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MONTHLY REPORT

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HANFORD ATOMIC PRODUCTS OPERATION

FOR

SEPTEMBER 1954

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Compiled By
DEPARTMENT MANAGERS

October 27, 1955

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MONTHLY REPORT
HANFORD ATOMIC PRODUCTS OPERATION

SEPTEMBER 1955

GENERAL SUMMARY

PRODUCTION OPERATION

A total of 447 tons of acceptable slugs were produced during the month. This production was 102 percent of the official forecast and established a new monthly record. The composite canning yield was 75 percent, representing a three percent increase over the August yield and 12 percent over the yield experienced in July.

The production rate of the Redox Plant was maintained at an 11 ton per day rate for 34 days, starting on August 25 and continuing until September 28. Several difficulties were encountered during this period, but none were severe enough to cause a plant shutdown. The total outage time for the month of September was 38 hours.

ENGINEERING TECHNOLOGY

Progress has been made in the evaluation of the economic and technical aspects of conversion of a K Pile to recirculation. From the study it appears that the two most serious problems are the development of a suitable fuel element for the very high specific powers and temperatures, and the decreasing time operated efficiency at high fuel throughputs, with the possibility of the need for remote charge-discharge operations.

The total design for Project CG-558, Reactor Plant Modification for Increased Production, was advanced to 92.5% complete.

Replacement of front face connectors was accomplished at 105-KW between September 19-27, inclusive, and 105-KE was scheduled for replacements, beginning October 5, 1955. The 3,300 connectors for 105-KE were shipped on September 29.

GENERAL

The Financial Plan for FY 1956 was officially transmitted to General Electric by the Commission and was reconciled in detail.

For the first time since the 702 data processing machine has been used to prepare payrolls, checks and earnings statements for the week ending September 18 were finished by 8:00 A.M. the following Tuesday. This betters the previous performance by six to eight hours.

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STAFF

General Manager, Atomic Products Division F. K. McCune

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

Counsel E. T. Maher

Manager, Finance D. M. Johnson

Manager, Employee and Public Relations L. L. German

Director, Radiological Sciences H. M. Parker

Manager, Engineering A. B. Greninger

Manager, Manufacturing W. K. MacCready

Operations Research Study B. F. Butler

HANFORD ATOMIC PRODUCTS OPERATION
NUMBER OF EMPLOYEES
SEPTEMBER 31, 1955

<u>DEPARTMENT</u>	<u>EXEMPT</u>		<u>OTHER</u>		<u>TOTAL</u>	
	<u>9-30-55</u>	<u>8-31-55</u>	<u>9-30-55</u>	<u>8-31-55</u>	<u>9-30-55</u>	<u>8-31-55</u>
<u>Counsel</u>	3	2	2	2	5	4
<u>Operations Research Study</u>	6	6	1	1	7	7
<u>Employee & Public Relations Department</u>						
General	8	8	8	8	16	16
Salary & Wage Administration	11	11	10	10	21	21
Personnel Practices	16	17	39	41	55	58
Education & Training	6	6	89	71	95	77
Emp. Comm. & Pub. Rel.	11	11	40	40	51	51
Union Relations	5	5	1	1	6	6
Aux. Oper. & Plant Prot.	115	115	797	800	912	915
Community	76	77	314	330	390	407
Health & Safety	47	47	169	171	216	218
<u>Engineering Department</u>						
Engineering Administration	30	29	85	88	115	117
Advance Engineering	8	8	1	1	9	9
Design	166	170	114	119	280	289
Project	178	179	163	171	341	350
Pile Technology	231	238	152	162	383	400
Separations Technology	170	171	94	94	264	265
<u>Manufacturing Department</u>						
General	23	21	9	9	32	30
Reactor	326	321	1 422	1 396	1 748	1 717
Separations	303	306	1 576	1 601	1 879	1 907
Metal Preparation	108	105	568	567	676	672
Transportation	44	44	444	443	488	487
Purchasing & Stores	61	61	220	225	281	286
Electrical Utility	16	16	73	73	89	89
<u>Financial Department</u>						
General	9	9	7	9	16	18
Budgets & Measurements	7	7	6	5	13	12
Contract Cost	24	23	101	101	125	124
General Accounting	10	9	59	61	69	70
Property Accounting	16	16	51	52	67	68
Auditing	14	14	2	2	16	16
SS Accountability	10	10	34	36	44	46
Personnel Accounting	8	9	53	54	61	63
Procedures & Computing	29	29	47	52	76	81
<u>Radiological Sciences Department</u>						
General	6	5	-	-	6	5
Records & Standards	30	30	175	171	205	201
Biophysics	54	55	65	72	119	127
Biology	32	32	42	42	74	74
Engineering	6	6	1	1	7	7
Adm. & Comm.	2	2	5	5	7	7
 GRAND TOTAL	 <u>2 225</u>	 <u>2 230</u>	 <u>7 039</u>	 <u>7 087</u>	 <u>9 264</u>	 <u>9 317</u>

AREA PERSONNEL DISTRIBUTION

SEPTEMBER, 1955

		100-B	100-D	100-F	100-H	100-K	200-E	200-W	300	700-1100	Other	Total
		Area	Area	Area	Area	Area	Area	Area	Area	Area and Plant General	Areas*	
<u>ENGINEERING DEPARTMENT</u>												
Exempt	23	49	-	5	34	52	63	265	292	-	-	783
Other	11	24	2	87	17	20	33	219	196	-	-	609
Total	34	73	2	92	51	72	96	484	488	-	-	1 392
<u>MANUFACTURING DEPARTMENT</u>												
Exempt	67	56	76	72	54	99	223	109	125	-	-	881
Other	285	215	299	280	250	403	1 217	567	696	-	-	4 312
Total	352	271	375	352	304	502	1 440	676	821	-	-	5 193
<u>FINANCIAL DEPARTMENT</u>												
Exempt	-	-	-	1	-	-	5	7	114	-	-	127
Other	-	-	-	5	-	-	20	12	323	-	-	360
Total	-	-	-	6	-	-	25	19	437	-	-	487
<u>EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT</u>												
Exempt	22	6	6	7	9	7	12	11	215	-	-	295
Other	72	50	39	45	56	40	123	113	875	54	54	1 467
Total	94	56	45	52	65	47	135	124	1 090	54	54	1 762
<u>RADIOLOGICAL SCIENCES DEPARTMENT</u>												
Exempt	1	-	35	-	-	4	18	66	6	-	-	130
Other	2	-	48	-	3	20	18	176	21	-	-	288
Total	3	-	83	-	3	24	36	242	27	-	-	418
<u>GENERAL</u>												
Exempt	-	-	-	-	-	-	-	-	9	-	-	9
Other	-	-	-	-	-	-	-	-	3	-	-	3
Total	-	-	-	-	-	-	-	-	12	-	-	12
Total Exempt	113	111	117	85	97	162	321	458	761	-	-	2 225
Total Other	370	389	388	417	326	483	1 411	1 087	2 114	54	54	7 039
GRAND TOTAL	483	500	505	502	423	645	1 732	1 545	2 875	54	54	9 264

* Includes White Bluffs and B-Y Exchange

MANUFACTURING DEPARTMENT

SEPTEMBER, 1955

METAL PREPARATION SECTION

A total of 447 tons of acceptable slugs were produced during the month. This production was 102 percent of the official forecast and established a new monthly record. Of the total production, 114 tons were of cored material. The production of this type of slug was accelerated in September primarily through the use of aluminum inserts as plugs for the slug chamber. The composite canning yield was 75 percent, representing a three percent increase over the August yield and 12 percent over the yield experienced in July.

The inventory of bare slugs, excluding slugs in process, fluctuated during the month from three days to less than a one-day supply. The canned slug inventory improved slightly, from one week to 2-1/2 weeks supply, because of a low reactor discharge rate. Efforts are being expended to keep metal moving throughout the process, particularly in slug recovery.

There was one autoclave failure during the month.

The number of acceptable canned thorium slugs produced during the month was 1253.

REACTOR SECTION

The total and plutonium input productions were 92 and 92.1 percent of the official forecast respectively. Production was below the official forecast, due principally to the low reactor operating efficiencies.

The overall reactor time operated efficiency was 67.9 percent. The primary factors affecting the efficiency were as follows: large amounts of outage time required by slug failures at all reactors except KE and KW; process tube leak testing at C, D, F, and H; process tube replacement at D and F; electrical fault tests, and normal charge-discharge activities.

Established maximum reactor operating levels, excluding enrichment burnout, were increased a total of 51 megawatts; 16 at H Reactor, and 35 at KE Reactor. At H Reactor, the increase resulted from increased water flow following the venturi installation and relaxation of limits for exit tube temperature, graphite temperature and pile atmosphere helium content. At KE Reactor, the increase resulted from improved flattening permitted by long term gains.

The plutonium megawatt day output production was 89 percent of the official forecast. Production was slightly below forecast due to smaller than forecast discharges at the low concentration reactors. The discharge tonnages of high and low concentration material were 103 and 207 respectively.

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There were 17 slug failures during the month, consisting of 12 regular uranium slugs, two production test slugs and three enrichment slugs. The total reactor outage time required for rupture removal was 370 hours.

Twenty-four reactor scrams occurred, fourteen of which were caused by normal Panellit system variables. Three normal scrams were necessary to control tube exit water temperatures within specified limits. The remainder of the scrams were caused by Panellit trips, pressure fluctuation and instrument difficulties described in the body of the report. Total outage time attributed to all scrams was approximately 110 hours.

