100	100
CA-514	300 Area Expansion	78	72
CG-535	Redox Capacity Increase Phase II	87	84
CA-546	Fuel Element Pilot Plant		42
CG-558	Reactor Plant Modifications	2	1

C. CRAFT LABOR

A jurisdictional dispute between construction machinists and piping crafts caused a brief stoppage at 100-K on November 5, 1954. The machinists walked out during the

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day shift but resumed work on graveyard shift. The disputed work was eventually performed by pipefitters.

The Union Relations Section has been informed unofficially of a jurisdictional settlement between International Presidents of the Machinists and Millwrights Unions. This settlement provides for specific divisions of work, but allows also for precedents established on projects to which both unions have been certified. Ratification is being sought from local unions before submittal to the Company. The proposed settlement offers substantial benefits to the Hanford construction program.

#### D. SAFETY AND SECURITY

Eight regular meetings for discussion of safety, security, and health topics were attended by about 285 personnel. Four Monday morning tool box meetings and one mass safety-security meeting were conducted in the field for service contractor personnel. Safety and Special Hazards Orientation was given to 12 new and re-hired construction employees. Eight cases of shoe contamination occurred during the month; all were successfully decontaminated.

#### E. HIGHLIGHTS

##### Minor Projects Sub-Section

Work was done on 43 project items, four informal requests, and miscellaneous work orders representing total authorized funds of \$40,745,645. The Sub-Section completed assigned work on CA-434, New Bio-Assay Laboratory; CA-513-D, Hot Semiworks Conversion; ER A-1213, Metal Loading Facility, 105 Buildings; and ER A-6022, Replacement of 146-FR Raw Water Supply. Eight project proposals were approved by the General Electric Company. Four authorizations were granted by A.E.C. The Sub-Section accepted initial assignments of work on three projects and two engineering requests. Construction on the Reactor Plant Modification progressed from the temporary into the permanent phase. Important projects now in progress include Recuplex Installation, Activate Task I - RMA Line, Expansion of 300 Area Production Facilities, Fuel Element Pilot Plant, Reactor Plant Modification, Effluent Water Monitoring Improvements, and Hanford 4X Program.

##### Project Auxiliaries Sub-Section

Inspection was completed on 91 orders, which with newly assigned orders leaves the total number of orders requiring inspection at 585, a slight increase following three months of rapid decrease. Samples evaluated under the Corrosion Testing Program decreased slightly to 246, of which 196 evaluations were made on the East Coast. Reproduction output was 272,660 square feet, a decrease of 13% from the preceding month. Estimating completed twenty estimates, of which six were for project proposals. Extensive work was being done for the Reactor Modification Program. Field Surveys completed preliminary design data for the Reactor Modification Program in 100-B, C, D, and DR Areas, and also completed the "as-built" survey of underground telephone cables for 100-K Area.

##### Reactor Projects Sub-Section

The estimate for beneficial use of KW Reactor was December 11, 1954. This appears to

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provide ample time for completion of construction work. New connectors have been installed on the outlet face, and about 30 rows were installed on the inlet face. Re-run of the Dynamic Flow Test of KW was essentially completed on November 11. All process tubes have been dried out, following the re-test which was completed November 22. The final gas test was completed on the process unit, and acceptance testing was being completed on pile control systems and area switchgear. At 190-KW four secondary pumps were returned to the vendor and are to be replaced by pumps with new casings. At 183-KE Filter Plant, all major equipment has been installed and is being tested. All necessary chemicals have been received. The 181-KE river pumps have been run eight hours or more and are being used for testing KE Water Plant. At 190-KE, the last two primary pumps and the fourth secondary pump were installed. Tests are being run on boilers and two turbine-generator sets at 165-KE. The Dynamic Flow Test has been started for KE Water Plant, and work was being directed toward using KE Water Plant to back up KW during start-up. At 2101-M Building, work was completed on graphite for both the Physical Constants Test Reactor and the Thermal Test Reactor.

#### Separations Projects Sub-Section

Purex design work as originally established has been completed, but work is being done on revisions to the project, review and approval of vendors' drawings, bid reviews, and "as-builts". Shipment of Purex vessels and engineered items was accelerated during the month. All process pumps have been shipped, 10 of the 11 centrifuges, 13 of the 14 pulse generators, 60 of the 67 agitators, and 148 of the 191 vessels. Repair of concentrators in mock-up was essentially completed. Of total major equipment received, 32 pieces have been completed through mock-up and delivered to 202-A Building. Installation of equipment in "F" Cell was nearing completion, and work in other cells consisted of Amercoat painting and equipment installation. Jumper fabrication was about 60% complete, there being 817 welded, 709 framed and balanced, and 678 tested. Total jumper installation was 74 in the cells. Acceptance testing was started on the remote crane and one pulse generator assembly. Tank insulation was completed in both 203-UNH Storage and 211-A Chemical Tank Farm. Hot Waste Lines were accepted on November 3; the cribs were completed, and saturation tests are being performed. Work continued satisfactorily on the 241-A Tank Farm.

#### F. MONTHLY REPORT OF INVENTIONS AND DISCOVERIES

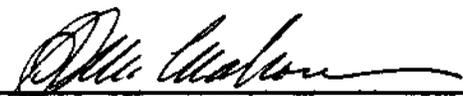
All persons in the Project Section engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge no inventions or discoveries were made in the course of their work during the period covered by this report, except as listed below.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

H. E. Hanthorn  
L. J. Battey

Flexible Element for Piping Systems

November 4, 1954

November 30, 1954.

  
J. S. McMahon, Manager - Projects

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II. STATISTICAL AND GENERAL

A. SIGNIFICANT ASSIGNMENTS

1. Initial Reporting

CG-608 - Redox Crane Viewing Room

Scoping and detailed design for this project estimated at \$21,000 are being managed by Design Section. A work release has been issued to Minor Construction, and construction is to start after procurement of materials has been completed. Installation is being scheduled between the periods of charging Redox dissolvers, and this is estimated to allow about 16 hours per week.

CG-613 - Hanford 4X Program - Metal Conversion Plant

The project proposal for a total estimated cost of \$340,000 was transmitted to AEC on November 18, 1954.

CG-614 - Hanford 4X Program - 300 Area

The project proposal for a total estimated cost of \$130,000 was transmitted to AEC on November 18, 1954.

ER A-1220 - Minor Construction Fabrication Shops Study

Preliminary scoping and design phases were about 95% complete for this work which was estimated at \$91,000. The study report has been completed and was reviewed with Minor Construction Management Unit. Minor changes are being made to incorporate results of the review.

ER A-3111 - Melt Plant Modifications - 311 Building

With scoping about 80% complete, the project proposal is being prepared. Technical Section has now decided to accept the costs for re-working the booster pumps, diffusion pumps, and vacuum piping except for some valve work.

2. Final Reporting

CA-434 - New Bio-Assay Laboratory

Construction progressed 2% to completion, with minor exceptions. Information for the Physical Completion Notice is being assembled.

CA-513-D - Hot Semiworks Conversion

Construction progressed 1% to completion. Information for the Physical Completion Notice was issued on November 9, 1954. A work order has been written to Minor Construction forces for a major start-up adjustment to the acid fractionation equipment.

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ER A-1213 - Metal Loading Facility - 105 Buildings

The work order for preparation of the project proposal was closed out November 3, 1954. No further work is to be performed until the project is approved by General Electric.

ER A-6022 - Replacement of 146-FR Raw Water Supply Line

The requested study progressed 10% to completion. It was recommended that the pipe line not be replaced at this time, and the study report was transmitted to the Radiological Sciences Department.

3. Current Projects

CG-496 - Recuplex Installation - 234-5 Building

Design had been completed previously; over-all construction progressed 2% to a total of 86%. Revision #5 to the project proposal, requesting a total of \$1,928,000 for completion of the project, a beneficial use date of February 1, 1955, and a final completion date of April 1, 1955, has been submitted to AEC.

The final phases of instrument piping installation are being completed. The Recuplex - Task I process tie-in is being made, and instrument calibration and testing of pipe pressures are started. Information concerning materials for chemical storage tanks and Chempumps is being exchanged with vendors.

CA-512 - 100-K Reactor Facilities

100-KW and 100-KE Water Plants

Over-all design of water plants remained at 99.8%. Construction progress was as follows: KW progressed .3% to a total of 99.9%; KE progressed 2% to a total of 96.4%; General Facilities were 94.4% complete.

General visual inspections were completed for the buildings and outside facilities of the 100-KW Water Plant and the 1700 Buildings. A list of items to be corrected was prepared. The delivery of new secondary process pumps progressed to the stage that four pumps were removed from the 190-KW Building and are being returned to the vendor. They are being replaced with pumps having new casings of acceptable quality. The axial oscillation of the secondary pump drive #6 has been corrected. The installation at 181-KW River Pump House was completed except for the insulated bearings, motor oil heaters, electrical controls, and cooling water strainers. Acceptance testing of these pumps was continued. The overflow facilities for 107-KW Retention Basins were being modified through the use of a test model at 183.2-KW.

All six pumps at 181-KE River Pump House have been run eight hours or more and are being used as necessary for testing. These motors require the same changes in lubricating and control systems as those at 181-KW.

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All major equipment was installed at 183-KE Filter Plant, and all necessary chemicals have been received. Instrument calibration and tests for control systems are in progress. At 165-KE Building, boiler steaming tests have been completed. Load tests have been started on #1 and #2 turbine-generators. Acceptance testing of switchgear was continued, and valve pit piping was essentially completed.

At 190-KE Process Pump House the last two permanent primary pumps were installed, and the fourth permanent secondary pump was installed. The pumps and pump drives are being tested, and the Dynamic Flow Test has been started for the KE Water Plant.

The 151-KE Substation has been prepared for energizing. The overflow weir at 107-KE was modified, but was not acceptable. The emergency crib is being studied following its failure to meet scope requirements.

In Building 1706-K, high pressure process water pumps #4 and #5 have been set in place. The glycol lines have been flushed and put into service to provide heat for the building. Excavation for 1706-KER was suspended by the AEC.

#### 100-KW and 100-KE Reactor Facilities

Construction progress in the 105-K Reactors was as follows: KW progressed .3% to a total of 99.9%; KE progressed 3.3% to a total of 95.3%. The present estimate for beneficial use of the KW Reactor was December 11, 1954, and this allows sufficient time for completion of construction work. The re-run of the Dynamic Flow Test was completed, and the tubes have been dried out. Installation of outlet connectors was completed, and about 30 rows have been installed on the inlet face. The final gas test was completed on the process unit, and acceptance testing was being completed on pile control and safety systems. Final work was being done on electrical systems in the KW Buildings. Instrumentation was progressing into the final stages of checking and calibrating. Some completions were made possible by transfer of parts from 105-KE Reactor.

Final work, such as concrete placements, hardware, handrails, and painting, was being accomplished in the 105-110-115 KE Buildings. Electrical systems were being connected and tested.

Instrumentation work consisted of final connections on lines and valves and preparations for testing. About two weeks of work remain for the gas system tubing. Installation of process water instruments was about 80% complete, and tests have been run in preparation for the Dynamic Flow Test.

The horizontal control rods have been run-in under power. Hose reels were installed and connected to rods, and the hydrostatic test was virtually complete. One hose failure is being corrected. Air supply lines to the vertical safety rods were purged, and the five-pound test was begun on cylinders and exhaust piping.

The 50-pound pneumatic test on headers and tubing was completed, and the 125-pound hydrostatic test was about 35% complete. The hydrostatic test is also

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being run for thermal and biological shield cooling connectors. Test facilities have been hydrostatically tested at 250-pound pressure. The unit air test was completed.

CA-513-A - Purex Facility

Design work as originally established has been completed; however, further design work is being done on revisions to the project, review of vendors' drawings and bids, and as-built drawings.

Construction for the over-all project progressed an estimated 6.1% to a total of 85.2%, as compared to 95% scheduled completion. The 202-A Building was about 83.3% complete as compared with 97.6% scheduled completion. Amercoat painting was continued in the Hot Pipe Trench, Sample Gallery, and Service Area; and painting was proceeding in the last Canyon Cell.

Installation work in the Hot Pipe Trench consisted of adjusting slopes and clearing punch list items. Cleaning, flushing, and auxiliary tests of piping were continued throughout the building. To date 49 jumpers have been installed in Cell "D", and 25 jumpers in Cell "E". Fabrication in the pipe shop progressed to 817 jumpers welded, 709 framed and balanced, and 678 tested. In 272-E Mock-Up, the subcontractor has completed 157 electrical jumpers.

Installation of major equipment was continued in all available locations, and "F" Cell was approaching completion. The repair of concentrators in 272-E Mock-Up was essentially completed. Electrical acceptance testing was starting on the remote crane and one pulse generator assembly. Wiring has started for one centrifuge motor control center.

The 202-A heating and ventilating system was 85% complete. The service area supply and exhaust systems are each 93% complete; the canyon supply system was 90% complete, and the exhaust system 88% complete. Instrumentation for heating and ventilating systems was about 30% complete.

Copper tubing for instrumentation has been completed in the Pipe Gallery and to the Head End graphic panel. Tubing was about 50% complete in the Central Control Room. Calibration has been completed for instruments now on the project, and calibration work was started in the Pipe and Operating Gallery.

Insulation was completed on the 203-A Storage tanks and was begun on the process lines. Insulation was also completed on tanks at the 211-A Chemical Tank Farm. Additional smaller installations and tests are being made. The Hot Waste Lines were accepted on November 3; and saturation tests are being performed on the waste cribs. Work also proceeded on clearing of punch list items.

Installation of wash-down piping in 291-A Stack was continued. Forms are being placed for the final concrete tie-in from the Fan House to the Stack. Amercoat painting is being applied at the Fan House. In the filter building all three forefilters have been packed and covered, and the waterproofing membrane is

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being applied. The gas sampling building was completed structurally.

The general outside facilities were about 83% complete. The 2714-A Dry Chemical Warehouse was accepted on November 18, 1954, and the chain link security fence has been accepted from the contractor. Other work consisted of tamping ballast on the Purex railroad, setting light poles, and placing covers.

General outside utilities were 98.6% complete. Work was essentially completed on the cathodic protection system at 202-A, the underground electrical system, and the sanitary and fire water lines.

Construction on the 241-A Tank Farm proceeded satisfactorily. Placement of concrete was approaching completion, and mechanical installations are being tested as the items are completed. Waterproof membrane is being applied to Tanks 101, 102 and 103.

Punch list items and clean-up work remain at the 283-E Filter Plant Addition. Two unsatisfactory pumps must be repaired or replaced.

#### CA-514 - 300 Area Expansion Program - Production Facilities

Completion status remained at design 99%, construction 72%. In the existing 313 Building, the new motor control center has been installed. Units 10 and 14 have been added to the heating and ventilating system. The metal drying unit has been temporarily relocated to the new building. Manufacturing Department has accepted the complete finishing line conveyor from cut-off through penetration etch. Also, the final two spray quench machines have been received, set, and accepted. Minor construction forces are installing the furnace area conveyor. Under-slab piping has been installed, and partition changes have been made for the office building. Plant Forces have installed telephones in the 313 Building addition.

#### CG-535 - Redox Capacity Increase, Phase II

Design progress consisted of work on the Silica Gel Facility which was 96% complete. Over-all design was essentially completed. Construction progressed 3% to a total of 84%. The beneficial completion date for the 204-S Facility Addition was established as November 1, 1954, when final inspection was conducted. It was found necessary to replace carbon steel studs with stainless steel studs in the insulation of 211-S Tank. Instrumentation to the 233-S Control Panel was essentially completed, and installation was continued in the process areas. Concrete work was completed on the encasement for 205-S Building waste line, except for tie-ins. Forms are being placed for the process cell and diversion box.

#### CA-546 - Fuel Element Pilot Plant

Design progressed 2% to a total of 62%; following change of scope, the construction completion was revised downward to about 42%.

The AEC has contracted with an architect-engineer for installation design of electroplating facilities. Acceptance tests were continued on the unit outdoor

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load substation on November 12, 1954. The construction contractor has begun installation of a two-hour fire wall partition. An erection engineer for the furnace vendor is now supervising erection of the electrical furnaces.

CG-558 - Reactor Plant Modification for Increased Production

Construction progressed to the permanent phase and was about 1% complete. Progress in 100-B Area consisted of work on the new Effluent Line from 105-B to 107-B, and the Outfall Line to the perimeter fence. The contractor has begun underwater excavation of the discharge line into the river.

In 100-DR, modification work was continued on the south process line tunnel tie-in and the vent room addition to 190-DR Building. Equipment and supply lines are being relocated. Expansion joints are being installed in the Effluent Line expansion boxes. In the 105 Buildings, work continued on equipment and facilities for an HSR outage.

B. OTHER ASSIGNMENTS

CG-187-D-II - Redox Production Plant

Design progressed 3% to a total of 93%; construction remained at 25% complete, as compared to 68% scheduled completion. Procurement was 90% complete. The revised project proposal is awaiting approval.

CA-187-D-III - Redox Cooling Water Disposal Basin

Completion status remained at design 100%, construction 99%. A small dike was built to extend the percolation area for chemical waste water. Installation of the two flow recorders is the only remaining work.

CA-431-C - Metal Examination Facility - 105-C

Design had been completed previously; construction progressed 23% to a total of 63%. Shop work is being performed on the 45X microscope manipulator and other optical equipment. The first slit camera is being tested in the shop. Testing of the slug cleaner has been completed. Equipment base plates have been installed in Basins #1 and #2. The valve panel was installed, and piping and electrical work was progressing.

CA-441 - Solvent Building

Design had been completed previously; construction progressed 39% to a total of 99%. All work was accomplished except installation of hardware which will be installed by AEC when it is received.

CA-532 - Fiscal Year 1954 Water Tank Replacements

Design had been completed previously; construction progressed 19% to a total of 69%. The General Electric Company was authorized an additional \$3500 for

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its portion of the project. Erection of Tank 2902-E was completed except for sterilization, painting, and re-strapping the vertical riser. Work on Tank 2902-W was approximately to the same stage of completion, and work on Tank 1902-F was scheduled to begin in early December, 1954.

CA-533 - Hanford Works Official Telephone Exchange

Design had been completed previously; over-all construction progressed 2% to a total of 24%. Steam connections to the 706 Building were completed on November 18. The contractor is installing the engine generator, underground telephone cable, and incidental facilities within the building.

CA-543 - Replace Sanitary Tile Field 200 West Administration Area

With design completed, the revised project proposal is being circulated for approvals.

CA-544 - Central Distribution Headquarters

Work was suspended during discussions of the possibility of using 2101-M Building for this headquarters.

CA-548 - Reactivate Project Proposal for New VSR Test Tower

With scoping completed, the existing tower has been re-analyzed, and the reports are being prepared.

CG-549 - Activate Task I, RMA Line - Building 234-5

Design had been completed previously; construction progressed 15% to a total of 39%. Work was started on the modification of hoods for special maintenance work. This work is being performed under SWP conditions. Other work consisted of piping, electrical connections, and vessel placement. Hoods #6 and #9WD are being altered for transfer to Plant Forces and subsequent installation.

CG-551 - Expansion of 234-5 Building Facilities

Design had been completed previously; construction progressed 9% to a total of 75%. Shop testing of the hood line was completed with satisfactory results, and the hood line is now being prepared for dismantlement and installation in the 234-5 Building. Preparations are being made in the 234-5 Building to receive the line and install it.

CA-555 - Graphite Hot Shop and Storage Building

Design progressed 2% to completion. Drawings and specifications are being prepared for transmittal to the AEC during early December, 1954.

CG-556 - X-Level Controlling and Recording Equipment

Design had been completed previously; construction progressed 9% to a total of 94%.

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The Ball 3X Room in 105-C has been successfully decontaminated. Thermocouples are scheduled for installation during the shutdown for replacement of "pigtail" connectors.

CG-562 - Waste Metal Recovery Plant Modifications

Design had been completed previously; construction progressed 11% to a total of 53%. Modification of the 8-4 Stripper was delayed by difficulties experienced in decontaminating Cell #15. Work was continued on instrumentation and modification of the trench. The thermoch in the 8-1 Intercycle Concentrator was relocated in order to obtain proper temperature sensing. It is now estimated that beneficial use will be gained in early December, 1954.

CA-566 - Building for Prototype Physical Constants Test Reactor

Design had been completed previously; construction progressed 27% to a total of 69%. The roof decks were placed on November 18 and 20, thus completing major concrete work.

Graphite fabrication at 2101-M Building was completed during the month.

CG-572 - Particle Problem Animal Exposure Equipment

Design had been completed previously; construction progressed 70% to a total of 75%. Revision #1 of the project proposal was authorized by AEC. Installation work progressed to the degree that manpower was decreased. All materials are available on the job site except bases for the hoods.

CG-574 - Irradiation

Scoping and design are being managed by Design Section. Construction progressed 9% to a total of 10%. The remainder of the 100 bucket inserts have been completed and installed. The double doors to and from the storage area in 105-H Building have been completed. Similar doors are being installed in 105-C. Work progressed on the air mask system in 105-H.

CG-576 - General Improvements to Laboratory Area - 300 Area

Design completion status remained at design 100%, construction 80%. Construction work is awaiting approval of Revision #3 of the project proposal.

CG-578 - Effluent Water Monitoring Improvements 100-B, D, F, DR and H Areas

Scoping and design are being managed by Design Section. Requisitions for rotameters and rotameter racks were sent to Purchasing Section. A preliminary construction schedule has been prepared and is being submitted for concurrence within General Electric before submittal to the AEC. The spectrometer vendor has assured that the spectrometer would be delivered as scheduled.

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CG-579 - Effluent Water Monitoring Improvements - 100-C Area

Scoping and design are being managed by Design Section. The spectrometer vendor has assured that the spectrometer would be delivered as scheduled.

CG-585 - Oxidizer Off-Gas Treatment, Redox

Completion status remained at design 100%, construction 98%. The J-2 Scrubber was put in operation during the first week of November. Disposal of the contaminated equipment is being delayed in order to benefit by the radioactive decay of the contaminants.

CG-587 - TBP Waste Scavenging

Scoping and design are being managed by the Design Section. Construction progressed 9% to a total of 97%. Work by both Plant Forces and Minor Construction was approaching completion. The U.S. Geological Survey had completed one test well when the perforator lodged in the bottom of the well. All attempts to remove it have failed; so the well is to be used as is.

CG-588 - Ammonia Scrubbers, Redox

Design is being managed by the Design Section. Procurement and construction work have been suspended to await a decision from the Design Council regarding the future of this project.

CG-589 - De-jacketing and Ultrasonic Equipment - 105-C Building

Design progressed 25% to a total of 80%. Excavation work by Minor Construction is expected to begin in December, 1954.

CG-590 - Fly Ash Collection Equipment, Building 384

The rough draft of the revised project proposal is being held to allow Manufacturing Department time to investigate the possibility of improving the coal crushing equipment, thus affording control of fly ash.

CG-592 - (formerly IR-172) Laboratory Supply Space, 3706 Building

Technical Section has given no further comment on this project. An alternate method of handling Caption 10 laboratory stores has been put into operation on a trial basis.

CG-594 - 221-T Building Roof Repair

Design had been completed previously; construction progressed 30% to completion. Information for the Physical Completion Notice is being assembled. An acceptance inspection is scheduled for the first part of December, 1954.

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CA-595 - Car Pullers 184 Building Coal Yards - 100-B, D, F, and H Areas

Design progressed 5% to completion. Detailed design was submitted to Manufacturing Department for approval on November 9. Following an exchange of letters, additional comments were incorporated into the final design. Drawings and specifications are to be transmitted to the AEC for bidding purposes during early December, 1954.

CA-596 - Central Mask Washing Station, Building 2723-W

Detailed design was started by the Design Section during the first part of November, 1954.

CG-597 - Hanford LX Program - B and T Plants, UO<sub>3</sub>, and 300 Area

Scoping and design are being managed by the Design Section. The project proposal for Part I scope has been transmitted to AEC. The advance ordering of materials was suspended pending additional authorization. Waste lines and 221-B cell equipment are being tested. Further work was being done on the dissolver and condenser cells. Testing of the 154-B box line was essentially completed.

The Design Council has concurred in the recommendation that the present UO<sub>3</sub> Plant (Building 224-U) be expanded to provide the required production capacity. A project proposal requesting \$340,000 for initiation of design and procurement is awaiting AEC approval.

A project proposal regarding expansion of the 300 Area facilities was transmitted to AEC. The Design Section has scheduled December 1, 1954, as the completion date for all scope information and a preliminary project proposal cost estimate.

CG-599 - Hanford LX Program - 100 Area

Scoping and design are being managed by the Design Section. The bid for the 600 stainless steel buckets has been placed. Delivery was promised as scheduled.

CG-600 - 100-C Alterations

Scoping and design are being managed by the Design Section. A work release was issued to Minor Construction on November 8, 1954, for the excavation of two 66" effluent lines from the 1904-C Diversion Box to the 107-C Basin. Field work is expected to start during the first part of December, 1954.

CA-601 - 300 Area General Improvement Program

With preliminary design 80% complete the project proposal was unapproved. It is now planned to prepare two project proposals, one for the Manufacturing Area and one for the Laboratory Area.

CG-602 - Remote Sampling - Hot Semiworks

Design progressed 20% to completion. Construction began and progressed to 35% complete. Shop fabrication was scheduled for completion on December 15, 1954.

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CG-603 - Hanford AE Program - Third Extraction Cycle "T" Plant

Scoping and design are being managed by Design Section. Construction progressed 35% to completion. Work on the Third Extraction Cycle of "T" Plant was essentially completed by the end of the month. This completes only the first phase representing about \$39,000, as compared to the total estimated cost of \$3,500,000.

CG-605 - Installation of Additional Generating Capacity - 189-D

Design had been completed previously; over-all construction progressed 26% to a total of 86%. A preliminary run-in of the 750 KW generator was accomplished by Plant Forces. An acceptance procedure is being prepared for use during the first week of December, 1954.

CG-610 - Replacement of 313 Building Roof

With preliminary design 85% complete, the project proposal at an estimated cost of \$55,000 was authorized by AEC on November 22, 1954.

CG-611 - Mobile Laboratory

The project proposal was transmitted to AEC on November 11, 1954.

IR-181 - Temperature Control Improvement - 108-F Building

Design had been completed previously; construction progressed 45% to a total of 50%. Shop fabrication of the ductwork was completed. The coils are being installed.

IR-183 - Study of Classified Scrap Disposal Problem - 300 Area Library

With preliminary design 10% complete, the informal request is awaiting approval by Financial Department.

IR-184 - Tocco Induction Heating Unit, 314 Building - 300 Area

The Design Section is preparing a specification for the required rotameters. Cycle timers and counters have been ordered.

IR-185 - Heating No. 1 and No. 2 Warehouses - White Bluffs

Design had been completed previously; construction began and progressed to 95% complete. The two furnaces, ductwork, and contingent accessories have been installed. The furnaces are now in operation, and they lack only guards and adjustments to furnace controls.

\* \* \* \* \*

The following studies and Engineering Requests, involving preparatory work and scoping of future projects, were active during the month.

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ER A-758 - Mechanical Maintenance Shop Centralization - 100 Areas

With preliminary design completed, the project proposal is being revised to strengthen the justification.

ER A-761 - Decontamination Facilities, First Aid Station - 100-H and 200-W Areas

With scoping 40% complete, the proposed layout of decontamination facilities has been forwarded to the Health and Safety Section for comments.

ER A-764 - Fire Station Addition

With scoping 50% completed, the Manufacturing Department - Separation Section is developing a plan which may provide the needed space and facility improvements by maintenance work orders. A firm decision is expected in early December, 1954.

ER A-765 - Painting Water Plant Structures - 100-DR Area

Most of the paint companies consulted have supplied data. A report of work to be done is being prepared.

ER A-1217 - 186-D Building Renovation

With preliminary design 70% complete, the rough draft of the project proposal is being modified to amplify justification. A comparison is being made of Minor Construction and lump sum contract construction to determine the most economical method of performing the work.

ER A-2749 - Sheltered Welding Manifolds - 200 Areas

With scope 60% complete, the Manufacturing Department - Separations Section is reviewing requirements and strengthening justification so as to complete this phase in early December, 1954.

ER A-2751 - Removal of Task I and II R.G. Line

The project proposal is being revised to reduce the scope of work and to show change of work forces from Minor Construction to Plant Forces.

ER A-2756 - FY-1955 Water Tank Replacements - 100-200 Areas

Scoping has been completed. The Manufacturing Department - Separations Section has asked that the proposal be prepared on the basis of replacing the 2901-W soft water tank. The justification will be based on the data used to justify replacement of the 2901-E soft water tank.

C. RELATED FUNCTIONS

The completion of 91 orders and the receipt of 118 new orders for items requiring inspection left a net total of 585 orders which require inspection. This

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represented a slight increase after three months of sharp decrease, and the reversal was attributed to receipt of orders for the Reactor Plant Modification Program, expansion of tank farms, and orders placed by operating departments at Hanford. The work load for the Corrosion Testing Program remained about level with 246 evaluations made, of which 196 were done on the East Coast.

The new castings for process water pumps were being completed rapidly enough to warrant replacement of casings previously installed in 190-KW Building. The order for connectors for the reactor units was increased to 7,000, and was later increased to about 14,000. Inspection problems on all these connectors are being cleared as they occur. Production of sintered rings for the Reactor Modification Program continued at a slow rate. Problems concerning aluminum extrusions for the same project have continued; however, 30 of the 68 required extrusions have been accepted to date. For the Purex project, shipment of vessels and engineered equipment was accelerated during the month. The Pfaudler tanks were substantially completed, and considerable progress is being made on inspection of other Purex components. All concentrators and fractionator units have been shipped, and repairs to the concentrators during mock-up processing were essentially completed. The critical items for Purex now are stainless steel piping, product concentrator towers, and acceptable materials for smaller vessels.

Following is a resumé of inspection activities during the month:

<u>Item</u>	<u>Number</u>
Total orders on hand requiring inspection	585
Cumulative number of orders assigned to inspectors	550
Number of orders assigned to inspectors this month	110
New orders received by Inspection during the month	118
Orders completed	91
Total requisitions for engineered equipment transmitted for Expansion Program	20
Total orders of engineered equipment placed for Expansion Program	16

At the end of November there had been transmitted 3238 Expansion Program requisitions for engineered equipment, and 3211 orders placed.

Reproduction output decreased by about 13% from the previous month to a total of 272,660 square feet. The working period was 20 working days, including 96 hours overtime. The largest orders processed during the month were 17,489 prints for 100-K Reactors, 7997 prints for the Reactor Modification Program, and 3975 prints for the 1706-KER installation.

Estimating completed 20 estimates during the month, and extensive work was accomplished on the Reactor Modification Program. The completed estimates comprised the following: project proposal - 6, study - 5, construction - 2, scope - 2, comparative - 1, high spot - 1, and miscellaneous - 3.

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Field Surveys completed the following assignments: coal pile inventory in the 100 and 300 Areas; preliminary design data for the Reactor Modification Program in 100-B, C, D, and DR Areas; and "as-built" survey of the underground telephone cables for 100-K Area. This group also continued assistance with routine surveys and optical work.

#### D. CRAFT LABOR

Voluntary terminations from both Kaiser Engineers and Blaw-Knox dropped sharply from rates of preceding months. Kaiser Engineers and associated subcontractors lost 3.7%; while Blaw-Knox and associated subcontractors lost 6.3%. The loss by J. A. Jones and subcontractors was 0.7%.

A brief work stoppage occurred at 100-K on November 5 when construction machinists walked out during the day shift. The issue was a jurisdictional dispute with piping crafts as to who would drill holes in expansion liners for outlet risers. The machinists returned to work on graveyard shift of the same day, and the disputed work was eventually performed by pipefitters.

The Union Relations Section has been informed unofficially of a jurisdictional settlement between International Presidents of the Machinists and Millwrights Unions. This settlement provides for specific divisions of work, but allows also for precedents established on projects to which both unions have been certified. Ratification is being sought from local unions before submittal to the Company. The proposed settlement offers substantial benefits to the Hanford construction program.

#### REPORT OF VISITORS

##### To Hanford

None

##### Official Trips to Other Installations during November, 1954

C. W. Harrison visited Chicago, Illinois, from October 30 to November 11 to attend the National Metal Congress and Exposition.

J. S. McMahon and J. C. Hamilton visited SWEPCO Company, Jersey City, New Jersey, from November 11 to November 15 to discuss inspection of Purex materials.

D. A. Hoover visited Pacific Qerlikon Company, Tacoma, Washington, November 19 and 20 for consultation on equipment for the Reactor Modification Program.

W. W. McIntosh visited points in Kansas and Missouri from November 14 to November 20 to recruit engineering personnel.

W. W. McIntosh visited New York, New York, from November 28 to December 4, to attend a meeting of the American Society of Mechanical Engineers.

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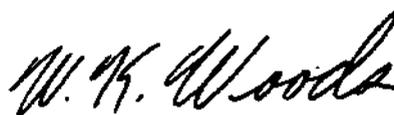
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MONTHLY REPORTADVANCE ENGINEERING SECTIONNOVEMBER, 1954

The fiscal year summary of Engineering Department Research and Development Program on Metallurgy was issued during the month. Initial drafts of material for the Hanford Atomic Products Operation Annual Report have been received.

Calculation of isotope yield during extended irradiation of depleted uranium (0.21% U-235) was completed, and a formal report on all calculations is in process.

Discussions with the Turbine Division indicate that whereas turbines in nuclear power systems can be operated with dry saturated steam there are large economic incentives for providing superheated steam with the present stage of development of moisture removal devices.



W. K. WOODS, MANAGER  
ADVANCE ENGINEERING SECTION

## EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

SUMMARY - NOVEMBER, 1954

### PERSONNEL PRACTICES SECTION

The number of applicants interviewed in November was 1,999 as compared with 1,748 for October. In addition, 112 new applicants applied by mail. Open, nonexempt, nontechnical requisitions decreased from 559 at the beginning of the month to 553 at month end. One hundred and thirty-six employees were added to the roll and 63 removed during the month. Separations rate decreased from .80% for fiscal month of October to .51% for fiscal month of November. These rates when converted to annual basis are 10.43% and 5.32%, respectively. During November 43 new requests for transfer to other type work were received by Employment, and 22 transfers were effected. Attendance recognition awards were distributed to 181 employees in November, including 36 who qualified for four-year awards.

Five employees retired during the month. One hundred and fifty-four visits were made to employees confined to Kadlec Hospital, and 42 checks were delivered to employees confined at the hospital or at home. At month end, participation in the Pension Plan was 98%, in the Insurance Plan 99.6%, and the Employees Savings and Stock Bonus Plan 56.6%. At month end there were 907 registered under Selective Service and 815 military reservists were on the roll. Since August 1, 1950, 370 employees have terminated to enter military service, of which 131 have returned, 22 have not claimed reemployment rights, leaving 217 still in military-leave status.

Eighty-eight adopted suggestions were approved for awards in November, resulting in cash awards totaling \$3,305 with a total net savings of \$29,327.51. The highest award of \$400 was paid to an employee in the Reactor Section of the Manufacturing Department for his suggestion which resulted in labor and material savings.

### EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS SECTION

The News Bureau issued 46 news releases during the month. Seven manuscripts were approved for release during the month, and arrangements were made for ten speeches to be delivered before public groups throughout the Northwest. The Community Newsletter was written and distributed to community leaders in Pasco, Kennewick, and Richland. Three Management News Bulletins were developed and distributed to all exempt personnel during the month. The November Health Bulletin and Safety Bulletin were also prepared and distributed.

AEC approval was received to place a HAPO exhibit in the Inland Empire Industrial Exposition to be held in Spokane's new coliseum in December.

Five editions of the new HAPO weekly radio program "Inside Hanford" were produced and broadcast during the month of February. Five weekly broadcasts of the HAPO produced Science Forum were released. Increased listener interest in Science Forum is evidenced by the greater number of questions sent in.

A total of 319 photographic assignments were completed this month, and 12,237 prints were produced.

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## Employee and Public Relations Summary

### SALARY AND WAGE ADMINISTRATION SECTION

A proposal for the adoption of the Company Salary Plan at Hanford was completed and delivered to the Hanford Operations Office of the A.E.C. along with a request for approval. A revised Position Description Manual, based upon the salary structure of the new Salary Plan, was completed and distributed along with the proposal to adopt the Plan.

New positions in the Engineering Department were evaluated, and work to complete the reorganization prior to December 15, 1954 was begun.

A reconciliation meeting was held with Messrs. Giddings and Steel of the Research Services Division.

The new Exempt Employee Appraisal Guide was distributed to all exempt employees and a schedule was established for the completion of appraisals to be retro-active for not more than one year.

Reimbursement Authorizations Nos. 235 and 236 relating to wage rates were received from the Hanford Operations Office of the A.E.C.

Study of a new wage rate plan was continued.

### UNION RELATIONS SECTION

On November 16, 1954, the initial meeting with Material Expeditors and Take-Off Men was held, and the demands included (1) pay increases to exceed the rates paid to mechanical crafts, (2) clear definition of jurisdiction, (3) seniority established on basis of HAFO adjusted service date, and (4) greater consideration for overtime assignments.

The settlement of the wage dispute at Oak Ridge and Paducah provides for a wage increase for production and maintenance workers of 10 cents per hour, six cents of which is effective April 15, 1954 and the remaining four cents as of January 15, 1955, and also includes a provision that paid holidays which fall on Saturday will be observed on Friday.

We have unofficially received a copy of a jurisdictional settlement signed by the International Presidents of the Machinists and Millwrights which endeavors to provide a guide to work assignments involving the two crafts.

### EDUCATION AND TRAINING SECTION

Efforts were continued to be highly selective in placement of trainees off the Rotational Training Program so that an adequate supply of manpower to fill rotational assignments can be maintained until new trainees are employed. A large number are in "tentative placements" so that they may be confirmed into "permanent placements" when new employees join the Program. Losses of young technically trained men to Selective Service continue at a rate of two or three a month, and it is anticipated that this trend will continue for the next few months.

A proposal covering a Training Program for Technicians was prepared and will be submitted to appropriate managers for further consideration.

## Employee and Public Relations Summary

### EDUCATION AND TRAINING SECTION (Continued)

Graduate school representatives from the University of Idaho, State College of Washington, and Oregon State visited Richland during the month for counseling with students affiliated with these schools.

Courses which will be of direct usefulness to HAPO are being developed as additions to the curricula which now includes the basic courses in science and engineering. Five of these courses are under consideration for next semester. A proposal outlining the advantages to HAPO of an Advanced Engineering education for outstanding young scientists and engineers was prepared and submitted to appropriate managers for further review.

Continued emphasis was given to the regular programs developed during the past several years by the Training group. In addition, discussions were held with Manufacturing representatives regarding the coordination of the many skills programs which have been developed in various parts of that department.

Further study was given to evaluations of the backgrounds of all exempt personnel and the training programs which they have attended over the past several years in furtherance of our efforts to develop future training programs which will be pertinent and worthwhile.

### HEALTH AND SAFETY SECTION

There were no major or sub-major injuries during the month of November. The minor injury trend was excellent with 252 for the Plant during November as compared to 257 in October. This is a new low in accident frequency.