Process tube leak testing programs were conducted during the month at C, D, DR, F and H because of abnormal water collection rates. At C one leaking tube was found and replaced. At D, during two separate leak testing programs, three tube leaks and one Van Stone flange leak were found. During two leak testing programs at F, 21 rear Van Stones and seven tube leaks were found. At H, during three leak testing programs, one tube and two Van Stone leaks were found. At DR a leak was found in conjunction with a slug rupture.

Process tube replacement programs were conducted at D and F Reactors in September. At D Reactor, 31 tubes were removed and replaced, and eight empty channels were retubed. At F Reactor, 67 tubes were removed and replaced, and three empty channels were retubed. Of the 67 tubes replaced at F, 42 were replaced on the basis of corrosion data.

KW Reactor was shut down from September 18 to 30 for front face connectors and rear face temperature monitor element replacement. In addition to the replacement of all front face aluminum connectors with teflon-stainless steel braid reinforced connectors, all of the remaining original temperature monitor bulbs were replaced with interim type bulbs. The inspection of horizontal and vertical rods, all Panellit gauges, and other instrumentation equipment was also accomplished.

Electrical fault tests were conducted on the 4.16, 13.8 and 230 KVA systems at KE and KW Reactors during the month to determine if the protective relaying and automatic switching mechanisms would function properly. All equipment was found to function satisfactorily.

The U-233 input production was 88 percent of the forecast. This production was the result of the low operating efficiencies at C and H Reactors. The balance of J-Q tubes at month end was 59 at C Area and 51 at H Area.

SEPARATIONS SECTION

The Redox production was 180 percent of the official forecast and was the result of a sustained operating period of 28 days at a rate of 11 tons of uranium per day. A new monthly production record of 310 tons of uranium processed was established. The F Plant production was 134 percent of the forecast and established a monthly production record.

The production rate of the Redox Plant was maintained at an 11 ton per day rate for 34 days, starting on August 25 and continuing until September 28. Several difficulties were encountered during this period, but none were severe enough to cause a plant shutdown. Significant items were the plugging and subsequent replacement of a silver reactor, and erratic performance of the waste concentrator. Toward the end of the operating period, high gamma ratio in the final uranium product plus erratic performance in several columns indicated the need of an equipment flush. The plant shut down on September 28, the columns were flushed, and operations were resumed on September 29. A rate of 9 tons per day was in effect throughout the remainder of the month. The total outage time for the month was 38 hours.

Operation of the T Plant was essentially normal during the month.

I¹³¹ emission continued as a significant problem at Redox and T Plants, even though all metal dissolved was cooled more than 88 days.

The TBP production was 75 percent of the official forecast. During the month the second cycle performed effectively, but higher than normal waste losses occurred in the first cycle operation. Outages to correct the condition resulted in lower than forecast production. A flush of the first cycle equipment and minor revisions to the RC column were accomplished in the period from September 8 to 10. Subsequent operation indicated no appreciable improvement in the waste losses. The first cycle was again shut down and the RC column was replaced. This equipment change corrected the condition and at month end the waste losses had returned to normal. The total outage time for the first and second cycles was 104 and 93 hours respectively. The second cycle lost time was attributable to lack of feed material from the first cycle.

The UO₃ production was 117 percent of the official forecast. No process difficulties were experienced during the month.

All fabrication in the Metal Fabrication plant was confined to a single model. The production commitment for the month was sufficiently surpassed to permit exceeding the total quarterly forecast. Because of the rigid specification for the neutron count per gram per second it was necessary to remelt much of the product in an effort to lower the count. An improvement in the feed material around mid-month permitted some blending with the high neutron count material.

Adequate waste metal removal from the tank farms was maintained during the month.

GENERAL

Personnel

On Roll September 1, 1955	5188
Net Increase	5
On Roll September 30, 1955	5193

J. H. Warren
 MANAGER
 MANUFACTURING DEPARTMENT

MANUFACTURING DEPARTMENTPATENT REPORT SUMMARY
FOR
MONTH OF SEPTEMBER, 1955

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

INVENTORTITLE

NONE

NONE

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

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MONTHLY OPERATING REPORT

SEPTEMBER 1955

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October 6, 1955

MANUFACTURING DEPARTMENT
METAL PREPARATION SECTION
September, 1955

I. RESPONSIBILITY

There was no change in responsibility during this period.

II. ACHIEVEMENT

A. Operating Experience

1. <u>Statistics</u>	<u>September</u>	<u>August</u>	<u>Year to date</u>
Total Acceptable Slugs Canned (Tons)	447	423	3580
Composite Canning Yield (%)	75	72	75
Efficiency (%) (Canning Throughput)	96	94	94
Forecast Achievement (Current Commitment)	102	94	102
Net Acceptable Solid Slugs (Tons)	333	363	3236
Slugs Returned from Reactor (Tons)	.42	4.10	41.19
Canning Yield (%)	76	72	76
Net Acceptable Cored Slugs (Tons)	114	60	344
Slugs Returned from Reactor (Tons)	.74	.00	1.57
Canning Yield (%)	74	70	72
Autoclave Failure - Solid (No./M)	.001	.00	.001
Autoclave Failure - Cored (No./M)	.00	.00	.00
Acceptable C-4 Slugs Canned (Pieces)	0	0	5298
Acceptable Pb-Cd Slugs Canned (Pieces)	0	0	2043
Acceptable 10-66 Slugs Canned (Pieces)	1253	0	1253
Average Steam Generated (M lbs/hr)	31.9	23.9	
Maximum Steam Generated (M lbs/hr)	68.0	31.0	
Total Steam Generated (M lbs)	23,005	17,811	
Coal Consumed (Tons)	1,559	1,175	
Sanitary Water from 3000 Area (Million Gals.)	78.2	76.8	
Average Rate (GPM)	1,810	1,720	

2. Activities

A net production of 447 tons of acceptable finished slugs achieved in 23 working days, including two overtime days, was essentially 102 percent of forecast. This is a new all-time production record for the Metal Preparation Section and is a particularly significant achievement in view of present relatively low yields. Six canning line-shifts per day were operated throughout the month, and there were a few occasions when manpower availability allowed seven line-shift operation. One hundred fourteen tons of the total production were cored slugs. Conversion to the technique of plugging cored slug chambers with aluminum inserts has permitted the increased cored slug production.

A composite yield of 75% was experienced in September. This was an increase of three percent over the previous month's yield and a twelve percent improvement over the low 63% yield experienced in July. All reject categories improved significantly except for bad welds.

The combined Metal Preparation and Reactor canned slug inventory improved from less than one week's supply to approximately a two and one-half weeks' supply at month-end. Substantial discharges scheduled in October for 100-B, 100-H, and 100-KW reactors, however, are expected to diminish this inventory. Bare slug inventory in Metal Preparation, excluding slugs in process, fluctuated during the month from three days' to less than a one-day supply. Every effort is being made to keep metal in process, particularly in slug recovery, to an absolute minimum. All metal shipments from the Feed Material Production Center at Fernald, Ohio are being traced to expedite prompt delivery to Hanford.

The 85-ton backlog of slugs in slug recovery, which existed at the beginning of the month, was reduced to normal by month-end. Most of this backlog was cored material which was deplugged and recessed for aluminum inserts. Three-shift operation was discontinued in the slug recovery operation on September 2, and normal two shift operation continued during the remaining portion of the month. Effective use of available manpower was achieved through re-assignment to the deplugging and recessing operations.

Approximately 50 tons of uranium scrap were shipped to the National Lead Company during the month for recovery and recycle. Most of the scrap was reject material which had been previously canned for the original Purex start-up.

The use of recycle uranium hexafluoride as part of the feed material at Fernald has been discontinued. All material now entering the production stream is of natural U₂₃₅ content.

An initial inventory of all production and associated equipment in the 313 Building for the unitization of Project CA-514 was completed during this month.

One eight-inch solid uranium canned slug failed during autoclave testing this month. A defect in the aluminum can was the probable cause of the failure.

The north retention pond for process wastes became full requiring diversion to the south pond. It is believed that the discharge from slug recovery reacts with other effluents to cause a sediment to be uniformly distributed over the pond bottom sealing it off and preventing percolation of the water. Possible correct measures for the solution of this problem are being investigated.

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3. Special Operations

Four-hundred eighty-two small diameter, uranium enriched aluminum alloy "C" slugs were canned by the hot press process during the month. A new electronic bond tester obtained from the Technical Section was used to complete the testing of the "C" slug backlog accumulated during August and September. Approximately 33 percent of the slugs tested were rejected by the new instrument on the basis of extremely critical inspection standards.

One-thousand eighty-two thorium slugs were canned by the "C" process with an overall yield of 81 percent. All available bare thorium slugs have been canned.

4. Schedule Variance

Acceptable canned slug production was 102 percent of forecast. An exceptionally high operating efficiency contributed substantially to this achievement.

B. Equipment Experience

1. Operating Continuity

Canning line operating efficiency was 96 percent during September, two percent higher than the 94 percent in August. This efficiency is one of the highest ever achieved by the Metal Preparation Section. More consistent performance of the metal wash machines, in addition to continued emphasis on routine maintenance of all equipment, was largely responsible for this achievement.

2. Inspection, Maintenance and Replacement

The slug recovery operation was suspended on September 29 and September 30 to allow revisions to be made to the piping systems. The revisions will permit access to the caustic pump and other equipment requiring periodic maintenance.

Spray banks were installed to provide better rinsing of the sleeves in the new sleeve cleaning machine. The angle of the baskets was also changed to improve drainage. A Ferro trap was installed on the suction side of the caustic recirculating pump to remove any ferrous particles from the caustic.

C. Improvement Experience

1. Production Tests

PT-313-47MT "Cored Slugs from Extruded Blanks and Rolled Rods" HW-33189
Satisfactory progress was made during this period on the production of cored slugs with aluminum end plugs. A total of 114 tons of finished slugs was produced with a yield of 74%. Poor bonds, frost test, and inclusions continued to be major causes for rejection.

At month-end the inventory of bare slugs was essentially exhausted except for approximately 3000 canning rejects being recovered. Future cored slug production will be dependent upon receipts from Fernald and will approximate 40 tons per month.

The alpha extrusion of tubular rods for cored slug fabrication has been discontinued since the quality is not comparable to alpha rolled drilled slugs. It is expected that the remaining lots of extruded slugs will be received for processing in October.

SECRET

Eb-3

Production Tests - continued

PT-313-56MT "Canning of Four Tons of Dingt Uranium for Pile Irradiation" HW-37695
A total of 1500 eight-inch dingt uranium slugs fabricated from special rod stock was canned by the lead dip process. The finished slugs are being measured and will be charged in sixteen control tubes to evaluate the effect of fabrication variables on irradiation performance. The slugs were fabricated from dingots reduced from 0 - 66% in diameter during forging and finished either by extrusion or rolling.

Under Supplement A to this production test an extended evaluation will be made of dingt uranium slugs. Approximately ten tons of this material is on hand for processing. Because of excessive slug surface oxidation after outgassing, further processing of this material has been deferred until October when adequate pickle facilities will be available.

2. Process Tests and Revisions

Reduction in the sampling frequency of metal baths for uranium content has been accomplished in the canning operation. Sampling for lead has been reduced from daily to monthly and alsi samples are now taken on a weekly rather than daily basis. Data from past analyses indicate that the uranium content increases to a saturation point and then remains almost constant.

Through a revision of operation techniques in slug recovery, the consumption of caustic and loss of uranium in the caustic and other treatment solutions have been minimized. Formerly the slugs were placed in tanks and the caustic and treater solutions were pumped into and out of the tanks in sequence. Since it was impossible to remove all of the solution in the tank, some was lost. Present practice is to move the slugs to permanent caustic and treater tanks.

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 Costs1. Labor Variance

Direct labor unit costs will decrease .005 per unit from the previous month as a result of a 4% increase in yield.

2. Material Variance

Unit costs for direct material remained essentially the same as the previous month. The decrease, as a result of yield improvement, will be offset by increased steel sleeve consumption, which resulted from diverting labor from the honing operation to other production activities.

3. Other Costs

Unit costs for I.M.E. will decrease .015, primarily as a result of an increase in production.

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

Project CA-514 - "Expansion of 300 Area Production Facilities" - Work orders issued to Minor Construction and Maintenance are scheduled for completion dates of October 15 and December 15, 1955.

Minor Construction Forces completed installing all overhead lighting, locating furniture, and are continuing work on the balancing of the heating and ventilating system, painting, repair of expansion joints, and dock drainage. General exhaust fans for the slug recovery room, pickle machine area, and component parts preparation area are to be installed.

All punch list items for the autoclave and final inspection area have been completed.

Work continued on the finishing line conveyor, radiograph trays, slug brushing devices, and lighting installations for the weld, braze, and final inspection stations. The film carrier system modifications were completed except for sealing minor leakage at the joints. The radiography conveyor extensions were installed and the modifications to prevent the trays from tipping were completed.

Minor Construction completed alterations to the exhaust duct on the No. 1 penetration etch machine so that the exhaust systems on the machine no longer have exhaust duct passing under the tanks to form condensate acid traps. Maintenance has replaced all conduit that had been attacked by corrosive fumes on both penetration etch machines. A low-level float switch indicator was installed in the acid tank on the etch machines to prevent element failures in case of acid loss. Stainless steel pipe drains are to be installed from each etch machine to the sewer to prevent noxious fumes from escaping into work areas.

Installation of the overhead conveyor guard for the furnace area was partially completed. Minor Construction Forces have completed all exception work orders for this area. Maintenance is continuing work on the Ajax furnace cradle, canning inter communication system, ventilation system, and stamping machines.

Minor Construction completed the conveyor installation on the pickle machines and seal welding around nitric acid tanks. Maintenance installed transfer pumps on the pickle machine, but the pressure gauges for the pump lines were not installed when investigation showed them to be of similar construction to the ones that failed previously. The junction box and conduit on the pickle machines that had been attacked by corrosive fumes were replaced with acid resistant materials.

The new slug recovery office, the ventilation system, and monorail system were completed by Minor Construction Forces. Maintenance is to modify the piping system between the caustic holding and treating tanks to allow access to the transfer pump. Work orders have been issued to Maintenance to install a stack extension on the process exhaust, fabricate seven additional slug recovery baskets with trays, and adjust manometers.

The feedpoint on the methanol still column was relocated and the column insulated according to suggestions made by technical consultants from the Separations Process Section. A product of 99.1% at a 15.5 gph feedrate and a 85.5% recovery of methanol was obtained. It is believed that further experience will increase the methanol recovery. The methanol still was accepted for operation on September 23, 1955. A new pump for the methanol storage tank was installed.

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Project Status - continued

Project CA-590 - "Fly Ash Collection Equipment - 384 Building" - Revision No. 2 of the project proposal was approved by the A.E.C. Project Review Board on September 8. No work authority has as yet been received.

Project CA-601 - "General Grounds Improvement - 300 Area" - A work authority has not been received from the Commission. Informal discussions were held with Commission representatives to ascertain the nature of the scope reduction. As some of the work proposed has been performed on other authorizations since the submittal of this project, it appears that the authorized funds will be sufficient to accomplish the necessary work. The A.E.C. is currently negotiating a contract with an architect-engineer. The construction contract is expected to be let by March 1, 1956. Completion is estimated at June 1.

Project CG-610 - "Replacement of 313 Building Roof" - Total authorized funds \$55,000. Total cost \$43,000. This project was completed and accepted as of September 7, 1955.

Project CG-614 - "Hanford 4X Program - 300 Area" - Work orders have been issued for the installation of all equipment under this project.

The four new automatic welders were received from the vendor. A strike has closed the vendor's plant in which the autoclaves are being fabricated and approximately thirty days of fabrication work remains. Work is continuing on the conveyors between the quench tank and inspection fluoroscope.

The resistance furnace and furnace area hatchway were relocated. Lining of the 7C induction furnace was completed. Instrument panels 7C and 7D were installed and wiring for power and instrumentation completed. Electrical runs to the overhead exhaust fan are ready for hook-up.

Project CA-627 - "Replacement of 300 Area Fence" - A new perimeter fence has been completed and has passed inspection by G.E. and A.E.C. Security personnel. The grounding of the fence beneath power lines and site levelling is the only work remaining.

Project IR-194 - "Centralized Quality Reporting System" - A request has been issued to the A.E.C. for an extension to the established completion date of this project from September 15 to March 1. Final design has been completed and essentially all materials have been received or are on order.

Project ER-A-3122 - "Steam Plant Deaerator Replacement - 384 Building" - Boiler feed water analysis has shown that the present deaerator is not operating efficiently even at loads within its rated capacity. An engineering investigation is being conducted to determine the efficiencies of the deaerator auxiliary equipment. The proposal is being held pending determination of the scope of work required to obtain sufficient deaerating capacity.

"Noise Reduction - 300 Area" - Estimated cost is \$45,000. The project proposal is being forwarded to the Commission for approval.

"Modification to Pickle Machines - 313 Building" - The preliminary project proposal, requesting funds for preliminary design and procurement, has been approved by the Manufacturing and Engineering Departments and forwarded to the Finance Department. The scope of the proposed work provides for: the relocation

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Metal Preparation Section

HW-39260

Project Status - continued

of the degreaser; the addition of an acid tank for immersion pickling; and conversion of the present acid spray tank to a water spray rinse. The final project proposal will be issued upon completion of preliminary design. Total project cost is expected to be under \$50,000. The study on "Fume Control in the 313 Building" was completed on September 22, 1955 by the Engineering Department. Evaluation of the study against the proposed modification will be made.

Work Orders CC-8188 and CC-8189 - "Installation of Dip Slug Pickle Equipment" Total cost - \$10,315. The job is to be completed by October 7, 1955. The acid brick floor, sump, monorail and exhaust stack were installed and piping to the tanks was continuing at month-end.

F. Significant Reports Issued

1. Routine

<u>Number</u>	<u>Title</u>	<u>Author</u>	<u>Date</u>
HW-38939	Operation Sub-Section Monthly Report - August 1955	W.W. Windsheimer	9-6-55
HW-38957RD	Production Report - Metal Preparation Section, Operation Sub-Section	H.E. Berg	9-8-55
HW-38940	Monthly Report, Process Sub-Section, Metal Preparation Section, August 1955	E.W. O'Rourke	9-7-55
HW-38942	Monthly Report, New Fuel Element Production Program, August 1955	W.A. Blanton	9-7-55
None	Monthly Project Status Report	J.W. Nageley	9-29-55
None	Monthly Cost Report	H.S. Krider	
None	Metal Preparation Section-Force Report	R.E. Anderson	9-1-55

2. Non-Routine

HW-39065RD	Official Production Forecast, Metal Preparation Section - September 1955 - June 1965	F.E. Berg	9-15-55
HW-38854	Manufacturing Dept., Radiation Incident Investigation No. 507-R	R.O. Budd	9-6-55
HW-39059	Atomic Spray Pickling Machines	J.E. Ruffin	9-19-55
HW-39146	Porosity Rejection Rates - Additional Data	S.M. Gill	9-26-55
HW-39172	Regard to Off-Site Shipment of Canning Residue	W.G. Tews	9-23-55
HW-39191	Hydrogen Explosion Hazard in Slug Recovery	R.C. Aungst	9-27-55
HW-39201	HAPO Lot Designations - Dingot Slugs	S.M. Gill	9-27-55
HW-39208	Aluminum Cans and Caps - Current Status of New Vendor Evaluation	T.D. Naylor	9-28-55
None	Proposed Evacuation Warning System for the 300 Area	T.B. Correy	9-28-55
None	Non-Destructive Testing Machines for 313 Building Production Lines	T.B. Correy	9-23-55

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ED-7

II. PERSONNELA. Organization

D. W. Haught transferred into the Section as Superintendent, Projects & Personnel Development Sub-Section vice F. K. Peck.