Preliminary studies of noise levels in the new 100-K Area indicate higher levels than for the other 100 areas. Proper protection is being used. Medical examinations increased from 988 to 1017, while dispensary treatments increased from 4551 to 4772.

Sickness absenteeism was 1.69% as compared with 1.58% for October, while total absenteeism was 2.52% as compared with 2.42%. Total absenteeism through November was 2.36%, which is identical with the absenteeism for this period in 1953.

The average daily census at Kadlec Hospital decreased from 68.6 to 60.2 as compared with 80.9 a year ago. This is the lowest census recorded for November since 1949. The average hospital stay was also very low at 3.8 days, which is one-third less than the stay five years ago.

A further increase in communicable disease was due to a continued high incidence of chickenpox, mumps, and ringworm.

### AUXILIARY OPERATIONS AND PLANT PROTECTION SECTION

Unaccounted for prints and documents were reduced to 346 from the 348 reported at the end of October, which includes 120 documents chargeable to du Pont. The monthly self inventory which was begun in August is producing excellent results. Due to the fact that misplaced documents are being discovered much sooner than formerly was the case, we are able to make immediate searches and locate them before it becomes necessary to formally report them as lost.

Employee and Public Relations Summary

AUXILIARY OPERATIONS AND PLANT PROTECTION SECTION (Continued)

Security violations, such as unlocked files and classified material improperly stored, remain at a low level.

During the month we were requested to secure up to date information on the marital status of all GE employees in order that the AEC might have current information for clearance purposes. This job is about 65 percent complete and 225 changes have been reported to the Commission.

There were noticeable reductions in volume of copies printed in the Printing and Duplicating Units as compared with the month of October. Mail volume decreased in number of pieces but increased in weight and bulk. Volume of work in other office service activities remained at a high level.

Considerable difficulty has been encountered in attaining automatic operation of the new Transportation heating plant. Some progress has been made in correcting the control system, but continuous attention is still necessary because of burner difficulties.

The Official Telephone Exchange building is now approximately 85% complete. Pre-service acceptance tests on the distribution cables for the KE Area produced satisfactory results.

COMMUNITY SECTION

Work in the Community Section is proceeding in a satisfactory manner. One unresolved problem which concerns the domestic water system is up for review. The Atomic Energy Commission has funds available in their project AEC-115 of about \$500,000. Some of the problems still not settled are:

1. Elimination of the irrigation canal through town, which first will require an additional supply of domestic water to off-set the water now available in the irrigation distribution system.
2. Whether water will be used from the Columbia River for well re-charging rather than from the Yakima River.
3. The approval of revised water rules and regulations submitted by us to the Atomic Energy Commission.
4. Installation of water meters.

Several meetings have been held between us and the Commission representatives, and agreement reached on installing meters on certain commercial buildings. Other phases of this work are either in the form of proposals now being reviewed or under discussion by interested parties.

ORGANIZATION AND PERSONNEL

Total on roll November 1, 1954	1782
Accessions	29
Separations	22
Total on roll November 30, 1954	1789*

\*Total includes 40 Rotational Trainees.

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Employee and Public Relations

PERSONNEL PRACTICES

General

The General Manager's luncheon for employees with at least twenty-five years of GE or GE-du Pont combined service was held November 11 with 28 of the 30 "long-timers" present. A few days after the luncheon each of the 30 was forwarded a copy of a group picture together with a brief sketch about each member.

Employment

	<u>October, 1954</u>	<u>November, 1954</u>
Applicants interviewed	1,748	1,999

378 of the applicants interviewed during November were individuals who applied for employment with the Company for the first time. In addition, 112 applications were received through the mail.

	<u>October, 1954</u>	<u>November, 1954</u>
Open Requisitions		
Exempt	1	1
Nonexempt	559	533

Of the 559 open, nonexempt, nontechnical requisitions at the beginning of the month, 240 were covered by interim commitments. Of the 533 open, nonexempt, nontechnical requisitions at month end, 212 were covered by interim commitments. During November, 74 new requisitions were received requesting the employment of 166 non-exempt, nontechnical employees.

	<u>October, 1954</u>	<u>November, 1954</u>
Employees added to the rolls	138	136
Employees removed from the rolls	<u>75</u>	<u>63</u>
Net Gain or Loss	+ 63	+ 73

Separation Rate:

<u>Fiscal Month</u>		<u>Fiscal Month</u>	
<u>October, 1954</u>		<u>November, 1954</u>	
<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
.57%	1.81%	.28%	1.55%

Over-all Separation Rate:

<u>Fiscal Month</u>	<u>Fiscal Month</u>
<u>October, 1954</u>	<u>November, 1954</u>
.80%	.51%

Employee and Public Relations

PERSONNEL PRACTICES

During November, 5 employees left voluntarily to accept other employment, 3 left to enter military service, and 1 left to enter business for self.

Transfer Data

Accumulative total of requests for transfer received since 1-1-54	616
Number of requests for transfer received during November	43
Number interviewed in November, including promotional transfers	42
Transfers effected in November, including promotional transfers	24
Transfers effected since 1-1-54 including promotional transfers	460
Transfers effected in November for employees being laid off	1
Number of stenographers transferred out of steno pool in November	7
Transfer requests active at month end	314

ADDITIONS TO THE ROLLS

	<u>Exempt</u>	<u>Nonexempt</u>	<u>Community Firemen</u>	<u>Total</u>
New Hires	1	120	--	121
Re-engaged	-	---	--	---
Reactivates	1	14	--	15
Transfers	-	---	--	---
<b>TOTAL ADDITIONS</b>	<b>2</b>	<b>134</b>	<b>--</b>	<b>136</b>

TERMINATIONS FROM THE ROLLS

	<u>Exempt</u>	<u>Nonexempt</u>	<u>Community Firemen</u>	<u>Total</u>
Actual Terminations	6	29	--	35
Removals from rolls(deactivates)	3	22	--	25
Transfers	3	---	---	3
<b>TOTAL TERMINATIONS</b>	<b>12</b>	<b>51</b>	<b>--</b>	<b>63</b>

GENERAL

	<u>10-1954</u>	<u>11-1954</u>
Photographs taken	302	240
Fingerprint impressions	162	176

PERSONNEL SECURITY QUESTIONNAIRES PROCESSED

	<u>10-1954</u>	<u>11-1954</u>
General Electric cases	101	110
Facility cases	20	32
<b>Total</b>	<b>121</b>	<b>142</b>

Employee and Public Relations

PERSONNEL PRACTICES

Zane Wood spoke to the sophomores at Pasco High School as one of their career day speakers. The 30 minute talk was entitled, "Job Opportunities in Industry".

Shirley Kreimeier, of the Employment Unit, conducted a tour on November 23 and November 30, for prospective employees and faculty members of the Columbia High School commercial class. A total of 32 students and 4 faculty members visited the Employment Office, Mail Room, Steno-Group, and I.B.M. Room.

Personnel Records and Investigation

INVESTIGATION STATISTICS

	<u>10-1954</u>	<u>11-1954</u>
Cases received during the month	149	238
Cases closed	137	99
Cases found satisfactory for employment	118	190
Cases found unsatisfactory for employment	32	37
Special investigation conducted	4	18
Cases closed before investigation completed	24	16

PERFECT ATTENDANCE RECOGNITION AWARDS

Total one-year awards to date since January 1, 1950	4876
One-year awards made in November for those qualifying in October	42
Total two-year awards to date since January 1, 1950	2549
Two-year awards made in November for those qualifying in October	49
Total three-year awards to date	1291
Three-year awards made in November for those qualifying in October	54
Total four-year awards to date	444
Four-year awards made in November for those qualifying in October	36

SERVICE RECOGNITION

Total Service Recognition Pins presented to date	4325
Five-year Service Recognition Pins presented during November to non-exempt personnel	19
Fifteen-year Service Recognition Pins presented during November to non-exempt personnel	1

During November, 14 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	154
Salary checks delivered to employees at Kadlec Hospital	35
Salary checks delivered to employees at home	7

At month end, participation in the Benefit Plans was as follows as compared with last month's participation:

	<u>October</u>	<u>November</u>
Pension Plan	98.1%	98.0%
Insurance Plan	99.3%	99.6%
Savings and Stock Bonus Plan	50.1%	56.6%

Twelve letters were written concerning deceased employees and their families during November, regarding payment of monies from the Company and answering questions.

One former employee, \_\_\_\_\_, died in Missouri.

Since September 1, 1946, 156 life insurance claims have been paid totaling \$999,013

Five employees retired during the month of November, namely:

William C. Craven	W-4101	Normal Retirement
Jean D. Dunlap	W-6041	Normal Retirement
Lloyd Farabee	W-9311	Normal Retirement
Everett E. Schmitt	W-7536	Normal Retirement
David W. Sullivan	W-6814	Normal Retirement

During November 22 letters were written concerning retirement and retired employees providing information of a general or specific nature. To date 324 employees have retired at Hanford, of which 166 are continuing their residence in this vicinity.

A total of 126 new employees attended Orientation Programs given by members of this group during the month of November. Of this number 98% have signed to participate in the Pension Plan, 100% have signed to participate in the Insurance Plan and 84.1% have signed to participate in the Good Neighbor Fund.

The final results of the solicitation program to enroll non-participating employees in the Nucleonics Employees Good Neighbor Fund showed a percentage increase in participation from 67.5% to 72.4%. Approximately 19% of our non-participating employees signed up to begin participation during this drive.

Employee and Public Relations

PERSONNEL PRACTICES

Employee Services

From the standpoint of training, the past few weeks have been profitable for the Women's Advisor in as much as she completed both the PMS and the HOESO II training sessions during the month of November. Each of these courses will doubtless prove to be of inestimable value to her as she proceeds as Advisor.

A total of 36 employees have contacted this office during the month to discuss problems related to being removed from the roll, sick leave, adjustment of service dates, housing facilities, job dissatisfactions, job placement and transfer.

Military Reserve and Selective Service

Statistics with respect to employees who are members of the military reserve are as follows:

Number of reservists on the rolls		815
Number of Reservists classified in Category A	116	
Number of Reservists classified in Category B	84	
Number of Reservists classified in Category C	61	
Number of Reservists classified in Category D	554	
Number of Reservists for whom delays have been requested		45
Number of Reservists classified in Category B-	3	
Number of Reservists classified in Category C	2	
Number of Reservists classified in Category D	40	
Delays requested (including renewal requests)		114
Delays granted		106
Delays pending		0
Delays denied		5
Delays requested recalled		3

The statistics with respect to employees registered under Selective Service are as follows:

Employees registered		907
Employees registered who are veterans		379
Employees registered who are non-veterans		538
Deferments requested to date (including renewals)		1391
Deferments granted		1117
Number of employees for which deferments have been requested		129
Number of employees classified in Category B	0	
Number of employees classified in Category C	1	
Number of employees classified in Category D	128	
Deferments denied and appealed at state levels		17
Deferments denied and appealed at local levels		0
Deferments denied and held pending appeal at national level		1
Deferments denied by local board and not appealed		1
Deferments denied by state board and not appealed		1
Deferments denied at national level (by Gen. Hershey's office)		2
Deferments denied at national level (by President)		5

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Employee and Public Relations

PERSONNEL PRACTICES

Military Reserve and Selective Service

Deferments requested, employees later reclassified	0
Deferments requested, later withdrawn	0
Deferments pending	43

Military terminations since 8-1-1950 are as follows:

Reservists recalled	119
Selective Service	246
Women employees enlisted	5
TOTAL	<u>370</u>

Employees returned from military service:

Reservists	64
Selective Service	67
TOTAL	<u>131</u>

Known number not claiming reemployment rights	22
---	----

Number of employees still in military-leave status	217
--	-----

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

<u>Suggestion Plan</u>	<u>October</u>	<u>November</u>	<u>Total Since 7-15-47</u>
Suggestions Received	255	434	15349
Acknowledgements to Suggesters	228	419	
Suggestions Pending Acknowledgement	58	73	
Suggestions Referred to Depts. for Investigation	372	493	
Suggestions Pending Referral to Departments	79	102	
Investigations Completed and Suggestions Closed	248	211	
Suggestions Adopted - No Award	0	3	
Adopted Suggestions Approved by Committee for Award	44	88	
Total Net Cash Savings	\$ 7,579.35	\$ 29,327.51	
Total Cash Awards	\$ 1,035	\$ 3,305	
Total Suggestions Assigned to Field for Investigation	641	752	
Total Number Suggestions Outstanding to Departments	628	739	

The highest award of \$400 was paid to an employee in the Reactor Section for his suggestion to revise charge trays used for aluminum dummies. Adoption of this suggestion resulted in labor and material savings.

An award of \$280 was made to a former employee in the Separations Section for his suggestion regarding a method of decontamination and re-use of stainless steel pressure type plug valves used for off-site shipments. Savings in material resulted from adoption of this suggestion.

The flow of new suggestions increased during the month to establish a new all time record of 434 suggestions received in any one month. This increase is due to the Operation 4-S program, which terminated on November 5, 1954 and the Separations Safety Stampede program conducted during the month of November.

Life Insurance

Code information which is known only to Home Office Life Underwriter's Association has been furnished 52 insurance companies and investigation agencies during the month of November, 1954. This is in accordance with an arrangement with the Underwriters whereby employees on this project might be insured on the same basis as those working elsewhere.

Insurance Statistics

Claims reported to Department of Labor and Industries	<u>October, 1954</u>	
	<u>Long Forms</u>	<u>Short Forms</u>
	52	322
	<u>November, 1954</u>	
	<u>Long Forms</u>	<u>Short Forms</u>
	34	316
Total Since September, 1946 - 23,118		

Insurance Statistics (Continued)

Claims reported to  
Travelers Insurance Co.

October, 1954

November, 1954

12

\*9

Total Since September, 1946 - 912

\* Of the claims reported to Travelers Insurance Company during the month of November five were property damage, three bodily injury, and one property damage and bodily injury.

Liability Insurance

....., a janitor in the Reactor Maintenance Sub-Section, filed a claim against General Electric for loss of sight in his right eye when he was allegedly struck by a metal ash tray thrown by a co-worker. The incident happened in the lunch room of the 190 Building in the 100-F Area prior to the beginning of the claimant's work day thus the matter has been reported to the Travelers as a public liability claim and is being investigated.

....., B-6835755 -- On November 19, 1954, a deposition was taken of ..... co-defendant, at the request of ..... attorney. Settlement negotiations have continued and the Travelers has recommended that they be permitted to negotiate a settlement in an amount not to exceed \$7500. The amount asked for in the Complaint was \$19,500. The request has been communicated to the Atomic Energy Commission and we have advised the Commission that we are in agreement with the recommendation, however, the Commission has not yet advised us of their position.

..... -- The above action arose out of damage to property and personal injuries when a bus operated by a General Electric employee smashed into the ..... residence. It was determined that the bus driver had died of a heart attack while driving. The case was tried in U. S. Court resulting in a verdict against the General Electric Company of \$14,904. Our attorneys then filed a motion for judgment notwithstanding the verdict or in the alternative for a new trial. The motion was denied and we then appealed to the U. S. Circuit Court of Appeals. The higher court set aside the verdict and dismissed the suit holding that there was no negligence on the part of General Electric.

..... -- Settlement negotiations proceeded during the month and we have been advised that a settlement figure has been agreed upon between Travelers and ..... An approval request is anticipated from Travelers in the near future.

Employee and Public Relations  
PERSONNEL PRACTICES

Technical Recruitment

During November GE teams visited the following schools for PhD recruiting for openings throughout the Company including HAPO:

University of Delaware	Stanford
Pennsylvania State College	Chicago
Princeton	Illinois Tech
Yale	Carnegie
Northwestern	Minnesota
Illinois	Texas
California Institute of Technology	Oregon
Univ. of California at Los Angeles	Oregon State
Univ. of California (Berkeley)	University of Washington

Hanford representatives participated in all of the above teams except at Princeton and Yale. As a result of these visits 145 PhD interview blanks were referred to HAPO by Schenectady during the month. One PhD candidate visited HAPO, two candidates accepted invitations to visit, one offer was accepted, and four candidates with PhD training were invited to visit in November.

By fields the candidates referred to HAPO to date are distributed as follows:

Chemistry		59
Analytical	11	
Biochemistry	0	
Inorganic	6	
Organic	4	
Physical	38	
Engineering		48
Chemical	16	
Civil	0	
Electrical	7	
Mechanical	8	
Metallurgical	17	
Physics		33
Experimental	20	
Solid State	4	
Theoretical	9	
Mathematics		3
Other Fields		2

Twenty-one experienced drop-in candidates were interviewed in the office. Two experienced applicants were signed on HAPO rolls in November, two candidates visited by HAPO invitation, and three offers were made, of which two were accepted.

Employee and Public Relations  
 PERSONNEL PRACTICES

Technical Recruitment

Twenty-six BS/MS recruiting visits to colleges and universities have been completed of 32 scheduled. The following table summarizes the BS/MS offers made:

<u>Field</u>	<u>Offers</u>		<u>Estimated Mid-Year Requirements</u>
	<u>Extended</u>	<u>To be extended</u>	
Engineering:			
Chemical	1	10	20
Mechanical	5	4	20
Electrical	2	4	10
Chemistry	1	6	16
Physics	3	1	6
Metallurgy	--	--	--
TOTALS	<u>12</u>	<u>25</u>	<u>82</u>

Of a total of 10 technical employees who left employment at HAP0, 2 entered military service, 2 left to accept other positions, 3 terminated for other reasons, and 3 transferred to other GE installations. These figures include terminations through November 30, 1954.

Employee and Public Relations

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

During the month of November, the News Bureau issued 46 news releases. The breakdown by category, distribution and content was as follows:

<u>Subject</u>		<u>Distribution</u>	
Pay and Benefits	7	Hanford	27
Employment Services	5	West Coast Area	2
Good Will	6	National	17
Technology & Research	10		
Safety, Fire	4	<u>Content</u>	
Real Estate	1	Information	2
Recreation	1	Pictures	4
Education & Library	7	Short	28
Plant Services	5	Long	3
Total	46	Features	9

A special release of an advance notice of a talk to be given by W. E. Johnson, General Manager of HAPO, was given to the Tri-City HERALD, the Columbia Basin NEWS, and the Walla Walla UNION-BULLETIN.

A special picture release, consisting of twelve pictures of the new Transportation Center, was given to a representative of the SPOKANE CHRONICLE and the paper ran them as a full page.

One daily release concerned a talk on the differences between nuclear and coal power plants. The second daily concerned the safety award received by F. J. McKinnon for the General Electric Company from the Government.

A short feature concerning a unique problem in maintenance was sent to the editor of McGraw-Hill News Bureau for his possible use. Another short feature concerning an employee in Hanford's SF Accountability Section was sent to UP and the MONOGRAM.

A new and expanded fact sheet describing the Hanford plant has been prepared and is now available.

The following eleven releases were sent to the Schenectady News Bureau with carbon copies to N. P. Jackson for use for national publicity: a picture on the Lab Waste Trailer; a picture relating to the Hanford reactor heat recovery system; a picture release illustrating a method of disposing of hot laboratory wastes; pictures of a plant growth chamber used at Hanford to be used with a story they have; a stock photo of a device for detecting extremely small leaks from gas-containing equipment; a short feature on the "Bazooka," a new radiation detecting instrument, for possible placement in NUCLEONICS; a one page story concerning the use of thorium gas mantles for removing static electricity on delicate balances; a magazine article concerning bioassay prospecting for possible placement in TODAY'S HEALTH; a short feature on underwater periscopes; one long and one short version of the new transportation center here at Hanford with pictures; and a short feature concerning a toy train in use in a Hanford laboratory.

## Employee and Public Relations

Valuable information was obtained from N. P. Jackson, Manager, Atomic Information Programs, during his two-day Hanford visit. Steps have already been taken to increase the amount of national publicity being sent to Schenectady for placement. Several specific stories are being done at the suggestion of Mr. Jackson. Certain procedures in Public Communications are being changed to conform with the new philosophy of distribution of national publicity through Schenectady and other procedures are being reviewed to make sure they are not in conflict with this philosophy.

A photograph of Hanford's "Plastic Man" to be published in weekly newspapers in Bombay, India was approved by the AEC and forwarded to Schenectady at their request.

Copies of a new booklet encouraging employees to publish in the GE REVIEW were received and distributed to our contacts in Engineering, Manufacturing and Radiological Sciences Departments. Arrangements were made for R. L. Moore to submit a technical paper to the JOURNAL OF THE AMERICAN CHEMICAL SOCIETY and the JOURNAL OF CHEMICAL CHEMISTS. The editor of CHEMICAL ENGINEERING was provided with information and photographs about Dr. W. D. Norwood's recent talk about Hanford's safety record at Houston, Texas.

The following papers, speeches and articles were approved for release this month:

"Central Oregon, Its Volcanoes and Quicksilver," by R. E. Brown for presentation to the Pacific Northwest Section, Electrochemical Society, in Spokane, Washington on November 10, 1954.

"New Techniques for Life-Testing," by J. L. Jaech for presentation at the 4th Annual Symposium on Statistical Methods, at New York, New York on November 16, 1954.

"The Mechanism of Uranium Extraction by Tributyl Phosphate," by H. T. Hahn, written as a formal report and also for later publication.

"On Certain Infinite Integrals Involving Bessel Functions," by G. M. Muller for presentation at a meeting of the American Mathematical Society in Berkeley, California in December 1954, during the week of 27-31.

"Growth and Metabolic Characteristics of *Chlorella Pyrenoidosa*," by J. W. Porter and M. S. Watson, for publication in PLANT PHYSIOLOGY.

"Effects of Cortisone Acetate on Distribution and Excretion of Radioyttrium," by Bergene Kawin for publication in ENDOCRINOLOGY.

"Engineers and Atomic Energy," by D. W. McLenegan, a speech to be given at the University of Wisconsin on December 3, 1954.

Employee and Public Relations

The following speeches were arranged during the month:

<u>Presentation or Submission date</u>	<u>Subject and Organization or Publication</u>	<u>Author</u>
11/11	"Reactor Technology" and the film "A is for Atom," at the American Legion Armistic Day celebration at Heppner, Oregon	O. C. Schroeder
11/18	"HOBBS I" to the Walla Walla St. Patrick's PTA	M. R. Adair
11/19	"Human Relations" to the annual meeting of the Local Chapter of the National Association for the Advancement of Colored People at Pasco	V. J. Byron
11/16	"The Essential Difference Between Nuclear and Conventional Power Plants" at the Seattle Section of the American Institute of Electrical Engineers	W. J. Dowis
11/30	Address to the Richland Rotary Club	W. E. Johnson
12/2	Show the movie "Here's Hanford" to the Yakima Rotary Club	W. A. Halteman
12/8	"Hanford Reactor Technology" to the Pendleton Rotary Club	O. C. Schroeder
12/14	"Magnetic Tape Recording" for the local Naval Reserve Unit	Frank Losch
12/21	"Human Relations" to the Richland Lions Club	V. J. Byron

A letter was sent to the Richland superintendent of schools proposing that a meeting be held to discuss the possibility of including HOBBS in the Richland school curriculum.

The community relations News Letter for November was distributed. Attached to the News Letter was a return postcard and instruction sheet to permit an expression of an opinion of the News Letter and its content. During the first five days after questionnaire was mailed, approximately 50 replies were received from about 400 questionnaires that were mailed.

An additional mailing to community leaders during the month was the GE NEWS DIGEST, with a tip-on calling attention to items about Hanford activities. Copies of a booklet "Neighbors from Way Back," a booklet describing GE business facilities in the West, have been received for distribution to community leaders.

Fact sheets about Richland and Hanford, "Adventures Inside the Atom," and 40 copies of "Here's Hanford" were provided for 40 boy scout executives visiting Richland.

AEC approval was received to place a HAPO exhibit in the Inland Empire Industrial Exposition to be held at Spokane's new coliseum in December. An improved picture tour of Hanford and the plastic man will be exhibited.

## Employee and Public Relations

The sign board between 705 and 703 Buildings is being repainted with a Christmas Holiday theme.

Subjects emphasized in GE NEWS lead and feature stories during November included: proper use of leased telephone lines; operation of the new transportation facilities; functions of the Operation Research study; employee Suggestion System response to the Operation 4S Cost Reduction Program; progress of the Separations Safety Stampede; presentation of Award to HAPO for establishing best safety record; review of the HAPO Grievance Procedure; health slogan contest; annual luncheon for 25-year service employees; human interest features about employees' off-the-job activities; and scheduling of GE Theatre telecasting two weeks behind "live" telecast by KXLY-TV Spokane.

A Greyhound Bus representative inquired whether or not the GE NEWS Share-a-Ride column could be eliminated. He contended that it probably was taking business away from the bus line. He was informed by Employee Benefits that the matter would be looked into. No further commitment was made.

The HAPO GE NEWS Editor presented a talk on "The Editor and the Reader" while attending a GE NEWS Editors' Conference in New York during the month.

Plant-wide health slogan contest was promoted throughout the month. Approximately 500 slogans were submitted by employees. Final contest winner will be announced early in December in the GE NEWS.

Final information-promotion part of the "Operation 4S" cost reduction-suggestion program was carried out with the distribution of the fifth 4S booklet, "Help Yourself," and carried attendant GE NEWS publicity.

Following a decision by the customer not to mail this year's Community Operations Annual Report to residents' homes, special display boxes were made and distribution begun at various public places in the community and through public information racks in the 700 Area.

The November Health bulletin and Safety topic were printed and distributed. The December issue of these bulletins were written and placed in production.

Movies taken at the October 15 birthday party for HAPO's Anniversary babies were shown to the parents whose children attended the party, and to representatives from the Company. Dessert was provided by the Desert Inn at no cost to the Company.

A letter from C. N. Gross to the Management Information Group explaining recent changes in the Fair Labor Standard Act regulations was revised and distributed.

Two binders of 29 photographs each and accompanying captions were prepared for Technical Recruitment for use in recruiting technical employees.

Reprint of a pamphlet, "Time to Curb Crime," was completed, and the pamphlets distributed to all Richland homes at the Police Department's request.

## Employee Communications and Public Relations

Employee's complaints concerning the new transportation facility, received as a "Can You Tell Me?" question, were discussed with Superintendent, Bus and Rail Operation. The on-the-spot investigation indicates no valid employee complaint of significance exists, and the complaints probably stem from employees getting used to the "change". Consequently, the quite vitriolic "Can You Tell Me?" was not answered in the November 26 issue of the GE NEWS, but will be answered by the GE NEWS editor in person.

Three Management NEWS Bulletins were published during the month.

It was decided in the future that public groups requesting GE films to show at meetings will be referred to the GE Film Distribution Center at Seattle when this is possible.

Seventeen films were shown to a total audience of 443. The following booklets were distributed during the month: "Adventures Into the Past," 500; "Adventures Inside the Atom," 300; "Adventures In Electricity," 100; Insurance Books, 100; and 1500 copies of Community Operations Annual Report.

Posters placed throughout the plant during the month included four Elliott Service Company posters, four Sheldon-Claire employee relations posters, and Suggestion System boxes were serviced on a bi-weekly basis.

Commercial artwork included: 4 full-page photo layouts, one double-page photo layout and one diagram for GE NEWS; final artwork was prepared for a radiation poster; layouts for two posters were developed; and final artwork for a reminder card showing employees how to wear badges and pencils was developed. In addition, various miscellaneous art services were performed.

Another shipment of film (10,500 feet) for the Construction Progress Motion picture was developed, processed and returned by Telefilm in Hollywood. A large portion of it was unsatisfactorily processed. AEC representatives attended a review of original and workprint film. They agreed the film processing was poor, and that it may be necessary to lower our quality requirements for this film. They appointed a committee to examine all footage processed by Telefilm and to return portions to them for replacement at no cost to us.

The Public Relations Services Division notified us they are ordering 150 prints of the HAPO produced motion picture Here's Hanford, for nation-wide distribution.

The Atomic Energy Commission at Savannah River Office had reprints made of the following HAPO produced training motion pictures: "Radiation Hazards Control," "Operation...Sample," "No Comedy in Errors," and "Getting the Job Done". They will use the films for training duPont personnel to handle materials properly in radiation zones.

Five editions of the new HAPO weekly radio program, INSIDE HANFORD, were produced and broadcast during the month of November. Highlights recorded were interviews of HAPO people performing work assignments in the actual production areas. This was augmented by interviews with the Assistant Secretary of Defense, and Military Liaison Committee members.

Employee Communications and Public Relations

Five weekly broadcasts of the HAPO produced Hanford SCIENCE FORUM, were released and increased listener interest is evidenced by an increase in questions being sent in.

Two television programs are nearing completion--"Hands Across the Atom," a subject dealing with handling radioactive materials by remote control means and "Through the Looking Glass," a featurette on unique viewing devices and materials in critical production phases of irradiation.

Six public address and recording installations were completed that included the Veteran's Day Civic Center ceremony and 200 Area presentation for Military Liaison Committee.

Graphics' November assignments were distributed as follows:

General Administrative (includes Operations Research)		8%
Employee and Public Relations		2
Engineering		41
Manufacturing		43
Finance		12
Radiological Sciences		6
Atomic Energy Commission		8
		<u>100%</u>
	<u>October</u>	<u>November</u>
Total assignments completed	55	46
Total assignments backlog	52	61

A perspective illustration of the overall Purex Plant was prepared and will be used in the Purex Project Manual. The air brush rendering includes a full length drawing of the 202-A Building with a cut-a-way to show the auxiliary crane and canyon. The plate also has an enlarged cut-a-way through H and J Cells, showing the architectural features of the building, cell details, the central control room and other specified parts of the aqueous make-up floor levels.

Six illustrations of equipment used to extract irradiated samples from a test canned slug were prepared for Design Engineering. The drawings show the step by step process of cask transfer, cutting the can end and removing it, removing a threaded plug and extracting the sample. The illustrations are to accompany a news story for off-site publication.

Graphics' work was started in the development of charts and illustrations for a report titled "Critical Experiments in the DR Pile." Raw data was supplied by Advanced Engineering for the preparation of 199 charts and graphs and 60 technical illustrations. Approximately 160 charts and illustrations were completed on this assignment during the month.

Two large six-foot flow illustrations of the Purex process are being developed for the Separations Section. As they are scheduled to start-up their operator training program next month every effort will be made to expedite completion of these illustrations. These drawings will show the equipment placed in process

## Employee and Public Relations

flow sequence rather than actual installed positioning. The more complex equipment units will be cut-a-way to show continuous flow of each process. All metal, chemicals, waste and product will be shown in coded colors.

A total of 68 charts and graphs were completed for a report titled "Noise Levels in Decibels vs. Octave Band Frequencies in Cycles Per Second."

A new up-to-date overall area process flow drawing was completed for the EOO Manager's Data Book. The base drawing includes all major fabrication, irradiation and separations buildings with the various process flow lines connecting. Laboratories and Research and Development Facilities were developed on a transparent overlay. These facilities are positioned to show their relationship to the overall plant operation.

### Graphics' Statistical Summary

	<u>Charts or Graphs</u>	<u>Illustrations</u>	<u>Other</u>
Report Material (includes Technical publications)	158		
Technical or Scientific Illustrations		38	
Mechanical Art (Flow charts, etc., not for reports)	19		11
Lecture Material (Includes slides)		4	20
Posters and embossograph signs			146
General (Posting of current data, assembly, revisions)	46		
	<u>223</u>	<u>42</u>	<u>177</u>
Total plates completed - 442			

A total of 319 photographic assignments were completed this month and 12,237 prints were produced, of which 6,703 were "A" and "B" employee identification photographs. A total of 5,534 were area and news work.

Motion picture film exposed for the month was: 1,400 feet, 16mm (b&w) film for 100-K; 600 feet, 16mm (b&w) for Purax; 1,300 feet, 16mm (b&w) film for Employee Communications and Public Relations.

One hundred ninety-two 8x10 negatives, and sixty-four 4x5 negatives were exposed using a prototype slit camera to photograph special slugs in the 300 Area for Fuel Technology. Working with the builders of this prototype camera, the personnel of the 300 Area Photo Lab exposed the film and processed this unusually large amount within the required period.

An increase of 91% of assignments covered for November, 1954, over November, 1953 is noted for 300 Area Photo Lab. An increase of 25% in the number of requests completed over November of last year is noted for 700 Area Photo Lab.

A total of 420, 8 $\frac{1}{2}$ x11 prints on cells in the 221-B Canyon Building were produced for Design Engineering.

See attached Statistical Report for Photography Unit.



PHOTOGRAPHY UNIT  
MONTHLY REPORT  
NOVEMBER, 1954

ENGINEERING (Con't.)

TECHNICAL

Applied Research  
Fuel Technology  
Pile Technology  
Separations Technology

MANUFACTURING

Manufacturing Admin.

REACTOR

SEPARATIONS

METAL PREPARATION

Power & Maintenance

TRANSPORTATION

RADIOLOGICAL SCIENCES

BIOLOGY

BIOPHYSICS

RADIO. RECORDS &  
STANDARDS

A.E.C. PROPERTY MANAGEMENT

A.E.C. SAFETY

A.E.C. SECURITY

TOTALS

2" X. 2"	2" X. 4"	5" X. 7"	8" X. 10"	8 1/2" X. 11"	N E G.	35mm Color Slides	3 1/4" X 4" (B&W) Slides	3 1/4" X 4" Color Slides	4" X 4" Color Transp. Film	4" X 5" Color Transp. Film	16mm M.P. Film
9	19	15	502	51	1						
	5	8	836	308							
	53	303	76	16							
			55								
			47	16							
22	10	23	38	23							
		6									
	25										
	10	35	27	35							
		29									
			30	9							
	36	9									
	32	25									
	8	36	2	36							
3,537	3,489	657	297	1,269	2,988	1,853	54	11	12	500	ft.

SEPTEMBER

OCTOBER

NOVEMBER

TOTAL ASSIGNMENTS  
TOTAL NEGATIVES  
TOTAL PRINTS

319	282	319
1,646	2,043	1,853
10,576	11,720	12,237

Employee and Public Relations

UNION RELATIONS

Union Relations - Operations Personnel

The initial meeting with Material Expeditors and Take-Off Men (recently certified) was held on November 16. Demands include:

1. Pay increases to exceed the rates paid to the mechanical crafts. Take-Off Men are presently grade 17; the crafts generally are grade 21. No increase appears warranted.
2. Clear definition of jurisdiction. This is very sticky in that these jobs are not well defined and vary somewhat according to work location.
3. Seniority to be established on basis of HAPO adjusted service date. Presents no problem.
4. Greater consideration for overtime assignments.

Further meetings with this group have been postponed until early in December.

J. W. Johnston, chief steward for the Operating Engineers Local of the Hanford Atomic Metal Trades Council has requested and received a leave of absence for one year to act as business representative for his local union. Johnston becomes the first such employee to exercise his option under the revised leave of absence article of the contract which provides:

" . . . an employee with at least one year of continuous service will be granted leave of absence, without pay, to act as a Council officer or as business representative of any of the local unions composed of General Electric employees which are affiliates of the Hanford Atomic Metal Trades Council."

Because of the financial limitations, it is anticipated that this contract provision will be used very sparingly by Hanford Locals.

A revised version of the slide film, "You and Labor Law" has been received by the Training and Development group. At their request, we have reviewed the contents of the film and have endorsed its use as a training film for HAPO.

We have received a copy of a letter from an unknown source at Portsmouth, Ohio which apparently is being used by the AFL as propaganda in their efforts to organize Goodyear employees at that location. Attached to the letter was an unsigned note which stated, "Enclosed find a testimonial on how well the union is doing at your plant for your information." The letter obviously is a reproduction on the letterhead of the HAMTC, addressed to all Goodyear employees at Portsmouth, and signed by the President, Secretary-Treasurer, and Business Representative of the Council.

## Employee and Public Relations

### UNION RELATIONS

In it they urge that Goodyear employees vote for the American Federation of Labor and endeavor to prove the value of that organization by stating that:

- "1. Our contract embodies one of the highest (if not the highest) maintenance and production wage scales on the Pacific Coast. Our 'fringe' benefits equal the best paid anywhere.
- "2. . . . The AFL won, for example, \$128,000 in back pay for our maintenance people in a single instance through vigorous enforcement of their rights under the union contract and federal legislation.
- "3. . . . delayed an inequitable increase in rental rates in the town of Richland . . .
- "4. Since the 1949 NLRB election at Hanford, nearly 500 additional G.E. employees here have voted to be represented by the AFL in three representation elections."

Such statements might be quite valuable in 1955 negotiations.

The settlement of the wage dispute at Oak Ridge and Paducah has been accomplished. The settlement formula provides for a wage increase for production and maintenance workers of 10 cents per hour, six cents of which is effective April 15, 1954, and the remaining four cents as of January 15, 1955, the date of the next scheduled reopening of the contract on wages. The union was also able to obtain a provision that paid holidays which fall on Saturday will be observed on Friday.

The money settlement preserves the Panel recommendation of a six-cent increase and the additional four cents to begin in January satisfies the January reopening as provided in the contract and closes the contract until its expiration date, October 15, 1955. The terms of the settlement will also be passed on to the AFL's Atomic Trades and Labor Council who accepted the six-cent adjustment without a strike last summer.

The strike crisis produced by the Oak Ridge-Paducah wage dispute resulted not only in issuance of an 80-day Taft Act injunction, but in a move by Labor Secretary Mitchell to establish a special committee of experts to review and reappraise collective bargaining procedures in the atomic energy industry. David L. Cole was named chairman to direct the review but thus far the remainder of the committee has not been named.

President Eisenhower has named, subject to Senate approval, Chicago Attorney Theophil Carl Kamholz as the National Labor Relations Board's General Counsel. He is to replace George J. Bott (holdover from the Truman administration) when his term expires in December. Albert C. Beeson, Eisenhower appointee to the Board, has announced he will not be a candidate for renomination when his term expires in December.

Employee and Public Relations

UNION RELATIONS

Grievance Statistics:

A total of twenty-nine (29) grievances were received and two (2) Step II grievance meetings were held during the month. A breakdown of the grievances received and processed follows:

	<u>ALL DEPARTMENTS</u>			<u>Total Unit</u>	<u>Total Nonunit</u>
	<u>NAMTC</u>	<u>HGU</u>	<u>BSEIU</u>		
Received this month	26	0	0	26	3
Received this year	284	44	2	330	29
Step I					
Pending October 31	5	0	0	5	0
Settled this month*	23	0	0	23	2
Settled this year	185	14	1	200	24
Pending November 30	5	0	0	5	0
Step II					
Pending October 31	11	1	1	13	0
Settled this month**	10	1	1	12	0
Settled this year	93	33	1	127	6
Pending November 30	14	0	0	14	1
Arbitration					
Pending October 31	4	0	0	4	
Settled this month	0	0	0	0	
Settled this year	0	0	0	0	
Pending November 30	4	0	0	4	

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	9	118	12	81	3	40
Nonunit	0	5	0	4	0	0
Separations - Unit	10	71	6	45	4	22
Nonunit	0	4	0	2	0	1
Metal Preparation - Unit	5	34	2	20	2	8
Transportation - Unit	1	21	1	12	0	9
Stores - Unit	0	4	1	3	1	2
Electrical Utilities - Unit	0	1	0	0	0	1

\* Grievances brought to Step II prior to September 1, 1954, 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 September 1, 1954, are for the purpose of this report, considered settled at Step II.