K. V. Stave assumed duties of Superintendent, Process Sub-Section replacing E. W. O'Rourke who transferred to Production Section, Manufacturing Department. S. M. Gill became Head, Process Control Unit vice K. V. Stave.

B. Force Summary

	<u>Start of Month</u>		<u>End of Month</u>		<u>Net Change</u>	
	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Exempt</u>	<u>Non-Exempt</u>	<u>E.</u>	<u>N.E.</u>
Section General	1	1	1	1	0	0
Operations	21	172	22	177	+1	+5
Power & Maintenance	34	322	34	318	0	-4
Process	36	66	36	64	0	-2
Projects & Personnel	14	5	15	5	+1	0
Section Totals	106	566 (672)	108	565 (673)	+2	-1

C. Safety Experience

There were no major, sub-major or near-serious incidents in September.

The results of nitric acid fume tests conducted by the Industrial Hygiene Unit indicate that standard tolerances are not being exceeded in the working areas surrounding both of the metal wash machines. Simultaneous operation of both metal wash machines can therefore be safely conducted.

D. Radiation Experience

No exposures exceeding the permissible limits occurred during the month. Four exposures in excess of 200 mrad/week and 49 exposures in excess of 100 mrad/week were reported.

A new burial ground for the Section is nearing completion. Excavation has been completed, and fencing is now being installed. The grounds are expected to be ready for use by October 15.

E. Personnel Activities1. Visits and Visitors

R. R. Witek attended the instruction clinic and Tenth Annual ISA Conference in Los Angeles.

S. M. Gill was present at the Metal Quality Working Committee meeting held in Cincinnati, Ohio.

T. W. Gore visited San Jose, California to provide engineering assistance on Commonwealth-Edison Project.

2. Meetings

H. A. Jones presented a speech entitled "Basic Philosophy of Accident Prevention" for members of the Hospital Medical Records Unit.

Meetings - continued

Four round table, 23 information and 20 staff meetings were held for Section personnel.

Forty-seven safety and security meetings were held during the month.

Six training programs and one training film were presented during this period with total attendance of 86 persons. The second series of the Work Simplification Program began on September 19. Two groups of exempt employees are participating in this program which will continue over a 16-week period.

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E6-9

Richland, Washington
October 7, 1955

MANUFACTURING DEPARTMENT
REACTOR SECTION
MONTHLY REPORT
SEPTEMBER, 1955

I. RESPONSIBILITY

Assigned responsibilities of the Reactor Section remained unchanged during September.

II. ACHIEVEMENT

A. Operating Experience

Reactor time operated efficiency was 67.9 per cent, lowest since February, 1955. This low efficiency resulted from the large amount of outage time required by slug failures, process tube leak testing, process tube replacement, electrical fault tests, and normal charge-discharge activities. This large amount of outage time more than compensated the forecasted 10 day DR Reactor Panellit gage outage which was postponed so that only two of the 10 days occurred during September.

Total and plutonium input productions were eight per cent below forecast because of the low efficiency as explained above.

Thorium input production was 12 per cent below forecast as the result of low operating efficiencies at C and H Reactors. Production at these reactors charged to thorium irradiation was 3.5 and 2.6 per cent, respectively.

Plutonium megawatt day output production was 99 per cent of forecast. Production was slightly below forecast due to smaller than anticipated discharges at the low concentration reactors. This resulted from the large amount of outage time which prevented achievement

DECLASSIFIED**A. Operating Experience (Continued)**

of goal concentration.

The goal concentrations for low, production and D Reactor pilot program material remained unchanged in September. Tons discharged of the low and production concentrations were 207 and 103, respectively.

Established maximum reactor operating levels, excluding enrichment burnout, were increased a total of 51 megawatts, 16 at H Reactor, and 35 at KE Reactor. At H Reactor, the increase resulted as continued benefits from increased flow following venturi installation, increased effluent water, graphite and helium limits, and a slight drop in inlet water temperature. At KE Reactor, the increase resulted from improved flattening permitted by long term gains.

There were 17 slug failures in September as compared to 22 in the previous month.

	<u>B</u>	<u>C</u>	<u>D</u>	<u>DR</u>	<u>F</u>	<u>H</u>	<u>KE</u>	<u>KW</u>	<u>Total</u>
Eight-Inch Regular	1	2	3	2	4				12
Production Test						2*			2
"C" Material	$\frac{1}{1}$	$\frac{2}{2}$	$\frac{3}{3}$	$\frac{2}{4}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{0}{0}$	$\frac{0}{0}$	$\frac{3}{17}$

*Production Test 105-7-MR, "Irradiation of High Quality Production Uranium Slugs."

Reactor outage time required for the removal of these slug failures was 370 hours.

1. Statistics

Operating statistics are summarized in the table on Page 3.

2. Activities

KW Reactor was shut down from September 18 to 30, for front face connector and rear face temperature monitor element replacement. In addition to the replacement of all front face aluminum connectors with teflon-stainless steel braid reinforced connectors, all of the remaining original temperature monitor bulbs were replaced with interim type bulbs, and miscellaneous maintenance and inspection of horizontal and vertical rods, Panellit gages, and other instrumentation was accomplished.

DR Reactor was shut down on September 28 for an approximate 10-day outage to replace Panellit gages in connection with

1. Statistics

Reactor Time Operated
Efficiency (%)

B	C	D	DR	F	H	KE	KW	Total or Ave.
91.1	56.2	60.4	80.4	38.8	70.2	89.8	56.8	67.9

Reactor Outage Time (Hrs)
Plutonium Production
Special Irradiations
and Tests

64.2	285.1	284.9	141.4	440.9	161.2	73.5	310.9	1762.1
-	30.6	-	-	-	53.3	0.3	-	84.2

Total Outage Time
Reactor Unscheduled
Outage Time (Hrs)

64.2	315.7	284.9	141.4	440.9	214.5	73.8	310.9	1846.3
28.3	285.7	134.7	93.2	150.2	162.1	33.2	-	887.4

Metal Discharged (Tons)

27.8	62.0	15.0	47.7	23.0	74.4	0.1	60.3	310
------	------	------	------	------	------	-----	------	-----

Water Quality (ppm Turbidity)

Raw Water - Average
Raw Water - Maximum
Process Water - Average
Process Water - Maximum

3	3	4	4	3	2	3	3	
4	5	4	4	4	2	4	4	
.004	.004	.005	.004	.005	.004	.003	.003	.003
.005	.005	.007	.005	.007	.005	.003	.003	.006

Water Pumped (MM Gals)
Bldg. 190 to reactor
Bldg. 182 to 200 Areas
Bldg. 181

1996	2532	1624	1922	1076	1961	5266	4126	20503
510		-		-	-			510
	5729		4324	1369	2228	5759	4316	23725

Steam Generated (MM Gals)
Coal Consumed (Tons)
Oil Consumed (M Gals)

	162	198	75	21	19	581		
	10300	12200	5045			33649		
				237	213	450		

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EC-3

A. Operating Experience

2. Activities (Continued)

Project CG-558 (Reactor Plant Modification for Increased Production). In addition to gage replacement, installation of the gamma monitoring system for slug failure detection and poison column control facility is planned.

Electrical fault tests were conducted on the 4.16, 13.8 and 230 KVA systems at KE and KW Reactors during the month to determine if the protective relaying and automatic switching mechanisms would function properly. A portion of the tests required that all reactors be shut down. All equipment was found to function satisfactorily.

Three tubes of J-Q material were discharged from C Reactor, leaving a total of 59 J-Q tubes at this reactor, and 51 at H Reactors.

There was no shipping of Mint material from DR Reactor to Savannah Works during September due to scheduled shipments late in August and early in October.

The following table indicates activities during September associated with special irradiations other than the J-Q program noted above:

	<u>Tubes Charged</u>	<u>Tubes Discharged</u>	<u>Casks Shipped</u>
Production Tests	36	13	1
Rala	0	6	2
Mint (flattening)	3	14	0
Chemical 10-66	29	0	0
Totals	68	33	3

B. Equipment Experience

Twenty-four reactor scrams occurred, 14 of which were caused by normal Panellit systems variables. Three manual scrams, two at C Reactor and one at D Reactor, were necessary to control high exit water temperatures. Three scrams at KE Reactor resulted from water pressure variations; one due to a high Panellit gage trip, the cause of which could not be determined although the gage and tube charge were examined; one due to a low Panellit gage trip on a Building 1706 KER test tube when a faulty pressure regulating valve caused pressure fluctuations; and one due to a flow decrease when the cross-tie valve to KW Reactor opened as the result of lowering the water pressure at KW Reactor without by-passing the cross-tie valve.

Two scrams at C Reactor resulted from water pressure variations; one when a front cap insert worked loose and became lodged against the

B. Equipment Experience (Continued)

charge causing a high Panellit gage trip; and one when a plugged cone screen caused a low Panellit gage trip. One scram at DR Reactor resulted from a short in the Beckman circuit while removing a Beckman instrument from the panel. This scram caused a scram at D Reactor through the D-DR Reactor inter-tie.

Total outage time attributed to all scrams was approximately 110 hours.

Process tube leak testing programs were conducted at C, D, DR, F, and H Reactors as detailed below. At C Reactor, after testing two tubes, a leaking tube was found and replaced. The approximate location of the leak was determined by evaluating graphite temperatures, exit water temperatures, and drip leg water collection rate data. At D Reactor, during two separate leak testing programs, a total of 238 tubes were tested with three tube and one Van Stone leaks found and corrected.

During two leak testing programs at F Reactor, involving all tubes and 1700 tubes, respectively, 21 rear Van Stone and seven tube leaks were found. Leaking tubes were replaced as part of the general tube replacement program (see below). At H Reactor, during three leak testing programs involving 471, 51 and 92 tubes, respectively, one tube and two Van Stone flange leaks were found and corrected. During the last test program, a new method of leak determination involving the detection of helium in cross headers was successfully used. At DR Reactor, a leak was found in conjunction with a slug failure. Testing of an additional 226 tubes did not reveal any other leaks.

At month end, collection rates remained high at F Reactor, were decreasing at C Reactor and had returned to normal at DR Reactor. At D and H Reactors, limited equilibrium operation precluded a determination of the trend.

Process tube replacement programs were conducted at D and F Reactors in September. At D Reactor, 31 tubes were removed and replaced, and eight empty channels were retubed. At F Reactor, 67 tubes were removed and replaced, and three empty channels were retubed. Of the 67 tubes replaced, 42 were replaced on the basis of corrosion data.

At C Reactor, all third safety system balls were dropped during a slug failure outage while attempting to reset the No. 1 safety system. Investigation revealed that mercoid switches on the two systems were fed by the same impulse line. To prevent a recurrence of this condition, separate impulse lines were installed.

Mercury separation in K Reactor Panellit gages continues to be a problem with separation found in 233 and 236 gages at KE and KW Reactors, respectively, during inspections of all gages. Since

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B. Equipment Experience (Continued)

no replacement gages were available, the situation was corrected temporarily by shaking the mercury down.

Panellit gage reliability checks at eight reactors revealed 17 faulty trips, 49 of which occurred at KE Reactor. This experience is approximately 50 per cent higher than in August, but with similar distribution.

During a routine start-up at Building 190-KW, a flashover occurred in tank cells of the liquid rheostat of No. 2 highlift pump unit. Inspection revealed breakdown of the insulating lining of the cells which were immediately dispatched to the manufacturer for repair.

C. Improvement Experience

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

- PT-105-579-A (Quantity Irradiation of J-Q Columns)
In September, three tubes of J-Q material were discharged from C Reactor. The resulting month end balance of tubes under irradiation at C and H Reactors was 59 and 51, respectively.
- PT-105-7-MR (Irradiation of High Quality Production Uranium Slugs)
Two slug failures from this test were discharged from H Reactor at exposures of 1436 and 1519 megawatt days per ton. As a result of these failures, the test was concluded by discharging the remaining seven tubes at an average exposure of 1435 megawatt days per ton.
- PT-105-587-A (Irradiation of Internally and Externally Cooled Slugs)
C Reactor was scrammed once in September by a high Panellit gage trip on a tube containing this test material. Investigation revealed that a front cap insert had broken loose and lodged against the upstream end of the column. During the resulting outage, the subject tube and two others under this test were discharged, after a two-week irradiation, since the desired data had been obtained.
- PT-105-354-E (KAPL-120 Recirculation Loop)
Installation of the recirculation loop and auxiliary equipment at H Area was completed in September, with charging of the fuel element accomplished during September 29, outage.

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C. Improvement Experience (Continued)

Seven revised Process Standards - Reactor were approved and issued. These were Standards titled: "Maintenance of Process Water System," "Gas Composition, Pressure and Flow," "Number of Inoperable Ball 3X Hoppers During Reactor Shutdown," "Ball 3X System," "Process Tube Temperature Monitor," "Ruptured Slug Detection," and "Film Formation Control." The most significant changes accomplished by these revisions included: the raising of the process tube temperature trip setting limit for the K Reactors from 5 C to a maximum of 10 C above the trip-before-instability limit of a tube, as necessitated by instrument trip setting limitations; and specification of the requirements for the gamma monitoring slug failure detection systems currently being installed at reactors.

Preliminary evaluation of protective rubber footwear molded of natural rubber was in progress during the month with satisfactory results. The rubbers appear to be equal in wearability to the neoprene rubbers now used. Savings of approximately 25 per cent in protective footwear costs may be realized if the new type rubber is approved for use.

At DR Reactor, the poison column control facility and horizontal "half" control rods proved to be a valuable control combination in expediting the removal of water from the near side graphite of the reactor by permitting higher than normal levels under these conditions, and by forcing the heat into the wet zone.

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

In August, an invention report filed by the Biology Section for N. L. Dockum on a design for a knife holder for the American Optical Company Rotary Microtome No. 820 listed Ralph E. Rugg of the Reactor Section Maintenance Sub-Section as co-designer.

D. Events Influencing Costs

Major factors adversely influencing cost during September included the tube replacement programs at D and F Reactors, leak testing programs at C, D, DR, F, and H Reactors, the dropping of third system balls at C Reactor, the continued relatively high slug failure rate, continued high maintenance activity relative to pump units, particularly at 190-C Building, and maintenance activities associated with scheduled reactor outages. In addition to their actual cost, these items resulted in a very low reactor time operated efficiency, with resultant production significantly below that of the previous month. Cost was also adversely affected by a \$30,000 accrual for wage increases recently granted.

Reactor Section cost was beneficially affected primarily by a \$42,500 decrease in Power Sub-Section cost. Reduced steam generation resulted in a decreased fuel cost of \$31,000, while chemical costs decreased approximately \$11,500 due to a 10 per cent decrease in process water pumped.

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D. Events Influencing Costs (Continued)

On the basis of the above factors, preliminary estimates indicate that both plutonium and total irradiation unit cost will be approximately 22 per cent higher in September than in the previous month. Of this, approximately 17 per cent may be attributed to lower production, with the balance due to the tube replacement program and the wage accrual.

E. Plant Development and Expansion

1. Project Status

The most significant Reactor Section project activity is reported below. Further details concerning projects may be found in the report, "Status of Reactor Section Projects, Informal Requests and Budget Items," F. A. R. Stainken to R. S. Bell, dated 9/20/55.

CA-512

(100-K Plant)

Revision No. 4 of the Project Proposal for CA-512, seeking authorization for expenditure of an additional \$2,000,000 for clean-up and start-up items, was approved by the AEC. Replacement of front face connectors and rear face temperature monitor elements was completed at KW Reactor in September as described in "Activities." Replacement of these items at KE Reactor is scheduled to begin October 4. The Design Section has recommended that the current interim type bulb be considered as adequate for permanent use. The Reactor Section is continuing a study of these bulbs.

CG-558

(Reactor Plant Modification for Increased Production)

Replacement of Panellit gages at DR Reactor began on September 29, with completion scheduled for the week of October 4. The pump vendor is experiencing difficulties with pump castings, but no delay is anticipated for the on-plant test of the first pump planned for November 15. Construction in the water plants and reactor areas is progressing on schedule. It has been determined that radiological control measures will be necessary during removal and disposal of replaced filter media at several water plants (see "Radiation Experience").

CG-574

(Hanford 3X Program - Irradiation)

The Project Physical Completion Notice for this project was issued August 31. The buckets required to complete the shipment of Mint material to Savannah Works were received in September, completing all exceptions made to the project acceptance.

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E. Plant Development and Expansion

1. Project Status (Continued)

CG-578 (Effluent Water Monitoring Improvements - 100-B, D, DR, F, and H Areas)
Preparatory work at DR Reactor was completed, and installation started on September 29, during the Panellit gage outage. Preparatory work at B and D Reactors is in progress.

2. Plant Engineering

A number of engineering and development studies were active in the Section during September. The studies are, in general, aimed at decreasing costs and/or increasing production. Details are given in Document HW-39326. Several items of interest are reported below.

Methods for removal of film from process tubes scheduled for replacement are being evaluated in an attempt to reduce contamination problems which minimize working time limits and render tools unfit for use. Hot chromic acid purges and sand purges have proved unsatisfactory, and further studies will be directed along the lines of wet sand blast impingement cleaning and chemical cleaning under static hydraulic conditions.

Studies to determine the causes of Panellit gage oscillations have revealed that the pulses originate from dual sources, the front face tube fittings and the 190 Building pumps. In view of the impracticability of eliminating these oscillations, investigation is continuing along the line of developing systems which dampen out the oscillations without seriously impairing gage response time. Injection of turbine oil into gage sensing lines to dampen the oscillations appears to be a promising solution to the problem.