Employee and Public Relations

UNION RELATIONS

BY DEPARTMENTS (Cont'd.)

	<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>
Employee and Public Relations						
Community - Unit	0	11	0	6	0	2
Hospital - Unit	0	2	0	1	1	1
Nonunit	0	1	0	1	0	0
Aux. Ops. & Plant Protection						
-Unit	1	57	1	24	1	35
-Nonunit	0	2	0	1	0	1
Telephone - Unit	0	3	0	2	0	1
Nonunit	0	1	0	0	0	1
Employee Comm. & Pub. Relations - Nonunit (1)	0	1	0	0	0	0
(1) Correction of omission error in August, 1954 report						
Radiological Sciences - Unit	0	8	0	7	0	1
Nonunit	3	7	2	5	0	0
Engineering - Nonunit	0	5	0	7	0	2
Financial - Nonunit	0	3	0	2	0	1

\* Grievances brought to Step II prior to September 1, 1954, 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 September 1, 1954, are, for the purpose of this report, considered settled at Step II.

BY SUBJECTS

<u>Unit</u>	<u>Manufacturing</u>		<u>Emp. &amp; Pub. Relations</u>		<u>Radiological Sciences</u>		<u>Engineering</u>		<u>Financial</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>	<u>This Mo.</u>	<u>This Year</u>	<u>This Mo.</u>	<u>This Year</u>
Discrimination	0	2	0	2	0	0				
Jurisdiction	10	104	0	20	0	5				
Health-Safety-Sanitation	5	16	0	5	0	0				
Hours of Work	1	11	0	28	0	0				
Overtime Rates	2	25	0	2	0	0				
Holidays	0	5	0	0	0	0				
Sick Leave	0	6	0	1	0	0				
Seniority	0	20	0	2	0	1				
Grievance Procedure	0	3	0	0	0	0				
Wage Rates	2	30	0	3	0	1				
Miscellaneous	5	27	1	10	0	1				

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Employee and Public Relations

UNION RELATIONS

BY SUBJECTS (Cont'd.)

	<u>Manufacturing</u>		<u>Emp. &amp; Pub. Relations</u>		<u>Radiological Sciences</u>		<u>Engineering</u>		<u>Financial</u>	
	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>	<u>This</u>
	<u>Mo.</u>	<u>Year</u>	<u>Mo.</u>	<u>Year</u>	<u>Mo.</u>	<u>Year</u>	<u>Mo.</u>	<u>Year</u>	<u>Mo.</u>	<u>Year</u>
<u>Nonunit</u>										
Health-Safety-Sanitation	0	0	0	0	0	0	0	1	0	0
Overtime Rates	0	4	0	1	0	2	0	0	0	0
Vacation	0	0	0	0	0	1	0	0	0	0
Seniority	0	1	0	0	0	0	0	0	0	0
Continuity of Service	0	1	0	2	0	0	0	0	0	0
Leave of Absence	0	1	0	0	0	0	0	0	0	0
Wage Rates	0	1	0	1	2	3	0	3	0	1
Work Assignment	0	1	0	0	0	0	0	0	0	2
Miscellaneous	0	0	0	1	1	1	0	1	0	0

Construction Liaison

We have unofficially received a copy of a jurisdictional settlement signed by the International Presidents of the Machinists and Millwrights which endeavors to provide a guide to work assignments involving the two crafts. The understanding provides that the manufacturing, handling, erecting, installing, and repairing of machinery and equipment in a plant of this nature is probably the work of Machinists. The application of this would alter a number of existing practices on this project. The agreement, however appears to invalidate the foregoing by stating:

"Where both organizations have been certified or recognized as the bargaining agent in the same plant, factory or project for certain groups of employees, this agreement shall not be used to alter the existing division of work between the employees of the two bargaining units."

The interpretation of the agreement is currently the subject of considerable controversy between the two crafts but, since the Council has not formally transmitted the settlement to us, we must conclude that they are endeavoring to settle their differences prior to the time they submit it to the Company. Construction should benefit materially from the understanding.

Employee & Public Relations

SALARY & WAGE ADMINISTRATION

1. A proposal for the adoption of the Company Salary Plan at Hanford was completed and delivered to the Hanford Operations Office of the A.E.C. along with a request for approval.
2. A revised Position Description Manual, based upon the salary structure of the new Salary Plan, was completed and distributed along with the proposal to adopt the Plan.
3. New positions in the Engineering Department were evaluated, and work to complete the reorganization prior to December 15, 1954, was begun.
4. A reconciliation meeting was held with Messrs. Giddings and Steel of the Research Services Division.
5. The new Exempt Employee Appraisal Guide was distributed to all exempt employees and a schedule was established for the completion of appraisals to be retro-active for not more than one year.
6. Reimbursement Authorizations Nos. 235 and 236 relating to wage rates were received from the Hanford Operations Office of the A.E.C.
7. Study of a new wage rate plan was continued.

Employee and Public Relations  
EDUCATION AND TRAINING SECTION

The report of the Education and Training Section is submitted as follows:

ROTATIONAL TRAINING PROGRAM

Present Assignments

<u>Department</u>	<u>Last Month</u>	<u>This Month</u>
<u>Engineering</u>		
Technical	16	13
Design	6	5
Project	6	7
<u>Manufacturing</u>		
Metal Preparation	0	2
Separations	3	4
Reactor	4	5
Transportation	0	1
<u>Radiological Sciences</u>		
Biology	1	0
Records & Standards	1	1
Bio-Physics	1	1
<u>Financial</u>		
Procedures & Computing	1	1
<b>TOTAL</b>	<u>39</u>	<u>40</u>

Permanent Placements

There was one placement off the program during the month. This compares to three placements during October. Continued efforts are being made to be highly selective of personnel placed off the program in order that an adequate supply of manpower can be maintained until new trainees are obtained to full anticipated increasing requirements from the program.

Selective Service

Two technically-trained men were lost to selective service; making a total of 38 since September 1953. The majority of these men are former technical graduates who participated on the Rotational Training Program before being placed with one of the departments.

Employee and Public Relations  
EDUCATION AND TRAINING SECTION

Selective Service (Continued)

To date, correspondence has been established with 15 of the 38 men who left for service, and it is anticipated within the next few weeks that additional contacts will be made with the remainder. It is planned to maintain correspondence with all of the men who are in service for the entire period. From the comments received it is apparent that the contacts made with the technically trained men in service will be most beneficial in keeping up their interest in the company. All of them have freely expressed their appreciation of the interest being maintained in them while they are in the Armed Forces.

Training Program for Technicians

A detailed proposal suggesting the establishment of a technician training program for Hanford to be modeled after similar training programs in the East was submitted for review and consideration prior to further submission to the department managers and other interested Hanford management.

Advertisements of Available Technical Positions

Several months ago a folder was established as a ready reference file of positions available for technically trained men throughout the country. One of the objectives was to keep abreast of the trends of employment in various sections of the country and of the various fields of scientific and engineering graduates. This folder was allowed to elapse during the period of re-organization of functions of the section. However, it has now been reactivated. There are some indications that the demand for technically trained people is increasing over what it was a few weeks ago and this apparent trend will be followed closely during the next several weeks.

SCHOOL OF NUCLEAR ENGINEERING

Fall Semester

Of the 279 students who paid tuition to take a course, 260 are still active in their course work. This number is small because the instructors and school administration work together to keep the students interested in their studies.

Visits

The following representatives from the University of Idaho visited Richland on October 28 and 29 to register and counsel their students

Dr. L. C. Cady, Dean of the Graduate School  
Dr. W. H. Cone, Professor of Chemistry  
Dr. M. L. Jackson, Professor of Chemical Engineering  
Mr. H. E. Slade, Accountant in Business Office.

Seventy-three students came in to seek guidance from the faculty members although they did not all register.

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Employee and Public Relations  
EDUCATION AND TRAINING SECTION

Visits(Continued)

On November 3 and 4 Dean S. E. Hazlet, Dr. S. T. Stephenson and Dr. H. Dodgen visited Richland to talk with students and also to inspect the laboratory equipment which Ira Myers is using in connection with a research topic.

The following members of the Oregon State College faculty visited Richland on November 9 and 10 to counsel their students.

- Dr. H. P. Hansen, Dean of the Graduate School
- Dr. E. C. Gilbert, Chairman of the Chemistry Department
- Dr. A. T. Lonseth, Professor of Mathematics
- Dr. E. A. Yunker, Chairman of Physics Department
- Professor M. Popovich, Chairman of Mechanical Engineering Department
- Professor J. S. Walton, Chairman of Chemical Engineering Department

Twenty-eight students came in for interviews.

Spring Semester

Arrangements are proceeding to set up the courses for the Spring Term. Among the new courses to be offered are:

- Operations Research
- Colloid Chemistry
- Metallurgy of Nuclear Components
- Numerical Methods and Computing Techniques
- Advanced Cost Accounting
- Internal Auditing
- Principles of Quality Control

Approvals

The University of Washington has approved five of our undergraduate courses for college credit. They are:

- Elementary Accounting I
- Business Law I
- Intermediate Algebra
- College Algebra
- Differential Calculus

TRAINING

Principles and Methods of Supervision was presented to Group #76 during the two weeks of November 8-19, with 14 exempt personnel completing the course. Arrangements are being made for PMS-dinner meeting to be held December 1 for Groups #74, 75, 76.

Employee and Public Relations  
EDUCATION AND TRAINING SECTION

Supervisor's Accident Prevention Program was held Wednesday, November 10, with an attendance of 10 area supervisors. This four-hour meeting gives supervisors an opportunity to discuss the many facets of accident prevention and how they as supervisors can develop their employees' awareness of the desirability of performing their jobs safely.

Conference Leading was conducted November 15 and 23, with a participation of 20 exempt personnel. This program is directed toward stimulating interest in learning and using the techniques of leading group discussions.

Effective Human Relations second conference meeting was held for Group #23 Wednesday, November 17, with 12 supervisors attending. This 12-hour program of three conferences deals primarily with actual human relations case studies. These cases are presented through various films, records, and written background, allowing group discussion of these and other on-the-job cases of the supervisors attending.

Throughout the month, members of Training have continued work on revising current training programs.

Transcripts were prepared on all exempt personnel of Reactor Section, Manufacturing Department, and Design Section and Project Section of Engineering Department. The transcripts provide information on each exempt employee's industrial experience, educational background, and training program attendance for a study by Education and Training Section personnel in the planning of future training needs.

A appreciation version of HOBSO II was presented to four supervisors on Wednesday November 10.

A member of Training presented HOBSO I Thursday night, November 18, to 123 members of St. Patrick High School P.T.A. in Walla Walla.

A member of Training presented "Motivations and Accident Prevention" to 25 exempt and non-exempt project section personnel on Friday, November 19.

On Tuesday and Wednesday afternoons, November 17-18, an appreciation version of J.T.T. was given by a member of Training for the Manager of Education and Training and the training staff. Discussion-meetings were held after the presentations.

A member of Training gave a talk on "Why of Human Relations" to 200 members of National Association for Advancement of Colored People in Pasco, Friday night November 19.

All exempt members of staff completed salary appraisal form, page 1.

During the month, there were 22 requests for Program Attendance Transcripts and a supervisor in Manufacturing Department requested 25 FMS Situation Analysis sheets.

Supervisor's Handbook records:

Number issued during November ----- 0  
Number returned during November ----- 0  
On hand end of November -----197

Of the 197 handbooks on hand, 66 are not usable because of missing pages; 21 have yet to be checked for completeness and 110 are ready for issuance.

EMPLOYEE & PUBLIC RELATIONS DEPARTMENT  
HEALTH & SAFETY SECTION  
NOVEMBER 1954

General

Personnel Changes

Two additions and seven deletions resulted in a decrease to 252.

Employee Relations

Employee attendance at 22 meetings was 215.

Visits

Dr. Martin attended a meeting of the American Heart Association in Seattle. One industrial nurse attended a meeting of the industrial nurses section of the Washington State Nurses Association. The supervisor of public health nurses attended a meeting of state supervisors of nurses in Seattle. One public health nurse attended an institute on "The Aging Population" at the University of Washington.

Dr. Joe Quigley, Director of Health and Safety for National Lead's Cincinnati plant was a visitor.

Several people in various public health fields visited the Public Health Unit.

Industrial Medicine

Preliminary studies of noise levels in the new 100-K area indicate higher levels than for the other 100 areas.

Medical examinations increased from 988 to 1017 while dispensary treatments increased from 4551 to 4772.

Sickness absenteeism was 1.69% as compared with 1.58% for October while total absenteeism was 2.52% as compared with 2.42%. Total absenteeism through November was 2.36% which is identical with the absenteeism for this period in 1953.

The health topic for the month was Rheumatism.

Safety and Fire Prevention

There were no major or sub-major injuries during the month in either the plant or community group. The minor injury trend was excellent with 252 for the plant and 17 for the community. This is a new low in accident frequency. One fire with no loss occurred.

Kadlec Hospital

The average daily census decreased from 68.6 to 60.2 as compared with 80.9 a year ago. This is the lowest census recorded for November since 1949 and the decreased revenue resulted in a fifteen thousand dollar deficit in the Hospital to date in spite of drastic operating economies.

The average hospital stay was also very low at 3.8 days which is one-third less than the stay five years ago.

Public Health

Bacterially contaminated drinking water was present for a short time in the White Bluffs construction area due to inadequate chlorination. Satisfactory water in barrels was supplied until the inadequacy was corrected.

A further increase in communicable disease was due to a continued high incidence of chickenpox, mumps and ringworm.

Of the 356 contacts by social service counsellors, one-third were for marital discord.

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HEALTH & SAFETY SECTION

NOVEMBER 1954

General  
Costs-October

	<u>Sept.</u>	<u>Oct.</u>	<u>Oct.</u> <u>Budget</u>
Industrial Medicine	\$43,867	\$44,645	\$47,530
Public Health (Oper.)	11,569	9,593	10,525
Kadlec Hospital (Net)	26,886	21,934	18,000
Hospital Expense Credits	996	1,775	2,000
Safety & Fire Prevention	<u>16,982</u>	<u>21,433</u>	<u>23,250</u>
Subtotal-Health & Safety (Oper.)	100,300	99,380	101,305
Construction Medical (Industrial and Public Health)	<u>593</u>	<u>-a)</u>	<u>-a)</u>
Total-Operations & Construction	\$100,893	\$99,380	\$101,305

-a) Public Health Construction costs included in Public Health Operations.

The net cost of operating the Health and Safety Section before charges were assessed to various departments was \$99,380, about \$1,000 less than the September cost and \$2,000 below the budget. The low patient load at Kadlec accounts for the higher net cost.

HEALTH & SAFETY SECTION

NOVEMBER 1954

Industrial Medical Services

The total number of examinations increased from 988 to 1017. General Electric employees sustained no major and no sub-major injuries. Contractor employees sustained one sub-major injury. Dispensary visits increased from 4551 to 4772. Dispensary services in the 100-K Area began November 15th on the day shift. Patients on the night shifts are reporting to the 100-B Area dispensary. Dispensary facilities in the K Area are satisfactory and most of the equipment has been installed. One nurse, Miss Anliker, attended a meeting of the Industrial nurses section of the Washington State Nurses Association. Dispensary visits in the 700 Area were up to 322 during the month. There were twenty-six nurses on the roll.

Dr. Martin attended a meeting of the American Heart Association in Seattle during the month.

Preliminary study of 100-K noise levels indicate higher levels than other 100 Areas. Personnel protection in addition to ear plugs may be necessary in some locations. Appeal hearing loss cases will be heard in January.

Dr. J. A. Quigley of the National Lead Company, was a visitor during the month.

Problems under study during the month included biological wastes in the 100-F Area, ventilation problems in plant operated buses and ozone toxicity.

The Health Activities Committee met on November 17th and the topic on Rheumatism was discussed and material on this subject was prepared for distribution throughout the plant. A health slogan contest was carried out and prizes given. Ways and means for giving more recognition for attendance records were discussed. Sickness absenteeism was 1.69% for the month and 2.36% for the year to date from all causes.

Net expenses incurred in October amounted to slightly more than \$36,000, an increase of \$1,000 from September. Minor fluctuations occurred in several categories of expense, but these were minor in relation to the total expenditure involved.

<u>Costs-Operations</u>	Oct.	Sept.	Increase (Decrease)
Salaries	\$34,166	\$33,726	\$ 440
Continuity of Service	3,075	3,035	40
Laundry	278	284	(6)
Utilities, Transportation, Maintenance	3,542	3,672	(130)
Supplies and Other	4,719	4,211	508
Total Gross Costs	45,780	44,928	852
Less: Revenue	1,135	1,061	74
Expense Credits	8,168	8,468	(300)
Net Cost of Operation	\$36,477	\$35,399	\$ 1,078

At the end of four months' operation, net expenses are nearly \$17,000, or 10% less than budgeted last spring when the FY 1955 Revised Budget was prepared. Lower than anticipated salaries and continuity of service expense account for the major portion of the underrun.

HEALTH & SAFETY SECTION

NOVEMBER 1954

<u>Industrial Medical Services (Continued)</u>	<u>October</u>	<u>November</u>	<u>Year to Date</u>
<u>Physical Examinations</u>			
<u>Operations</u>			
Pre-employment . . . . .	90	98	977
Rehire . . . . .	23	18	270
Annual . . . . .	293	317	2877
Interim . . . . .	190	200	1846
A.E.C. . . . .	30	29	343
Re-examination and recheck . . . . .	218	230	2271
Termination . . . . .	67	58	887
Sub-total . . . . .	911	950	9471
<u>Contractors</u>			
Annual . . . . .	19	32	194
Pre-employment . . . . .	12	13	553
Recheck . . . . .	4	15	284
Termination and Transfer . . . . .	42	7	299
Sub-total . . . . .	77	67	1330
Total Physical Examinations . . . . .	988	1017	10801
<u>Laboratory Examinations</u>			
<u>Clinical Laboratory</u>			
Government . . . . .	130	117	1479
Pre-employment, Termination, Transfer . . . . .	1400	1253	17323
Annual . . . . .	1621	1705	15721
Recheck (Area) . . . . .	1027	987	9100
First Aid . . . . .	2	7	74
Clinic . . . . .	402	333	4043
Hospital . . . . .	3964	3711	45797
Public Health . . . . .	0	1	4
Total . . . . .	8546	8114	93541
<u>X-Ray</u>			
Government . . . . .	23	26	196
Pre-employment, Termination, Transfer . . . . .	157	200	2234
Annual . . . . .	511	566	5184
First Aid . . . . .	54	61	875
Clinic . . . . .	183	190	2315
Hospital . . . . .	261	233	3055
Public Health . . . . .	19	2	103
Total . . . . .	1208	1278	13962
<u>Electrocardiographs</u>			
Industrial . . . . .	92	71	789
Clinic . . . . .	1	0	12
Hospital . . . . .	29	33	351
Total . . . . .	122	104	1152

HEALTH & SAFETY SECTION

NOVEMBER 1954

<u>Industrial Medical Services (Continued)</u>	<u>October</u>	<u>November</u>	<u>Year to Date</u>
<u>First Aid Treatments</u>			
<u>Operations</u>			
New Occupational Cases . . . . .	310	300	4294
Occupational Case Retreatments . . . . .	1227	1233	14309
Non-occupational Treatments . . . . .	2681	2975	28359
Sub-total . . . . .	4218	4508	46962
<u>Construction</u>			
New Occupational Cases . . . . .	58	48	774
Occupational Case Retreatments . . . . .	216	146	2260
Non-occupational Treatments . . . . .	59	70	661
Sub-total . . . . .	333	264	3695
<u>Facility Operators</u> . . . . .	0	0	149
Total First Aid Treatments . . . . .	4551	4772	50806
<u>Major Injuries</u>			
General Electric . . . . .	0	0	5
Contractors . . . . .	0	0	0
Total . . . . .	0	0	5
<u>Sub-Major Injuries</u>			
General Electric . . . . .	0	0	17
Contractors . . . . .	1	1	5
Total . . . . .	1	1	22
<u>Absenteeism Investigation</u>			
Calls Made . . . . .	4	2	40
Employee Personal Illness . . . . .	4	2	32
No. absent due to illness in family . . . . .	0	0	1
No. not at home when call was made . . . . .	0	0	7

HEALTH & SAFETY SECTION

NOVEMBER 1954

Kadlec Hospital

The average daily adult census decreased from 68.6 to 60.2, as compared with 80.9 a year ago. This is the lowest census recorded for the month of November since 1949 when it was 43.1. Our present census represents an occupancy percentage of 55.2, broken down as follows: Mixed Service (Medical, Surgical, Pediatrics) 57.2; Obstetrical Service 47.1. The minimum and maximum daily census ranged as follows:

	<u>Minimum</u>	<u>Maximum</u>
Mixed Service	31	76
Obstetrical Service	4	15
Total Adult	38	87

The average daily newborn census decreased from 13.0 to 10.1 as compared to 9.1 a year ago.

In connection with the marked decrease in patient census it is worthy of note that fewer admissions are not the only cause of this decrease. Of substantial importance is the continued reduction in the average length of stay of each patient as shown by the following summary:

<u>Month &amp; Year</u>	<u>Average Stay</u>
November, 1954	3.8 days
" 1953	4.3 "
" 1952	4.8 "
" 1951	5.4 "
" 1950	5.5 "
" 1949	5.6 "

This represents a reduction in length of stay of approximately 12% in the past year and about 32% over the past five years. Further analyses of the average length of stay by years will be made in our annual report for 1954.

Nursing hours per patient per day:

Medical, Surgical, Pediatrics	4.09
Obstetrical	5.95
Newborn	3.56

The increase in nursing hours per patient per day is due directly to the unseasonal drop in patient census which was greater than the decrease in number of nursing hours resulting from a reduction in nursing personnel.

The ratio of inpatient hospital employees to patients (excluding newborn) for the month of October, was 2.27. When newborn infants are included, the ratio is 1.98.

HEALTH & SAFETY SECTION

NOVEMBER 1954

Kadlec Hospital (Continued)

The net expense for the operation of Kadlec Hospital for October was \$21,934, as compared to \$26,886 for September. Summary is as follows:

Kadlec Hospital net expense \$21,934  
This represents a decrease of \$4,952. It results from an increase of \$4,407 in revenue and an increase of \$779 in expense credits which more than offset a \$234 increase in gross costs.

A summary of our present net operating expenses in relation to the budget appears in a letter to Mr. Gross dated November 26, 1954.

Following is a summary of employee relations meetings held in the Health and Safety Section during November.

	<u>Meetings</u>	<u>Attendance</u>
Hospital	13	135
Industrial Medical	2	11
Public Health	6	56
Safety & Fire Prevention	<u>1</u>	<u>13</u>
	22	215

HEALTH & SAFETY SECTION

NOVEMBER 1954

Hospital Unit (Continued)	October	November	Year to Date
<u>Kadlec Hospital</u>			
Average Daily Adult Census . . . . .	68.6	60.2	71.0
Medical . . . . .	20.7	17.7	19.9
Surgical . . . . .	25.3	20.0	28.1
Pediatrics . . . . .	9.5	12.6	10.9
Mixed . . . . .	55.5	50.3	58.9
Obstetrical . . . . .	13.1	9.9	12.1
Average Daily Newborn Census . . . . .	13.0	10.1	11.6
Maximum Daily Census:			
Mixed Services . . . . .	70	76	99
Obstetrical . . . . .	17	15	21
Total Adult Census . . . . .	86	87	116
Minimum Daily Census:			
Mixed Services . . . . .	37	31	20
Obstetrical Service . . . . .	8	4	4
Total Adult Census . . . . .	52	38	28
Admissions: Adults . . . . .	531	480	5842
Discharges: Adults . . . . .	538	477	5844
Medical . . . . .	152	130	1541
Surgical . . . . .	210	185	2399
Pediatrics . . . . .	76	88	911
Mixed . . . . .	438	403	4851
Obstetrical . . . . .	100	74	992
Newborn . . . . .	82	70	887
Patient Days: Adult . . . . .	2127	1805	23713
Medical . . . . .	641	532	6634
Surgical . . . . .	784	600	9384
Pediatrics . . . . .	296	378	3642
Mixed . . . . .	1721	1510	19660
Obstetrical . . . . .	406	295	4053
Newborn . . . . .	402	303	3891
Average Length of Stay: Adults . . . . .	4.0	3.8	4.1
Medical . . . . .	4.2	4.1	4.3
Surgical . . . . .	3.7	3.2	3.9
Pediatrics . . . . .	3.9	4.3	4.0
Mixed . . . . .	3.9	3.7	4.1
Obstetrical . . . . .	4.1	4.0	4.1
Newborn . . . . .	4.9	4.4	4.4
Occupancy Percentage: Adults . . . . .	62.9	55.2	65.1
Medical . . . . .	55.9	47.8	53.8
Surgical . . . . .	79.1	62.5	87.8
Pediatrics . . . . .	50.0	66.3	57.4
Mixed . . . . .	63.1	57.2	66.9
Obstetrical . . . . .	62.3	47.1	57.6
Newborn . . . . .	50.0	38.8	44.6
(Occupancy Percentage based on 109 adult beds and 26 bassinets.)			

HEALTH & SAFETY SECTION

NOVEMBER 1954

<u>Hospital Unit</u> (Continued)	<u>October</u>	<u>November</u>	<u>Year to Date</u>
<u>Kadlec Hospital</u> (Continued)			
Avg. Nursing Hours per Patient Day:			
Medical, Surgical, Pediatrics . . . . .	3.65	4.09	
Obstetrics . . . . .	4.00	5.95	
Newborn . . . . .	2.78	3.56	
Avg. No. Employees per Patient (excluding newborn) . . . . .			
	2.27		
Operations: Major . . . . .			
	66	57	811
Minor . . . . .	83	81	938
E.E.N.T. . . . .	45	29	613
Dental . . . . .	0	3	14
Births: Live . . . . .			
	84	69	887
Still . . . . .	1	2	9
Deaths . . . . .			
	4	5	50
Hospital Net Death Rate . . . . .			
	.16%	.55%	.37%
Net Autopsy Rate . . . . .			
	50.0	40.0	48.0
Discharged against advice . . . . .			
	3	0	22
One Day Cases . . . . .			
	161	151	1663
Admission Sources:			
Richland . . . . .	72.1	73.7	72.4
North Richland . . . . .	12.4	12.3	12.5
Other . . . . .	12.5	14.0	15.1
Admissions by Employment:			
General Electric . . . . .	69.2	68.5	67.9
Government . . . . .	3.0	3.1	3.2
Facility . . . . .	4.7	2.9	5.1
Contractors . . . . .	16.9	18.8	18.1
Schools . . . . .	1.5	.8	1.2
Others . . . . .	4.7	5.9	4.5
Hospital Outpatients-F.A. . . . .			
	623	574	1197
Recovery Bed Patients-F.A. . . . .			
	0	0	71
<u>Physical Therapy Treatments</u>			
Clinic . . . . .	258	315	3249
Hospital . . . . .	53	74	906
Industrial: Plant . . . . .	269	235	2249
Total . . . . .	580	624	6404
<u>Pharmacy</u>			
No. of Prescriptions Filled . . . . .	2714	2452	48908
No. of Store Orders Filled . . . . .	588	477	5733

HEALTH & SAFETY SECTION

NOVEMBER 1954

<u>Hospital Unit (Continued)</u>	<u>October</u>	<u>November</u>	<u>Year to Date</u>
<u>Kadlec Hospital (Continued)</u>			
<u>Patient Meals</u>			
Regulars . . . . .	3140	2590	36700
Children under 8 . . . . .	407	609	4479
Specials . . . . .	1239	1021	12310
Softs . . . . .	716	531	8257
Tonsils . . . . .	89	68	1106
Liquids . . . . .	182	122	1780
Surgical Liquids . . . . .	128	62	1082
Total . . . . .	5901	5003	65714
<u>Cafeteria Meals</u>			
Noon . . . . .	1655	1716	19573
Night . . . . .	321	368	3645
Total . . . . .	1976	2084	23218

HEALTH & SAFETY SECTION

NOVEMBER 1954

Public Health Unit

Communicable diseases reported again increased due to the continued high incidence of chickenpox, mumps and ringworm.

The number of home visits made by public health nurses increased by approximately 5%. A shift was noted in calls made for communicable disease control. This reflected the increase in the number of communicable diseases which is typical at this time of the year. Most of the calls were in respect to checking on contacts of known communicable disease cases. The increase in terms of communicable disease control reduced the number of visits made for maternal and infant health.

Mr. Standish Seymour, Executive Secretary of the Washington State Health Council, made two visits to arrange for a community health clinic to be held in the Tri-City area in the spring of 1955.

A regular scheduled tuberculosis clinic was held with Dr. G. Marcy of the Central Washington Tuberculosis Hospital as consultant.

Miss Julia Anderson, Field Advisor, University of Washington School of Nursing, visited the unit in respect to the progress of a student nurse on the staff.

The supervisor of public health nurses attended a state supervisors meeting at the State Health Department in Seattle.

One staff nurse attended an institute on "The Aging Population" at the University of Washington campus in Seattle.

Miss Helen Dagle, of the Washington State Dairy Council, visited the unit to present information regarding new visual aids and nutrition.

A regular scheduled hearing clinic, sponsored by the unit, was held with Dr. Louis Hulsman acting as consultant.

Mr. Felix Montes, Washington State Executive Secretary of the National Foundation of Infantile Paralysis, conferred with the unit chief in regard to plans for the control of poliomyelitis.

Miss Carolyn Bowen, Physical Therapy Consultant, State of Washington Department of Health, visited the area as part of a state-wide survey of physical therapy installations as part of the school program for the handicapped and crippled child.

Problems of marital discord were given considerable attention by the social service counselors during November. Of the 356 contacts, 120 (33%) were focused on this area. Difficulties in the relationship between parents and children was the subject of 102 (28%) interviews. In 93 (26%) instances, children were helped directly to improve their relationship to home, school and community. Adult personality problems were the focus of 17 (5%) interviews. Problems of physical and mental illness were met in 22 (6%) instances, and there were two requests for financial and other material assistance.

HEALTH & SAFETY SECTION

NOVEMBER 1954

Public Health Unit (Continued)

Plans are being formulated for a restaurant survey to be conducted in the early part of January by a representative of the State Health Department. It is planned to regrade restaurants at this time in relation to score made. Results of the inspection of restaurants were satisfactory. However, regrading is desirable at this time since numerous changes have been made in their management.

A 2½ day training course in epidemiology and communicable diseases was held in Richland for sanitation personnel in southeastern Washington.

One milk producer was approved for shipping of Grade A milk. Results of 29 dairy farm inspections were satisfactory. Bacteriological results of sixteen pasteurized milk samples were satisfactory with the exception of a cream sample from one plant. However, rechecking indicated satisfactory bacteria and coliform count.

A mosquito control field inspection was made with representatives of the Corps of Army Engineers. They have agreed to survey troublesome areas south of Richland and grade and fill those where needed. This work is to be done this winter.

Positive water samples were obtained from White Bluffs area and were found to result from inadequate chlorination. This source was cut off until corrective methods were instigated. Water barrels in construction areas were sampled and bacteriological results were satisfactory.

HEALTH & SAFETY SECTION

NOVEMBER 1954

Public Health (Continued)	October	November	Year to Date
<u>Education</u>			
Pamphlets distributed . . . . .	6,024	11,206	127,411
News Releases . . . . .	30	16	171
Staff Meetings . . . . .	2	1	13
Classes . . . . .	4	8	144
Attendance . . . . .	64	140	3,302
Lectures & Talks . . . . .	8	10	63
Attendance . . . . .	133	507	2,736
Films Shown . . . . .	8	9	109
Attendance . . . . .	220	286	3,997
Community Conferences & Meetings . . . . .	43	52	337
Radio Broadcasts . . . . .	12	9	98
<u>Immunizations</u>			
Diphtheria . . . . .	6	2	77
Diphtheria Booster . . . . .	0	0	244
Diptusses Booster . . . . .	0	0	2
Tetanus . . . . .	6	0	76
Tetanus Booster . . . . .	0	0	243
Pertussis . . . . .	6	0	53
Pertussis Booster . . . . .	0	0	242
Smallpox . . . . .	6	2	188
Smallpox Revaccination . . . . .	0	0	591
Tuberculin Test . . . . .	3	0	22
Immune Globulin . . . . .	1	1	795
Other . . . . .	0	0	4
<u>Social Service</u>			
Cases carried over . . . . .	101	101	1,046
Cases admitted . . . . .	17	27	195
Cases closed . . . . .	17	21	174
Remaining case load . . . . .	101	107	1,067
Activities:			
Home Visits . . . . .	6	12	82
Office Interviews . . . . .	267	343	3,322
Conferences . . . . .	40	61	511
Meetings . . . . .	10	12	95
<u>Sanitation</u>			
Inspections made . . . . .	113	95	1,465
Conferences held . . . . .	12	3	153
<u>Bacteriological Laboratory</u>			
Treated Water Samples . . . . .	209	254	2,275
Milk Samples (Inc. cream & ice cream) . . . . .	32	34	386
Other bacteriological tests . . . . .	532	422	5,869
Total . . . . .	773	710	8,530

HEALTH & SAFETY SECTION

NOVEMBER 1954

<u>Public Health (Continued)</u>	<u>October</u>	<u>November</u>	<u>Year to Date</u>
<u>Communicable Diseases</u>			
Chickenpox . . . . .	53	61	418
German Measles . . . . .	5	4	59
Gonorrhoea . . . . .	0	0	1
Impetigo . . . . .	0	0	7
Influenza (U.R.I.) . . . . .	0	0	4
Infectious Mononucleosis . . . . .	0	0	1
Infectious Hepatitis . . . . .	0	0	15
Measles . . . . .	3	4	1,386
Meningitis . . . . .	1	0	2
Mumps . . . . .	3	20	61
Pinkeye . . . . .	0	0	6
Poliomyelitis . . . . .	0	1	5
Ringworm . . . . .	27	36	71
Roseola . . . . .	2	1	14
Scabies . . . . .	0	0	1
Scarlet Fever . . . . .	7	20	92
Streptococcal Infections-Throat . . . . .	0	0	4
Syphilis . . . . .	0	0	1
Tuberculosis . . . . .	0	0	2
Whooping Cough . . . . .	0	1	70
Total . . . . .	101	148	2,220
Total No. Nursing Field Visits . . . . .	528	555	6,760
Total No. Nursing Office Visits . . . . .	59	91	964

COMMUNITY SECTION

NOVEMBER 1954

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	143	9	145
Police Unit	16	27	16	30
Commercial & Residential Property Unit	8	25	8	24
Fire Unit	66	0	66	0
Transfer Study	1	1	1	1
Community Operations Administration	1	1	1	1
Electrical Unit	5	16	5	16
Engineering Unit	7	4	7	4
Water & Sewerage Utilities Unit	5	17	5	18
Library Unit	4	9	4	8
Public Works & Recreation Unit	<u>7</u>	<u>38</u>	<u>7</u>	<u>40</u>
	130	282	130	288

	<u>Exempt</u>	<u>Nonexempt</u>
Additions to Payroll	0	9
Removals from Payroll	0	2
Transfers In	0	5
Transfers Out	0	6
Net Increase <u>6</u>		

MAINTENANCE AND RENOVATION UNIT

	<u>Exempt</u>	<u>Nonexempt</u>
Employees - Beginning of the month	9	143
New hires	0	4
Transfers Out	0	2
Employees - End of month	9	145

INTERIOR PAINT REPORT - FY 1955

FOREMAN	PAINTERS	TRUCK DRIVERS	TOTAL
Chambliss	20	1	21
Lukins	20	1	21
Tappan	<u>20</u>	<u>1</u>	<u>21</u>
Total	60	3	63

TYPE UNIT	NO. UNITS SCHEDULED	COMPLETED THIS MONTH	COMPLETED TO DATE	BALANCE TO BE PAINTED
A	134	8	14	120
B	158	20	30	128
C	8	0	0	8
D	0			
E	23	0	0	23
F	52	3	4	48
G	0			
H	91	7	7	84
K	2	0	0	2
L	13	0	0	13
M	1	0	0	1
Q	3	0	1	2
R	1	0	0	1
S	1	0	0	1
T	3	2	2	1
U	21	5	8	13
V	79	13	21	58
Y	96	25	29	67
Z	6	1	1	5
1BP	94	10	15	79
2BP	457	42	73	384
3BP	303	45	54	249
Tract	16	0	0	16
1BR Apt.	10	0	1	9
W-13 Apt.	2	0	0	2
2BR Apt.	0			

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Total                    1574                    181                    260                    1314

14 Units added

Est. MH This Mo.	8,278	Actual MH This Mo.	8,197
Est. MH B. F.	<u>3,424</u>	Actual MH B. F.	<u>3,699</u>
Total Est. MH	11,702	Total Actual MH	11,896

PLUMBING SHOP

FOREMAN - F. L. ELSENSOHN

<u>JOB DESCRIPTION</u>	<u>NO. COMPLETED</u>
Electric water heaters replaced	17
Laundry tubs replaced	3
Shower stalls replaced	2
Miscellaneous plumbing work orders completed	18
Plumbing for floor and sink linoleum replacement	87
Cleared major sewer stoppages caused by tree roots	91
Steam work orders completed	4
Repaired radiators in dormitories	20
Replaced street steps	7
Repaired blacktop sidewalks	34
Service orders	46 Hrs.

Excavated all sewer lines for cleaning out of roots, and backfilled.  
Landscaped and seeded excavated portion.

Made routine steam inspection once each week in Government owned  
commercial buildings, apartments and dormitories.

SERVICE ORDER CREW

FOREMAN - L. F. CARPENTER

The following is a status report on service orders:

A. On hand at the beginning of the month	342
B. Received during the month:	2037
C. Completed during the month:	2007
D. On hand at the end of the month:	372

E. A total of 234.8 hours were spent on work orders.

G. Backlog of service orders by craft:

Plumbing	303
Electrical	18
Carpentry	<u>51</u>
Total	372

RENOVATION AND LABOR CREW

FOREMAN - B. C. BAIN

The following services were performed during the month:

Vacant houses renovated	24
Trash pickups	28
Minor painting jobs in renovated houses	4
Minor carpenter repairs to housing units	23 locations
Minor carpenter repairs to dormitories	11 rooms
Dormitories sprayed for pest control	1 (W-11)
Dormitory rooms redecorated	3

Painted entire interior of the consumers pump house office.

Painted 3 offices and 2 locker rooms for Electrical Distribution.

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

The following services were completed during the month:

A. Millwright Crew:

Furnace service orders	165
Routine furnace inspections	185
Weep tubes for prefabs	3000

Replaced valve motor and thermostat in Village Theater.

Work in progress of setting new radio antenna on top of 703 Building.

B. Sheetmetal Crew:

Installed flashing around coat hatches	16
Replaced smoke pipes	17
Repaired or replaced closet door tracks in ranch house closets	48
Installed flashing for bathrooms in ranch houses	12
Fabricated metal tool carriers for telephone trucks	2

Removed air conditioner and restored furnace at 1434 Goethals.