F. Significant Reports

1. Routine

Monthly operating reports issued for August were:

HW-38828-A	Reactor Section	R. S. Bell	9/8/55
HW-38902	Operations Sub-Section	A. R. Maguire	9/1/55
HW-38910	Process Sub-Section	O. C. Schroeder	9/1/55
HW-38860	Projects and Personnel Development	F. A. R. Stainken	9/1/55
HW-38961	Radiation Monitoring Sub-Section	E. C. Herman	9/6/55
-	Maintenance Sub-Section	E. E. Weyers	9/8/55
HW-38935	Power Sub-Section	L. C. McLaughlin	9/6/55

Other routine reports issued during September include:

HW-39111	"Monthly Progress Report, Reactor Section Expansion, September, 1955"	J. P. Langan	9/22/55
-	"Status of Reactor Section Projects, Informal Requests, and Budget Items"	F. A. R. Stainken	9/20/55
HW-38909	"Reactivity Balance and Associated Data - Period August, 1955"	A. F. Vinther	9/1/55

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F. Significant Reports2. Non-Routine

HW-38959	"KW Reactor Operation Subsequent to Replacement of Front Face Connectors"	D. S. Lewis	9/15/55
HW-39286	"105-KK Reactor Radiation Levels"	J. J. Kaigler	9/8/55
HW-38808	"Interim Report, Production Test 105-12-MR, Crossheader Purge with Chromic Acid"	A. K. Hardin	9/19/55
HW-38760	"Measurement of the Sensitivities of Reactor Neutron Flux Monitors at F Reactor"	Y. Murakami	8/11/55
HW-39058	"Measurement of the Sensitivities of Reactor Neutron Flux Monitors at KW Reactor"	D. E. Crouter	9/19/55
HW-39048	"Unit Motion Report - Biological Shield Displacement"	R. R. Bloomstrand	9/23/55
HW-38969	"Six Months Post Acceptance Report, Project CG-567, Phase I, Alum-Activated Silica Water Treatment Facilities, 100-B, D, DR, F, and H"	R. S. Bell	9/9/55
HW-39181	"Six Months Post Acceptance Report, Appropriation Request 55-M-6, Light Scattering Microphotometer"	R. S. Bell	9/26/55
OUO	"Reactor Section Manual of Standard Costs"	R. S. Bell	9/6/55

III. PERSONNELA. Organization

There were no appointments in the Reactor Section during September.

B. Force Summary

	<u>Beginning of Month</u>	<u>End of Month</u>	<u>Net Change</u>
Section General	2	2	0
Operations	378	379	+ 1
Maintenance	639	666	+ 27
Projects and Personnel	52	49	- 3
Power	486	486	0
Process	76	76	+ 2
Radiation Monitoring	89	92	+ 3
Section Total	1722	1752	+ 30

Changes during September included 29 transfers into the Section, seven transfers out of the Section, 21 new hires, 11 terminations, no reactivations, and two deactivations.

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C. Safety Experience

One Major Injury, No. 111, and two Sub-Major Injuries, Nos. 285 and 286, occurred in the Reactor Section during September. No. 111 occurred at the Building 184-D coal unloading facilities on September 1, and involved a coal handler who had the tips of two fingers amputated when they were pinched between the floor of a railroad hopper car and the hopper door control lever shaft while he was attempting to open the hopper doors which were wired shut.

No. 285 occurred at D Reactor on September 7, and involved an operator who received a broken toe when his foot was struck by a three-foot metal trough knocked from a leaning position against the cushion corridor fence. No. 286 occurred at Building 1717-B on September 15, when a machinist, while facing a valve seat body mounted in a lathe with copper sheet to protect the valve body, inserted a finger into the valve body to test the smoothness of the cut during operation of the lathe. The copper sheet caught his finger, completely removing the fingernail.

D. Radiation Experience

Two Class II Radiation Incidents, Nos. 95-R and 97-C, and two Class I Radiation Incidents, Nos. 514 and 517-R, occurred in the Reactor Section in September. No. 95-R occurred at C Reactor on September 10, and involved an operator who received localized exposure in excess of the weekly limit while operating a ball return hose during the recovery of third safety system balls. No. 97-C occurred at F Reactor on September 25, and involved a craftsman who received localized exposure in excess of the weekly limit from a radioactive particle which lodged on his neck.

No. 514 occurred at F Reactor on September 11, and involved a craftsman who received unplanned exposure to the thighs when contamination was spread to his coveralls during process tube removal. No. 517-R occurred at DR Reactor on September 14, and involved personnel who received unplanned exposure through momentary loss of radiation control during the removal of dummies from the basin.

Complete details relative to these incidents can be found in Documents HW-39289, HW-39320, HW-39079, and HW-39183, respectively.

Contamination to a maximum of 1200 c/m has been detected in Building 183-D filter beds. Similar conditions have been observed at Buildings 183-F and H. Filter beds at 100-B and K Areas have not yet been surveyed. The source of this activity has not been positively established, but is thought to be either upstream effluent discharge, or concentration of naturally occurring radioactivity.

E. Personnel Activities

At month end, 21 employees are receiving on-the-job training for engineering or supervisory assignments in the Section; 10 of these are on assignment under the rotational training program.

C. W. Botsford and G. O. Amy of the Process Sub-Section attended the Production Engineering Show and Machine Tool Exhibition at Chicago, Illinois during the period September 5 to 9, to investigate equipment and methods which may be applicable to Reactor Section installations.

R. L. Roy of the Process Sub-Section and J. D. McCullough of the Projects and Personnel Development Sub-Section attended the Tenth Annual Instrument Automation Conference and Exhibit at Los Angeles, California during the period September 12 to 16.

A. L. Bement of the Projects and Personnel Development Sub-Section visited the Pacific Scientific Company and Chapman Freezer Company at Portland, Oregon on September 7, to inspect refrigerators purchased on Project CG-583 for moisture monitoring systems to detect leaking process tubes.

A review of the revised insurance and pension plans was presented to approximately 40 Reactor Section sub-section superintendents and unit heads by W. P. Allen of the Employee Services Unit.

Rescue crew training of the second group (32 individuals) of Reactor Section personnel began September 9, with completion of the program scheduled for December 23.

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Richland, Washington
October 7, 1955

MANUFACTURING DEPARTMENT
SEPARATIONS SECTION
SEPTEMBER 1955

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Operating Experience

1. Statistics

a. Bismuth Phosphate Operations

	<u>September</u>		<u>August</u>	
	<u>Normal</u>	<u>Acid Wash</u>	<u>Normal</u>	<u>Acid Wash</u>
Charges started in Canyon Bldgs.	106	2	89	2
Charges completed in Conc. Bldgs.	106	2	90	2
Special charges-Conc. Bldgs.		14		3
Charges completed-Isolation Bldg.	119	2	84	2
Average Waste Losses, %		3.3		3.0
Special charges-Isolation Bldg.		15		8
Material balance, %		101.8		98.8
Yield through Process, %		98.5		95.8
Average cooling time (days)		102		108
Minimum cooling time (days)		87		76

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b. Redox Operations

	<u>September</u>	<u>August</u>
Equivalent charges started	209.2	161.0
Charges completed	219.7	169.1
Tons Uranium delivered to storage	310.1	228.9
Average Production Rate per Operating days, Tons	10.9	8.4
Average Daily Operating Rate for the month, Tons	10.3	7.5
Average yield, %		
Uranium	100.0	99.2
Plutonium	100.9	104.0
Total Waste Loss, %		
Uranium	0.43	0.79
Plutonium	0.76	0.71
Average cooling time, days	100	109
Minimum cooling time, days	85*	96
Percent down time	5.2	13.4

*Does not reflect the 1 ton of 64 day old metal charged due to a Reactor loading error.

c. 231

	<u>September</u>	<u>August</u>
Batches started	132	95
Batches completed	136	96
Batches awaiting processing	1	12

d. 234-5 Operations

	<u>September</u>	<u>August</u>
Batches completed through Task I	159	128
Batches completed through Task II	226	124
Runs completed through Task III	85	44
Waste Disposal (Units)	86.61	16.34

e. UO₃ Operations

	<u>September</u>	<u>August</u>	<u>To Date</u>
Uranium drummed, Tons	422.62	339.61	11,035.99
Uranium shipped, Tons	428.89	374.33	11,030.28
Average cooling time, days	106	115	
Minimum cooling time, days	91	102	
Waste Loss, %	0.02 est.	0.02 est.	

f. TBP Operations

	<u>September</u>	<u>August</u>	<u>To Date</u>
Tons received from Metal Removal	137.98	147.53	5,940.50
Tons shipped to UO ₂ Plant	132.62	146.04	5,740.68
Average Production Rate per Operating day, Tons	5.08	5.11	
Average Daily Operating Rate for the Month, Tons	4.42	4.71	
Average yield, %	94.60	95.43	
Total Waste Loss, %	5.21	3.25	
Ratio Actual Waste Volume returned to Theoretical Volume	0.82	0.79	
Percent Down Time	12.92	7.74	

g. Power

	<u>200 East</u>	<u>200 West</u>
Raw water pumped, gpm	2 071	8 724
Filtered water pumped, gpm	515	1 171
Steam generated, lbs/hr	26 841	160 207
Maximum steam generated, lbs/hr	44 000	225 000
Total steam generated, M lbs.	19 322	115 349
Coal consumed, tons (est.)	1 247	7 579

h. Waste Storage

	<u>Equivalent Tons U</u>	<u>Sept.</u>	<u>Aug.</u>
Metal Waste reserve storage capacity-T Plant	293	122	
1st Cycle reserve storage capacity-T Plant	337	410	
Metal Waste reserve storage capacity-B Plant	685	685	
1st Cycle reserve storage capacity-B Plant	74	74	
Redox Waste reserve storage capacity	415	305	

2. Activities

a. Redox Processing

A combined first cycle feed rate of 11 tons uranium per day was established and maintained for 34 days starting on August 25 and continuing throughout this month until September 28. During this period several difficulties were encountered, but were not severe enough to cause a plant shutdown. Among these were plugging and replacement of a silver reactor, erratic performance of the waste concentrator (D-12) to (D-10) overflow line which restricted waste cell throughput, and a three minute power outage caused by an electrical storm.