Worked 2 men 3 days in 200-E Area setting shelving and bins.

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MECHANICAL SHOP (Cont.)

C. Labor Crew:

Tree removal orders	46
Hauled away trees removed by tenants	11
Top soil fills made	56

LINOLEUM AND CARPENTER SHOP

FOREMAN - R. M. MARTIN

Replaced bath wall tile	17
Repaired bath wall tile	13
Replaced bath floor linoleum	30
Repaired bath floor linoleum	1
Replaced bedroom floor linoleum	3
Replaced living room linoleum	2
Repaired living room linoleum	2
Replaced dining room linoleum	1
Replaced kitchen floor linoleum	33
Repaired kitchen floor linoleum	3
Replaced hall linoleum	2
Replaced steps linoleum	23
Replaced kitchen sink top linoleum	64
Repaired kitchen sink top linoleum	3
Replaced work bench linoleum	12
Jack and Shim	6
Repaired porches	37
Replaced broken sinks	4
Repaired thresholds	1
Checkpoint	142
Paint touch ups	64
Repaired exterior doors	1
Repaired interior doors	4
Interior house repairs	164
Drilled weepholes	62
Repaired siding	3
Repaired walls	2
Repaired ceilings - houses	3
Repaired ceilings - dormitories	1
Repaired floor boards	10
Repaired roofs	8
Repaired window screens - Ranch houses	4
Sidewalk forms	1
Raised slabs	2

COMMUNITY SECTION  
RICHLAND POLICE DEPARTMENT  
MONTHLY REPORT  
NOVEMBER 1954

ORGANIZATION

	Exempt	Non-Exempt
Employees - Beginning of Month	16	27
Transfers In	0	0
Transfers Out	0	0
New Hires	0	3
Terminations	0	0
Total - End of Month	16	30

GENERAL

Lt. E. E. Miller, of this department, attended the Traffic and General Safety Sections of the Sixth Annual Governor's Safety Conference which was held in Olympia on November 17 and 18.

Six thousand folders entitled "Time to Curb Crime" were mailed to every Richland resident during the month of November.

Sgt. L. M. Linkous of this department attended the F.B.I. Conference on Interstate Transportation of Stolen Property and related Matters which was held on November 19 in Seattle.

A new style flasher stop light, designed by Lt. Miller of this department and Clem Adrian of the Electrical section was installed at the intersection of Symons and Stevens this month. This new traffic safety control device is several times larger than the standard red and amber blinker and has the word "Stop" printed across the red sides with amber lights on the main arterial.

TRAFFIC	1954		1953		1954	1953
	Oct.	Nov.	Oct.	Nov.	Total To Date	Total Same Period
Reportable accidents	19	32	19	20	228	214
Property damage accidents	16	28	15	18	197	180
Injury accidents	3	4	4	2	31	32
Total persons injured	4	7	8	2	35	44
Fatal accidents	0	0	1	0	0	2
Accidents-daylight hours	12	20	12	10	158	145
darkness	7	12	7	10	70	69
Accidents-Business district	12	9	5	7	70	75
residential "	6	20	10	10	125	108
other "	1	3	4	3	33	31
Accidents investigated	13	23	15	13	149	145
Criminal complaints filed	8	18	10	10	101	113
Violations contributing to accidents:						
Negligent driving	4	8	1	6	45	26
Fail. to yield r.o.w.	5	11	6	3	71	76
Following too closely	4	4	1	4	38	32
Drunk driving	1	1	3	1	4	9
Pedestrian violation	1	0	0	0	7	3
Inattention to driving	3	0	0	1	5	5
Reckless driving	0	0	0	0	5	4
Speeding	0	0	1	0	1	6
Unsafe speed	0	0	0	1	21	9
Improper backing	0	2	1	2	10	13
Disregarding stop sign	0	1	1	2	3	7
Hit and run	1	1	0	1	2	1
Improper passing	0	1	0	0	2	1
Improper turn	0	1	0	0	3	3
Failure to signal	0	2	0	0	3	3
Wide right turn	0	0	0	0	1	0
Wrong side of road	0	0	1	0	1	1
Improper parking	0	0	0	0	0	1
Bicycle violation	0	0	0	0	1	0
Asleep at wheel	0	0	2	0	3	3
Defective equipment	0	1	0	0	2	2
Dog in street	0	0	2	0	0	3
Debris in street	0	0	0	0	1	0
North Richland:						
Reportable accidents	16	14	5	9	97	87
Property damage accidents	6	14	5	8	85	74
Injury accidents	1	0	0	1	12	13

Richland Accident Property Damage	1954		1954		1953	
	Oct.	Nov.	Ave. Per Accident Oct.	Nov.	Ave. Per Accident Oct.	Nov.
	\$5,530.00	\$11,708.65	\$301.58	\$365.90	\$376.58	\$244.50

1202

TRAINING

5 Advance training for Richland police members at the Small Arms Range for the period in Field Instruction was as follows:

38 Caliber Revolver  $\frac{1}{2}$  Hour  
 Total number of men reporting at the range 4  
 Number of men fired over the Army-L course 4

Qualifications on the Army-L course as follows:  
 Marksman 1 25% Sharpshooter 1 25%  
 Expert 1 25% Unqualified 1 25%

ACTIVITIES AND SERVICES

	October		November	
	Richland	North Richland	Richland	North Richland
Bank escorts and details	8	5	3	5
Bicycles impounded	6	0	4	1
Bicycle violations, other	0	0	0	0
Bicycles registered	35	0	25	0
Children lost or found	12	2	9	0
Complaints investigated	27	4	24	2
Deaths reported	3	1	0	1
Dog, cat, loose stock complaints	6	1	12	1
Dogs, cats, reported lost or found	10	2	17	2
Doors, windows found open in facilities	23	9	27	10
Emergency messages delivered	11	89	18	87
Fires investigated	12	6	10	2
Guns registered	27	0	5	0
Law enforcement agencies assisted	4	0	3	0
Letters of inquiry	156	0	214	0
Miscellaneous escorts	5	3	2	1
Persons injured by dogs	0	0	0	0
Plant departments assisted	28	3	23	0
Prisoners processed through Jail	14	18	17*	9
Private individuals assisted	13	1	15	3
Property lost or found	12	2	27	2
Records inquiries	84	0	80	0
Reports processed through Records	224	120	216	102
Street lights out reported to Electrical	170	15	211	25
Traffic safety meetings (Nov. attendance - 235)	5	0	5	0
Total	895	281	967	253

\*1 Prisoner handled for Security Patrol.

MONTHLY REPORT  
 RICHLAND POLICE DEPARTMENT  
 (RICHLAND - NO. RICHLAND)  
 NOVEMBER 1954

OFFENSES	KNOWN		UNFOUNDED		CLEARED OTHERS*		CLEARED ARRESTS	
	RICH.	NO. RICH.	RICH.	NO. RICH.	RICH.	NO. RICH.	RICH.	NO. RICH.
<b>PART I</b>								
1. CRIMINAL HOMICIDE		1	-	-	-	-	1	1
A. MURDER & NON-NEG. MANS.		10	1	-	-	8	-	-
B. MANS. BY NEGLIGENCE		1	-	-	-	-	-	-
2. RAPE		16	4	-	-	5	2	-
3. ROBBERY		2	1	-	-	-	-	-
4. AGGRAVATED ASSAULT		30	8	3	-	6	11	1
5. BURG.-BREAK, & ENTRY								
6. LARCENY OVER \$50.00								
UNDER \$50.00								
7. AUTO THEFT								
TOTAL PART I CASES								
<b>PART II</b>								
8. OTHER ASSAULTS	2	1	-	1	-	1	1	-
9. FORGERY & COUNTERFEIT	-	-	-	-	-	-	-	-
10. EMBEZZLEMENT & FRAUD	3	-	2	-	-	-	-	-
11. STOLEN PROP:BUY:REC	-	-	-	-	-	-	-	-
12. WEAPONS:CARRY:POSS.	-	-	-	-	-	-	-	-
13. PROSTITUTION	-	-	-	-	-	-	-	-
14. SEX OFFENSES	-	1	-	-	-	-	-	1
15. OFFENSES AG. FAM & CHILD	1	-	-	-	-	-	-	-
16. NARCOTICS	-	-	-	-	-	-	-	-
17. LIQUOR LAWS	1	-	-	-	-	1	-	-
18. DRUNKENNESS	3	3	-	-	-	-	3	3
19. DISORDERLY CONDUCT	-	-	-	-	-	-	-	-
20. VAGRANCY	1	3	-	-	-	-	1	3
21. GAMBLING	-	-	-	-	-	-	-	-
22. DRIVING WHILE INTOXICATED	3	-	-	-	-	-	3	-
VIOL. RD. & DR. LAWS:								
FAIL. TO STOP & IDENTIFY	5	-	-	-	-	6	2	-
SPEEDING	18	5	-	-	-	-	12	5
STOP SIGN	14	8	-	-	-	1	13	8
RECKLESS DRIVING	1	2	-	-	-	-	1	2
RIGHT OF WAY	7	2	-	-	-	-	7	2

OFFENSES	KNOWN		UNFOUNDED		CLEARED OTHERS*		CLEARED ARRESTS	
	RICH.	NO. RICH.	RICH.	NO. RICH.	RICH.	NO. RICH.	RICH.	NO. RICH.
PART II								
NEGLECTIVE DRIVING	17	8	-	-	-	-	17	8
DEFECTIVE EQUIPMENT	9	7	-	-	2	7	7	-
ILLEGAL PASSING	-	2	-	-	-	-	2	2
24. PARKING	11	36	-	-	3	-	8	36
25. ALL OTHER TRAFF. VIOL.	16	6	-	-	-	2	16	4
26. ALL OTHER OFFENSES:								
MAL. MISCHIEF	3	-	-	-	3	-	-	-
VANDALISM	3	4	-	-	-	2	-	-
BIKE VIOLATIONS	4	1	-	-	4	1	-	-
PUBLIC NUISANCE	1	1	-	-	-	-	1	1
INVESTIGATION	1	1	-	-	-	-	-	-
PROWLER	4	1	-	-	-	-	-	-
FAMILY DISTURBANCE	1	-	-	-	-	-	-	-
PICKUP FOR OUTSIDE AGENCY	1	-	-	-	-	-	-	-
FALSE FIRE ALARM	2	-	-	-	2	-	-	-
OBSCENE PHONE CALL	1	-	-	-	-	-	-	-
PROPERTY DAMAGE	1	-	-	-	-	-	-	-
JUVENILE DELINQUENCY	1	-	-	-	-	-	-	-
27. SUSPICION	-	-	-	-	-	-	-	-
TOTAL PART II	135	92	2	1	27	13	94	75
PART III								
28. MISSING PERSONS	3	-	-	-	2	-	-	-
LOST PERSONS	8	-	-	-	8	-	-	-
LOST ANIMALS	8	1	-	-	2	-	-	-
LOST PROPERTY	46	1	-	-	39	1	-	-
29. FOUND PERSONS	-	-	-	-	-	-	-	-
FOUND ANIMALS	4	-	-	-	-	-	-	-
FOUND PROPERTY	48	1	-	-	30	1	-	-
TOTAL PART III	117	3	-	-	81	2	-	-

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KNOWN UNFOUNDED CLEARED OTHER\* AWARDED ARREST  
 Rich. No. Rich. Rich. No. Rich. Rich. No. Rich. Rich. No. Rich.

OFFENSES	KNOWN Rich. No. Rich.	UNFOUNDED Rich. No. Rich.	CLEARED OTHER* Rich. No. Rich.	AWARDED ARREST Rich. No. Rich.
Part IV				
30. Fat. M.V. Tr. Acc.	-			
31. Pers. Inj. M.V. Tra. Acc.	4			
32. Prop. Dam. M.V. Add.	28	14		
33. Other Traffic Acc.	-			
34. Public Accidents				
35. Home Accidents				
36. Occupational Acc.				
37. Firearms Accidents				
38. Dog Bites				
39. Suicides				
40. Suicide Attempts				
41. Sud. Death & Bod. Found				
42. Sick Cared For				
43. Mental Cases				
TOTAL PART IV	33	15		
COMPOSITE TOTALS				
PART I, II, III, IV CASES	315	118	2	10
			108	30
				105
				76

\*Cases listed under "Cleared Other" are those cleared by various means other than arrest, such as: order 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 \$2,436.77  
 Property reported stolen No. Rich. \$ 657.50  
 Property recovered Richland \$1,881.47  
 Property recovered No. Rich. \$ 50.00

RICHLAND POLICE DEPARTMENT  
(COMMUNITY OF RICHLAND)

NUMBER OF OFFENSES KNOWN TO POLICE PER 25,000 INHABITANTS IN CITIES OF 25,000 PERSONS:

WASH. ORE. & CALIF. SIX MONTHS (JULY - DEC.)	ONE MONTH AVERAGE	1953		1954	
		JULY - DEC.	OCTOBER	OCTOBER	NOVEMBER
MURDER	.468	1	-	-	-
ROBBERY	12.925	-	-	-	-
AGG. ASSAULT	13.100	-	-	-	1
BURGLARY	80.750	19	3	10	10
LARCENY	228.430	91	18	17	17
AUTO THEFT	40.380	6	4	2	2

NUMBER OF OFFENSES KNOWN TO POLICE PER 25,000 INHABITANTS REGARDLESS OF WHETHER OFFENSES OCCURRED IN CITIES OR RURAL DIST.

STATE OF WASHINGTON SIX MONTHS (JULY - DEC.)	ONE MONTH AVERAGE	1953		1954	
		JULY - DEC.	OCTOBER	OCTOBER	NOVEMBER
MURDER	.378	1	-	-	-
ROBBERY	7.900	-	-	-	-
AGG. ASSAULT	2.280	-	-	-	1
BURGLARY	69.550	19	3	10	10
LARCENY	211.700	91	18	17	17
AUTO THEFT	38.950	6	4	2	2

THE PERCENTAGE OF OFFENSES COMMITTED BY PERSONS UNDER THE AGE OF 25 YEARS IS SHOWN:

	RICHLAND	
	1953 JULY - DEC.	1954 OCTOBER
ROBBERY	-	-
BURGLARY	22%	80%
LARCENY	18%	47%
AUTO THEFT	17%	-

NOTE: COMPARATIVE STATISTICS FOR JUVENILE OFFENSES ARE NOT AVAILABLE IN CURRENT ISSUES OF THE UNIFORM CRIME REPORT  
PUBLISHED BY THE FEDERAL BUREAU OF INVESTIGATION.

RICHLAND POLICE DEPARTMENT  
(COMMUNITY OF NORTH RICHLAND)

NUMBER OF OFFENSES KNOWN TO POLICE PER 10,000 INHABITANTS IN CITIES OF 10,000 PERSONS:

	1953		1954		1954 NOVEMBER
	JULY - DEC.	OCTOBER	JULY - DEC.	OCTOBER	
WASH. ORE. & CALIF.					
SIX MONTHS (JULY - DEC.)					
MURDER	.187		.032	2	1
ROBBERY	5.170		.862		2
AGG. ASSAULT	4.240		.707	1	4
BURGLARY	32.300		5.383	9	1
LARCENY	91.370		15.228	1	
AUTO THEFT	16.150		2.692		

NUMBER OF OFFENSES KNOWN TO POLICE PER 10,000 INHABITANTS REGARDLESS OF WHETHER OFFENSES OCCURRED IN CITIES OR RURAL DIST.

	1953		1954		1954 NOVEMBER
	JULY - DEC.	OCTOBER	JULY - DEC.	OCTOBER	
STATE OF WASHINGTON					
SIX MONTHS (JULY - DEC.)					
MURDER	.227		.038	2	1
ROBBERY	3.160		.527		2
AGG. ASSAULT	.910		.152	1	4
BURGLARY	27.820		4.637	9	1
LARCENY	84.680		14.113		
AUTO THEFT	15.580		2.597		

THE PERCENTAGE OF OFFENSES COMMITTED BY PERSONS UNDER THE AGE OF 25 YEARS IS SHOWN:

	No. RICHLAND 1953		No. RICHLAND 1954	
	JULY - DEC.	OCTOBER	JULY - DEC.	NOVEMBER
ROBBERY			100%	
BURGLARY			100%	
LARCENY	19%			
AUTO THEFT	20%			

NOTE: COMPARATIVE STATISTICS FOR JUVENILE OFFENSES ARE NOT AVAILABLE IN CURRENT ISSUES OF THE UNIFORM CRIME REPORT  
PUBLISHED BY THE FEDERAL BUREAU OF INVESTIGATION.

MONTHLY REPORT	RICHLAND POLICE DEPARTMENT												NOVEMBER				
	OFFENSES	NO. CASES	JUVENILES INVOLVED												SEX	JUVENILES	NOVEMBER
4			5	6	8	10	11	12	13	14	16						
<u>RICHLAND</u>																	
MISCHIEF	2																
PROWLER	1																
BURGLARY	1																
DAMAGE TO PROPERTY	1																
LARCENY	6																
JUVENILE DELINQUENTS	1																
TOTALS	12																
<u>NORTH RICHLAND</u>																	
VANDALISM	2																
TOTALS	2																

RICHLAND POLICE DEPARTMENT  
 RICHLAND JUSTICE COURT CASES  
 NOVEMBER 1954

VIOLATIONS	NO OF CASES	NO OF CONV.	NO OF FORF.	CASES CONT.	CASES DISM.	SENT JAIL	SENT SUSP.	LIC. SUSP. OR REV.	CASES ORIG. PREV. MONTH	BAIL FORF.	FINES		
											FINES	SUSP.	
DEFECTIVE EQUIPMENT	14	7	6	3					1	\$35.00	\$42.00	\$17.50	(3)
NO LICENSE PLATE	2	4	2	1				4	1	17.50	410.00	50.00	(1)
DRUNK DRIVING	5	4	1							5.00	18.50	5.00	(1)
ILLEGAL USE OF PVT. RD.	1	4	3		1					17.50			
NO REGISTRATION CERT.	7	4	3										
FAIL. TO STOP & IDENTIFY	1	3	5							117.50	27.50	7.50	(1)
FAIL. TO YIELD R. OF WAY	8	3	5	1									
THROW DEBRIS FROM MOV. VEH.	1	1	1								10.00	10.00	(1)
FAILING TOO CLOSE	1	1	1							7.50	7.50		
ILLEGAL STOPPING	1	1	1		1								
INATTENTION TO DRIVING	2	1	2							22.50	7.50		
INVALID VEHICLE LIC PLATES	2	1	2		1					15.00			
IMPROPER TURN	1	5	4	1						18.50	44.50	10.00	(2)
INVALID DRIVER'S LICENSE	10	12	3	2	2					125.00	147.50	20.00	(2)
NEGLIGENT DRIVING	19	4	5							17.50	14.00		
PARKING	10	2	1							5.00	10.00	5.00	(1)
IMPROPER DISPLAY OF LIC.	3	2	1	1						70.00	15.00		
SPEEDING	11	3	8							118.50	22.50		
STOP SIGN	19	3	14	2						37.50	7.50		
RECKLESS DRIVING	3	1	1	1									
PUBLIC INTOXICATION	5	2	3			2	2				45.00		
PUBLIC NUISANCE	1	1	1			1	1				12.50		
THIRD DEGREE ASSAULT	2	2	2			1	1				5.00		
SECOND DEGREE ASSAULT	1	1	1			1	1				40.00		
VAGRANCY	2	2	3										
SECOND DEGREE BURGLARY	2	1	1								12.50		
DESTRUCTION OF PROPERTY	1	1	1								27.50		
OBSTRUCTING POLICE OFFICER	1	1	1										
	136	59	59	10	4	3	3	4	3	\$629.50	919.00	132.50	(13)

2 SECOND DEGREE BURGLARY CASES REFERRED TO SUPERIOR COURT  
 1 RECKLESS DRIVING CASE GIVEN A CHANGE OF VENUE  
 1 SECOND DEGREE ASSAULT AMENDED TO THIRD DEGREE ASSAULT  
 1 RECKLESS DRIVING CHARGE AMENDED TO NEGLIGENT DRIVING

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RICHLAND POLICE DEPARTMENT  
NORTH RICHLAND JUSTICE COURT CASES  
NOVEMBER 1954

VIOLATION	NO. OF CASES		NO. OF FORF.		CASES SENT.		CASES LIC.		ORIG. PREV. MONTH		FINES	
	CONV.	NO. OF	NO. OF	CONT.	JAIL	REV.	MONTH	FORF.	FINES	SUBP.		
Inattention to Driving	2	1	1		1			\$ 15.00	\$ 10.00	\$ 5.00	(1)	
No Drivers License	6	1	1			1		8.50	10.00			
Drunk Driving	2	1	1						52.50			
Driv.while Lic. Revoked	1											
Perm.Unlic.Driv. to Drive	1	1		1				25.00	10.00	10.00	(1)	
F. T. Y. R. O. W.	3	1						15.00	10.00			
Following Too Closely	2	1						25.00	10.00			
Illegal Parking	26	17						59.50	3.50	3.50	(1)	
Illegal Passing	3	2						15.00	5.00			
Improper Plates	1	1						7.50				
Negligent Driving	12	6						270.00	100.00	17.50	(2)	
Reckless Driving	2	1		1	1			67.50				
Speeding	7	6		1				57.50	42.50	5.00	(1)	
Stop Sign	13	8		1								
Public Nuisance	1	1						27.50	10.00			
Public Intoxication	2	2										
Third Degree Assault	1	1		1	2							
Vagrancy	3	1							27.50			
<b>TOTAL</b>	<b>88</b>	<b>22</b>	<b>48</b>	<b>6</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>\$593.00</b>	<b>\$281.00</b>	<b>\$41.00</b>	<b>(6)</b>	

1 Driving While License Revoked case referred to Superior Court

POLICE DEPARTMENT - TRAFFIC CONTROL STATISTICS  
NOVEMBER 1954

MOTOR VEHICLE ACCIDENTS REPORTABLE:

	Total Number		Fatalities		Major Injuries		Minor Injuries	
	Oct.	Nov.	Oct.	Nov.	Oct.	Nov.	Oct.	Nov.
Richland	19	32	0	0	0	0	3	4
North Rich.	7	14	0	0	0	0	1	0

ACCIDENT CAUSES:

	Negligent Driving		Failure to Yield		Reckless & Drunken		Other Causes	
	Oct.	Nov.	Oct.	Nov.	Oct.	Nov.	Oct.	Nov.
Richland	4	8	5	11	1	1	9	12
North Rich.	0	3	3	4	1	1	3	7

PLANT WARNING TRAFFIC TICKETS ISSUED:

	Speeding		Stop Sign		Parking		Imp. License		Def. Equip.		Other Viol.		Totals	
	Oct.	Nov.	Oct.	Nov.	Oct.	Nov.	Oct.	Nov.	Oct.	Nov.	Oct.	Nov.	Oct.	Nov.
Richland	0	6	2	1	5	3	1	0	0	2	1	0	39	12
North Rich.	1	0	2	0	0	0	0	0	0	7	0	2	3	9

TRAFFIC CHARGES AND COURT CITATION TRAFFIC TICKETS ISSUED:

	Speeding		Stop Sign		Drunken Dr.		Reckless Dr.		Right of Way		Neg. Drv.		Parking		Other V.		Totals	
	Oct.	Nov.	Oct.	Nov.	Oct.	Nov.	Oct.	Nov.	Oct.	Nov.	Oct.	Nov.	Oct.	Nov.	Oct.	Nov.	Oct.	Nov.
Rich.	15	12	14	13	2	2	3	5	6	7	14	17	10	6	38	16	104	75
No. Rich.	4	5	5	8	2	0	0	1	2	2	11	8	26	36	18	4	72	65

TRAFFIC CONTROL STATISTICS SHOW ORIGINAL CHARGES ONLY.

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT  
COMMUNITY SECTION  
November, 1954

PERSONNEL - COMMERCIAL & RESIDENTIAL PROPERTY UNIT:

	<u>November</u>	
	<u>Exempt</u>	<u>Non-Exempt</u>
Beginning of Month	8	25
End of Month	8	24
Net Change	0	-1

PERSONNEL - COMMERCIAL AND NONCOMMERCIAL FACILITIES:

	<u>Commercial</u>		<u>Noncommercial</u>		<u>Total</u>	
	North		North		North	
	<u>Richland</u>	<u>Richland</u>	<u>Richland</u>	<u>Richland</u>	<u>Richland</u>	<u>Richland</u>
October	1,629	182	120	1	1,749	183
November	<u>1,628</u>	<u>174</u>	<u>120</u>	<u>1</u>	<u>1,748</u>	<u>175</u>
Net Change	-1	-8	0	0	-1	-8

SUMMARY OF ROUTINE ITEMS PROCESSED:

	<u>Commercial</u>		<u>Noncommercial</u>		<u>Total</u>		
	North		North		North		
	<u>Richland</u>	<u>Richland</u>	<u>Richland</u>	<u>Richland</u>	<u>Richland</u>	<u>Richland</u>	<u>Total</u>
Work Orders	42	13	2	0	44	13	57
Back Charges	2	0	0	0	2	0	2
FY Work Orders	754	277	31	0	785	277	1062
FY Back Charges	35	1	4	0	39	1	40

CONTRACTS AND NEGOTIATIONS:

A. Commercial:

1. Leases:

- a. Richland Thrifty Drugs, Inc. - to provide for the maintenance and operation of a drugstore in a portion of Building 13, North Richland.
- b. Dr. R. V. Rose - to provide for the lease of space in the Medical-Dental Building for the practice of medicine.

2. Business Development:

- a. Invitations to bid were mailed to 25 prospective Lessees in connection with leasing the space formerly occupied by Klopfenstein's, Inc. located in the government-owned building at 615 George Washington Way.

- b. Invitations to bid were mailed to 48 prospective Lessees in connection with leasing the vacant land site on George Washington Way and Newton Street.
- c. Three proposals were received in answer to our Invitations to Bid in connection with leasing the space in the government-owned building at 615 George Washington Way. These were opened and read on November 17, 1954.
- d. Two proposals were received in connection with leasing the vacant land site at the corner of Lee Boulevard and Wellsian Way. These were opened and read on November 2, 1954.
- e. Six bids were received in connection with leasing the vacant land site at the corner of Lee Boulevard and Goethals Drive. These were opened and read November 30, 1954.
- f. Bids were received from eight prospective Lessees in connection with leasing the land site on George Washington Way and south of Newton Street. These were opened and read on November 30, 1954.
- g. The bid of Murphy Motors, Inc. was accepted in connection with leasing the government-owned building at 615 Goethals Drive.
- h. The bid of Robley Johnson was accepted in connection with leasing Building 89-X. He proposes to operate a photography finishing shop.

B. Noncommercial:

1. Supplemental Agreement:

- a. Richland Baptist Church - to provide for the lease of additional land, construction of an additional building and certain other changes in connection with the payment for utilities furnished by General Electric.

GENERAL:

A. Commercial:

1. Brochures describing the premises and outlining the operating experiences were prepared for twelve commercial facilities. These brochures were prepared for use in connection with a pending appraisal of the properties, primarily, for purposes of lease renegotiations.
2. A. P. Thorsness commenced construction of his service station and drive-in restaurant buildings to be located at the southeast corner of Goethals Drive and Williams Boulevard.
3. The Leader Barber Shop sublease with V. O. McVicker was assigned from Hershel J. & Agnes M. Lee to Marvis S. Faris, Wendell D. Lint & Charles Courtney who will continue to operate the Facility.
4. Authorization was granted C. M. Wells to construct an addition of approximately 600 square feet to his building located at 706-708 George Washington Way.

COMMERCIAL PROSPECTS:

Inquiries were received during the month concerning the establishment of the following types of enterprises in Richland.

Motel  
Service Stations  
Trailer Court

Tavern  
Auto Accessories

COMMERCIAL & RESIDENTIAL PROPERTY UNIT - COMMUNITY SECTION

SUMMARY OF OCCUPANCY AND EXPANSION STATUS:

A. Commercial:

OCTOBER

NOVEMBER

	<u>OCTOBER</u>		<u>NOVEMBER</u>		<u>Total</u>
	<u>Richland</u>	<u>North Richland</u>	<u>Richland</u>	<u>North Richland</u>	
1. Number of Government-owned Buildings	40	8	40	8	48
a. Number of Prime Lessee Businesses	37	10	37	10	47
b. Number of Sublessee Businesses	<u>17</u>	<u>0</u>	<u>17</u>	<u>0</u>	<u>17</u>
c. Total Businesses in Government-owned Buildings	54	10	54	10	64
2. Doctors and Dentists in Private Practice	35	0	35	0	35
3. Number of Privately-owned Buildings	68	6	69	6	75
a. Number of Prime Lessee Businesses	45	5	45	5	50
b. Number of Businesses operated by Sublessees	<u>110</u>	<u>0</u>	<u>110</u>	<u>0</u>	<u>110</u>
c. Total Businesses in Privately-owned Buildings	155	5	155	5	160
4. Privately-owned Buildings under Construction	3	2	4	2	6
5. Total Number of Businesses in Operation	209	16	209	16	225

7-1089



COMMERCIAL AND RESIDENTIAL PROPERTY UNIT

TENANT RELATIONS

PROGRESS REPORT

	Orders incomplete as of November 30	Orders issued 10-30 to 11-30	Total orders Incomplete as of November 30, 1954
Service orders	424	2261	553
Work orders	844	454	598
Service charges		195	

Principal work order loads

	Incomplete as of October 30, 1954	Incomplete as of November 30, 1954
Laundry tub replacement	32	37
Tileboard bathroom	15	11
Kitchen floor linoleum	125	92
Kitchen cabinet linoleum	42	29
Shower stall	9	14

134 alteration permits were issued, as compared to 158 issued in October.

Install automatic dryer	56	Install automatic washer	22
Convert to oil	12	Basement excavation	4
Install stoker	2	Remove partition	3
Install windows on sunporch	1	Remove laundry trays	3
Install water softener	1	Sand & refinish floors	1
Move hot water heater	3	Install partition	2
Install swing doors	1	Change range receptacle	2
Install outlets	4	Install 220 v outlets	3
Install TV antenna	6	Install sidewalks	1
Install driveway	2	Remove broom closet	1
Install light outlets	2	Install back door	1
Install cupboards	1		

782 inspections were made, as compared to 881 in October.

Alteration permits	52	Basement	2
Bathroom	3	Doors	4
Fill	1	Floorboards	6
Laundry trays	10	Linoleum	47
Paint	217	Porch & steps	12
Range & refer recall	9	Shower stalls	4
Screens	4	Sidewalks	16
Sink	7	Toilet seats	14
Trees	18	Walls	1
Yard	1	Renovation rechecks	26
Dormitories	65	Miscellaneous	43
Cancellations	76	Renovations	71
Shows (new tenants)	73		

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT

TENANT RELATIONS

TENANT STORES

<u>Merchandise Issued</u>	<u>Total Amount</u>
Shades	840
Reflectors	19
Drip tray	10
Meat tender	7
Ice trays	10
Hydrator glass	1
Furniture delivery	18
Furniture recall	48
Refer parts	2
Range parts	4
Cooker pots	1
Space heaters	13
Door stops	9
Caulking compound	1
Grass seed	2
Furnace shaker	2

RECALL AND DELIVERY OF RANGES AND REFRIGERATORS -- MONTH OF NOVEMBER

	DELIVERY		RECALLED	
	REFERS	RANGES	REFERS	RANGES
1Br.	1	0	0	0
2Br.	1	1	2	3
3Br.	2	0	3	0
A	0	1	5	5
B	2	0	6	5
E	0	1	0	0
F	1	1	1	2
G	0	0	0	1
H	0	1	0	0
T	1	0	0	0
Y	0	0	0	0
<b>Total</b>	<b>8</b>	<b>5</b>	<b>17</b>	<b>16</b>

Excess: 7 ea TA refers; 2 ea GE-TA refers; 2 ea GM refers, 11-17-54  
 13 SC AB ranges, 11-11-54

IN WAREHOUSE:

TA refers -----13  
 GE refer 8' ---- 1  
 GM refer 7' --- 2  
 GM refer 6' ---- 2  
 SC ranges -----17  
 GE ranges ----- 15

COMMERCIAL & RESIDENTIAL PROPERTY UNIT  
RESIDENTIAL LEASES

NOVEMBER 1954

DORMITORY REPORT

Dormitories:

	<u>Beds Available</u>	<u>Vacant beds</u>	<u>Occupied beds</u>
Men	477	52	425
Women	381*	40**	341*
Total	<u>858*</u>	<u>92**</u>	<u>766*</u>

\*This includes 2 beds used for Dorm Offices

\*\*This includes 5 vacant beds in Dorm M 13

WAITING LISTS:

	<u>Single Rooms</u>	<u>Double Rooms</u>
Men	1	0
Women	2	0

The following Dormitories are in Stand-By condition:

W 21	50 beds	W 15	50 beds
W 17	50 beds	M 7	39 beds
W 16	50 beds		
	<u>Total beds</u>		239

RESIDENTIAL LEASING

CANCELLATIONS

ALLOCATIONS

Voluntary terminations	11	Houses allocated to new tenants	38
R.O.F.	0	Exchanged houses	10
Discharge	1	Moves (within Richland)	22
Transfers	8	Turnovers (divorce, death, schools)	1
Retirement	0	Wherry house move to G.E. house	0
Move off project	12		
Divorce	0	Total leases signed	71
Death	0	Total cancellations	71
Move to Wherry house	0	Houses assigned "As Is"	35
Military Service	2	Houses sent to "Renovation"	28
	<u>2</u>	Applications pending	276
Total	38		

RICHLAND HOUSING

HOUSING UTILIZATION AS OF MONTH ENDING NOVEMBER 30, 1954  
 HOUSES OCCUPIED BY FAMILY GROUPS

	Conven	A&J	T	Pre Cut	Pre Ranch	Pre Fab	Dorm Apt.	A&J Apt.	2BR Apt.	4th Hsg.	Tract	Total
G. E. Employees	2230	256	10	387	843	1127	10	54	62	203	37	5219
Comm. Fac.	91	17		28	59	50		5	4	8	2	264
AEC	65	29		19	55	15		4	3	12	3	205
Other Gov't	7	2			3	1						13
Post Office	6				2	8				1	3	20
Schools	63			7	11	45			1	1		128
Comm. Activities	10			2	6	4					1	23
Med. Facilities	4	17			3	1				3		28
Chas. T. Main	2			2	4	3				2		13
Kaiser Eng.	6	7			7	2						22
J. A. Jones	2	2			2							6
Blaw-Knox	3	2		2	2							9
Minor Const.					1			1				2
Commonwealth Inc.						1						1
Not Certified	2			2	1	7					1	13
Turnover	1			1	1							3
<b>Total</b>	<b>2492</b>	<b>332</b>	<b>10</b>	<b>450</b>	<b>1000</b>	<b>1264</b>	<b>10</b>	<b>64</b>	<b>70</b>	<b>230</b>	<b>47</b>	<b>5969</b>
Assigned Leases Written	3											3
Assigned Leases Not Written						5						5
Available For Assignment	5	1				7						13
<b>Total</b>	<b>2500</b>	<b>333</b>	<b>10</b>	<b>450</b>	<b>1000</b>	<b>1276</b>	<b>10</b>	<b>64</b>	<b>70</b>	<b>230</b>	<b>47</b>	<b>5990</b>

	Begin Month	Moved In	Moved Out	End of Month	Dif.
Conventional Type	2493	+23	-24	2492	-1
A&J Type	333	+3	-4	332	-1
"T" Type	10			10	
Precut Type	449	+4	-3	450	+1
Ranch Type	999	+4	-3	1000	+1
Prefab Type	1267	+25	-28	1264	-3
Dorm Apts.	10			10	
A&J Apts.	63	+3	-2	64	+1
2BR Apts.	70			70	
Fourth Housing Tracts	229	+3	-2	230	+1
	47			47	
<b>Total</b>	<b>5970</b>	<b>+65</b>	<b>-66</b>	<b>5969</b>	<b>-1</b>

COMMUNITY SECTION  
 RICHLAND FIRE DEPARTMENT  
 MONTHLY REPORT

November 1954

<u>Organization and Personnel</u>	<u>Exempt</u>	<u>Non-Exempt</u>
Employees beginning of Month	66	0
Transfers In	0	0
Transfers Out	0	0
Terminations	0	0
New Hires	0	0
End of Month	66	0

<u>Fire Protection</u>	<u>Richland</u>	<u>North Richland</u>
Fire Loss (Estimated) Government	\$ 0.00	\$ 0.00
Personal	0.00	24.20
November Total	\$ 0.00	\$ 24.20
Year's Total	\$11,359.23	\$7,304.39*

\*Loss figures not yet available for August 6, North Richland Drug Store Fire.

	<u>Richland</u>	<u>North Richland</u>
Response to fire alarms	21	21
Investigation of minor fires	0	0
Ambulance Responses	35	0
Inside Schools or Drills	25	9
Outside Drills	8	5
Safety Meetings	8	4
Security Meetings	4	2
Fire Alarm Boxes Tested	210	116

Three standbys were made during the month for aircraft landings and take-offs at the AEC Airport.

A reserve North Richland pumper, re-outfitted with portable lighting plants, salvage equipment and smoke ejectors, was placed in service November 1, at the Central Fire Station to respond on all Richland alarms, except those calling for aerial truck response.

Ten muscular dystrophy patients and their parents residing in the Tri-City Area were entertained Sunday, November 21, at the Central Fire Station. As a community project, firemen voluntarily began November 29, collecting dystrophy

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campaign contribution envelopes.

One Boy Scout was examined November 11, for his Firemanship Merit Badge.

The two 750 gallon-per-minute fire trucks recently received from the Savannah River Project and remodeled for municipal purposes, were given pumping performance tests on November 10, with satisfactory results.

#### Fire Marshal's Activities

A total of 195 Richland and 19 North Richland buildings were inspected, resulting in 18 hazard reports being submitted during the month. Also, 310 fire extinguishers were inspected and serviced, 2 removed and 7 installed, and 57 fire hose standpipes received inspection and service.

Compiled a 375 page scrapbook of our Fire Prevention Week and Spring Clean-up activities and submitted it to the NFPA National Contest, as a city-wide, Chamber of Commerce sponsored program. Reviewed the book and showed the movie at a Kiwanis Club Luncheon.

Participated in a Chamber of Commerce sponsored party given in honor of all juvenile winners in Fire Prevention Contests.

Conducted two fire demonstrations for employees of Kadlec Hospital.

Assisted with evacuation drill in Building 762.

Inspected a new propane gas delivery truck which is intended for commercial delivery of gas to North Richland Trailer Camp residents. A report of deficiencies encountered was submitted the Commercial Real Estate Unit.

At the Architect's request, made inspection of sprinkler system valving at the new Central United Protestant Church's educational building.

Recommended replacement of two air control valves and five mercoid alarm valves in the sprinkler systems at Kadlec Hospital due to their recent failures.

Assisted AEC Engineers with operational tests of the new fire alarm system at Jefferson school.

Assisted AEC Electrical Engineer with inspection test of the Chief Joseph School fire alarm system to determine cause for continuous ground on system and necessary work to be contracted to correct condition.