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

Toward the end of this operating period, high E-12 (final UNH product receiver) gamma ratio analyses combined with erratic performance in several columns indicated the need for a shutdown and flush. The plant was shutdown on September 28. During this shutdown, columns were flushed and the third uranium cycle letdown valve (3DW) which stuck open was replaced. On September 29 the extraction batteries were started up, and a reduced rate of 9 tons uranium/day held through month end and while E-12 gamma ratios were being brought within the limit of shipping specifications.

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

During the month second cycle performed effectively but higher than normal waste losses occurred in the first cycle operation, resulting in a production slightly under commitment.

With waste losses ranging from 10 to 15 times normal, a shutdown was made to flush this system, however, this was only partially successful. This was followed by an installation of a "surge pot" chamber and sampler in the RC column inlet riser in an attempt to correct a channeling condition thought to exist. Failure of this expedient resulted in a complete RC column replacement later in the month which returned waste losses to normal.

2) UO₃ Processing

Adequate feed supplies were provided all month. In the face of a one day Labor Day holiday shutdown and a two day scheduled outage for repairs, a production of 422.62 tons UO₃ as uranium - exceeded only by a May 1954 production of 475 tons - was achieved. This represented an average daily output of 15.6 tons.

3) Waste Metal Removal

Tank farm blends were maintained in the ratio range of 61 - 78 percent UR farm (minimum age - 18 months) material of 0.171 lbs. U/gallon average. Sluicing was begun in 102-UR and 106-TX and was discontinued in 101-UR and 105-TX this month.

c. T Plant Processing

Although the continuity of operations was affected by some mechanical difficulties and by an operating problem involving high product content of Isolation Building clean-out and recycle material which necessitated the processing of 14 master recycle

c. T Plant Processing (Continued)

runs in the Concentration Building, the production commitment was exceeded by approximately 34%. I^{131} emissions continued as a significant problem, even though all metal dissolved was cooled more than 88 days. The average was 0.61 curies per day.

d. Isolation and Metal Fabrication

Production schedules in the Isolation Building was limited to low MWD/T material from the T Plant which was converted to plutonium oxalate for subsequent processing in the fabrication facility. Operations in the Isolation Building were limited to the Day Shift and production commitments were met.

A primary problem limiting the production is the continued difficulty in weighing the rigid specifications for the neutron count per gram per second. It was necessary to remelt much of the plutonium twice in an effort to lower the neutron count. An improvement in the feed material toward mid-month permitted further blending of the high neutron count material although there remains on hand a significant amount still requiring blending.

3. Special Operations

a. Waste Evaporators

Both 242-B and 242-T evaporators remained in standby condition. Removal of evaporators from standby is not anticipated in view of the currently satisfactory progress of the waste scavenging program.

b. Pu Recovery - Metal Fabrication

The Hood 41 recovery unit was used for dissolution of low MWD/T skull material which after recovery was returned to the RMA Line. Hood 40 the other recovery unit was used for dissolution of high MWD/T scrap material which provided concentrated feed for the Recuplex facility. Operations of both units is currently satisfactory.

The Recuplex facility processed successfully all types of available feed during the month. This included slag and crucible solutions, scrap fluoride solutions and scrap metal solutions. The extraction columns are operating successfully at 80 to 90 grams/l and the subsequent concentrated product met the 95% purity specification. The buildup of solids on the walls of the extraction columns has continued and is under study.

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4. Schedule Variance

Redox production exceeded forecast by 80%. A new high monthly production total of 310.1 tons of Uranium was achieved. A sustained production rate of 11 tons uranium/day was held for the first 28 days of the month.

TBP Plant production of 132.62 tons was .25 percent under commitment this month while UO_3 Plant exceeded commitment by 17 percent. Eleven carloads of UO_3 were shipped this month.

T Plant production exceeded commitment by 34%.

All fabrication in the 234-5 Building was confined to a single model. The production commitment for the month was surpassed sufficiently to permit exceeding the quarterly commitment by 3%. Operations in the Isolation Building were limited to the Day Shift and production commitments were met.

B. Equipment Experience

1. Operating Continuity

Down time in Redox amounted to approximately 38 hours taken in order to flush extraction columns following the long period of high throughput.

First cycle TBP was down 104 hours for flushing and RC column replacement. Second cycle lost 93 hours due to lack of feed from first cycle. A scheduled outage of 48 hours was taken at the UO_3 Plant to replace the water side gaskets on the EA2 (pot off gas cooler-condenser) unit.

Downtime in T Plant amounted to approximately 177 hours due to the failure and replacement of various units of mechanical equipment.

Although appreciable difficulties were encountered in the casting and coating operations the flexibility permitted as a result of the relaxed production schedule avoided any adverse effect on the continuity of operation.

2. Inspection, Maintenance and Replacement

a. Cell Equipment Replacement - Redox

A new Johnston pump was installed in the waste neutralizer tank (D-8) in place of the jet, which had been in service since the last D-8 pump failure on August 19. Partial plugging of the D-12 to D-10 overflow line caused abnormal waste concentrator operation for about ten days this month. Removing the D-10 section of line on three occasions gave temporary improvement each time. The 3DW letdown valve stuck wide open following the column flushes. A new valve jumper and air control jumper were installed.

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b. 60 Ton Crane - Redox

The electrical brakes on the 60 T hoist operated erratically several times during the month. The cause of the difficulties has not yet been determined positively but special metering devices have been installed on the brake circuits to aid in diagnosing the trouble.

The hoist cables on the 60 ton crane were replaced on September 13 as a preventive maintenance measure. Radiation readings up to 4 rads/hr were encountered during contact work on the drum. The replacement required the services of 16 riggers over a period of 15 hours. Special approval was obtained for exposures up to 250 mrad on those riggers who had no previous radiation exposure during the week in order to complete the work without incurring a delay in building operations.

c. Pot Off-Gas Cooler - Condenser - Metal Recovery (UO₂)

Replacement of water side gaskets was made on a scheduled shutdown. Complete inspection was conducted of inner and outer tube surfaces revealing no corrosion. This constituted the first complete inspection of this equipment since start-up three years ago.

d. Equipment Maintenance - Metal Fabrication

The installation of the cooling system for the reactors in Task I is approximately 95% complete. This system includes heat exchangers and refrigeration units as well as the recirculating pump connected to each reactor for cooling the draft tubes.

The removal of Task I and Task II equipment on the RG Line is progressing. All but the floor of the old greenhouse surrounding the equipment has not been removed and preparations are being made for removal of the hoods.

C. Improvement Experience

1. Process Tests and Revisions

a. Iodine Emission

Redox

Iodine emission averaged over two curies per day during the last three weeks of the month. There was a marked correlation between the increasing iodine emission and the decreasing age of the metal processed this month. The A-3 reactor was replaced this month while both the B-3

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~~DECLASSIFIED~~a. Iodine EmissionRedox (Continued)

and C-3 reactors were regenerated. Two steps taken to improve iodine control included:

- 1) Dissolver lids have been replaced where necessary to improve pot vacuum. On A-2 dissolver, where particularly good vacuum has been established, the least trouble with iodine has been experienced.
- 2) A standard procedure has been adopted to immediately neutralize the sodium nitrate added to the dissolver prior to coating removal with 100# of 30% caustic to retain the iodate impurity.

T Plant

I^{131} emission at T Plant continued to be a problem this month. Excluding two significant I^{131} emissions of .8 curies each which occurred on August 26 and 27, the average I^{131} emission during the period August 26 through September 27 was 0.61 curies per day. All metal dissolved during this period was cooled more than 88 days, the arithmetic average being 105 days. The emissions which occurred on August 26 and 27 were due to the failure of the 3-5-R silver reactor. This unit was replaced and the iodine emission levels returned to normal.

Operation of the original gamma scintillation iodine monitor installed in the 3-5-R dissolver off-gas line during July proved to be unsatisfactory because of a high gamma background which could not be satisfactorily reduced by normal flushing procedures. The Engineering Department subsequently designed and fabricated a new system for the iodine monitor and one of the new units was installed on the 3-5-R dissolver off-gas line during the latter part of August. Preliminary evaluation of the new unit has presented no significant background interference, however, minor mechanical difficulties have hampered continuous operation. With minor mechanical adjustment it appears that the new unit will operate satisfactorily. Evaluation of the operating characteristics will continue during the coming month.

b. Waste Scavenging

Tests begun last month with in-plant scavenging using strontium nitrate instead of calcium nitrate as a carrier precipitant gave Sr 90 concentrations of approximately one-half of previous results. As a result of this test enough strontium salts have been ordered to treat additional wastes equivalent to three waste tanks. Early in the month, 617,375 gallons of the thirteenth tank of scavenged waste (12-107-BY) was cribbed. Also, fourteenth waste tank (14-108-BY), in which the strontium nitrate substitute was

b. Waste Scavenging (Continued)

used, was cribbed beginning September 21. Waste volumes for September averaged 7500 gallons per ton of uranium production. Waste concentration in the TBP Plant averaged 31.5 percent volume reduction.

2. Inventions and Discoveries

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

D. Events Influencing Costs

The September Separations Section manufacturing cost is expected to be approximately 8% above the August level. The increased cost will reflect the record production achieved by T and Redox Plants. The increase in cost will be the result, primarily, of increased essential material consumption. As a result of the record production, of low level material, achieved by both the Redox and T Plants, the unit cost of low material, from each of these facilities is expected to establish a new record low.