COMMUNITY OPERATIONS SUB-SECTION  
 RICHLAND ELECTRICAL UNIT  
 MONTHLY REPORT  
 NOVEMBER 1954

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ORGANIZATION AND PERSONNEL

	<u>Exempt</u>	<u>Non-Exempt</u>
Employees Beginning of Month	5	16
Transfers In	0	0
Transfers Out	0	0
Terminations	<u>0</u>	<u>0</u>
Total End of Month	5	16

SYSTEM MAINTENANCE AND OPERATION

Outside Lines

Poles set and transferred	<u>6</u>
Anchors set and guys installed	<u>4</u>
Street lights repaired and steel mast arms installed	<u>3</u>
Street lights relamped - mercury vapor and sodium vapor	<u>6</u>
Street lights relamped - 6000L and 4000L, 1100 Area	<u>186</u>
Street lights relamped - 6000L and 4000L, 700 Area	<u>10</u>
Flood lights relamped, 1100 Area	<u>11</u>
Flood lights relamped, 700 Area	<u>0</u>
Stack lights relamped, 700 Area	<u>0</u>
Primary line footage added	<u>0</u>
Primary line footage removed	<u>0</u>
Transformer KVA added	<u>0</u>
Transformer KVA removed	<u>72.5</u>
Net transformer KVA installed	<u>0</u>
New services installed - residential	<u>0</u>
New services installed - commercial	<u>6</u>
Services removed - commercial	<u>2</u>
Temporary services installed and removed	<u>1</u>
Scheduled outages - primary	<u>1</u>
Scheduled outages - secondary	<u>1</u>
Unscheduled outages - primary	<u>3</u>
Unscheduled outages - secondary	<u>2</u>
Standby and escort	<u>0</u>
High voltage tree trimming	<u>180</u>
Low voltage tree trimming	<u>11</u>
Trees removed	<u>42</u>

TRAFFIC SIGNALS

Relamping	<u>112</u>
Operational failures	<u>+</u>
Installations	<u>1</u>
Removals	<u>0</u>

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**RICHLAND ELECTRICAL UNIT**

Routine maintenance checks	<u>48</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	<u>3</u>
Total signals in operation - flasher	<u>2</u>

**PUBLIC WORKS ELECTRICAL MAINTENANCE**

Electrical motors checked and serviced - irrigation	<u>7</u>
Electrical motors checked and serviced - water	<u>91</u>
Electrical motors checked and serviced - sewage	<u>82</u>

**FIRE DEPARTMENT TEST AND MAINTENANCE**

Inside circuit and equipment checks	<u>4</u>
Outside circuit checks.	<u>4</u>
Inside faults repaired	<u>0</u>
Outside faults repaired	<u>2</u>
New circuits placed in operation	<u>0</u>
New boxes placed in operation	<u>5</u>

**SUBSTATIONS**

Main feeder and tie breaker checks - BBL51	<u>4</u>
" " " " " " - BBL52	<u>4</u>
Secondary and pad located stations -	<u>24</u>
Checked jumpers, cutouts, grounds and general condition	

**METERING - OPERATION, MAINTENANCE, CONSUMPTION AND REVENUE**

Voltage and load checks	<u>8</u>
Meters tested - customer's requests	<u>0</u>
New meters shop tested	<u>3</u>
Faulty meters replaced	<u>1</u>
Damaged meters and covers	<u>1</u>
Residential read-ins	<u>155</u>
Residential read-outs	<u>193</u>
Residential disconnects	<u>1</u>
Residential reconnects	<u>1</u>
Meters resealed	<u>1</u>
Radio interference checks	<u>5</u>
Overloaded meters changed out	<u>3</u>
Routine meter tests	<u>1</u>

Consumption and Revenue:	<u>No. of Meters</u>	<u>KWH</u>	<u>Revenue</u>
Residential - Schedule 1	6984	5,344,842	\$57,290.56
Commercial - Schedule 2	394	<u>3,077,062</u>	<u>26,348.89</u>
	Total	8,421,904	\$83,639.45

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## RICHLAND ELECTRICAL UNIT

### COMMENTS

Service removals were performed at following locations:

230 volt service to 1131-F Building - building relocated.  
Associated Engineers yard, Duane and Gillespie - vacated building.  
1125-12 Warehouse south of Gillespie - relocated by Transportation.  
729-A Garage - removed one 37.5, two 15, and one 5 kva transformers and associated secondaries outside of yard - relocation of facility.  
Temporary service to contractor at Parcell's station, Duane and Lee.

Service connections were made to the following locations:

Install service to three paint renovation busses.  
Connected three power services to 713 Building.

Service disconnects and reconnects account of delinquent billing collections:

Eight instances on 11-4-54, and five instances on 11-11-54.

Fire alarm system rearrangements, additions and maintenance:

Cleared ground on circuit No. 4.  
Connected four new boxes at Central Transportation.  
Connected auxiliary box at 713 Building.  
Open circuit failure was caused to No. 3 alarm circuit by municipal parks crew falling tree on wire.

Scheduled outages:

1182 power station - to change motor starter contacts - 9:20 a.m. to 9:40 a.m.  
To primary switch 44X188 on Williams west of GW Way to rearrange connections and replace defective contacts - 1:00 p.m. to 3:00 p.m.

Unscheduled outages and call-outs:

To replace fuse to primary switch D1-44-X188 account of bird shorting out wire - 7:30 a.m. to 8:15 a.m. - call out two men and 1 foreman.  
To replace fuse to primary switch D1-14X-128 near Humphreys and Wright, cause unknown - call out two men and 1 foreman, 1:20 p.m. to 2:15 p.m.  
To repair broken neutral wire to 1925 Hood - call out two men and foreman, 2:15 p.m. to 3:55 p.m.  
To replace faulty primary fuse to transformer in rear of 205 Abbot - two men and 1 foreman - 11-25-54 - 11:15 a.m. to 12:05 p.m.

Street lighting, rear of 1335 Cottonwood, broken jumper wire to S. L. transformer during high wind at night. Caused failure to about 80 street lights in upper end of Ranch House District. Repaired during following day.

Blown primary fuse to No. 900 street light station about midnight, blew switch off pole. Call out - 2 men and foreman to repair same night.

Installed additional mercury vapor light and 40' pole to Stevens and Bypass grade relocation, and relocated existing light.

RICHLAND ELECTRICAL UNIT

Traffic control system rearrangements, additions and maintenance:

Installed over light on span wire at Stevens and Symons.  
Repaired broken bond to railroad signal at Bypass and Van Giesen.  
Rearranged traffic controller at Stevens and Bypass, to conform to new traffic lane relocations. Set two poles, two anchors, span wire, and relocated same signal.

Telephone cable and messenger work for Telephone Section was performed as follows:

Removed 300 ft. of underground cable near 702 Building as requested by Job No. C55-4A.  
Removed 2000 ft. of 13 quad cable and messenger.  
Removed 380 ft. of 10 pr.  
Removed 380 ft. of 16 pr.  
All of which was removed from lines near Adams and GW Way, due to rearrangement of telephone circuits by Telephone Section.

Scheduled load and voltage checks were made as follows:

Checked voltage at 1503 Marshall at customers request and found o.k.  
Installed recording voltmeter to 700 area 480 volt station to record fluctuations, and recording amp meters to record capacity.  
Installed recording voltmeter to record voltage to Public Library.

Electrical maintenance to water system:

Winterized electrical equipment to three high water tanks.  
Repaired 600 amp switch in 1182 Building.  
Disconnected main irrigation motors in Stations 4, 5, and 6 to prevent winter flood damage.

Electrical maintenance to sewer system:

Replaced thermostat to main pumphouse at Sewer Treatment Plant.  
Rewired service to waste burner to conform to change made by Instrument Dept. and millwright.

Tree trimming and removal from under lines continued during month at same accelerated rate, and will continue for some time as weather permits.

COMMUNITY OPERATIONS SUB-SECTION  
ENGINEERING UNIT  
MONTHLY REPORT  
NOVEMBER 1954

<u>PERSONNEL:</u>	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>
Employees Beginning of Month	7	4	11
Transfers In	0	0	0
Transfers Out	0	0	0
Terminations	0	0	0
Total End of Month	7	4	11

BUILDING PERMITS ISSUED IN NOVEMBER:

1. A. P. Thorsness - Service Station & Drive In - 295 Williams Blvd.
2. Wells Radio & T. V. - Storage Building - 708 Geo. Washington Way
3. 1 Sign Permit

NEW MUNICIPAL CONSTRUCTION STARTED IN NOVEMBER:

Intersection Change-over, By-Pass & Stevens Drive

NEW PRIVATE CONSTRUCTION STARTED IN NOVEMBER:

1. A. P. Thorsness - Service Station & Drive In - 295 Williams Blvd.
2. Wells Radio & T. V. - Storage Building - 708 Geo. Washington Way

PRIVATE CONSTRUCTION COMPLETED IN NOVEMBER:

None

ENGINEERING JOBS COMPLETED IN NOVEMBER:

- G-02174 - Electricity Metering, Richland Domestic Water System
- C-70589 - Legal Description Plot of Land on Southeast Corner Goethals & Williams
- C-70590 - Legal Description of Plot at Southeast Corner Knight & Stevens  
(Continental Oil Co.)
- C-70592 - Legal Description of Plot Southeast Corner Knight & Stevens  
(Frances S. Taylor)

STATUS OF ENGINEERING UNIT PROJECTS:

- ESR I-90624 - Title III Services, Storm Drain, G. W. Way - 99% complete. Final closure pending on negotiations being administered by A.E.C.
- ESR I-90604 - Inspection 24" Sanitary Sewer, Swift Boulevard - 99% complete. Final closure pending on negotiations being administered by A.E.C.

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STATUS OF ENGINEERING UNIT PROJECTS: (Cont.)

- G-03570 - Replace Raw Water Line #5 Well to Lee Boulevard - Contract awarded. Notice to proceed given Nov. 22, 1954. No construction to date.
- G-03577 - Improvements to Existing Street, Geo. Washington Way - Construction 100% complete.
- G-01001 - Guthrie Avenue Sidewalk - Gilmore to Goethals - Construction 100% complete.
- G-01004 - Installation of Fire Insulated Fire Alarm Wire - To be finished as locations given by Fire Department.
- G-01002 - Improvements to Medical Arts Building, Service Drive - Construction 100% complete.
- G-01005 - Sewer and Water Lines to Richland Heights Baptist Church - Temporary installation made. To be completed as soon as manpower is available.
- G-02165 - Parking Facilities, Kadlec Hospital - Construction 100% complete.
- G-02171 - Automatic Bar Screens Sewage Lift Station - To be readvertised in January 1955. No bids received at first advertising.
- G-02176 - Comfort Station, Sewage Lift Station - Chlorination Station, Riverside Park - A.E.C. retaining plans pending final review.
- G-02182 - 6" Water Main, Stevens Drive, Kadlec Hospital to Central U.P. Church - Construction 100% complete.
- G-01011 - Intersection Change-Over, By-Pass & Stevens Drive - Construction 100% complete.

STATUS OF ACTIVE ENGINEERING SERVICE REQUESTS:

- I 90234 - Inspection, Bauer-Day Housing - Materially complete. Question remains on final surveying and monumenting of intersection.
- I 90594 - "As Builts" General, Part II - Minor work yet to be done, but no other work delayed because not fully completed.
- I 90634 - Kadlec Hospital Grounds Improvements - Construction 100% complete.
- I 90914 - Utility Lines, Legal Descriptions and Diagrams for Churches - 95% complete.
- I 90944 - Erosion and Dust Control 300 Area - Project deferred by Engineering Department.
- I 91014 - Retirement of Separate Irrigation System - 18% complete.
- I 91024 - Retirement of Irrigation Canal - Design delayed temporarily by other work.
- I 91044 - Sketch, Review, and Legal Description, Tidewater Associated Oil Company - 50% complete.

STATUS OF WORK ORDERS:

All New work requests will be shown by work order number.

C-0547 - Design, Title III Inspection, Catskill & Rainier Avenue - Construction  
100% complete.

C-11439 - Catholic Church Sewer Easement - 90% complete.

C-70524 - Pauls, Inc. - 80% complete.

C-70588 - Legal Description Plot at Southwest Corner Goethals & Williams -  
90% complete. Originally completed, but was returned for revision  
by A.E.C.

C-70591 - Legal Description of Plot West of By's Burgers - 90% complete.

C-70608 - Study & Sketch for Utility Lines for "Rose Garden" - 75% complete.

C-70684 - Approval "As Built" Plans - Parcell's Service Station, Duportail and  
Hartford - Deferred for other work.

BUILDINGS UNDER CONSTRUCTION:

NOTE: All ESRs for Plans, Specifications, and Inspections were closed as of  
July 1, 1954. This type of work is now indicated by job title only, the  
expense of which is lumped and charged against routine expense code  
"Plans and Specifications". Buildings on which final acceptance has not  
been made include:

First Baptist Church (Richmond and Raleigh Streets) - Construction 92% complete.  
No progress this month.

Assembly of God Church - 95% complete. Work progressing slowly.

Alteration Permits - an open active file.

Television Antennae - An open active file.

Plans, Specs., Inspections, Grace Bacon Roller Rink - Construction 98% complete.  
No progress this month. Open for business.

Plans, Specs., Inspections, Church of Nazarene Addition - Construction 80% complete.  
Work progressing slowly.

Plans, Specs., Inspections, Richland Heights Baptist Church - 97% complete. Work  
progressing slowly. Building occupied.

Plans, Specs., Inspections, Richland Baptist Church, G.W.W. - Construction 99%  
complete. Work progressing slowly. Building occupied.

Plans, Specs., Inspections, Christ of King Parish (Catholic) - Construction 70%  
complete. Work progressing nearly as scheduled.

Plans, Specs., Inspections, Central U.P. Church - Construction 70% complete.  
Work progressing according to schedule.

BUILDINGS UNDER CONSTRUCTION (Cont.)

Plans, Specs., Inspections, Walsh Tire Shop - 99% complete. Final inspection to be made. Open for business.

Plans, Specs., Inspection, Parcell Service Station (Duane & Lee) - Construction 90% complete. Work progressing as scheduled.

Plans, Specs., Inspection, Couden Drive-In (Stevens & Knight) - 99% complete. Final inspection to be made. Open for business.

Plans, Specs., Inspection, Bus Depot Service Station - 99% complete. Final inspection to be made. Open for business.

COMMUNITY OPERATIONS SUB-SECTION  
PUBLIC WORKS & RECREATION UNIT  
MONTHLY REPORT  
NOVEMBER 1954

ORGANIZATION AND PERSONNEL

	<u>Exempt</u>	<u>Non-Exempt</u>
Employees Beginning of Month	7	38
Transfers Out	0	3
Transfers In	0	3
New Employees	0	2
Terminations	0	0
Total End of Month	7	40

ROADS AND STREETS

Grading and renovating of gutters and shoulders was completed on approximately two (2) miles of streets in the Wilson Street section, to facilitate drainage in this relatively flat area.

The 48" drainage ditch culvert under Van Giesen Street, west of George Washington Way became plugged with gravel, debris and weeds at the point where an inverted siphon section was cut into the culvert to carry it under the 30" sanitary sewer main from North Richland. Since access to the siphon section was not provided, and entrance from either end would be difficult and hazardous, the culvert was excavated and cut into at both ends of the siphon to allow for cleaning by working a fabricated bucket, attached to cables, through the stopped section. A manhole and grill was installed on the upstream side to allow for inspection and facilitate cleaning.

A street marker sign and a traffic control "Stop" sign were mounted on a single standard and installed at the intersection of Goethals Drive and Guthrie Street as a sample installation to determine whether this more economical method is satisfactory. If approved by Traffic Control, this procedure will be followed in the future, thereby saving the cost of material and labor of setting a separate standard for the "Stop" sign.

One sand spreader is ready for service and the second sand spreader is now being mounted for service.

Final acceptance inspection was made on the following street improvement construction projects, and they have been accepted by the operating group effective 12-1-54;

1. Improvement of George Washington Way, Symons to Catskill.
2. Improvement of Catskill, George Washington Way to Rainier.
3. Improvement of Rainier, Catskill to 300 ' north of Coast.

**PUBLIC WORKS & RECREATION UNIT**

- 4. Intersection change-over, Stevens and By Pass Highway.
- 5. Improvement of Guthrie, Goethals to Gilmore.

A physical inventory of material stock-piles was made on 11-8-54 under the direction of an Inventory Control representative.

Routine seasonal maintenance of all facilities was continued.

Parks and Public Grounds

All portable park furniture has been collected and stored for the winter season.

Work was started on the clearing and grading of the undeveloped section of Riverside Park on the north side of Bradley Road to provide a parking area for cars and boat trailers of those who utilize the Bradley Road boat launching ramp.

Seasonal pruning of trees and shrubs is in progress on assigned properties.

General clean up and weed burning was continued in the shelter belts and undeveloped areas throughout Richland.

The small amount of trees remaining in the tree nursery east of Kadlec Road has been made available to the Army for planting at Hanford Works, and on removal of these trees the area will be released for other usage.

Routine services and maintenance were continued.

RECREATION

Attendance Statistics - November 1954

	<u>No. of Sessions</u>	<u>Youth</u>	<u>Adults</u>	<u>Sub-Total</u>
A. <u>Community House</u>				
Adult Table Tennis League	5		219	219
Arts & Crafts	8	133	13	146
Ballroom Dancing	3	47	6	53
Elementary Movies	4	773	48	821
Elementary Sq. Dancing	4	857	84	941
Fencing	5		32	32
Games Room (Open Play)	24	1 132	315	1 447
Junior Sq. Dancing	4	255	28	283
Minnesingers	3	216	7	223
Photography	4	18	5	23
Tumbling	5	53	10	63
Allied Arts Assn.	1	4	22	26

PUBLIC WORKS & RECREATION UNIT

	<u>No. of Sessions</u>	<u>Youth</u>	<u>Adults</u>	<u>Sub-Total</u>
Gentrics	1		33	33
Hi-Spot	8	3 271	37	3 308
Int. Folk Dancers	4	7	67	74
Junior Sportsmen	1	20	1	21
Junior Stamp Club	2	15	5	20
Richland Rod & Gun Club	1	6	70	76
Y-Supper Club	4	30	190	220
Election	1		400	400
Miscellaneous Bookings	<u>64</u>	<u>306</u>	<u>1 365</u>	<u>1 671</u>
Total Community House	156	7 143	2 957	10,100
<b>B. <u>Parks &amp; Playgrounds</u></b>				
School Activities - Columbia	<u>21</u>	<u>7 800</u>	<u>39</u>	<u>7 839</u>
Total Parks & Playgrounds	21	7 800	39	7 839
<b>C. <u>Summary</u></b>				
Community House and Parks and Playgrounds Total for November 1954.	<u>177</u>	<u>14 943</u>	<u>2 996</u>	<u>17 939</u>
Calendar Year to Date				<u>358 377</u>

SANITATION

Collections were continued according to schedule, with Thanksgiving being observed as a holiday and routes falling due on that day being covered on the following day by a supplementary crew. Total weight of waste material disposed of through sanitary fill was 119<sup>4</sup> tons.

Operation of the Sanitary Fill Disposal Grounds in accordance with a long range plan to provide a site that may later be developed into a sheltered boat basin, was commenced on November 29, 1954. Under this arrangement a naturally low area of several acres will be used as a borrow pit until ground water or large rock would cause further excavation to add to the cost of waste disposal, and the surrounding area will be raised by building up with waste material and earth fill from the borrow pit. Further excavation to provide the depth necessary to complete a boat basin might then be accomplished by others.

COMMUNITY OPERATIONS SUB-SECTION  
 WATER AND SEWERAGE UTILITIES UNIT  
 MONTHLY REPORT  
 NOVEMBER 1954

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ORGANIZATION AND PERSONNEL

	<u>Exempt</u>	<u>Non-Exempt</u>
Employees Beginning of Month	*6	17
Transfers Out	0	0
Transfers In	0	1
New Employees	0	0
Terminations	0	0
Total End of Month	5	18

\* Figure includes one shift supervisor on loan from Public Works Unit.

DOMESTIC WATER

Normal operations were continued throughout the month. Routine maintenance work was continued. All domestic water system equipment subject to freezing has been winterized. Three water main leaks were repaired during the month.

The 3000 Area percolation basin was cleaned by removing approximately 6" of material from the surface. Water was turned into the south portion of the percolation basin on November 9 to build up the water table to facilitate testing pumping capacity of the newly installed well pumps in this area.

DOMESTIC WATER

	<u>Well Production</u>	<u>Av. Da. Prod.</u>	<u>Total Consump.</u>	<u>Av. Da. Consump.</u>
Richland	17,210,000	573,600	86,770,700	2,892,356
North Richland	99,950,000	3,331,600	36,595,000	1,219,833
Columbia Field	58,908,200	1,963,600		
300 Area			54,755,000	1,825,166
<b>Total</b>	<b>176,068,200</b>	<b>5,868,800</b>	<b>178,120,700</b>	<b>5,937,355</b>

Maximum daily consumption was 6,504,400 gallons on November 3, 1954.

Community Operations  
Water and Sewerage Utilities Unit

SEWERAGE SYSTEM

Normal operations and maintenance were continued throughout the month. Three sewer main stoppages were cleared during November.

Several items of scheduled preventative maintenance and inspection of equipment were performed at the Sewage Treatment Plant during November.

90,000 gallons of sludge was pumped to the drying beds.

Chlorination of the south trunk sewer through #6 Irrigation Station chlorinator was commenced on November 15.

On November 16 a serious chlorine leak developed in a chlorine gas line at #2 Sewage Treatment Plant chlorinator station. An operator received a minor injury by inhaling chlorine fumes when attempting to enter the station for a routine check. It was necessary to use a gas mask to enter the station to cut off the chlorine gas supply.

A routine annual program of flushing the sewage collection system was commenced on November 2.

SEWAGE

Plant No. 1	Total Flow	32,440,000	Av. Da. Flow	1,080,000
Plant No. 2		73,905,000		2,460,000
	Total	106,345,000	Total	3,540,000

IRRIGATION SYSTEM

Winterizing of irrigation pumping and distribution systems is about 98% complete. Canal cleaning and maintenance from the penstock to Richland is progressing satisfactorily while water is being run through the main canal and to the 3000 Area percolation basin.

COMMUNITY OPERATIONS SUB-SECTION  
 RICHLAND PUBLIC LIBRARY  
 MONTHLY REPORT  
 November 1954

ORGANIZATION AND PERSONNEL

	<u>EXEMPT</u>	<u>NON-EXEMPT</u>
Employees - Beginning of Month	4	7½
Transfers In	0	0
Transfers Out	0	0
New Hires	0	0
Terminations	0	½
End of Month	4	7

GENERAL

Circulation

Books	21,520
Magazines	737
Pamphlets	92
Records	1,150
Inter-Library Loans	47
Grand Total	23,546

Current Book Stock

Books added this month	509
Books withdrawn this month	0
Grand Total	32,690

Registration

Adult	190
Juvenile	134
Total	324
Total Registered Borrowers	18,195

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Community Operations  
Library Unit

Children's Story Hour Attendance	573 (475 pre-school; 98 elementary school)
Meetings in North Hall	10

Approximately 2,260 people visited the Library's Fourth Annual Book Fair during National Book Week, November 15-20. This includes 1,000 school age children who attended the movie, "Adventures of Huckleberry Finn" which was shown on Saturday, November 20 and 160 pre-school children who attended the movie "Mother Goose Stories", which was shown with the story hours on Tuesday and Wednesday mornings, November 16 and 17, and 100 persons who attended the mountaineering movies on Tuesday, November 16, which were furnished by the Richland Chapter of the American Association of University Women as part of their sponsorship of the Children's Special Activities Program. Awards for the "Book Comment" contest were presented to the 100 elementary school winners on Monday, November 29, by Miss Ann Peck, Columbia Book Store. At the same time the award for the book character identification contest for Junior High School students was presented by Mrs. Maggie Kuempel, Shield's Book and Stationery Store.

The Allied Arts have had a Latin-American Exhibit and their Fall Art Exhibit on display in North Hall this month.

AUXILIARY OPERATIONS AND PLANT PROTECTION SECTION

MONTHLY REPORT - NOVEMBER 1954

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	100	102	2 (a)	
Security and Patrol	489	494	5 (b)	
Fire Protection	136	135		1 (c)
Office	124	121		3 (d)
Telephone	77	77		
	<hr/>	<hr/>	<hr/>	<hr/>
TOTALS	928	931	7	4

NET INCREASE: 3

(a) - Administration Area Maintenance

2 - New Hires

(b) - Security and Patrol

5 - New Hires  
1 - Transferred in  
1 - Termination

(c) - Fire Protection

1 - Termination

(d) - Office

12 - New Hires  
1 - Deactivated  
13 - Transferred out  
1 - Termination

FIRE PROTECTION UNIT

Fire Responses

Construction	6	Loss	\$12.00
HAPO	4	Loss	---
Army	1	Loss	---
TOTAL	---		---
	11		\$12.00

Safety and Security Meetings

Number of Security meetings	12
Number attending meetings	82
Number of Safety meetings	24
Number attending meetings	161

Drills Held during November

Outside drills held	85
Inside drills held	147
TOTAL	232

22,850 feet of fire hose and 990 feet of ladders used for drill purposes during November.

Fire Protection Unit officers held nine classes on Fire Protection which were attended by 169 people of various departments.

Two fire trucks were tested during the month of November.

Fire Extinguishers

Inspected	1,741
Installed or relocated	3
Tested	496
Delivered to new locations	11
Seals broken and not reported	23
Serviced	581
Weighed	853

Gas Masks

Inspected	38
Serviced	8

OFFICE SUB-SECTION

Plant Mail Unit

Plant mail volume was slightly lower during the past period, however, bulk and weight increased.

The new mail room at 100-K Area opened November 3, 1954, and the 100-B Area mail room closed as the 100-B Area will receive service from the 100-K Area.

Special assignments included the preparation and mailing for the management list, which consisted of five pages, preparation and mailing to all employees of "Data Report on Spouse" for the Security Unit.

Addressograph work showed a slight decrease during the past period due to machine difficulties and shows a twenty-order back log.

<u>Types and Pieces of Mail Handled</u>	<u>October</u>	<u>November</u>
Internal	4,561,796	4,355,317
Postal	86,251	79,271
Special	2,262	2,494
Registered	9,767	10,145
	<hr/>	<hr/>
	4,660,076	4,447,227
Total postage used	\$3,211.05	\$3,202.03
Total teletypes handled	2,599	2,340
Total store orders handled	727	722

<u>Addressograph</u>	<u>October</u>		<u>November</u>	
	<u>Number of Runs</u>	<u>Total Copies</u>	<u>Number of Runs</u>	<u>Total Copies</u>
<u>Type of List</u>				
Plant Name List	112	157,450	111	146,563
Housing List	12	60,221	12	59,961
Payroll List	10	23,819	9	22,983
Total new plates	4,383		3,265	
Total corrected plates	5,685		2,645	
	<hr/>		<hr/>	
	10,068		5,910	

Printing Unit

Consulting with the Printing Unit this month were representatives of Minnesota Mining and Manufacturing Company to correct problem with pre-sensitized metal plates and Eastman Kodak Company regarding film negatives.

The ink drying rack recently ordered was received and is proving to be a very worthwhile addition to our operation by speeding drying time and preventing ink transfers.

Responsibility for printing Organization and Policy Guides was transferred to the Duplicating Unit. Final copy of Organization and Policy guides will now be prepared by Finance Department, thereby reducing to a considerable degree the amount of photo copy preparation in Printing. A force reduction of one employee in copy preparation was effected as a result of this change.

<u>Work Completed</u>	<u>October</u>	<u>November</u>
Orders received	406	395
Orders completed	438	425
Orders on hand	111.4	72.2
Copies printed	1,884,573	1,360,661
Negatives masked	647	429
Negatives processed	778	514
Photo copy prepared	149	194
Litho plates processed	823	516

### Stenographic Unit

Nine new employees were assigned to the Stenographic Unit in November -- four Stenographer-Typists and five Stenographers. Three employees who had the required experience to be hired as Stenographers were hired as Stenographer-Typists due to inability to pass the shorthand tests for the higher classification. Since being assigned to the Stenographic Unit these employees have passed these tests and can be transferred to the higher classification. Eleven transfers were effected during the month and twenty-two temporary assignments were made. Work assignments were performed for sixty-eight individuals against fifty-six cost codes.

Stenographic assistance was supplied on rush work with deadline completion dates to both Salary Administration and the Special Study group.

On November 23, three commercial instructors from Columbia High School, together with members of the 1955 commercial course graduating class were escorted through the Stenographic Unit by a representative of Personnel Practices. A short discussion on operation of the unit and qualifications required for stenographers was held.

The work load has been consistent during the month and all work is current at month's end.

<u>Breakdown of Hours</u>	<u>October</u>	<u>November</u>
Dictation & transcription		3
Meeting Time	5	5
Absentee time	40	36
Machine transcription	24.5	6.5
Letters	46	9
Rough Drafts	63	69.5
Dittos, duplimats and xerography	413.5	357
Miscellaneous	369	392.5
Training Time	254	273
Unassigned time	60	94
	<hr/>	<hr/>
Total	1,275	1,245.5
Employees on loan to other units	1,425	1,438.0
	<hr/>	<hr/>
1202154 Grand Total	2,700	2,683.5

### Duplicating Unit

Workloads in the recently opened 1704-K Duplicating office in 100-K Area have proven the need for such service at that location. During the period reported, a total of 14,460 copies were reproduced in spite of alterations to the office space occupied. These alterations included the installation of a dutch door which will provide better security control since unauthorized personnel will not be able to enter.

Cost per hundred copies duplicated for the period reported was \$1.69. This figure is lower than those reported for the months of July, August, and September of this year and compares favorably with the figure \$1.90 reported for the Fiscal Year 1954.

The largest priority job handled this month was an order processed for Reactor Section by the 300 Area Duplicating office. The order consisted of 289 masters, with 100 copies required on each.

	<u>October</u>	<u>November</u>
Orders received	3,285	3,384
Orders completed	3,210	3,302
Orders on hand	126	139
Offset plates	13,466	14,569
Offset copies	969,086	842,985
Verifax masters	2,458	2,920
Verifax copies	9,504	10,613
Stencils	212	
Stencil copies	2,631	
Ditto masters	386	306
Ditto copies	5,566	4,355
Zerox plates	1,175	1,669
Ozalid masters	29	31
Ozalid copies	889	70

### Office Equipment Unit

A physical inventory of office equipment was completed during the month. Cost code corrections were made to account for machines by latest revised cost codes in accordance with physical inventory data.

Approximately 75% of furniture and equipment requirements for 100-K facilities was delivered during the month.

Construction contractors' surplus office furniture was screened for those items required by operations. The bulk of furniture checked was classified as salvage and not economical for repair. A few straight back chairs and office tables were purchased. Serviceable materials of significant quantity will not be available until the end of Construction Contractors program. AEC Property group will furnish a schedule listing those items that can be made available and every effort will be made to utilize this equipment for project and operations requirements.

The FY 1955 mid-year budget review was submitted for expendable office furniture with no changes made from original forecast as submitted in March.

Office Equipment Unit (Contin)

The mid-year review of FY-55 budget of capital office furniture and equipment was prepared and forwarded to Financial Department. This review resulted in a total budget of \$200,475.00 which included \$116,000.00 approved for purchases of material from Construction Contractors which will be used to upgrade operations equipment. The original budget for capital items was \$183,205.

Office Furniture

The expendable office furniture inventory account 93 was valued at \$28,380.00 at end of October or a 4.1 months supply. Volume of furniture handled during the month was as follows:

	<u>Issued</u>	<u>Received</u>
Bookcase	19	0
Blackboard	3	2
Chairs	365	177
Costumers	57	9
Card File	7	12
Cabinets	109	43
Desks	89	71
Tables	98	35
Miscellaneous	461	155
	<hr/>	<hr/>
	1,208	504

There were 116 service orders issued for minor maintenance repairs during the month and one work order.

Office Machines

There was an inventory balance of 5,097 machines carried in service and stock on the 20th of the month.

Sixty machines were excessed by Kaiser during the month. Thirteen machines were transferred from Kaiser to G.E. to be used for upgrading purposes.

Office Machine Repair Unit

Two flexwriters and one auto-typist perforator were received during the period. The flexwriter will be used in connection with systems application for IBM data processing. The perforator will be used by Technical Recruiting.

A representative of the Sunset McKee Company of Yakima installed automatic line finders on five IBM typewriters. These will be used in conjunction with the plant IBM punch card system.

Several requests for loans of the Edison V.P. dictating equipment were received during the period. Two of the loans involved use of the equipment in New York on business trips by HAPO personnel.

A representative of Addressograph Company of Spokane made a maintenance inspection and performed minor repair to one model 2000 Addressograph located in the 703 Building.

Office Machine Repair Unit (Contin)

Instrument work other than routine consisted of rebuilding a flame detector for the sewage disposal plant, overhaul of a water flow meter because of chlorine contamination, and rebuilding a PC-2 radiation counter for Bio-assay laboratory in the 747 Building.

The instrument shop was also requested to completely overhaul a five-fold radiation counter in the 1100 Area Transportation Shop, and to put the equipment on a routine maintenance schedule.

Repair tickets were processed as follows:	<u>October</u>	<u>November</u>
	640	625

ADMINISTRATION AREA MAINTENANCE SUB-SECTION

AEC-1114 New Transportation Facilities: Property transfer papers have been made up by AEC for signatures by General Electric. A list of 28 exceptions which the contractor must complete, as well as four additional items which the Using Agency feels are unsatisfactory, are attached to the transfer papers. Final payment to the contractor will not be made prior to clean-up of the listed items.

Work orders have been issued by AEC to GE Maintenance for installation of acoustic tile in train dispatcher's office, rehangng a fire door, weatherstripping windows and doors, and installation of manually controlled dampers in roof ventilators located in the railroad shop.

CA-561 713 Building Alterations: Project completed, with exception of some hardware items on which delivery was delayed. Final inspection was made on November 16. Plans underway to move IBM operation into new facility early in December.

CA-606 Additional Office Space - Central Stores Warehouse: Proposal formally submitted to AEC on November 3. Informal information indicates it has had preliminary study by their review board and is on the agenda for further consideration in meeting scheduled for the first week in December.

Preliminary design work and preparation for proposal for improvement to roads and walks in east end of 700 Area is progressing.

Three Hauserman partition installations were made in 700 Area and one in 1100 Area.

Carload shipment consisting of approximately 330 lineal feet of partitioning and 75 doors was received and stored shortly before the end of the month.

Five office moves were made in November.

The Northwest Utilities group was moved to new quarters in 760 Building.

## General Maintenance

Accoustical tile for sound proofing was placed on one office wall and four office ceilings.

All openings were closed in 1131 Area fence and a 12-foot gate installed so that the area can be locked up prior to final disposition.

In the rearrangement of office space, 96 lineal feet of Hauserman partition was removed and 174 feet installed, of which 52 feet was filled to ceiling. Two new openings for doorways were made in steel wall partitions.

Two carpenters were detailed to 100-D Area for three days to assist in shipping York refrigeration equipment.

Carpenter shop made 1,000 feet of molding and cut 1,000 feet of 2" x 2" material for use in Hauserman top filler. Several miscellaneous items were made and painted, including cabinets, tool boards, newspaper rack, bulletin boards, signs, etc. Most of these items were for the new Transportation facility. Several items of office equipment were refinished.

Seventeen rooms, two hallways and one stairwell were repainted.

Signs were painted for 300, 600, 700 and 1100 Areas. Room numbers were made and hung for all offices in new Transportation facility.

Glazier spent four days installing glass in Hauserman partitions; two days were spent on outer area work, and the remainder of time on Community housing.

Electrical work at new Transportation facility was heavy. Work included repairing switch for pump at bulk oil storage yard, hooking up three welding machines, repairing three electrical door hoists, changing out receptacle outlets, installing two time clock circuits, making extensions and installing 40 trolley duct drops, installing horn and telephone circuits, providing extra receptacles for motor room and heavy equipment shop, installation of buzzer systems for offices in 1170 and 1171 Buildings, fabricating and installing 90 Kim-Start cords, and installing 10 Kim-Start units for buses. Several hours were expended in trouble shooting on electrical control system for hot air furnaces.

Buzzer systems were installed for 700 Area offices, one in 760, two in 761 and six in 703. New circuits were run for: PBX Board, 713 Building; Aero-Vane indicator on Thayer; oil furnace in Warehouse 13; dry ice storage at Central Stores. Three receptacles were provided in 703, one of which was for a clock. Six fluorescent light fixtures were installed in 703 Building.

Machinist made up pump shafting and repaired pump for community well; made 100 sash gears for Housing, and fabricated a set of driving heads for Transportation, along with other miscellaneous repair jobs.

Locksmith repaired vault combination at 3760 Building, master-keyed door locks in 105-C Building, checked and repaired all files in 760 Vault, and performed routine small locksmith jobs in all areas.

No. 3 boiler at 784 heating plant was overhauled and 29 tubes replaced. A new 3" steam valve was installed to provide steam service to new 702-B Plant Telephone Exchange.

### General Maintenance (Contin)

The regrading of condensate lines at Central Stores to prevent line "hammer" is 75% complete. The sink and safety shower installation at Stores is 75% complete.

Air coolers, drinking fountains, hot water tanks and unit heaters were removed from 1131 and 729 Areas, in preparation for excess. Push nipples were replaced in five radiators in 760 Building and five at Kadlec Hospital.

Installed oil line valve for each of 24 oil burners, and repaired and maintained hot air heating plant at new Transportation facility. A great deal of overtime was required to adjust this new system in an effort to provide satisfactory automatic operation.

New tables were assembled and secured to floor in Transportation lunchrooms. Several racks for belts, axles, tail pipes and miscellaneous parts were fabricated and installed for assigned Stores space at 1171 Building.

Removed some posts and extended others for sign posts at new bus lane at 1171 Building.

Large time card box at Dispatch Building was repaired and covered with sheetmetal.

Metal screens for upstairs third-wing windows of 703 Building were fabricated and painted. These will be installed as soon as work schedules permit.

### Building Service

Building Services personnel were assigned to swing shift for cleaning light fixtures. Progress is being made on this work in first wing of 703 Building.

Two janitors were assigned to new 1170 and 1171 Transportation Buildings, on night shift.

The floors in new IBM section of 713 Building were resealed in preparation for moving in equipment.

### Steam Operation

At the beginning of the month, Nos. 1 and 4 boilers were in service, No. 2 in reserve, and No. 3 undergoing biennial major overhaul.

On October 29, failure of a stoker rotor bearing on No. 4 boiler necessitated removal of this unit from service. It was replaced by No. 2 boiler. Repairs were quickly accomplished and No. 4 boiler placed in reserve status on the same day.

At the close of the month Nos. 1 and 2 boilers were in service, No. 4 in reserve and No. 3 approaching completion of major overhaul.

The quantity of steam generated at the 784 Plant was 5.8% less than for the same period of the previous year.

A tank-car load of sulphuric acid was received, tested, and unloaded on November 9.

## Steam Operation (Contin)

Operation of Central Stores Heating Plant was normal throughout the month.

Bulk propane deliveries at Transportation Main Shop, Building 1171, were set up on a "keep full" basis with the vendor, Columbia Gas-Heat, Inc., with deliveries on Mondays, Wednesdays and Saturdays as required.

Contractor installed an automatic change-over propane gas regulator at Transportation Dispatch Building 1170, thus assuring a constant supply of gas for oil burner ignition at this location. Regulator is identical with those at 747 Building and Central Stores Heating Plant, where experience has been entirely satisfactory.

Coal consumed: 1,378.45 net tons

Steam generated:	19,628.7 M. lbs.
Steam leaving plant:	17,149.1 M. lbs.
Steam delivered:	14,845.1 M. lbs.

Total water softened	2,718,700 gallons
Total soft water sent to Kadlec Hospital:	84,020 gallons
Total soft water sent to 784 Heating Plant:	2,634,680 gallons

## TELEPHONE SUB-SECTION

### General

The report for October indicated that bids had been received for printing the next three editions of the official telephone directory and that the Columbia Basin News' low bid appeared to be satisfactory. Final examination of the size and type print which they proposed to use in the directory proved not to be acceptable; therefore a contract has not yet been awarded for printing the directory. The Contract Supervisor has directed a letter to the Columbia Basin News advising that their proposal was not acceptable as submitted and inquiring if they wish to furnish the specified Bell Gothic print. Their reply is being awaited.

Construction of the new official exchange building, No. 706, was 85% complete on November 19, 1954.

Information was received from Union Relations on November 10th advising that an agreement had been reached with the HAMTC that the maintenance of PBX and PAX telephone systems in the 221-B, 221-T, 221-U, 234-5 and Redox buildings would, in the future, be maintained by Telephone craftsmen instead of by electricians as in the past. Separations Section supervisors are being contacted by the Telephone Sub-Section to work out satisfactory arrangements for future maintenance.

Completed transfer of telephone and radio equipment to the new Transportation Center.

### Plant Telephone Operations

Electrical tests were made on the buried paired cable between 100-K and 100-B and one exception, an open cable pair, was noted for correction. A final inspection of the above cable and the 100-K to Pt. K trunk cable was made on November 22, 1954.

A 51-pair cable and cable terminal provided by minor Construction to serve the 313 Building was tested and tied in to the 300 Area distribution system. The building distribution system was also tested, and approximately 25 telephones installed.

A 5-trunk 20-station cordless PBX switchboard was installed in the 713 Building for use by the Computing and Procedures Section. Twenty-five telephones were connected for this service.

1202150

### Plant Telephone Operations (Contin)

Located and cleared cable faults in the BY to White Bluffs and Pt. H to 100-K trunk cables. Both faults were sheath openings caused by ring wear.

As required by the Inventory Accounting Unit, an inventory was made of material stored on all service trucks.

A 76-pair cable provided to serve the 202-A building was tested and tied-in to the 200-E distribution system.

Several mandays were spent rearranging cables and cable racks in manhole No. 25 in Richland. This work was done to provide space for new cables to be installed by the official exchange contractor.

Completed the shop work required to prepare crash alarm equipment for installation in the 300 area exchange.

The inventory of aerial cable plant in service in 700-1100 areas and Pasco and Kennewick trunk cable sections was completed and a summary was furnished to Plant accounts on November 29, 1954.

Made traffic studies on a total of 52 official subscriber lines to determine if these lines can be used to a better advantage.

On the basis of a traffic study, recommended installation of a 5-trunk, 20-station PBX for the Computing and Procedures Section.

### Commercial Telephone Operations

Prepared field instructions for replacing temporary inside cable in the Cannon Building with a permanent house-cable system.

Reviewed and commented on plans for new commercial sites on Stevens at Knight, and at Goethals and Williams.

Continued extensive inspection of Richland outside plant conditions and the preparation of maintenance requirement data.

Completed installation of grounded-line lock-up and alarm circuit in the Richland exchange.

Completed cable preparation work necessary prior to gas pressurizing the Pasco trunk cable.

Installed two additional cable terminals in Richland.

Commenced work of relocating loading coils in the Pasco trunk cable near the Richland exchange.

Installed a special intercommunicating circuit in the 702 Building for use by Operations Unit personnel when making traffic studies.

Installed a telephone-off-hook howler tone circuit in the Richland exchange.

Continued assistance to Plant Accounting Unit in setting up Federal Communications Commission Approved System of Uniform Accounts.

## Radio System Operations

Moved Radio Station KKE-624 No. 15, from temporary location to the new Patrol Headquarters in the 100-K Area.

Installed a radio remote control unit in the Railroad Dispatcher's office in the new Transportation building. Also removed a similar remote control unit from the old Dispatcher's office at Riverland.

Recorded Science Forum programs on October 27th, November 3rd and November 30th.

Relocated three Ediphone Voicewriter machines in the 703 Building for the A.E.C.

Installed and operated a portable public address system in the Desert Inn on November 3rd for a special Company meeting.

Installed a public address system in the 277-U building, 200-W area. This is a temporary installation and is to be removed later.

Removed an intercommunicating system from the Classified Files office in the 703 building and delivered the equipment to the 300 Area electricians for re-installation in the 300 Area.

Installed and operated a portable public address system for the Veterans' Day services on November 11.

Installed a portable public address system in the cafe of the Chief Joseph School for a Company meeting on November 16.

Installed a six-station intercommunicating system in the 713 Building on November 22.

On Gable Mountain, the old antenna serving Radio Station KEB-886 was replaced with a new antenna on November 30th, to eliminate operating difficulties experienced with the old antenna.

Installed a portable public address system in the Central Stores building for a meeting on November 17.

Installed and operated portable public address and recording equipment for a meeting held by Mr. W. E. Johnson on November 30.

One radio station service outage occurred during the month. Station KGB-513 No. 5 (Richland Police) was out of service on November 14th from 7:25 PM to 9:55 PM due to tube failure.

A meeting was held on November 17th with members of the Instrument Development Unit, Biophysics Section, to discuss equipment requirements for a planned experimental radio telemetering circuit.

Statistical Data

	<u>At 20th of November</u>	<u>Change From Previous Month</u>	<u>Change From Year Ago</u>
Residential Subscribers	6,061	- 2	/ 369
Business Subscribers	482	- 6	- 6
Paystation Telephones	70	0	/ 5
Official Subscribers:			
Richland Exchange	984	- 4	- 1
North Richland Exchange	243	/ 3	/ 11
Process Area Exchanges	1,813	0	/ 117
		<hr/>	<hr/>
		- 9	/ 495

New Service Requests Received during the month:

For Residential Service	90
For Business Service	7

TOTAL 97

Backlog of Service Requests:

		<u>Total</u>
For New Residential Telephones:	270	
For New Business Telephones:	1	
		271
For Residential Outside Moves:	28	
For Business Outside Moves:	1	
		29

Service Orders Processed:

In connection with Residential and Business Service	484
In connection with Official Service	423
	<hr/>
Total	907

Facilities - Installed, In Service and Available:

	<u>Exchange Lines</u>			<u>Party Lines Available</u>
	<u>Installed</u>	<u>In Service</u>	<u>Available</u>	
Richland	4,050	3,984	66	328
North Richland	600	441	159	82
Process Areas	2,050	1,708	342	--
	<hr/>	<hr/>	<hr/>	<hr/>
	6,700	6,133	567	410

	<u>Exchange Lines in Service</u>	<u>Subscriber &amp; PBX Stations in Service</u>	<u>Ext. &amp; Extra Telephones In Service</u>	<u>Exchange Lines Available</u>	<u>Vacant Sides</u>
Richland	4,042	7,309	1,161	115	346
North Richland	383	563	170	159	64
Process Areas	1,708	1,868	1,121	342	
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Total	6,133	9,740	2,452	546	410

Lines Reserved in  
PBX Group: 21

<u>Class of Service</u>	<u>Subscriber Main Stations in Service</u>	<u>PBX Stations in Service</u>	<u>Ext. &amp; Extra Telephones in Service</u>	<u>Total</u>
Official	2,647	393	2,014	5,054
Business	444	38	248	730
Residential	6,061		189	6,250
Paystations	70		1	71
Test Numbers	87			87
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Total	9,309	431	2,452	12,192

**Radio Stations:**

	<u>At 1st of November</u>	<u>Change from Previous Month</u>	<u>Change from Year Ago</u>
Fixed Stations	35	0	✓ 17
Mobile Stations	153	0	✓ 10
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	188	0	✓ 27

**SECURITY AND PATROL UNIT**

**Document Report**

Number of classified documents and prints unaccounted for as of November 1: 348  
(120 of the above 348 documents are chargeable to E. I. du Pont de Nemours & Co.)

Number of classified documents and prints reported as unaccounted for during November: 0

Number of documents and prints either recovered or downgraded in classification during November: (one located, one declassified) 2

Number of classified documents and prints remaining unaccounted for as of December 1, 1954: 346  
(120 of the above 346 documents and prints are chargeable to E. I. du Pont de Nemours and Company)

1202154

The Non-Technical Document Review Board held two meetings during November, and reviewed a total of 96 documents. Of this number -

73 were downgraded to "Official Use Only",  
17 had their classification retained,  
4 were not within the scope of the Board, and  
2 were declassified.

### Security Education

Six items concerning the subject of Security appeared in the GE NEWS during the month.

There were 505 security meetings held and attended by 7,737 HAPO people. A representative of the Security and Patrol Unit showed one of the security films at some of these meetings as indicated below:

"Turn Left Across the Bridge" was shown at 21 meetings, each with an average attendance of 32 employees.

"The Calculated Risk" was shown at one meeting with 145 people present.

"The Tallest Shadow" was shown at one meeting with 42 employees present.

"Only the River" was shown at one meeting with 22 people in attendance.

GE Security Bulletin No. 88 entitled "The Atomic Energy Act of 1954 - Enforcement" was distributed November 22, 1954.

One hundred copies of the poster with the slogan "The Primer of Security" were posted in the plant areas during the reporting period. This poster was furnished by the Department of Defense, Washington, D.C.

Organization and Policy Guide 15.1 entitled "Responsibility for Security" was revised and issued November 1, 1954.

To comply with the Atomic Energy Commission request that all persons who are granted security clearance by the Commission shall furnish data to them concerning their spouses, a memorandum dated November 8, 1954, with the AEC form 354 (11-53) "Data Report on Spouse" was issued to all Hanford Atomic Products Operation personnel. As of the end of the month, 340 completed forms had been forwarded to the Commission. This same form was forwarded to all subcontractors, consultants and licensees of the General Electric Company. Necessary papers have been completed and forwarded to the Commission.

Security Field Memorandum, concerning "Change in 'Restricted Data' Stamp" and "Preparation of Classified Documents" was issued November 26, 1954.

Ninety-nine employees of the General Electric Company received a "Q" security orientation from either a representative of the Security Unit or a Security Patrol supervisor during the month of November 1954.

Statistical Report of Security Patrol Activities

	<u>100-B</u>	<u>100-D</u>	<u>100-F</u>	<u>100-H</u>	<u>100-K</u>	<u>200-W</u>	<u>300</u>
Pat Searches	72	96	84	19	0	0	0
Escorts	10	7	10	18	31	11	58
Ambulance Runs	1	3	3	3	0	2	2
Passes Issued:							
One day temporary	81	17	7	7	0	54	53
Travel	0	0	0	0	0	0	59
Red Tag	164	104	38	25	0	511	91
Telephonic	2	0	0	0	0	0	9
Supervisors' Post Contacts	434	310	278	290	297	853	491
Other Security Patrol Activities (Computed by Hours)							300 & 700
Security File Check	183	306	199.3*	495.75*	432	600	2,368
Building Check	367	32			432	600	768

\*In the 100-F and 100-H Areas, the Security file check and building check are combined into one figure.

Arrest Report

<u>Violations</u>	<u>Number of Violations</u>	<u>Cont.Cases from Oct.</u>	<u>Cases Cleared</u>	<u>Pend- ing</u>	<u>Fined</u>	<u>Jailed</u>	<u>Dis- missed</u>
Failure to observe							
Stop Sign	1	0	1	0	1	0	0
Illegal Parking	2	0	2	0	2	0	0
Illegal Passing	4	0	4	0	4	0	0
Illegal Trespassing	1	0	1	0	0	0	1
Negligent Driving	2	0	2	0	2	2	0
Involving Liquor							
No Driver's License	1	1	1	1	1	0	0
Speeding	5	1	5	1	5	0	0
<b>Total</b>	<b>16</b>	<b>2</b>	<b>16</b>	<b>2</b>	<b>15</b>	<b>2</b>	<b>1</b>

Citation Tickets issued: 16  
 Warning Tickets issued: 42  
 Verbal Warnings: 0

Security Patrol Training Activities

240 Security Patrolmen received Firearms Training during November.

226 Security Patrolmen received classroom instruction during the same period.

Security Patrol Post Changes

On November 9, a new post known as the "Metal Storage" post was established in 100-K, 105-KW Building.

General

In addition to the regular inventory audits of custodians charged with classified documents and prints, the following installations were inspected by the Field Inspection Group during the reporting period:

100-F	Reproduction Files	100-D	Mail Station	100-K	Duplication Office
200-W	Reproduction Files	100-K	Mail Station	100-H	Duplicating Office
		200-W	Mail Station	200-W	Duplicating Office
100-D	Classified Files	300	Mail Station	3000	Duplicating Office
200-W	Classified Files	3000	Mail Station	300	Duplicating Office
		700	Central Mail Station		

Security Administration

Daily Badge Log Entries	2,859
"Q" Clearances	99
Formal "P" clearances issued	51
"P" approval clearances issued	29
Category Access granted	46
Category Access withdrawn	35
Category Access revised	36

Rephotographing Project

During the reporting period, the following photographs were processed by the Security Office:

Number of "A" Badges	40
Number of "B" Badges	124
Number of persons rephotographed	26
	<hr/>
	190

Badges

Photo passes laminated and issued:	190
"A" badges assembled and distributed to proper areas:	468
"A" badges received from the areas:	151
"A" badges received from the areas for repair:	84

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**HANFORD ATOMIC PRODUCTS OPERATION**  
General Electric Company  
Richland, Washington

REPORT OF VISITORS FOR PERIOD ENDING NOVEMBER 30, 1954

<u>Name - Organization</u>	<u>Purpose of Visit</u>	<u>Person Contacted</u>	<u>Arrival</u>	<u>Departure</u>	<u>Restricted Data</u>	
					<u>Class.</u>	<u>Unclass.</u>
<b>EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT</b>						
<b>I. Visitors to this Works</b>						
G. Giddings Research Laboratory Schenectady, New York	Salary evaluation program	W. I. Patnode	11-22-54	11-23-54	X	700-703
N. P. Jackson General Electric Company Schenectady, New York	Discuss employee public relations	G. L. Brown, Jr.	11-9-54	11-12-54	X	100-H 105 200-W Redox 300 303
J. A. Quigley National Lead Company Fernald, Ohio	Discuss medical program and industrial hygiene in 300 Area	W. D. Norwood P. A. Fuqua	11-3-54	11-3-54	X	300 XXX
T. C. Runion National Lead Company Fernald, Ohio	Discuss medical program and industrial hygiene in 300 Area	W. D. Norwood P. A. Fuqua	11-3-54	11-3-54	X	300 XXX
L. W. Steele Research Laboratory Schenectady, New York	Salary evaluation program	W. I. Patnode	11-22-54	11-23-54	X	700-703

**ENGINEERING DEPARTMENT - ENGINEERING ADMINISTRATION SECTION**

**I. Visitors to this Works**

V. P. Calkins Aircraft Nuclear Propulsion Cincinnati, Ohio	Discuss fuel element program	A. B. Greninger	11-11-54	11-11-54	X	300 XXX
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Name - Organization      Purpose of Visit      Person Contacted      Arrival      Departure      Restricted Data Class.      Unclass.      Areas

W. L. Geras, Jr.  
Reactor Development  
U. S. Atomic Energy Comm.  
Washington, D. C.

Attend fuel element meeting

A. B. Greninger  
W. E. Johnson

11-12-54      11-12-54

X

J. A. Horan  
U. S. Atomic Energy Comm.  
Chicago, Illinois

Patent matters

M. K. Cain

11-1-54      11-4-54

X

700-760

P. E. Lowe  
Aircraft Nuclear Propulsion  
Cincinnati, Ohio

Discuss fuel element program

A. B. Greninger  
W. E. Johnson

11-12-54      11-12-54

X

700-760

I. H. Mandil  
Reactor Development  
U. S. Atomic Energy Comm.

Attend meeting on fuel element development

A. B. Greninger  
W. E. Johnson

11-12-54      11-13-54

X

700-760

H. G. Rickover  
Reactor Development  
U. S. Atomic Energy Comm.  
Washington, D. C.

Attend meeting on fuel element development

A. B. Greninger  
W. E. Johnson

11-12-54      11-13-54

X

700-760

W. H. Wilson  
Reactor Development  
U. S. Atomic Energy Comm.  
Washington, D. C.

Attend meeting on fuel element development

A. B. Greninger  
W. E. Johnson

11-12-54      11-13-54

X

700-760

ENGINEERING DEPARTMENT - ADVANCE ENGINEERING

I. Visits to other Installations

P. F. Gast  
to: Argonne National Lab.  
Lemont, Illinois

Consultation on Reactor Technology and attend meeting of Reactor Handbook Review Board

N. Hilberry

11-14-54      11-21-54

X

ENGINEERING DEPARTMENT - TECHNICAL SECTION

I. Visitors to this Works

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<u>Name - Organization</u>	<u>Purpose of Visit</u>	<u>Person Contacted</u>	<u>Arrival</u>	<u>Departure</u>	<u>Restricted Data</u>		
					<u>Class.</u>	<u>Unclass.</u>	<u>Areas</u>
D. F. Babcock E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Observations and discussions regarding slug failures	O. H. Greager J. F. Music P. H. Reinker L. W. Lang	11-2-54	11-3-54	X		100-D 105 105-KW 300-L 303 700
L. Burris, Jr. Argonne National Laboratory Lemont, Illinois	Obtain information on techniques and equipment for remote and automatic operation of high temperature furnaces, waste gasses	V. R. Cooper O. F. Hill A. E. Smith	11-10-54	11-11-54	X		200-E 201-C 200-W 234, 235 300-L XXX
V. P. Calkins Aircraft Nuclear Propulsion Cincinnati, Ohio	Discuss fuel element development	L. D. Turner E. P. Galbraith	11-11-54	11-11-54	X		300-L XXX
D. H. Cornell Knolls Atomic Power Lab. Schenectady, New York	Discuss in-pile loop facilities	G. E. Wade	11-18-54	11-19-54	X		100-D XXX 100-H 105 105-KW 300-L XXX; 700
R. W. Coyle Aircraft Nuclear Propulsion Cincinnati, Ohio	Discuss an in-pile experiment proposed for ANP Program	J. A. Berberet	11-22-54	11-24-54	X		100-B 105-C 100-D XXX 100-H XXX 105-KW 300-L 303; 700
D. C. Durrill Aircraft Nuclear Propulsion Cincinnati, Ohio	Observe Hanford radio-chemical facility and hot cell configuration	L. D. Turner	11-9-54	11-10-54	X		100-B 105-B, 105-C 300-L XXX
R. H. Fillnow Westinghouse Atomic Power Div. Pittsburgh, Pennsylvania	Investigate hot lab. facilities and radiation effects	L. D. Turner	11-4-54	11-5-54	X		100-H 105 105-KW 300-L 303; 700
T. J. E. Glasson Knolls Atomic Power Lab. Schenectady, New York	Discuss in-pile loop facilities	G. E. Wade	11-18-54	11-19-54	X		100-D XXX 100-H 105 105-KW 300-L 303; 700

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Areas
D. C. Hampson Argonne National Laboratory Lemont, Illinois	Obtain information on techniques and equipment for remote and automatic operation of high temperature furnaces, waste gasses	V. R. Cooper O. F. Hill A. E. Smith	11-10-54	11-11-54	X	200-B 201-C 200-W 234, 235 300-L XXX
J. H. Holmes Knolls Atomic Power Lab. Schenectady, New York	Discuss in-pile loop facilities	G. E. Wade	11-18-54	11-19-54	X	100-D XXX 100-H 105 105-KW 300-L XXX; 700
N. E. Huston North American Aviation Downey, California	Discuss reactor safety device program	R. L. Dickeman	11-15-54	11-16-54	X	100-D XXX 100-H XXX 300 -L 303
W. M. Heston E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Discuss fuel element failures	J. F. Music P. H. Reinker L. W. Lang	11-2-54	11-5-54	X	100-D 105 105-KW 300-L 303; 700
R. T. Jones Westinghouse Atomic Power Pittsburgh, Pennsylvania	Investigate hot lab. facilities and radiation effects	L. D. Turner	11-4-54	11-5-54	X	100-H 105 105-KW 300-L 303; 700
R. L. Lee Aircraft Nuclear Propulsion Cincinnati, Ohio	Discuss an in-pile experiment proposed for the AMP Program	J. A. Berberet	11-22-54	11-24-54	X	100-B 105-C 100-D XXX 100-H XXX 105-KW 300-L 303; 700
R. L. Lee Aircraft Nuclear Propulsion Cincinnati, Ohio	Discuss proposed experiments	J. A. Berberet	11-30-54	12-24-54	X	100-B 105-B, 105-C 100-H 105 105-KW 300-L 303; 700
R. L. McJugus E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Observations and discussions regarding slug failures	O. H. Greager J. F. Music P. H. Reinker L. W. Lang	11-2-54	11-3-54	X	100-D 105 105-KW 300-L 303 700

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<u>Name - Organization</u>	<u>Purpose of Visit</u>	<u>Person Contacted</u>	<u>Arrival</u>	<u>Departure</u>	<u>Restricted Data</u>	
					<u>Class.</u>	<u>Unclass. Areas</u>
H. Miller Aircraft Nuclear Propulsion Cincinnati, Ohio	Discuss an in-pile experiment proposed for ANP Program	J. A. Berberet	11-22-54	11-24-54	X	100-B 105-C 100-D XXX 100-H XXX 105-KW 300-L 303; 700
R. C. Nelson Knolls Atomic Power Lab. Schenectady, New York	Discuss proposed irradiation facilities	J. A. Berberet W. E. Fry	11-2-54	11-5-54	X	100-D 105-DR 100-B 105-C 100-H 105 105-KW 300-L XXX; 700
P. Kopitzky Knolls Atomic Power Lab. Schenectady, New York	Discuss proposed irradiation facilities	J. A. Berberet W. E. Fry	11-2-54	11-5-54	X	100-B 105-C 100-D 105-DR 100-H 105 105-KW 300-L XXX; 700
H. K. Ruhl Knolls Atomic Power Lab. Schenectady, New York	Discuss proposed irradiation facilities	J. A. Berberet W. E. Fry	11-2-54	11-5-54	X	100-B 105-C 100-D 105-DR 100-H 105 105-KW 300-L XXX; 700
J. B. Sampson Knolls Atomic Power Lab. Schenectady, New York	Collaboration and con- sultation on reactor physics	W. J. Ozeroff	11-8-54	11-19-54	X	100-D 105 300-L XXX
G. W. Watt University of Texas Austin, Texas	Consultation on Redox and separations problems	O. H. Greager	11-1-54	11-5-54	X	100-D 105 200-E 201-C 200-W Redox, 234, 235 300-L XXX
C. E. Weber Knolls Atomic Power Lab. Schenectady, New York	Consultation on fuel element technology	A. B. Greninger A. G. Blasevitz	11-11-54	11-12-54	X	300-L 303 700

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<u>Name - Organization</u>	<u>Purpose of Visit</u>	<u>Person Contacted</u>	<u>Arrival</u>	<u>Departure</u>	<u>Restricted Data</u>	
					<u>Class.</u>	<u>Unclass. Areas</u>
D. W. White, Jr. Knolls Atomic Power Lab. Schenectady, New York	Consultation on fuel element technology	A. B. Greninger	11-11-54	11-12-54	X	300-L 303 700
D. M. Wilsey All States Employee Schenectady, New York	Work on in-pile water	G. E. Wade	8-31-54	12-31-54	X	100-B XXX 100-H 105 300-L XXX; 700 100-B 105-B, 105-C 100-F XXX 105-KV

II. Visits to other Installations

G. W. Anthony to: Oak Ridge National Lab. Oak Ridge, Tennessee	Instruction on how to operate Oracle computing machine for HAPO physics	R. A. Charpie	11-17-54	12-10-54	X	
H. H. Bush to: Battelle Memorial Inst. Columbus, Ohio	Attend meeting on tensile testing	H. Saller	11-8-54	11-9-54	X	
J. J. Cadwell to: Knolls Atomic Power Lab. Schenectady, New York	Discuss fuel element technology	D. W. White	11-8-54	11-9-54	X	
J. J. Cadwell to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Discuss fuel element technology	J. C. Woodhouse	11-11-54	11-12-54	X	
J. J. Cadwell to: Aircraft Nuclear Propulsion Cincinnati, Ohio	Discuss fuel element technology	A. E. Focke	11-15-54	11-15-54	X	
J. J. Cadwell to: National Lead Company Fernald, Ohio	Discuss fuel element technology	J. Giborski	11-16-54	11-16-54	X	
V. R. Cooper to: Radiation Laboratory University of California Berkeley, California	Consultation on heavy metal chemistry	E. G. Thompson	11-2-54	11-3-54	X	

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<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>
J. L. Daniel to: Argonne National Lab. Lemont, Illinois	Discuss use of Inverfero-meter-Spectrograph combination	M. Fred	11-8-54	11-19-54	X		
W. T. Kattner to: Battelle Memorial Inst. Columbus, Ohio	Discussion on uranium quality	H. A. Saller	11-8-54	11-8-54	X		
W. T. Kattner to: National Lead Company Fernald, Ohio	Discussion on uranium quality	F. L. Cuthbert	11-9-54	11-11-54	X		
W. T. Kattner to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discussion on uranium quality	J. A. Garrett	11-12-54	11-12-54	X		
M. Lewis to: Battelle Memorial Inst. Columbus, Ohio	Discuss development work being done at Battelle for Hanford	L. D. Lock	11-9-54	11-12-54	X		
H. L. Libby to: Argonne National Lab. Lemont, Illinois	Testing problems	W. J. McDonnagle	11-1-54	11-5-54	X		
G. E. McCullough to: Knolls Atomic Power Lab. Schenectady, New York	Discuss fuel element technology and Power Program	K. R. Van Tassel B. R. Prentice	11-15-54	11-19-54	X		
W. C. Riley to: Battelle Memorial Inst. Columbus, Ohio	Discuss development work being done at Battelle for Hanford	L. D. Lock	11-9-54	11-12-54	X		
M. J. Sanderson to: Knolls Atomic Power Lab. Schenectady, New York	Discuss fuel element technology	D. W. White	11-8-54	11-9-54	X		
M. J. Sanderson to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Discuss fuel element technology	J. C. Woodhouse	11-11-54	11-12-54	X		

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<u>Name - Organization</u>	<u>Purpose of Visit</u>	<u>Person Contacted</u>	<u>Arrival</u>	<u>Departure</u>	<u>Restricted Data Areas</u>	
					<u>Class.</u>	<u>Unclass.</u>
M. J. Sanderson to: Aircraft Nuclear Propulsion technology Cincinnati, Ohio	Discuss fuel element technology	A. E. Focks	11-15-54	11-15-54	X	
M. J. Sanderson to: National Lead Company Fernald, Ohio	Discuss fuel element technology	J. Ciborski	11-16-54	11-16-54	X	
M. J. Sanderson to: Westinghouse Atomic Power Div. Pittsburgh, Pennsylvania	Discuss fuel element technology	R. H. Fillnow	11-24-54	11-24-54	X	
M. J. Sanderson to: Knolls Atomic Power Lab. Schenectady, New York	Discuss fuel element technology	D. W. White	11-26-54	11-30-54	X	
M. J. Sanderson to: Atomic Energy of Canada, Chalk River, Ontario	Discuss fuel element	P. B. Langmuir	11-30-54	12-3-54	X	
E. A. Smith to: Argonne National Lab. Lemont, Illinois	Discuss aluminum cans and zirconium tubes	F. T. Foote F. T. Foote	11-2-54 11-8-54	11-3-54 11-10-54	X X	
E. A. Smith to: Superior Tube Company Norristown, Pennsylvania	Discuss aluminum cans and zirconium tubes	H. W. Cooper	11-4-54	11-5-54	X	
D. F. Snceberger to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Thorium Working Committee Meeting	R. T. Huntoon E. C. Laing	11-15-54	11-15-54	X	
D. F. Snceberger to: National Lead Company Fernald, Ohio	Thorium Working Committee Meeting	T. C. Runion	11-16-54	11-18-54	X	
L. A. Wilson to: Aircraft Nuclear Propulsion Cincinnati, Ohio	Attend ABC Shielding Information meeting	H. F. Matthiesen	11-15-54	11-16-54	X	

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Restricted Data  
Class. Unclass. Areas

<u>Name - Organization</u>	<u>Purpose of Visit</u>	<u>Person Contacted</u>	<u>Arrival</u>	<u>Departure</u>	<u>Class.</u> <u>Unclass.</u> <u>Areas</u>
P. D. Wright to: Bridgeport Brass Company Adrian, Michigan	Observe extrusion at that company	R. M. Treco	11-15-54	11-26-54	X
<b>ENGINEERING DEPARTMENT - DESIGN SECTION</b>					
<b>I. Visits to other Installations</b>					
E. L. Armstrong to: Argonne National Lab. Lemont, Illinois	Discuss new reactor design problems	L. W. Fromm	11-15-54	11-16-54	X
E. L. Armstrong to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss new reactor design problems	J. A. Swartout	11-16-54	11-18-54	X
E. L. Armstrong to: Westinghouse Atomic Power Pittsburgh, Pennsylvania	Discuss new reactor design problems	D. M. Wroughton	11-18-54	11-19-54	X
L. E. Foster to: Argonne National Lab. Lemont, Illinois	Discuss new reactor design problems	L. W. Fromm	11-15-54	11-16-54	X
L. E. Foster to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss new reactor design problems	J. A. Swartout	11-16-54	11-18-54	X
L. E. Foster to: Lewis Flight Propulsion Lab.	Discuss new reactor design problems	D. Frieno	11-18-54	11-19-54	X
W. L. Pearl to: Argonne National Lab. Lemont, Illinois	Discuss new reactor design problems	L. W. Fromm	11-15-54	11-16-54	X
W. L. Pearl to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss new reactor design problems	J. A. Swartout	11-16-54	11-18-54	X

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Restricted Data  
Class. Unclass. ~~Secret~~

<u>Name - Organization</u>	<u>Purpose of Visit</u>	<u>Person Contacted</u>	<u>Arrival</u>	<u>Departure</u>	
W. L. Pearl to: Westinhouse Atomic Power design problems Pittsburgh, Pennsylvania	Discuss new reactor	D. M. Wroughton	11-18-54	11-19-54	X
S. F. Schure to: Lynn River Works West Lynn, Massachusetts	Exchange of technical trained personnel	J. S. Parker	11-17-54	11-18-54	X
<b>FINANCIAL DEPARTMENT</b>					
<b>I. Visits to other Installations</b>					
K. G. Grimm to: Knolls Atomic Power Lab. with Schenectady, New York	Measurements conference with Measurements Program on productivity, market ability, etc.	R. W. Lewis R. Turner	11-15-54	11-19-54	X
K. G. Grimm to: Aircraft Nuclear Propulsion Cincinnati, Ohio	Measurements conference with Measurements Program on productivity, market ability, etc.	R. E. Van Ausdal	11-22-54	11-22-54	X
D. M. Johnson to: Knolls Atomic Power Lab. Schenectady, New York	Review financial informa- tion	W. W. Smith R. Turner	11-11-54	11-17-54	X
D. M. Johnson to: Knolls Atomic Power Lab. Schenectady, New York	Review financial informa- tion	W. W. Smith R. Turner	11-30-54	12-1-54	X
<b>MANUFACTURING DEPARTMENT</b>					
<b>I. Visits to other Installations</b>					
S. M. Gill to: Bridgeport Brass Co. Adrian, Michigan	Observe uranium extrusion	R. M. Treco	11-15-54	11-16-54	X
S. M. Gill to: National Lead Company Fernald, Ohio	Discuss production and quality control, uranium slugs	J. M. Ciborski	11-17-54	11-19-54	X

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Name - Organization      Purpose of Visit      Person Contacted      Arrival      Departure      Restricted Data Class.      Unclass.      Area

J. E. Malder, Jr.  
to: U. S. Atomic Energy Comm. Production Planning Committee  
Washington, D. C.

F. K. Pittman

11-9-54

11-11-54

X

W. W. Windsheimer  
to: Bridgeport Brass Co.  
Adrian, Michigan

Observe uranium extrusion

11-15-54

11-16-54

X

W. W. Windsheimer  
to: National Lead Company  
Fernald, Ohio

Discuss production and quality control, uranium slugs

11-17-54

11-19-54

X

**RADIOLOGICAL SCIENCES DEPARTMENT**

**I. Visitors to this Works**

O. Park  
Division of Biology & Medicine  
U. S. Atomic Energy Comm.  
Washington, D. C.

H. M. Parker

11-29-54

12-1-54

X

100-F XXX

**II. Visits to other Installations**

J. De Pangher  
to: Los Alamos Scientific Lab.  
Los Alamos, New Mexico

Discuss particle-accelerator techniques and neutron measurements

11-18-54

11-19-54

X

J. De Pangher  
to: Radiation Laboratory  
University of California  
Berkeley, California

Discuss particle-accelerator techniques and neutron measurements

11-22-54

11-23-54

X

J. De Pangher  
to: Radiation Laboratory  
University of California  
Berkeley, California

Discuss particle-accelerator techniques

11-24-54

11-24-54

X

J. De Pangher  
to: U. S. Naval Radiological Research  
San Francisco, California

Discuss neutron measure-

11-26-54

11-26-54

X

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Restricted Data  
Class. Unclass. Area

<u>Name - Organization</u>	<u>Purpose of Visit</u>	<u>Person Contacted</u>	<u>Arrival</u>	<u>Departure</u>	<u>Class.</u>	<u>Unclass.</u>	<u>Area</u>
J. F. Honstead to: U. S. Atomic Energy Comm. radiation protection Arco, Idaho	Consultation on design criteria	G. V. Beard	11-3-54	11-5-54			X
<b>OPERATIONS RESEARCH STUDY</b>							
<b>I. Visits to other Installations</b>							
R. Y. Dean to: Rand Corporation Santa Monica, California	Use Rand computing equipment and mathematical formulations on production scheduling research program	J. D. Madden M. L. Jancosa D. M. Fort W. Orchard-Hays	11-29-54	12-4-54			X
L. W. Smith to: Rand Corporation Santa Monica, California	Use Rand computing equipment and mathematical formulations on production scheduling research program	J. D. Madden M. L. Jancosa D. M. Fort W. Orchard-Hays	11-29-54	12-4-54			X
P. M. Thompson to: Rand Corporation Santa Monica, California	Use Rand computing equipment and mathematical formulations on production scheduling research program	J. D. Madden M. L. Jancosa D. M. Fort W. Orchard-Hays	11-29-54	12-11-54			X
<b>SPECIAL STUDIES</b>							
<b>I. Visits to other Installations</b>							
W. K. MacCready to: Knolls Atomic Power Lab. Schenectady, New York	Cost data on Special Studies operations	F. K. McCune B. R. Prentice	11-22-54	11-23-54			X
K. L. Robertson to: Knolls Atomic Power Lab. Schenectady, New York	Cost data on Special Studies operations	F. K. McCune B. R. Prentice	11-22-54	11-23-54			X
J. R. Wolcott to: Knolls Atomic Power Lab. Schenectady, New York	Cost data on Special Studies operations	F. K. McCune B. R. Prentice	11-22-54	11-23-54			X

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RADIOLOGICAL SCIENCES DEPARTMENT

NOVEMBER

1954

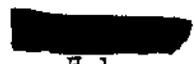
Twenty informal, 4 Class I and 2 Class II radiation incidents were recorded.

Bioassay data indicates an employee may have internally deposited plutonium equal to 50 per cent of the MPL.

Increased ground contamination near the Redox stack was noted. Recent emissions consisted of particles of lesser activity than previously encountered. Monitoring of construction and military personnel was begun at several locations.

Ruthenium contamination problems continued to occupy a position of major importance in research and development activities. Reduction of the MAC for  $\text{NO}_2$  led to a critical review of stack emission of nitrogen oxides.

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RADIOLOGICAL SCIENCES DEPARTMENT

NOVEMBER 1954

Organization

The month-end force of 385 included 39 supervisors, 87 engineers and scientists, 21 clerical, and 238 other personnel.

Number of Employees on Payroll

Beginning of Month	382*
End of Month	<u>385</u>
Net increase	3

\*Incorrectly reported as 385 in previous month's report.

General

There were 20 informal, 4 Class I and 2 Class II radiation incidents. None was of major significance.

The ruthenium particle contamination situation continued to occupy a position of major importance in both radiation monitoring and research and development activities. Radiation monitoring procedures were established to implement the policy directive from the Atomic Energy Commission that permits construction contractor personnel to work in radiation control areas.

Preliminary evaluation of bioassay data indicates that an employee may have acquired significant plutonium deposition. Resamples over a period of several months will be necessary to establish a reasonable estimate of the actual body burden that is presently judged to be 50 per cent of the MPL.

Revision of the MAC for NO<sub>2</sub>, by the Threshold Limits Committee of the American Conference of Governmental Industrial Hygienists, from 25 ppm to 5 ppm has led to a critical review of stack emission of nitrogen oxides.

Inventions

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.

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Radiological Sciences Department

<u>INVENTOR</u>	<u>TITLE</u>
D. A. Campbell and L. D. Test	A Doorway Beta Detector for Personnel
D. A. Campbell	A Wide-Angle Beta Detector
L. D. Test	A Stable Counting Rate Meter

RADIOLOGICAL ENGINEERING

The Bioassay Laboratory Project (CA-434) was completed. Authorization of funds was received for Phase II of Project CG-572, Particle Problem Animal Exposure Facilities.

Radiological Engineering consultation subjects included establishment of waste disposal criteria for dummy slug decontamination wastes and proposed re-circulation facility waste streams, radiological factors influencing the Redox ammonia scrubber and ozone tail-end projects, use of a river dredge and divers at a reactor area, and considerations for replacement of the 100-F river out-fall line. In accordance with an AEC request, consultation services were provided on thorium processing radiation protection procedures at the Bureau of Mines, Albany, Oregon.

Initial production runs of scavenged TEP wastes indicated satisfactory cesium decontamination, but strontium concentrations were 6 to 30 times that expected; while ground disposal using a greater number of disposal facilities may still be economical, it would appear undesirable to place in ground storage the significantly increased quantities of long-lived fission products involved. Studies were initiated to predict the useful life of continuously used Separations Area cribs; the need for replacement of the 216-S Redox Unit was indicated and recommended.

Radiological design assistance was given to the Biology Section in development of equipment for safe operation in connection with particle inhalation studies.

RADIOLOGICAL RECORDS AND STANDARDS

Radiation Monitoring Unit

General Statistics

	<u>October</u>	<u>November</u>	<u>1954 to Date</u>
Special Work Permits	493	550	5,914
Routine and Special Surveys	1,802	1,629	17,570
Air Samples	1,633	1,858	16,521
Skin Contamination	13	3	171

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Radiological Sciences Department

Radiation Monitoring Unit (Continued)

Extensive ground, equipment, and personnel surveys were made in connection with the particulate contamination problem and checking of construction and military personnel was begun in several locations. A number of sites were decontaminated, including the entire Purex construction zone.

The scintillation beta-gamma doorway monitor was continued in operation throughout the month with no particle detected on personnel. Additional monitors are planned at this location, for the 200 East Area and the 100-B Area.

Radiological Standards

Radiation Incidents

<u>Type</u>	<u>October</u>	<u>November</u>	<u>1954 to Date</u>
Informal	19	20	244
Class I	5	4	63
Class II	2	2	19

Two Class II, four Class I, and twenty Informal radiation incidents were reported. The two Class II incidents involved localized skin exposure; one from a particle and one from glove contamination. The Class I incidents included a blow-back of contaminated liquid at the 244-BXR tank vault, uncontrolled spread of contamination from a waste line leak in the 200 West Area, exposure of three employees when irradiated dummies were inadvertently discharged at the 105-C Reactor, and a case of excessive batch size at the 224-T Building. One Class I incident reported in the October report, involving potential inhalation of uranium oxide at the 314 Building was reclassified to an Informal incident.

Bioassay results indicated that a Maintenance employee of the Separations Section has acquired significant plutonium deposition in the body. Preliminary evaluations of the case indicate that the deposition may be as high as 50 per cent of the Maximum Permissible Limit.

During the month, 8 claims for reimbursement of contaminated personal effects amounting to \$47.50 were approved bringing the total for 1954 to 106 claims totaling \$1,240.20.

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Radiological Sciences DepartmentExposure RecordsPersonnel Meters, and Records and Photometry

	<u>October</u>	<u>November</u>	<u>1954 to Date</u>
Gamma Pencils read	235,986	249,562	2,522,590
Potential overexposures	12	14	133
Confirmed overexposures	2	0	2
Slow neutron pencils read	1,222	1,324	13,814
Potential overexposures	2	0	4
Confirmed overexposures	0	0	0
Beta-Gamma film badges processed	39,382	42,303	420,681
Potential overexposures	30	21	530
Confirmed overexposures	2	0	3
Fast neutron badges processed	618	680	5,701
Potential overexposures	0	1	6
Confirmed overexposures	0	0	1
Lost readings (all causes)	111	70	1,936

Bioassay

<u>Plutonium Analyses</u>	<u>October</u>	<u>November</u>	<u>1954 to Date</u>
Samples assayed	776	864	8,315
Results above detection limit*	17	43	283
Resamples assayed	41	40	399
Results above detection limit*	16	18	133
Maximum d/m/sample	1.26	1.47	2.60

\*Detection limit was 0.05 d/m.

Fission Product Analyses

	<u>October</u>	<u>November</u>	<u>1954 to Date</u>
Samples assayed	839	847	9,114
Results above 10 c/m/sample	1	0	69

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Bioassay

Uranium Analyses

Results of 391 samples processed this month are tabulated below. This brings the total number of samples processed in 1954 to 3,357.

<u>Sample Description</u>	<u>Following Exposure</u> <u>ug/liter</u>			<u>Following Period</u> <u>of No Exposure</u> <u>ug/liter</u>		
	<u>Maximum</u>	<u>Average</u>	<u>Number</u> <u>Samples</u>	<u>Maximum</u>	<u>Average</u>	<u>Number</u> <u>Samples</u>
Metal Preparation	39.1	3.1	107	9.7	2.1	65
UO <sub>3</sub> Plant	55.2	6.7	94	15.9	2.9	61
Technical	24.8	5.3	32	3.6	3.4	3

Tritium Analyses

	<u>Activity Density (<math>\mu\text{c}/\text{cc} \times 10^3</math>)</u>			
	<u>0-5</u>	<u>5-10</u>	<u>&gt;10</u>	<u>1954 to Date</u>
Number of Samples	6	9	0	1928

Thyroid Checks

All thyroid checks reported were below the warning level.

Hand Score Summary

There were 65,518<sup>\*</sup> alpha and 63,366 beta scores reported. About 0.012% of the alpha and 0.008% of the beta scores were above the warning level. Decontamination of all reported high cases was attempted and successful.

Calibrations

	<u>Number of Routine Calibrations</u>		
	<u>October</u>	<u>November</u>	<u>1954 to Date</u>
Fixed Instruments	80	93	871
Portable Instruments	3,998*	3,931	37,782
Personnel Meters	14,180*	14,668	169,747
Total	18,258	18,692	208,400

\*Correction of numbers reported last month.

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BIOPHYSICS

Regional Radiation Measurements

Regional Monitoring

The general findings are summarized in the following table:

<u>Sample Type and Locations</u>	<u>Activity Type</u>	<u>Average Activity Density</u> <u>/uc/cc</u>	<u>Trend *</u> <u>Factor</u>
<u>Drinking Water and Related Materials</u>			
Benton City Water Co. Well	alpha	$1.2 \times 10^{-8}$	--
Richland, N. Richland, Benton City Wells	alpha	$(\lt 0.5 \text{ to } 1.6) \times 10^{-8}$	-5
100 Areas	beta	$(0.9 \text{ to } 9.6) \times 10^{-7}$	--
Pasco, Kennewick, McNary Dam	beta	$(\lt 0.5 \text{ to } 4.9) \times 10^{-7}$	--
Backwash Solids - Pasco Filter Plant	beta	$2.0 \times 10^{-2}$ /uc/g	--
Backwash Liquids - Pasco Filter Plant	beta	$3.6 \times 10^{-7}$ **	--
Sand Filter - Pasco Filter Plant	beta	$2.8 \times 10^{-5}$ /uc/g	-10
Anthracite Filter - Pasco Filter Plant	beta	$2.2 \times 10^{-4}$ /uc/g**	+2
<u>Other Waters and Related Materials</u>			
300 Area Wells #1, 2, 3	alpha	No Sample	--
300 Area Well #4	alpha	No Sample	--
Well #4 measured as uranium	U	No Sample	--
Other Wells on the Reservation	beta	$(\lt 0.05 \text{ to } 1.3) \times 10^{-6}$	--
Columbia River - Hanford Ferry	beta	$2.1 \times 10^{-5}$	--
Columbia River - below reactors	beta	$1.9 \times 10^{-5}$	--
Columbia River - Patterson to McNary	beta	$4.5 \times 10^{-7}$	--
Columbia River - shore mud	beta	$(0.2 \text{ to } 2.0) \times 10^{-4}$ /uc/g	--
Raw Water - Operating Areas	beta	$(\lt 0.05 \text{ to } 1.9) \times 10^{-6}$	--
Reactor Effluent Retention Basins to River	beta	14,000 to 20,000 /uc/sec/reactor	--
Reactor Effluent Retention Basins to River	alpha	$(3.7 \text{ to } 6.6) \times 10^{-3}$ /uc/sec/reactor	--
I <sup>131</sup> in farm wastes to river	I <sup>131</sup>	$\lt 5 \times 10^{-9}$ /uc/day	-3
I <sup>131</sup> in Columbia River - Hanford	I <sup>131</sup>	$6.9 \times 10^{-7}$	-2
		$1.8 \times 10^{-7}$	--

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Regional Monitoring (Continued)

Sample Type and Locations	Activity Type	Average Activity Density $\mu\text{c}/\text{cc}$	Trend Factor
<u>Atmospheric Pollution</u>			
Gross Alpha Emitters	alpha	$(\leq 4 \text{ to } 5) \times 10^{-15}$	--
Gross Dose Rate - Separations Areas	beta - gamma	1.0 to 3.3 mrad/day	-2
Gross Dose Rate - Residential Areas	beta - gamma	0.4 to 0.9 mrad/day	--
Active Particles - Separations Areas	beta	$(1.7 \text{ to } 2.2) \times 10^{-12}$	+2
$^{131}\text{I}$ Separations Areas	$^{131}\text{I}$	$(0.4 \text{ to } 8.5) \times 10^{-13}$	--
$^{131}\text{I}$ Separations Stacks	$^{131}\text{I}$	$\leq 2.1$ curies/day	+2
Ruthenium - Separations Stacks	$\text{Ru}^{103,106}$	0.03 curie/day	+3
Rare Earths - Yttrium - Separations Stacks	beta - gamma	No Samples	--
Active Particles - Wash., Idaho,	--	0.06 to 0.41 ptle/ $\text{m}^3$	--
Oregon, Montana	--	0.06 to 0.38 ptle/ $\text{m}^3$	--
Active Particles - HAPO			--
Tritium(as oxides) - Reactor Stacks	T	1.5 curies/day	--
<u>Vegetation</u>			
Environs of Separations Areas	$^{131}\text{I}$	$(\leq 0.3 \text{ to } 3.1) \times 10^{-5} \mu\text{c}/\text{g}$	+6
Residential Areas	$^{131}\text{I}$	$4 \times 10^{-6} \mu\text{c}/\text{g}$	--
Eastern Washington and Oregon	$^{131}\text{I}$	$(\leq 0.3 \text{ to } 1.6) \times 10^{-5} \mu\text{c}/\text{g}$	+5
Non-Volatile Beta Emitters - Washington and Oregon	beta	$(3.3 \text{ to } 4.7) \times 10^{-5} \mu\text{c}/\text{g}$	--
Alpha Emitters - Separations Areas	alpha	$(1.8 \text{ to } 4.3) \times 10^{-7} \mu\text{c}/\text{g}$	+2
Alpha Emitters - 300 Area	alpha	$7 \times 10^{-8} \mu\text{c}/\text{g}$	-3

\* The trend factor shows the n-fold increase (+) or decrease (-) from last month, where values of n less than 2 will not be noted.

\*\* Values reported last month were in error. Average activity densities for "Backwash Liquids" and the "Anthracite Filter" were  $5.8 \times 10^{-7} \mu\text{c}/\text{cc}$  and  $1.1 \times 10^{-4} \mu\text{c}/\text{g}$  respectively.

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Radiological Sciences Department

Regional Monitoring (Continued)

An average of 2 curies per day of  $I^{131}$  was emitted in separation plant effluent gas during the month with the highest emission of 7.4 curies occurring from October 28 to October 29, 1954, at Redox. Ammonium nitrate emission as determined in air samples collected from the 190-foot level of the Redox stack and the 50-foot level of the T Plant stack averaged 30 pounds per day at Redox and 8 pounds per day at T Plant during the week ending November 27, 1954.

Surveys of the Hanford environs revealed increases in ground contamination near the Redox stack with effects being insignificant at distances over 3,000 feet from the stack. The more recent emissions have consisted of particles with generally lower dose rates than those encountered in the emissions before July.

Airborne radioactive particle concentrations were on the order of 1-2 particles per cubic meter at several northwest stations during the period from November 9 to November 12, 1954. Analyses indicated the origin to be fallout from recent nuclear detonations.

Radio-Analysis Laboratory

Analysis of five particles emitted from the Redox Stack during the week ending November 7 revealed that more than 95 per cent of the beta particle emitter activity of these particles was from ruthenium-rhodium isotopes with the ratio of the activity of  $Ru^{103}$  to that of  $Ru^{106}$  being less than 0.05. Trace activities of strontium, zirconium, and rare earths were also found. Plutonium was found in the only two particles tested for this element with one particle having 270,000 d/m of plutonium. Four of the particles were an agglomerate of smaller white crystals with a yellow discoloration on some surfaces and both ammonium nitrate and iron were found in these particles. One apparently different particle was bright yellow without the crystalline appearance of the others and results of spectrographic analysis indicated major components to be calcium and iron.

Radiation Measurement Evaluation

Evaluations were completed of the most recent data defining the magnitude and distribution of particulate ground contamination in the HAPO environs. The maximum frequency of deposition, in the immediate vicinity of the Redox stack, was one particle with dose rate greater than 10 mrad/hr every 5 square feet. A monitoring schedule of such plots was also recommended to facilitate ground contamination surveys.

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Radiological Sciences Department

Synoptic Meteorology

<u>Type of Forecast</u>	<u>Number Made</u>	<u>Percent Reliability</u>
8 Hour Production	90	80.5
24 Hour General	60	86.1
Special	79	86.8

Average temperature for the month was 46.0° F which was 6.0° above normal and equal to the November average of 1934, the highest in 43 years. Precipitation, totalling 0.86", was normal. Wind speeds averaged 6.0 mph including a peak gust of 68 mph on November 26 which was the highest of the year.

Experimental Meteorology

A second field experiment designed to study the wind pick-up and translocation of small particles was carried out. The relative efficiencies of four different ground surfaces in the trapping and retention of particles were studied using fluorescent pigment particles: a natural cover of desert vegetation, a furrowed surface, a rock-covered surface, and a natural surface protected by snow fence. Analysis of the results was started.

Preparation was made for the use of fluorescent pigment in diffusion studies from an elevated source on the Meteorology Tower.

Fabrication of the counting rate meters for the Portable Mast anemometers was completed and the units were under test by Instrument Development at month end. Improved thermocouple units were also fabricated; they will be calibrated in situ.

Specification of necessary dilutions and the frequency with which these were obtained were contributed to the appraisal of potential hazards associated with the stack emission of oxides of nitrogen.

Earth Sciences

Dilution-velocity tests continued, and showed that ground water velocities immediately south of Gable Butte were far lower than the high velocities measured north of Gable Mountain but higher than those determined by observation in the 200 West Area. The differing flow rates correspond to different geologic formations and their respective permeabilities, indicating the correctness of the geological data and providing concrete bases for the estimates of time of travel of the ground water from the 200 Areas to the Columbia River. Electrical conductivity determinations of the diffusion rate in wells provided close agreement with the determinations based on sampling and chemical analysis.

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Radiological Sciences DepartmentEarth Sciences (Continued)

Further experimental work with Cs, Sr, and Y solutions in the presence of Hilco cleaner (decontaminating agent) defined more closely the effects of pH on the adsorption of the radioactive ion by earth materials. Under some conditions adsorption was negligible. The widespread use of the cleaner in decontamination work would therefore lead to problems in ground disposal of the solutions.

Removal of Sr from synthetic "low-acid" TBP waste solutions is markedly increased by the presence of phosphate therein. Removal may be due to the precipitation of insoluble phosphate at increased  $PO_4$  and Sr concentrations and to an adsorption process at lower concentrations.

No drilling has been completed to date on the Earth Sciences fiscal 1955 program. Drilling is scheduled to start at month end on that program with the exploration of the 216-S crib in order to estimate the probable life of that unit.

Industrial Hygiene

Seven radioactive particles of relatively high activities were isolated and three with the greatest activities were mounted for skin tests. During radioautography these latter particles were fractured and rendered unfit for use as point sources. Twenty-seven particles were remounted and radioautographed to determine if the specimens consisted of point sources; twenty-five were satisfactory.

Tests on the effectiveness of respirators against ruthenium-contaminated atmospheres continued; particle sizes in the test atmosphere were studied by electron microscopy. Appraisals were made of Army Assault Mask filter and chemical cartridges, MSA filter cartridges and All-Service canisters. Tests indicated that certain types of Army Assault Mask cartridges leaked.

During the respirator testing, some particulate material upstream from the sand filter was found to have a  $Zr^{95}$ - $Nb^{95}$  content amounting to 50% of the total activity.

The MAC (8 hr. daily exposure) for  $NO_2$  was reduced from 25 ppm to 5 ppm by the Threshold Limits Committee of the American Conference of Governmental Industrial Hygienists in 1954 and recently reported. A review is currently being made to determine if there is any reliable work which would justify the establishment of an MAC for short-term exposures. The varying percentages of NO and  $NO_2$  in such atmospheres have a distinct bearing on the toxicity and on the results of air sampling.

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Methods

The gamma ray spectrometer scan method was successfully applied to ruthenium particle activity calibrations. From repeated measurements made over many days on particles and prepared sources the precision of the activity measurements was determined. The standard deviation for activity calibration of particles on scotch tape or microscope slides was 3.0% and for particles in small gelatin capsules the standard deviation was 3.3%;  $^{4\pi}$  counting and standard Gm counting were used to calibrate the standards. In estimating the precision with which the relative amounts of  $Ru^{103}$  and  $Ru^{106}$  could be determined, standard deviations were obtained on the ratio of the 0.51 Mev peak height to the 0.62 Mev peak height on a series of measurements on six sources made up from pure  $Ru^{103}$  and  $Ru^{106}$  to have 0 to 12.3%  $Ru^{103}$  present.

A  $RuO_2 \cdot xH_2O$  colloid was prepared which contains 0.091 mg Ru/ml as particles less than 0.3  $\mu$ ; it was stable for at least one month. Addition of gum arabic as stabilizing agent gave a colloid which was dialyzed for 48 hours without coagulation and, in addition, was evaporated to dryness and resuspended satisfactorily.

$Zr^{95}$  was obtained from reactor effluent water by a solvent extraction procedure using 0.06M dibutyl hydrogen phosphate in benzene; the radiochemical yield was about 70% but 10-20% radiochemical contamination was observed.  $Ba^{140}$  and  $Sr^{89-90}$  were isolated from two 4000 ml reactor effluent water and river water samples without the necessity of evaporating the samples; preliminary results showed the radiochemical yield to be good and the contamination low. First and second shell backscatter factors and absorption coefficients were measured for  $Au^{198}$ .

Physics

The moderated  $BF_3$  in general use at HAPO was calibrated with neutrons of 100 to 200 Kev. Data on counting rate as a function of thickness were obtained to be used in improving such instruments.

An extrapolation chamber was completed for use in measuring beta ray dose rate from fine particles or narrow beams in support of biological experiments.

A radiator was made for the K source which emits fluorescence radiation very similar in energy to that of the x-rays following the decay of plutonium. This will be used in a calibration of instruments at that energy. By modifying the collimators of the K source a large increase in the intensity of the fluorescence radiation was obtained.

It was found that a thin scintillation crystal is an efficient measuring device for the x-rays from plutonium. It should be possible to measure quantities as low as about 0.01 microcuries in mice with errors of possibly 20% due to the strong absorption of the low energy rays.

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Radiological Sciences Department

River Studies

The sampling of Columbia River water at cross-sections between 100-B and McNary Dam continued. The beta particle emitter concentrations were determined from these samples. Usually the surface water velocity of the river was determined at the sampling time. Fathometer readings were taken during the month at all locations where samples are collected. The information will be used as base-data for a comparison of the effect of KW on the river and to predict certain river hydraulic characteristics in areas of special interest.

Instrument Development

The installation of the doorway monitor in the 200-W gatehouse was completed. The sensitivity at most points in the doorway was sufficient to detect a 50  $\mu$ r per hour particle if carried through at a slow walk; but areas of lower sensitivity existed between adjacent tubes. Use of a hemisphere of lucite covered with scintillator and superimposed on a photomultiplier increased the sensitivity to radiation from the side by a factor of four with no loss in the forward sensitivity. Hemispheres are being prepared for installation on the existing monitor.

A small scaler with power supply was essentially completed for high counting rates such as may be experienced in the mouse counter. Counting rates of approximately  $10^6$  counts per minute can be recorded.

The indexing mechanism for an automatic sample changer was mounted and operated satisfactorily. The mechanism for carrying the samples into the pig was designed.

A model of one channel of a combined alpha, beta, and gamma hand and shoe counter was partly assembled.

Tests were commenced on four Thyac GM portable survey instruments in order to determine the cause of excessive failures.

BIOLOGY

Aquatic Biology

Highlights of the Columbia River Survey

Activity densities of small fish and some bottom organisms at Hanford were slightly less than last month. An all-time high ( $2 \times 10^{-2}$   $\mu$ c/g) occurred in caddis fly larvae immediately below 100-F, however. Activity densities of whitefish flesh remained about the same as in October. Although the average value for plankton increased sharply to  $3 \times 10^{-2}$   $\mu$ c/g, this level is expected for the low flow period. The activity density of midge larvae from the bottom of McNary Reservoir increased substantially. Samples from the Washington side were over three times more radioactive than those from the Oregon side, presumably owing to effects of the Snake and Walla Walla rivers.

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Radiological Sciences Department

Highlights of the Columbia River Survey (Continued)

Selected values of interest were:

<u>Organism</u>	<u>Location</u>	<u>Sample Type</u>	<u>Activity Density</u> ( $\mu\text{c/g}$ )	
			<u>October</u>	<u>November</u>
Minnows (Shiners)	Hanford	Average	$3 \times 10^{-3}$	$2 \times 10^{-3}$
Whitefish flesh	Hanford vicinity	Average	$8 \times 10^{-4}$	$7 \times 10^{-4}$
		Maximum	$2.7 \times 10^{-3}$	$1.5 \times 10^{-3}$
Whitefish flesh	Priest Rapids	Average	--	$2 \times 10^{-4}$
		Maximum	--	$1 \times 10^{-3}$
Plankton	Hanford	Average	$1 \times 10^{-2}$	$3 \times 10^{-2}$
Midge larvae	McNary (composite)	Average	$8 \times 10^{-4}$	$1 \times 10^{-3}$
		(Wash. side)	Average	--
		(Ore. side)	Average	--

A total of 157 salmon nests was observed within the HAPO, compared to 292 in the parent year of 1950. The reduction was anticipated since this year's fall run of chinook salmon over Bonneville Dam was the smallest on record.

Semi-quantitative spectrochemical analysis showed crayfish ash to contain about 500 ppm of strontium (stable). This is at least one order of magnitude greater than for other aquatic forms.

Effluent Monitoring

Routine monitoring of reactor area effluent water was resumed with chinook salmon eggs (Puget Sound strain) on November 4. A test was also started with chinook salmon eggs to determine the chronic toxicity of sodium dichromate in a series of concentrations ranging from 0.02 ppm to 0.5 ppm. A comparison of the toxicity of river water below 100-F and above 100-B is a part of the dichromate study. No significant effects have been observed during the early incubation of the eggs.

Biology Control Unit

Biological Monitoring

Game species of waterfowl contained only natural amounts of radioactivity. Samples of diving ducks showed a slight increase in activity density with an average in muscle tissue of  $5 \times 10^{-4} \mu\text{c/g}$ .

Rodent thyroid activity densities increased from two to twenty-five times the values observed in October, with maximum increases occurring in a north-easterly direction from the Separations areas. Fission product contamination in feces samples also increased, but to a lesser degree.

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HW-33962

Radiological Sciences Department

Biological Monitoring (Continued)

Typical average activity densities were:

	Units of $\mu\text{c/g} \times 10^{-5}$	
	<u>Thyroid</u>	<u>Feces</u>
One mile S. E. of Redox	1800	6
Prosser Barricade	1300	4
Meteorology Tower	700	22
Ten miles N. W. of Pasco	1000	4
Wahluke Slope, East	800	8
Five miles S. W. of Redox	300	3

Clinical Laboratory

In addition to the routine services, special studies of X-radiated sheep were made. Sheep subjected to whole-body irradiation of 750 or 900 r in most cases showed a definite decrease in numbers of lymphocytes within two hours after irradiation.

Microscopy and Radiochemistry

Service followed the routine pattern.

Experimental Animal Farm

Toxicology of  $\text{I}^{131}$

There was no significant change in thyroid metabolism in any group of sheep compared with results of last month or one year ago.

Irradiation of Pig Skin with Radioactive Particles

Two areas of pig skin were exposed to radioactive particles for a total dose of 300 and 2400 microcurie-hours, respectively. Following removal of the particles and cleansing of the exposed area, some residual contamination remained. Only the area receiving the 2400 microcurie-hour dose showed a visible effect, consisting of a reddish pink area approximately 1 cm in diameter.

Metabolism

Fission Product Absorption and Metabolism

The retention of ruthenium in rats which were chronically fed by stomach tube for a period of 72 days has now been followed for a period of 16 days after cessation of ruthenium feeding. Highest ruthenium activity is still found in the kidney. The slowest turnover rate is exhibited by bone, with only about 20 per cent of the initial ruthenium activity lost over the 16-day period.

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HW-33962

Radiological Sciences Department

Fission Product Absorption and Metabolism (Continued)

Ten rats were sacrificed after exposure for 71 days to drinking water containing ruthenium-106 at MPC levels (0.1  $\mu$ c per ml). Radiation to the kidney in these animals varied between 14 and 21 rads per week, a factor of 50 to 70 times in excess of the maximum permissible limit.

Complete analytical data on the absorption and distribution of ruthenium in 11 rats fed "ruthenium particles" indicate wide variations in absorption. The highest total absorption observed was approximately 0.1%, with other values ranging downward to as low as 0.001%.

Pharmacology and Experimental Therapeutics

Intratracheal administration of Ru<sup>106</sup>O<sub>2</sub> particles to mice and balance studies on these animals were continued.

Plant Nutrition and Microbiology

A concentration ratio (plant/soil) of 0.0013 was obtained for Pm<sup>141</sup> using barley plants and the Neubauer technique. Tc<sup>99</sup>, tested similarly, gave marked toxicity symptoms and no concentration ratio was obtained.

Strontium-90 and other fission products in South Pacific soil were more readily available to plants if the soil were treated with a balanced fertilizer.

The effect of chromium on starch content in bean plants is similar to its effect on sugar content. Increasing the chromium concentration from 0.1 to 100  $\mu$ g/ml of nutrient solution gave a slight increase in starch content at lower concentrations and a greater decrease at higher concentrations.

Barely grown for two years under irrigation with 5 and 100% reactor effluent produced no more mutations than control plants. No effect of effluent watering on subsequent seed germination was found in the 1954 crop.

R. B. E. by Microbiological Methods

The autoturbidimeter was modified in a manner which is expected to result in more trouble-free operation.

Genetic Effects of Internally-Deposited Radioelements

The initial test for transmutation effects in yeast using S<sup>35</sup> indicated that continued stirring of the refrigerated culture (to maintain uniform radiation conditions) excessively damaged the cells. Lyophilized cultures circumvent this difficulty and give more promise as a suitable technique.

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FINANCIAL DEPARTMENT MONTHLY REPORT  
NOVEMBER, 1954

DEL

The Financial Department was reorganized into eight sections as of November 1, the sections of the reorganized department and their managers being as follows: Auditing, J. P. Holmes; Budgets and Measurements, K. G. Grimm; Contract Cost, R. M. Watkins; General Accounting, W. S. Roe; Personnel Accounting, E. F. Charette; Procedures and Computing, H. Tellier; Property Accounting, P. D. Lee; and SF Accountability, V. D. Donihee.

The office personnel of the Procedures and Computing Section moved from their various locations to the 713 Building on November 19, with IBM equipment and operating employees scheduled to be moved by December 10. When the move is completed, all personnel of the section, with the exception of the Records Operations Unit, will be located in the 713 Building.

Two members of the Procedures and Computing Section went to Poughkeepsie, N. Y., in November to attend an IBM programming class for the 702 Electronic Data Processing Machine, to be held from November 15 through December 10.

During the month all Financial Department personnel affected by the establishment of the Employee and Public Relations Cost Unit were transferred to their new assignments and offices were physically rearranged as required by the new setup. Also during the month balances in cost accounts of the former Plant Auxiliary Operations Department were transferred to the appropriate cost units, together with supporting details and records. Schedules showing applicable budget information were also prepared and appropriate transfers made.

The Section Manager of the newly created Budgets and Measurements Section consulted with personnel in the Measurement Services Department in Schenectady and with several other departments in Schenectady, Boston and Cincinnati during the early part of November to obtain information which would assist in developing measurements work at HAPO.

An agreement was reached with the HOO-AEC Finance Division in November to charge the overhead allowance to production costs at HAPO and KAPL instead of carrying it as an overhead item on the consolidated financial statements prepared by the General Books Unit for the Atomic Products Division (which statements exclude figures for the Aircraft Nuclear Propulsion Department). As a result of this agreement an allocation between HAPO and KAPL was made of its overhead allowance, and production costs for the fiscal year to date were recast to include the HAPO portion. Henceforth this portion will be currently included in production costs. None of these costs will be allocated to Community or to Research and Development at present.

On October 12 a special bank account was opened with the Richland Branch of the Seattle-First National Bank for the purpose of disbursing General Electric Company funds covering expenses not directly related to Contract W-31-109-Eng-52. The responsibility for this account has been assigned to the Personnel Accounting Section due to the fact that certain salary payments are to be made from this account.

In connection with the close-out of the Kaiser and Blaw-Knox programs a considerable quantity of machine tools, office machines, automotive and construction equipment will become available for the AEC upgrading program. Co-ordination of the program between the Company and AEC is being handled by the Property Management Unit. Old equipment will be traded for newer equipment wherever possible.

Road materials in the custody of the Transportation and Community Sections were physically inventoried on November 4 and 5 respectively. Results of the inventory reflected a difference of \$666 over the reconciled book value of \$13,211.

Standardization of nomenclature and assignment of commodity code classifications is proceeding on schedule. The phase of this work receiving emphasis at this time is machine tools, since this group of equipment will be used as a trial run in the application of IBM system of accounting. This phase of the work is approximately 25 percent complete and is scheduled for completion January 21, 1955.

A study of the methods of allocating depreciation expense on general facilities was started during the month, and a report embodying recommendations and proposals will be completed during December. Prior depreciation expense on this type of equipment was distributed on the basis of cost liquidations for a specific operating group.

Project proposals and informal requests approved by Department Managers and the General Manager for transmission to the AEC during the month amounted to \$6,136,000. Appropriation requests approved during the month amounted to \$269,925.

The annual physical inventory of spare parts in the custody of the Stores Sub-Section, located in warehouses in the 100-H, 200-E, 700 and 3000 Areas, began on November 10 and was concluded November 27. Reconciliation of the accounts is to be completed in December.

The SF Accountability Section reports improvements in the field of SF measurements which include the development of: (1) Redox dissolver heels; (2) revised precision statements for UO<sub>2</sub> product shipments; (3) calibration of key measuring tanks at Redox; and (4) revised plutonium content of Tank II powder weights.

The SF Accountability Section also reports that shipments of irradiated enriched uranium to ARCO were completed under the current program as of November 18.

Detailed reports for the Financial Department appear on succeeding pages, as follows:

Summary of Cash Disbursements, Receipts and Advances	I - 4
Auditing Section	I - 5
Budgets and Measurements Section	I - 6
Contract Cost Section	I - 7 through I - 10
General Accounting Section	I - 11 through I - 16
Personnel Accounting Section	I - 17 through I - 19
Procedures and Computing Section	I - 20 through I - 21
Property Accounting Section	I - 22 through I - 27
SF Accountability Section	I - 28
Personnel and Organization Statistics	I - 29 through I - 30

SUMMARY OF CASH DISBURSEMENTS,  
RECEIPTS AND ADVANCES

A summary of cash disbursements and receipts (excluding advances of \$6,175,000 and \$5,250,000, respectively, by the Atomic Energy Commission) for the months of November and October, 1954, is shown below:

<u>Disbursements</u>	<u>November</u>	<u>October</u>
Payrolls (net)	\$2 903 373	\$2 875 120
Materials and Freight	1 597 432	1 775 207
Payroll Taxes	646 613	549 323
Payments to Subcontractors	538 409	330 151
United States Savings Bonds	193 672	225 354
Group Insurance Premium	143 739	142 750
Satisfaction of Judgement	-0-	117 024
Pension Plan - Employees' Portion	87 243	116 154
Travel Advances to Employees	66 305	74 609
All Other	131 688	128 070
	<hr/>	<hr/>
Total	6 308 474	6 333 762
	<hr/>	<hr/>
<u>Receipts</u>		
Rent	122 467	146 172
Electricity	70 687	55 012
Hospital	62 162	59 819
Telephone	61 036	59 467
Sundry Accounts Receivable	15 944	9 438
Refund of Travel Advances to Employees	14 947	12 360
Bus Fares	8 399	7 928
Sales to AEC Cost-type Contractors	4 009	3 218
Refunds from Vendors	2 512	41 331
Other	4 629	6 682
	<hr/>	<hr/>
Total	366 792	401 427
	<hr/>	<hr/>
Net Disbursements	\$5 941 682	\$5 932 335
	<hr/>	<hr/>

Outstanding advances as of November 30 and October 31, 1954 were as follows:

	<u>November</u>	<u>October</u>
Cash in Bank - Contract Accounts	\$2 245 700	\$2 012 383
Cash in Bank - Salary Accounts	15 000	15 000
	<hr/>	<hr/>
Total	\$2 260 700	\$2 027 383
	<hr/>	<hr/>

AUDITING SECTION  
MONTHLY REPORT - NOVEMBER, 1954

Reports were prepared and issued for the completed audits listed below:

Fabrication Work in Progress  
Employee Awards and Recognition Pins  
Office Supplies

An investigation was made and a letter report was issued to Purchasing and Stores Section concerning a settlement proposal submitted by Solar Aircraft Company on HAPO purchase order HW-35240 for furnace pots.

Reports were being prepared at month-end for the following audits:

Timekeeping Practices  
Termination Clearance Procedure  
Tools, Protective Clothing and Equipment (Audit started during November)  
Motor Pool Operations (Audit started during November)

Field work was continued on the audit of Cost Accounting and on the following audits which were started during the month:

Management of Capital Assets  
Receiving and Inspection

Follow-ups were made to determine the extent of compliance with recommendations made as a result of the audits listed below:

Forms Related to the Protection of HAPO Assets, Etc.  
Financial Activities of Graduate School of Nuclear Engineering  
Telegram Usage

As of November 1, 1954, J. H. Roberts transferred to Auditing Section from Contract Cost Section, and V. B. Schwinberg transferred from Auditing Section to S. F. Accountability Section.

Three employee information meetings of exempt employees were held during the month.

BUDGETS AND MEASUREMENTS SECTION  
MONTHLY REPORT - NOVEMBER, 1954

General

This Section was newly created as of November 1. Previous consolidated budgeting functions, including monthly cost charts and bogey preparations, were transferred from the former Cost and Budgets Section, now the Contract Cost Section, and personnel were transferred with the functions assigned to the Budgets and Measurements Section. The Measurements group has been assigned a function which is new to HAPO, and its employees were obtained from the former Internal Audit Unit and Operations Analysis Section.

Budgets

The Midyear Budget Review is progressing well. A due date of December 17 has been established and no trouble is anticipated in meeting this target date. Generally, the budget will be reduced from previous estimates, the principal reductions being in inventory consumption and in the number of employees.

Measurements

Space accommodations were not available for the entire Section until November 15, which delayed initial progress in starting measurements work. The Section Manager visited the Measurement Services Department, Large Motor and Generator Department, Knolls Atomic Power Laboratory and the Research Laboratory, all at Schenectady, in connection with measurements problems. In addition, he visited Aircraft Gas Turbine Division in Boston and Aircraft Nuclear Propulsion Department in Cincinnati.

CONTRACT COST SECTION

MONTHLY REPORT - NOVEMBER 1954

Agreement was reached with General Accounting Section to transfer to Engineering Cost from Accounts Payable project commitment records previously maintained by the latter unit. The employee responsible for the records was also transferred and it is expected that Engineering Cost will be able to absorb this addition without any increase in personnel ceiling.

The major portion of the FY 1955 Midyear Budget Review was completed during the month. All of the budget information with the exception of production cost by AEC classification and the "Schedule E Short Form Summary" was submitted to the Budgets and Measurements Section. Production cost by AEC classification will be submitted by December 2. As a result of later startup dates, production schedule changes and anticipated operating cost reductions, the Manufacturing Department Midyear Review production cost budget will be \$7 750 000 below the July 1954 revision.

Work on consolidation and preparation of the Plant and Equipment Projects Budget for the FY 1955 Midyear Review was in progress and it is planned to forward it to the Atomic Energy Commission shortly after December 1, 1954.

Employee and Public Relations Cost Unit

An analysis letter, supported by a schedule showing total costs incurred by the Employee and Public Relations Department, was prepared and forwarded to the department manager. The schedule segregated costs according to those incurred by Community functions and those by Plant functions. Comparison with budgeted amounts was also provided as were fiscal-year-to-date totals. This schedule will be presented to the department manager each month in the future. Preliminary arrangements were made with the Graphics Unit to develop a series of charts for the Manager of Employee and Public Relations Department which will be designed to show his financial picture quickly and clearly. It is hoped that these charts will be ready by the first of the year.

The Kadlec Hospital is currently overrunning its budget due to the unusually low adult census, (the census in November was approximately 30% below the average for the same month in the three preceding years). This has been the cause of great concern within the Health and Safety Section and within the department. In anticipation of the necessity of drastically reducing costs in order to operate within the Financial Plan, a summary of proposed changes in operating procedures necessary to effect such reductions was furnished the department manager. The financial analyst assigned to the hospital assisted in these summaries.

An audit of the Richland Concrete Company conducted by the Atomic Energy Commission developed that this concern had entered into an agreement with a Kennewick firm to supply certain materials at reduced prices. This agreement was entered into without the knowledge of our Commercial Property Unit or of the Atomic Energy Commission and apparently was in violation of lease provisions. The Richland Concrete Company has agreed to pay any additional costs for utilities caused by this work. Accordingly, a study was made by the Community Cost group and information furnished the Commercial Property Unit and the Atomic Energy Commission Audit Branch to assist them in their negotiations with the Richland concern.

#### Engineering Cost Unit

During the present expansion program the reserve for major overhaul of equipment has been maintained by HOO-AEC. This reserve, created by including in the rate charged for equipment a factor for overhaul, is being transferred by HOO-AEC to Contractors responsible for equipment. A transfer of approximately \$215 000 for equipment in the custody of Minor Construction is expected early in December.

Special information concerning cost of projects and remaining unfinished project work was prepared for Manager - Engineering.

Informal information was received from the Atomic Energy Commission on November 18, 1954 regarding the status of the FY 1956 Plant and Equipment Projects Budget as submitted to the Director, Bureau of the Budget by the Washington Office of the Atomic Energy Commission. A letter containing highlights of changes and deletions was forwarded to interested personnel.

Budget Status was prepared for inclusion in project proposals for five (5) projects during the month of November:

CA 514	300 Area Facilities
CG 603	Hanford 4X Program - Bismuth Phosphate Plants
CA 612	Alteration of Building 713 for Electronic Data Processing Machine
***	Melt Plant Modifications - 314 Building
CG 539 Rev. 1	Additional Waste Storage Facilities for Redox

Arrangements were completed to effect the transfer of Construction Work in Progress - Engineering commitment records and files from Accounts Payable Unit to Engineering Cost. As a result of this transfer the Plant Accounts' copy of all purchase orders will be routed through Engineering Cost which will segregate the orders by cost code and forward to Plant Accounts through the various other Cost Units.

New organizational cost codes were established during the month as a result of Technical and Project Sections reorganization. Midyear Budget Reviews - FY 1955 for these two Sections will have to be recast to reflect the new organizations by January 1, 1955. Work recasting actual cost to date on the new organizational basis is proceeding and should be completed in time for use on the December reports issued early in January.

Letters of instruction covering the Plant and Equipment Budget - Projects for FY 1957 and Revision for FY 1956 were issued early in November. This

action precedes by about two months the instruction letters of previous years as it is planned to level out the work load and improve the submittal date, if possible. Present planning indicates budget package should be ready for GE Management review about February 25, 1955.

#### General and Consolidations Cost Unit

All costs were recast for the Financial Department to conform with the present reorganization, including the Procedures and Computing Section. Due to the extra work incurred this month as the result of budgeting and reorganizations, Midyear Budget Review figures will appear on November Cost Reports at section level only.

As a result of the recent agreement reached with AEC Finance, a percentage allocation will be made of the Overhead Allowance between HAPO and KAPL; HAPO's portion to be included in Production Costs. Billing was received in November retroactive to July 1 and a recast of first quarter and October Production Costs including overhead allowance was completed for use in succeeding months' reports.

As 6000 Program Research and Development costs are presently overrunning the budget estimates, a commitment record has been established for applied materials to be used for keeping managers informed of outstanding purchase orders. Two Radiological Sciences staff meetings were attended this month and a discussion conducted on budgeting and cost coding.

Time card pre-coding instructions were issued to the cost units enabling them to have cost codes (in lieu of salary suffix) pre-printed on the cost distribution side of the time cards for both exempt and non-exempt personnel.

Arrangements were completed with Computing Unit to place the revised work order procedure into effect as of December 1. It is anticipated that this will permit earlier reporting and more effective control, particularly of overruns.

#### Manufacturing Cost Unit

Six people were transferred to Manufacturing Cost Unit from other Cost Units on November 15, 1954, as accounting responsibility for Transportation, Electrical Utility, and Purchasing and Stores Section was transferred to the Manufacturing Cost Unit.

A comparison of Work in Process Inventory at June 30, 1954 and September 30, 1954 was completed. Price and quantity changes were determined and analyzed. Results of this comparison were issued in Document HW-33695.

In the Metal Preparation Section, a procedure for reporting direct labor and material used in the canning of cored slugs was prepared. The cost information obtained will provide a basis for measuring and comparing the costs of the cored slug program and the normal slug program. Two information

meetings were conducted with Unit Superintendents regarding the establishment of the procedure.

In the Reactor Section revisions were made in standard costs. The new standards set a standard essential material requirement per startup or per tube whereas previous standards included average monthly quantities.

Elimination of an extensive proration of shift electricians time in the 100 Areas was made. With the concurrence of the Superintendent of Operations Sub-Section, expense accounts were opened for each operations area and the electricians time charged directly to the Operations Unit. Work Orders formerly used to accumulate this expense which previously was prorated to several units within the Reactor Section and other Departments were cancelled.

Clerical effort on Reactor Section Cost was reduced by eliminating the use of nine codes which are used as salary suffixes but are not required for cost accumulation. Should the occasion arise when a more detailed breakdown of cost is desired these codes are still available.

During the month, a meeting was held with representatives of Engineering Cost Unit, Plant Accounting Unit, and Stores to review the procurement of spare equipment withdrawn for use on projects. In several cases it was noted that spare equipment had been withdrawn against the Manufacturing Department Equipment Budget. It was agreed with Engineering Cost that in all future projects specifying the withdrawal of spare equipment where this equipment was requested to be maintained as a spare, that funds would be provided in the project for replacement. It was recommended that only Manufacturing Department personnel be authorized to withdraw spare equipment from the Manufacturing Department Spare Equipment account. In the past some of these withdrawals have been made by Engineering Department personnel.

General Ledger code 0591 - Deferred Charges - Miscellaneous - Overtime Lunches, was opened to record the purchase and disbursement of Frozen Lunches which Manufacturing Department will place in several area locations. Sub-accounts for each area location were also opened so that the Inventory can be reported by area location.

On November 30, 1954, a Manufacturing Cost Unit representative witnessed the regular Essential Material Inventory for Separations Operations Units of material stored in Warehouses in both 200-E and 200-W Areas. A visit was also made of 221-U, 221-T and Redox plants. A test check of the material stored in these plants was made and inventory computations were examined and found accurate.

Work Order activity during the month included (1) adoption of a program in the 100 Areas designed to prevent overruns on all jobs except those of an emergency nature due to outages; (2) a review of the proposed IBM Work Order Procedure; (3) an examination of all uncompleted work orders upon which there had been no charges in six months; and (4) the transfer of Transportation and Electrical Utility Section's Work Orders and expense codes into the Manufacturing Cost Unit work order system.

GENERAL ACCOUNTING SECTION  
MONTHLY REPORT--NOVEMBER, 1954

In connection with the reorganization of the Financial Department, necessary office rearrangements and furniture movements involving 41 employees in 19 offices in the 703 Building were handled by this Section. Five partitions were removed, five were installed, and one relocated by the landlord to accommodate the tenant.

ADMINISTRATIVE PLANNING

A total of 66 organization and policy guides were published during November. Four of these were General Manager's issues: 04.5, Property Management; 09.1, Monthly Report; 14.2, Hanford District Civil Defense; and 15.1, Responsibility for Security. Two were issued by the Manager - Employee and Public Relations: 13.9, Employee Purchase Plan; and 14.8, No-Accident Safety Award Plan. One was issued by the Manager - Manufacturing: 16.11, Authorization to Perform Work in the Vicinity of the Railroad. (The classification of this OPG was changed from "Safety and Health" to the more appropriate "Transportation.")

A new numerical index covering the organization section of the organization and policy guides was issued, together with an explanatory letter. The new index was deemed desirable in view of the extremely large number of organization changes which had taken place and which were reflected in organization and policy guides.

Fifty-eight guides were either organization and appointment guides or functions and responsibilities guides.

All of the organization and policy guides published during the month were printed by the Duplicating Unit rather in the Central Print Shop as has been done in the past. This change in method was made for economic reasons and should result in a savings of approximately \$1,500 a month if the volume of guides continues at the current rate.

Four complete organization and policy guide books were compiled for distribution to individuals newly placed on List 2; and 178 extra copies of organization and policy guides were sent to individuals requesting them.

One office letter, No. 203, on the Thanksgiving Day Holiday, was processed.

A report was prepared summarizing the AEC transmittals received during October.

ACCOUNTS PAYABLE UNIT

The volume of vouchers processed in the Accounts Payable Unit during the month increased substantially, 4301 vouchers being recorded during November as compared to 3939 in October.

Changes in procedures effected during November relative to the reconciliation of vendors' statements and the primary processing of vendors' invoices have resulted in a personnel reduction of two clerks, while a rearrangement of office space has resulted in the release of one room (No. 87) to the landlord.

ACCOUNTS PAYABLE UNIT (Continued)

Active contracts handled by the Unit, excluding requirements contracts, numbered 15 and open contract commitments at the end of November amounted to \$788,884. The current month's payments on these contracts totaled \$55,149, while disbursements on requirements contracts amounted to \$481,805.

Commitment records maintained on 28 construction projects indicated an open balance at the end of November of \$2,594,134.

Statistics for November, as compared with those for the previous month, are given below:

Accounts Payable:	<u>November</u>	<u>October</u>
Balance at beginning of month	\$ 835 498	\$ 733 002
Vouchers entered	3 118 977	3 291 572
Accrual for inventories	50 085	31 387
Cash receipts	<u>2 512</u>	<u>41 331</u>
	<u>4 007 072</u>	<u>4 097 292</u>
Less:		
Vouchers paid	3 211 461	3 233 287
Reversal of accruals	<u>31 387</u>	<u>28 507</u>
	<u>3 242 848</u>	<u>3 261 794</u>
Balance at end of month	<u>\$ 764 224</u>	<u>\$ 835 498</u>
Other Statistics:		
Number of vouchers recorded	4 301	3 939
Number of checks issued	2 668	2 435
Number of freight bills paid	1 679	1 629
Amount of freight bills paid	\$353 711	\$340 211
Number of purchase orders received	1 943	1 996
Amount of purchase orders received	\$2 349 281	\$2 122 713
Amount of cash discount earned	\$5 931	\$3 837

ACCOUNTS RECEIVABLE UNIT

Accounts determined to be uncollectible amounting to \$2,299 were transmitted to the Atomic Energy Commission during November and approved for write-off. Of the total, \$1,920 represented Kadlec Hospital accounts, and \$380 represented rental, tenant service and utility accounts. Collections on accounts previously written off amounted to \$65, resulting in a net charge to the Reserve for Bad Debts of \$2,234.

ACCOUNTS RECEIVABLE UNIT (Continued)

Since November 16, 1953, a cash deposit has been required from all new customers applying for electrical service and consumers moving from one address to another within Richland. The amounts of the deposits were fixed at \$10 for conventional housing, including Wherry Act housing, and \$25 for "prefab" and other electrically heated houses. During the period from November 16, 1953 through November 30, 1954, a total of \$21,900 has been collected as deposits, and \$3,475 has been refunded or applied to final billings. The balance at November 30 amounted to \$18,425 and covered 1,442 deposits. The total was comprised of 1,175 \$10 deposits and 267 \$25 deposits.

Statistics for Accounts Receivable activities are given below:

<u>Account</u>	<u>Balance 10-31-54</u>	<u>Net Charges</u>	<u>Collec- tions</u>	<u>Balance 11-30-54</u>	<u>Number of bills issued during month</u>
Kadlec Hospital:					
Active	\$ 99 395	\$ 57 955	\$ 66 752	\$ 90 598	1 296
Collection Agencies (104 Accounts)	12 413	1 119	2 124	11 408	
Sundry:					
Active	36 137	8 421	16 027	28 531	497
Collection Agencies (164 Accounts)*	7 583	1 001	126	8 458	
Telephone	41 832	54 143	62 123	33 852	6.851
Electricity	33 682	66 587	71 749	28 520	3 914
Equipment sales to Facilities (1 Account)	24 081		349	23 732	
Rent	23 743	398 456	391 817	30 382	6 877
Sales to Cost-type Contractors	17 659	3 966	4 009	17 616	19
Safety Shoes	1 429	2 792	2 451	1 770	525
Loans to Employees (4 Accounts)	<u>520</u>		<u>30</u>	<u>490</u>	
Sub-total	298 474	<u>\$594 440</u>	<u>\$617 557</u>	275 357	<u>19 979</u>
Reserve for bad debts	<u>(32 717)</u>			<u>(31 262)</u>	
General Ledger Balance	<u>\$265 757</u>			<u>\$244 095</u>	

\*Includes all utility and rental accounts.

#### GENERAL BOOKS UNIT

Departmental budgets for travel and living expense variation and conference expense were revised to reflect organizational changes in those departments which now include components of the former Plant Auxiliary Operations Department. Expenses in these categories incurred by the PAO Department during the first four months of the fiscal year 1955 were reviewed and the monthly travel and living expense and conference expense reports were adjusted to include such expenses in the appropriate departments' total to-date costs.

The preparation of a budget for travel and living costs for employees attending meetings of technical and professional societies continued in November. Department managers were furnished with details of such costs for the fiscal year 1954 and the first four months of the fiscal year 1955, and were requested to prepare estimates of expenses for the balance of the current fiscal year. Budget estimates have now been received from all departments, and it is expected that a budget of expenses for employees' attendance at meetings of technical and professional societies will be completed sometime in December.

During November, the Commission was billed with the portion of travel and living expense incurred to conduct regular HAPO business on those trips which also included attendance at Association Island conferences. This cost had been held in suspense pending determination of amounts to be billed to the Commission in connection with the Island conferences.

In accordance with an agreement with the AEC to charge the Overhead Allowance to operating expenses, a journal entry was prepared reversing the amount of \$388,000, representing the \$97,000 per month reimbursed Schenectady and booked in the Departmental Accounts in the first four months of fiscal year 1955. A cost transfer was received from the Commission for \$326,000, covering HAPO's portion of Overhead Allowance for the first four months of fiscal year 1955. The Overhead Allowance is now charged directly to HAPO and KAPL on a pro rata basis by Government cost transfer and is allotted directly to production costs.

Statistical data for November and for the previous month, included for comparison purposes, follows:

GENERAL BOOKS UNIT (Continued)

	<u>November</u>	<u>October</u>
Advances from AEC		
Balance at beginning of month	\$2 027 383	\$2 709 718
Advances received from AEC	6 175 000	5 250 000
Other cash receipts	366 791	401 427
	<u>8 569 174</u>	<u>8 361 145</u>
Less disbursements	6 308 474	6 333 762
Balance at end of month	<u>\$2 260 700</u>	<u>\$2 027 383</u>
Advances requested for subsequent month	<u>\$6 000 000</u>	<u>\$6 175 000</u>
Travel Advances to Employees		
Balance at beginning of month	\$ 70 506	\$ 68 797
Advanced to employees	67 398	74 609
	<u>137 904</u>	<u>143 406</u>
Less:		
Travel, living and conference expenses reported by employees	58 937	60 540
Cash refunded by employees	14 947	12 360
	<u>73 884</u>	<u>72 900</u>
Balance at end of month	<u>\$ 64 020</u>	<u>\$ 70 506</u>
Outstanding Travel Advances to Employees		
Current	\$ 58 284	\$ 64 253
Outstanding over 30 days	5 736	6 253
Total	<u>\$ 64 020</u>	<u>\$ 70 506</u>
Employees' Travel, Living and Conference Expenses		
Reported by employees, etc:		
Travel and living expenses		
Off-site inspectors	\$ 20 816	\$ 24 399
Others	37 613	33 847
	<u>58 429</u>	<u>58 246</u>
Conference expenses	508	2 294
Total	<u>58 937</u>	<u>60 540</u>
Less:		
Expenses for trips which included attendance at Association Island conferences, temporarily transferred to Undistributed Costs	(14 245)	(4)
Expenses transferred to AEC	285	(1 011)
Expenses charged to other G.E. components or carriers	2 142	2 932
Living expenses in excess of \$9 per diem	(771)	3
Conference expenses	508	2 294
	<u>(12 081)</u>	<u>4 214</u>
Amounts determined to be payable by AEC	<u>\$ 71 078</u>	<u>\$ 56 326</u>
Number of expense reports submitted by employees	<u>293</u>	<u>268</u>

REIMBURSEMENT ACCOUNTING

The October "Summary of Disbursements," transmitted to the Commission through the Chief of its Finance Division, covered disbursements totaling \$5,932,335.24, as follows:

Payrolls and Payroll Deductions Disbursed	\$3 841 352.78
Material* and Freight	2 047 603.57
Subcontracts and Agreements	57 754.21
Advances for Travel and Living Expense	74 608.66
Miscellaneous Payments	312 442.74
Transfers to and from Unclaimed-Uncashed Checks Account	<u>.14</u>
Gross Disbursements	\$6 333 762.10
Less: Revenue	<u>401 426.86</u>
Net Disbursements	<u>\$5 932 335.24</u>

\*Including payments on requirements contracts.

In preparing this report, a review was made of each of the 282 items which comprised miscellaneous payments to establish their propriety, while all other disbursements and receipts were analyzed, classified, and summarized to disclose the nature of all of the expenditures made by HAPO during the month.

Work continued on the revision of Financial Department authorizations required in connection with the reorganization, and these should be finished in December.

One exempt employee was loaned to the Special Studies group for the first two weeks of the month.

Six letter approvals were received from the AEC during the month, and numerous inquiries concerning reimbursement problems were handled.

PERSONNEL ACCOUNTING SECTION

MONTHLY REPORT

In order to have current information with respect to the number of withholding exemptions claimed by each employee for withholding tax purposes, during November employees were asked to complete a new Withholding Exemption Certificate (form W-4) and return the completed forms during December.

The salary rate of each nonexempt employee presently being used in preparation of the payroll was verified in November with the salary rate records in Wage Rate Unit. Such verifications are made periodically to insure the accuracy of salary rates.

The number of employee sale certificates issued under the Employee Purchase Plan during November was approximately 65% higher than the number of certificates issued during October.

Four time clocks were installed in the new Transportation Building. At November 30, there were 41 time clocks in use on the Project.

Annuity Certificates were issued to two former duPont employees, making a total of 106 Certificates issued to date under the Annuity Plan.

Two Reimbursement Authorizations (Nos. 235 and 236) were received from the Atomic Energy Commission in November. Authorization No. 235 approves the following for reimbursement with respect to Community Firemen:

1. Revisions to schedules of hours of work.
2. Overtime pay.
3. Revised rate structure.
4. Cost of furnishing, cleaning, and repairing uniforms.

Authorization No. 236 approves for reimbursement the deletion of the classification, Inspector "B", and transfer of employees assigned to that classification to the classification, Radiation Monitor.

One Office Letter was issued during the month, covering distribution of salary checks during Thanksgiving week.

STATISTICS

Personnel Accounting Section

<u>Number of HAPO Employees</u>	<u>Total</u>	<u>Monthly Payroll</u>	<u>Weekly Payroll</u>
<u>Changes during month</u>			
Employees on payroll at beginning of month	8 789	2 289	6 500
Additions and transfers in	136	2	134
Removals and transfers out	(62)	(11)	(51)
Transfers from weekly to monthly payroll		9	(9)
Transfers from monthly to weekly payroll		(1)	1
Employees on Payroll at end of month	<u>8 863</u>	<u>2 288</u>	<u>6 575</u>

<u>Overtime Payments During Month</u>	<u>November</u>		<u>October</u>	
	<u>Number</u>	<u>Amount</u>	<u>Number</u>	<u>Amount</u>
Weekly Paid Employees	5 743	\$ 87 640-a)	7 081	\$111 361-b)
Monthly Paid Employees	404	37 844	323	23 264
Total	<u>6 147</u>	<u>\$125 484</u>	<u>7 404</u>	<u>\$134 625</u>

<u>Number of Changes in Salary Rates and Job Classifications</u>	<u>November</u>		<u>October</u>	
	Temporary Changes	84		93
Retroactive Changes	24		13	
Normal Changes	833		780	
Total	<u>941</u>		<u>886</u>	

<u>Gross Payroll Paid During Month</u>	<u>November</u>		<u>October</u>	
	Engineering	\$ 799 113		\$ 846 736
Manufacturing	2 182 984		2 101 884	
Plant Auxiliary Operations	-		950 540	
Other	1 111 994		800 449	
Total	<u>\$4 094 091-a)</u>		<u>\$4 699 609-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>Number Participating</u>		<u>Percent Participation</u>	
	<u>November</u>	<u>October</u>	<u>November</u>	<u>October</u>
<u>Participation in Benefit Plans at Month End</u>				
Pension Plan	7 957	7 964	98.0%	98.1%
Insurance Plan				
Personal coverage	8 799	8 724	99.3	99.3
Dependent coverage	6 212	6 149	-	-
U.S. Savings Bonds				
Stock Bonus Plan	4 408	4 402	49.7	50.1
Savings Plan	1 150	1 151	13.0	13.1
Both Plans	5 017	5 008	56.6	56.9

<u>Pension Plan</u>	<u>November</u>	<u>October</u>
Number retired	0	6
Number who became eligible for participation	39	37
Number who applied for participation	37	36
Number who elected not to participate	2	0
Replies not received	0	1
 <u>Insurance Plan - Number of Claim Payments</u>		
Employee Life Insurance	0	2
Employee accident and health insurance	436	445
Dependent accident & health insurance	414	452
Total	<u>850</u>	<u>899</u>
 <u>Good Neighbor Fund</u>		
Number participating	6 279	6 187
Percent of participation	70.8%	70.4%
 <u>Suggestion Awards</u>		
Number of awards	92	67
Total amount of awards	\$3 305	\$1 220
 <u>Preferential Rates</u>		
Number (eliminated) or added	(1)	(1)
Number currently in effect	558	559
 <u>Number of Military Allowance Payments</u>		
	6	6
 <u>Number of Payroll Deductions - Other than Taxes</u>		
Barracks rent	6	14
Dormitory rent	534	500
Good Neighbor Fund	10 830	12 707
Hospital	466	576
House rent	5 092	4 937
Insurance	8 893	8 904
Pension	25 200-a)	30 100-a)
Safety shoes	533	851
Savings Bonds	15 539	18 863
Trailer space	142	197
Union dues	2 016	1 986
Other	115	180
Total	<u>69 366</u>	<u>79 815</u>

(a- Approximate number rounded to nearest hundred.

PROCEDURES AND COMPUTING SECTION  
MONTHLY REPORT -- NOVEMBER, 1954

GENERAL

A Project Proposal (CA-612) in connection with the alteration of the 713 Building for the installation of the Electronic Data Processing Machine was prepared during the month. The Work Authority, Dated November 26, 1954 and Directive AEC-54, dated November 23, relating to the project, were received from the Atomic Energy Commission.

On November 19, 1954 office personnel of the Procedures and Computing Section moved from their various locations to the 713 Building. It is anticipated that all personnel and machinery will be moved into this building by December 10, 1954. When the move is completed, all personnel of the Section, with the exception of the Records Control group, will be located in the 713 Building.

Two members of the Section, C. B. Poland, Procedural Analysis Unit, and C. E. Thompson, Numerical Analysis Unit, are attending the IBM sponsored programming class for the 702 Electronic Data Processing Machine at Poughkeepsie, New York. The training school began on November 15 and will continue through December 10, 1954.

PROCEDURAL ANALYSIS

Forms Control reviewed 436 orders for forms during November covering 2,081,450 forms; 12 orders amounting to 6,480 forms were rejected; 149 new forms were designed.

Assistance was given the Richland Police Department in developing a system for reporting the disposition of juvenile cases handled by the Juvenile Court and the local police.

The procedure originally developed for creating Activity Reports and Rental Cost Distribution for office machines was revised and put into final form during the month.

Approximately 80% of the original Classified Files record cards have been converted to IBM machine controls. Improved selection techniques were devised and incorporated in panel wiring during November. These improvements reduce the time required to select and report on the accountability status of any given document or group of documents.

As a result of recent extensive changes in organization structure and assignment of new cost codes, a considerable amount of adjustment in report distribution and tabulation was necessitated. Control panel wiring covering Payroll Statistics, Salary Distribution, and Work Order cost was revised in order to segregate report information pertinent to the new components of each new section. Procedures for these changes were developed for use by Computing Operations.

Copies of the first edition of the Auditing Manual were completed and submitted to the Manager--Auditing on November 15, 1954.

Procedures and panels were completed this month to effect Work Order cost distribution. The new procedure is effective with Cost Reports for December.

PROCEDURAL ANALYSIS (continued)

Initial discussions were held with Plant Accounting and Property Management personnel to present graphically a plan for conversion of Plant Accounting records to punched cards. A draft copy of a record form, utilizing perforated tape for data transmission, was submitted and is being considered by Plant Accounting.

RECORDS OPERATIONS

Quantity of Records received, processed and stored:

Employee & Public Relations Department	34	Standard Storage Cartons
Engineering Department	66	" " "
Financial Department	121	" " "
Manufacturing Department	196	" " "
Radiological Sciences Department	<u>7</u>	" " "
	<u>424</u>	

Three hundred and thirty-nine cartons of records were destroyed.

NUMERICAL ANALYSIS

Report is included in Secret Document HW-33962-W.

COMPUTING OPERATIONS

During the month of November the following non-routine assignments were completed for customers:

Financial	16
Employee & Public Relations	1
Atomic Energy Commission	2
Manufacturing	5
Engineering	22
Radiological Sciences	1
Operations Research	<u>2</u>
TOTAL	<u>49</u>

Service charges for the month amounted to \$40,536.00. Services, by customer, were as follows:

Atomic Energy Commission	\$ 272.00	1%
Operations Research Study	106.00	0 *
Employee & Public Relations	587.00	1
Engineering	15 245.00	38
Manufacturing	792.00	2
Financial	23 161.00	57
Radiological Sciences	<u>373.00</u>	<u>1</u>
	<u>\$40 536.00</u>	<u>100%</u>

\* Less than 1%

PROPERTY ACCOUNTING SECTION  
MONTHLY REPORT - NOVEMBER 1954

Plant Accounting Unit

Ninety-two percent of the property control cards for uninstalled cataloged equipment were delivered to the field during November. Group meetings were held in the Separations and Reactor Sections to minimize the amount of duplicate effort of contacting individual custodians. Other meetings for Metal Preparation and Technical Sections were held on an individual basis with each custodian. Completion of this phase of the work is anticipated early in December.

A detailed reconciliation of Minor Construction shop equipment account was made and balanced to the control ledgers. The reconciliation was forwarded to Minor Construction for verification and comparison to physical custody of equipment.

An inventory of spare equipment held in storage was completed during November and reconciliation will be completed in December. In connection with this inventory, a review was made of all stores documents, records and registers, preparatory to final reconciliation. IBM runs of equipment inventoried will be forwarded about December 10.

Standardization of nomenclatures and assignment of commodity code classification is proceeding on schedule. The phase of this work receiving emphasis at this time is machine tools, since this group of equipment will be used as a trial run in the application of IBM system of accounting. This phase of the work is approximately twenty-five percent complete and is scheduled for completion January 21, 1955.

A complete recheck of a prior inventory of the 2101 Building and facilities was taken during November. This inventory was required in connection with turnover of the facilities to Manufacturing Department on November 22, and verification of equipment assigned to a new property custodian.

A study of the methods of allocating depreciation expense on general facilities was started during the month. A report of our recommendations and proposals will be completed during December. Prior depreciation expense on this type of equipment was distributed on the basis of cost liquidations for a specific operating group.

Unitization reports distributed during November include:

AEC-IA-158	Replacement of Raw Water Main in 700 Area	\$ 3,310
CA-489	Positive Ion Accelerator Laboratory	201,639
CA-512-R(G)	Graphite Fabrication Fac. - 2101 Building	4,614,971
CG-523	Installation of Automatic Valves in Export Water Lines, 100-B, D and F Areas	28,334
CG-559	Process Tube Flow Facility - 189-D, 100-D Area	93,141
CG-569	Replacement of Catch Tanks, 311-ER and 302-BR, 200-E and W	32,325
K-664	Traffic Light - Symons and Jadwin	863
K-825	Construction of Fireplace in Columbia Playfield Shelterhouse	497
K-811	Sewer and Water Extension to Commercial Building - Hartford and Duportail	774
K-881	Building Improvements - 910 Spengler Road	982

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Plant Accounting Unit - continued

Unitization of the 100-K facilities, exclusive of 2101 Graphite Fabrication Facilities, is approximately forty percent complete. Studies were completed and a report issued which estimated final cost of individual facilities, buildings, reactors, etc., in connection with the 100-K Areas. Direct costs were distributed to principal facilities included in the report on a prorata basis.

One man was assigned and has offices located in the Blaw-Knox building in North Richland to coordinate the efforts for the unitization of Purex Facilities, which was started during the month.

Meetings were held with Kadlec Hospital administrators and personnel preparatory to taking of physical inventories of medical equipment, reviewing present capitalization policy of medical equipment, and formulating the capitalization policy comparable to the American Hospital Association regulations. It is the intent to establish a capitalization policy for use at HAPO which is consistent with and can be compared to other hospitals throughout the state. Also included in these meetings were discussions as to the methods of segregating industrial medical from general hospital equipment.

A complete inventory of the telephone equipment is scheduled for completion in the latter part of February, 1955. Since an inventory of this type requires assistance, it is being conducted by the Telephone Sub-Section. The inventory is required in order that records may be established, meeting the minimum requirements of federal and state communication commission regulations.

Plant and Equipment balances at the end of November are:

	(In Thousands)		
	<u>ASSET</u>	<u>RESERVE</u>	<u>NET</u>
Completed Plant and Equipment	\$737,908	\$293,102	\$444,806
Construction Work in Progress	35,999		35,999
Total Cost Recorded (GE Books)	<u>773,907</u>	<u>293,102</u>	<u>480,805</u>
AEC and Other Contractor Costs			
Land and Land Rights	5,476		5,476
Construction Work in Progress-1)	<u>186,653</u>		<u>186,653</u>
Total	<u>\$966,036</u>	<u>\$293,102</u>	<u>\$672,934</u>
(In Dollars)	<u>This Month</u>	<u>Last Month</u>	
(1-Kaiser	\$119,293,585	\$116,894,825	
Blaw-Knox	45,340,620	41,740,506	
AEC	22,018,342	20,063,865	
Total	<u>\$186,652,547</u>	<u>\$178,699,196</u>	

During the month the subsidiary ledgers applicable to spare equipment held in storage were converted from manual to machine posting operation.

One rotational trainee was assigned to Plant Accounting during the month, increasing total personnel to 40, comprising 33 non-exempt and 7 exempt.

Inventory Accounting Unit

The annual physical inventory of spare parts in the custody of Stores Sub-Section was taken as scheduled during the month. The counting and testing of materials began on November 10, and progressed through November 22. The items inventoried were stored in warehouses located in the 100-H, 200-E, 700 and 3000 Areas. Results of the inventory are not yet available as work is still underway in reviewing custodial records and procedures and analyzing source documents and other data to determine final amounts and reasons for any variances.

Road materials in the custody of the Transportation and Community Sections were physically inventoried on November 4 and 5 respectively. Results of the inventory reflected a difference of \$666 over the reconciled book value of \$13,211.

Preparatory work was begun during the month to making necessary arrangements for taking the annual physical inventory of railroad and automotive parts which are in the custody of Transportation Section. This inventory is scheduled to be taken on December 15, 1954.

The automotive parts inventory in the custody of Stores Sub-Section is the only inventory that remains to be taken to complete the physical inventory program for the second year. This inventory was originally scheduled to be taken on December 20. It appears now, however, that the physical inventory of these parts will have to be deferred until the first part of January 1955, because the items have not been completely transferred and warehoused in the new consolidated Transportation Center.

On November 16, 1954, a letter was prepared and forwarded to all the designated control custodians for special materials to remind them of the quarterly physical inventory requirements as set forth in Organization and Policy Guide 04.10. It was pointed out in the letter that the inventory should be taken as of November 30, 1954, with the results reported to Inventory Accounting by December 10, 1954, for reconciliation with accounting records.

Following is a summary showing inventory account balances for the months of October and November 1954, together with the amount of change:

	(In Thousands)		
	Book Balance		Increase (Decrease)
	<u>10/31/54</u>	<u>11/30/54</u>	
Current Inventories			
General Supplies	\$ 1,505	\$ 1,539	\$ 34
Fuel and Lubricants	55	65	10
Essential Materials	3,361	3,498	137
Total Current Inventories	<u>4,921</u>	<u>5,102</u>	<u>181</u>
Special Materials	1,412	1,410	(2)
Spare Parts	2,819	2,873	54
Standby	0	48	48
Excess Materials	1,268	658	(610)
Total Inventories - Gross	<u>10,420</u>	<u>10,091</u>	<u>(329)</u>
Less: Spare Parts Inventory Reserve	(655)	(664)	9
Standby Inventory Reserve	0	(12)	12
Excess Inventory Reserve	(885)	(394)	(491)
Total Inventories - Net	<u>\$ 8,880</u>	<u>\$ 9,021</u>	<u>\$ 141</u>
As a Memo: Excess Equipment	\$ 2,046	\$ 1,161	\$ (885)
Excess Equipment Reserve	(1,506)	(823)	(683)

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### Property Management Unit

In connection with the closeout of the Kaiser and Blaw-Knox programs a considerable quantity of machine tools, office machines, automotive and construction equipment will become available for the AEC upgrading program. Coordination of the program between the Company and AEC is being handled by Property Management. Old equipment will be traded for newer equipment wherever possible.

Some administrative difficulties are being experienced in the control and disposition of government material furnished to vendors. This matter has been under review with interested GE and AEC personnel. A revision of Organization and Policy Guide 21.11 will be issued to cover the revised procedure.

During the current month the York refrigeration equipment installed in 189-F Building and also that stored in the 186-D Building was disposed of by sale to the Army.

The laundry equipment in 723 Building has been declared excess to AEC and steps are underway to dispose of same. This building is tentatively scheduled to be used as office space.

The graphite machining program in the 2101 Building has been completed. The Plant Records Unit has inventoried the equipment and transferred same to the custody of the Separations Section. Small scale graphite machining required by the Technical Section will be performed in the 328 Shop.

Seventy-three requests for the disposal of property were investigated, processed and approved during the month.

### Appropriations Unit

#### Hanford 4X Program

##### CG-603 - Bismuth Phosphate Plants

Project proposal requesting \$3,500,000 (including \$39,000 previously authorized for the "T" Plant) for design, procurement and physical performance of work for the scope of work which is known to be required for the reactivation and for modification of the bismuth phosphate plants and design and procurement of critical materials, at such time as the need is established for those items of potential work yet under way was forwarded to the AEC November 18, 1954.

##### CG-613 - Metal Conversion Plant

Preliminary project proposal requesting an interim authorization of \$340,000 for design and procurement of critical materials for the Metal Conversion Plant portion of the 4X Program was forwarded to the AEC November 18, 1954.

##### CG-614 - 300 Area

Preliminary project proposal requesting an interim authorization of \$130,000 for design and procurement of critical materials for the 300 Area portion of the 4X Program was forwarded to the Commission November 18, 1954.

Appropriations Unit - continued

CG-496 - Recuplex Installation - Building 234-5

Project proposal requesting additional funds in the amount of \$328,000 (Total project funds requested \$1,928,000) to complete the installation of the Recuplex facility was forwarded to the Commission November 16, 1954.

CG-572 - Particle Problem - Animal Exposure Equipment

Due to the complexity of the inhalation problem, the project was divided into two phases. Phase I requested \$22,500 for installation of small animal exposure facilities. Phase II requested additional funds in the amount of \$57,500 for installation of large animal exposure facilities. Total project funds in the amount of \$80,000 were approved by the Commission November 19, 1954.

CG-576 - General Improvements to Laboratory Area Buildings

Project proposal dated February 23, 1954, requesting \$265,000 to correct inadequacies of the Laboratory Area facilities was returned unapproved by the AEC June 23, 1954, as it was felt many of the proposed items did not measure up to the current criteria of "essentiality". After discussions held between GE and AEC representatives, a revised proposal was prepared and resubmitted to the AEC requesting \$230,000 (including \$60,000 previously approved for improvements to Building 326) to correct inadequacies of the Laboratory Area facilities.

CA-586 - First Capacity Increase - 230 KV System

Project proposal dated May 4, 1954, requested \$1,390,000 (GE \$65,000) to supplement the existing 230 KV electrical transmission system with an additional line, including necessary breakers and terminal equipment, from the Bonneville Power Administration Midway Substation to the Hanford Production Areas. This proposal, which included the acquisition through Government transfer of an existing 230 KV line built and energized in 1949 by the Bonneville Power Administration, was returned by the AEC July 20, 1954, for further consideration. The Commission requested a detailed review of the operating procedures, the design scope and the leasing of the existing BPA line rather than purchase.

A proposal revising only those items which had changed since the submittal of the original proposal and requesting \$1,500,000 (GE \$92,000) for the work described in the original proposal was forwarded to the Commission for approval November 1, 1954. Directive dated November 26, 1954, authorized AEC \$1,100,000 for this project with the stipulation the 230 KV line be acquired by lease instead of purchase.

CA-606 - Additional Office Space - Central Stores Warehouse

Project proposal requesting \$125,000 (GE \$10,000) for building modifications required to consolidate Purchasing, Stores, Accounts Payable and Inventory Accounting activities in one central location was forwarded to the AEC for approval November 3, 1954.

Appropriations Unit - continued

CG-608 - Redox Crane Viewing Room

Project proposal requesting \$21,000 for design and construction of a crane viewing room on the existing crane maintenance platform of the Redox canyon was authorized by the Commission November 3, 1954.

CG-609 - Charge-Discharge While Operating - Test Facility

Project proposal requesting \$41,500 to install improved equipment required for a five tube charge-discharge test facility in 105-C Reactor, including a charging machine, and for a one tube mock-up in the 108-D Flow Laboratory was approved by the AEC November 23, 1954.

CG-610 - Replacement of Existing 313 Building Roof

Project proposal requesting \$55,000 to replace the deteriorated built-up roof of the original sections of the 313 Building with a new built-up roof was approved by the Commission November 22, 1954.

CG-611 - Mobile Laboratory for Environmental Monitoring

Project proposal requesting \$26,000 to provide mobile laboratory facilities for monitoring environmental samples in the field was forwarded to the Commission November 12, 1954.

CA-612 - Alteration of Building 713 for Electronic Data Processing Machine

Request for authorization of \$6,000 for the design of facilities for an electronic data processing machine was approved by the Commission November 23, 1954.

SF ACCOUNTABILITY SECTION  
MONTHLY REPORT - NOVEMBER, 1954

Numerous changes associated with the Section's Reorganization were initiated during the month. Separations Area activities were independently established with direct supervision in the field. Personnel procurement problems were undertaken by SF Measurements Unit with one monthly roll employee obtained by transfer effective January 15, 1955. Similar activities have been conducted relative to the SF Reactor Area Unit with transfers subject to availability dates.

The Normal Uranium SF Accountability controls continued under an unusually high degree of accuracy. Problems associated with cored slugs and plugs have been successfully integrated into the system. The feasibility of segregation at the time of discharge appears highly questionable and while there has been complete solution of the 300 Area problems, the Reactor Area presents an entirely different picture. Piece count control has been one of the major controls but may be approaching an end. The rate of generation of the Reactor Area problems has not been helped by the delays in personnel procurement for the Reactor Area and physical transfer of material is now ahead of planning and scheduling.

Contacts with Technical Sections have now been set up under one Supervisor in an effort to improve mutual problems. Under these arrangements the SF Accounting and SF Measurements Units will continue audit functions.

Further progress on the standardization of accounts has been established with respect to TBP and  $UO_3$ . Considerable progress has been made with respect to the elimination of Security problems and to the reduction of ultimate audit time.

Improvement in the field of SF Measurements include the development of: (1) Redox Dissolver Heels; (2) Revised precision statements for  $UO_3$  product shipments; (3) Calibration of key measuring tanks at Redox; (4) Revised plutonium content of Task II powder weights.

Shipments of Irradiated Enriched Uranium to ARCO was completed under the current program as of November 18, 1954.

FINANCIAL DEPARTMENT PERSONNEL AND ORGANIZATION\*

NOVEMBER, 1954

	<u>Current Month</u>	<u>Prior Month</u>
<u>Personnel Changes During Month</u>		
Employees at beginning of month	466	386
Additions and transfers in	6	86
Removals and transfers out	(6)	(6)
Employees at end of month	<u>466</u>	<u>466</u>
 <u>Personnel by Unit at Month-End</u>		
<u>General</u>	<u>10</u>	<u>10</u>
<u>Auditing Section</u>	<u>17</u>	<u>16</u>
<u>Budget and Measurements Section</u>	<u>7</u>	<u>7</u>
<u>Contract Cost Section</u>		
General and Consolidations Cost Unit	11	11
Engineering Cost Unit		
General	5	5
Design Cost	7	6
Project Cost	15	15
Technical Cost	11	11
Employee and Public Relations Cost Unit		
General	2	2
Plant Activities Cost	10	10
Community Cost	6	6
Medical Cost	3	3
Manufacturing Cost Unit		
General	2	1
Financial Representatives	7	8
Budgets and Control	18	16
Reports and Records	19	19
Analysis and Studies	3	3
	<u>119</u>	<u>116</u>
<u>General Accounting Section</u>		
Accounts Payable Unit	30	32
Accounts Receivable Unit	22	21
General Books Unit	19	19
Administrative Planning	2	2
Contract Reimbursements	5	5
	<u>78</u>	<u>79</u>

\* Reorganized effective November 1, 1954. Figures for Prior Month adjusted to reflect new organization.