E. Plant Development and Expansion

1. Project Status

a. CA-513 - Purex

Construction status is essentially complete. Minor Construction in the final stage of cleaning up miscellaneous items left by the sub-contractor. The project is complete financially since original project funds have been expended. As mentioned in last month's report an additional \$1,500,000 was approved for equipment modification to obtain the 2.75 capacity factor. It is anticipated that the Manufacturing Department will be assigned responsibility for operation of the plant during October. At the request of AEC, additional justification for expenditure of funds for an additional 40 ton remote crane was submitted by the Manufacturing Department. Equipment alteration and additions to the product removable facilities is 65 percent complete. Work is progressing satisfactorily on the Railroad Tunnel extension for equipment burial; excavation is complete and pouring of the retaining walls is in progress.

Procurement of a caustic scrubber type iodine monitor for the dissolver and vessel condenser vent systems is being expedited. It is questionable whether this equipment will be available for installation prior to start-up.

DECLASSIFIEDa. CA-513-- Purex (Continued)

Modification of the HA and LA column has weakened justification of uranium silica-gel tail-end treatment. However it is recognized that changes in production schedules and unusual occurrence problems may require this equipment installation. A project proposal will be prepared for "design funds only" for silica-gel facilities in Purex. Temporary silica-gel equipment similar to that in Redox will be provided for start-up.

b. CA-539 - Redox

Hoffman Company has started installation of circulators in tanks 107 and 108. Materials for completion of the last eight tanks are arriving and being fabricated for installation. The completion of all eight tanks by November 15 appears possible.

Design of the Phase II (instrumentation portion of SX tank farm) is progressing on an expedited schedule to meet a deadline of October 25. It is planned to have a contractor on site by the end of November and completion by March 1, 1956.

c. CG-598 - Purex

Lumax Company equipment drawings are enroute to General Electric for approval. On-site construction has been temporarily suspended due to material shortages. Construction of the A9 Crib for disposal of fractionator cooling water is approximately 44 percent complete.

The General Electric portion of the project is complete.

d. CG-603 - 4X Program

The B Plant portion of Project CG-603 is estimated to be 87% complete. Acceptance tests at the 224-B Building are essentially complete. The testing of outside waste lines by Minor Construction forces was initiated during the week of September 19, 1955.

Minor Construction forces initiated a second shift to improve the current date for beneficial usage as requested by the AEC. This date is presently established as December 31, 1955. The installation of the crane periscope and the placing of new agitators on remote operation together with the conducting of acceptance tests will be accomplished on the second shift. This two shift arrangement is anticipated to continue for approximately five weeks.

A second 15 Hp agitator has been transferred to the T Plant as a replacement for a defective unit. These units will be replaced as soon as procurement can be accomplished by T Plant.

e. CG-613 - UO₂ Expansion

Phase I work was accepted about two weeks behind the contract schedule.

Phase II work is scheduled to start October 3. The G. R. Clark Company of Seattle will erect the building, filters and some piping.

The Phase III contract award will be made October 12. The Purchasing Section reports that delivery of bag filters and process gas filters may delay the March 1, 1956 completion date.

Architectural modifications to the 224-U Building lunch room and locker room have been started by Minor Construction.

Project Proposal 3, HW-38855, requesting \$4,000,000 for the project is being circulated.

f. CG-621 - Redox

The E-13 ozone contactor system is ready for installation. Cold side work is 92% complete and dependent on receipt of materials for future work. These materials will arrive by December.

g. CA-625 - 241 SY Tank Farm

Detailed design of this project is 95% complete although none of the drawings are approved. The status of this project has not changed since the previous report because of the need for further engineering study which is now in progress. The study concerns the possibility of increased pressures within the tank and the need for corresponding increase in the strength of the tank walls. The balance of the design work will await completion of this study.

h. CG-643 - Redox

A preliminary project proposal for design and critical procurement for Redox capacity increase, Phase III, is scheduled for submission to the AEC review board by October 10. In addition, a request for a proposal revision is being processed by Manufacturing. This revision must provide authorization of funds for fabrication and installation of a modified spare extraction column and rearrangement of three condensers on an expedited basis in order to offset a 20% capacity loss which will be caused by a change to the ruthenium-eliminating "precycle" flowsheet. This flowsheet change is currently scheduled for January 1956.

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2. Plant Engineering

a. Work Simplification

The fourth series of Work Simplification started with 42 people enrolled. These four groups are scheduled so that personnel from A, B, C, and D as well as day shift can attend. This represents the first step to insure that all interested individuals have the opportunity to attend this course in the use of cost-reduction techniques.

b. Preventive Maintenance

Installation of the physical system of the preventive maintenance program was installed in Redox. Preventive maintenance schedules were set up for electrical maintenance and work is currently being done in conjunction with the Instrument Sub-Unit to revise and improve the instrument maintenance schedules and procedures. Several meetings were held to acquaint maintenance employees with the program and during the month all craftsmen began submitting daily reports of their activities. This report provides the source for history information on equipment maintenance and costs. Special attention was given to the system for the canyon crane since this is a particularly critical item.

The Industrial Engineering Unit is currently engaged in guiding and assisting in the establishment of preventive maintenance systems in the Purax and Power and Maintenance Sub-Sections.

c. Engineering Assistance

1) Cask Car Study

Fabrication of geared hinged lids for cask car 3643 is complete. Work remaining consists of completing of assembly and final painting.

2) Chemical Hazards Survey

A survey of hazards associated with handling of Separations Section chemicals is being conducted in all process and storage locations. Recommendations for correction of hazards found are being given to the responsible plant superintendent.

3) Redox Television

The television system for the crane maintenance platform, after considerable testing and remodification, has been installed in its designated location on the crane maintenance platform, and operational tests have been started.

4) Design and Drafting

Progress continued on the over-all as-built drafting program. Items completed during the period include: T Plant cell diagrams, DeLaval Pump Flanges and Bearings, Connector Head assemblies for T, U, and B Plants, and Purex-Redox Connector Sub-assemblies.

F. Reports Issued

1. Routine

<u>Number</u>	<u>Subject</u>	<u>Author</u>
HW-39309	Separations Section Redox Plant Sub-Section Monthly Report - Sept. 1955	R.T. Jessen
HW-39290	Separations Section Metal Recovery Sub-Section Monthly Report - Sept. 1955	T. Prudich
HW-39322	Separations Section T Plant Sub-Section Monthly Report - Sept. 1955	C.T. Groswith
HW-39292	Separations Section Z Plant Sub-Section Monthly Report - Sept. 1955	W.N. Mobley
HW-39321	Separations Section Radiation Monitoring Monthly Report - Sept. 1955	A.R. Keene
HW-39306	Separations Section Analytical Control Sub-Section Monthly Report - Sept. 1955	L.M. Knights
HW-39305	Separations Section Projects & Personnel Development Sub-Section Monthly Report - Sept. 1955	O.V. Smiset
Official Use Only	Separations Section Power & Maintenance Sub-Section Monthly Report - Sept. 1955	C.P. Cabell
HW-39412	Separations Section Purex Sub-Section Monthly Report - Sept. 1955	V.R. Chapman
None	Status of Projects, Informal Requests and Budget Items, Sept. 1955	V.D. Rouse
HW-38887	Essential Materials Consumption for T Plant, August 1955	M.A. Thress
HW-38888	Essential Materials Consumption for TBP Plant, August 1955	M.A. Thress
HW-38889	Essential Materials Consumption for Redox Plant, August 1955	M.A. Thress
HW-38890	Essential Materials ordered Sept. 1 - Sept. 30, 1955	D.E. Peterson
HW-38891	Essential Material Area Report to Cost and Purchasing, August 1 - August 31, 1955	M.A. Thress
HW-38926	Separations Section Waste Status Summary for August 1955	D.E. Peterson
HW-39269	Separations Section Process Council	L.W. Finch
HW-38899	Analytical Control Quality Report	D.T. Crawley, Jr.

2. Non-Routine

<u>Number</u>	<u>Subject</u>	<u>Author</u>
HW-38966	Design of Off-Site Product Shipment Purex Plant - Present Status	C.R. Anderson by D.E. Braden
HW-39239	Radiation Incident, Class II, No. 96-C	W.G. Westover
HW-39238	Radiation Incident, Class I, No. 520-C	D.R. Koberg
HW-39224	Radiation Incident, Class I, No. 519-C	W.G. Westover
HW-39217	Radiation Incident, Class I, No. 518-C	G.E. Backman
HW-39168	Radiation Incident, Class I, No. 516-C	D.R. Koberg
HW-39980	Radiation Incident, Class I, No. 508-R	D.R. Koberg
HW-39122	Job Description for Z Plant Utility Operator	W.N. Mobley
HW-38930	Recommended Site for Proposed Pu Fabrication Laboratory	W.N. Mobley
HW-38971	Radiation Incident Investigation Limits for T Plant Process Tanks	C.T. Groswith by W.G. Browne

III. PERSONNELA. Force Summary

	<u>Start of Month</u>	<u>End of Month</u>	<u>Net Change</u>
Section General	1	1	0
Redox Plant Sub-Section	223	224	/ 1
Metal Recovery Plant Sub-Section	255	249	- 6
Z Plant Sub-Section	183	176	- 7
T Plant Sub-Section	216	214	- 2
Purex Plant Sub-Section	284	278	- 6
Power & Maintenance Sub-Section	316	319	/ 3
Projects & Personnel Development	61	58	- 3
Analytical Control Sub-Section	206	208	/ 2
Radiation Monitoring Sub-Section	<u>162</u>	<u>159</u>	- 3
Section Total	1907	1886	- 21

B. Safety Experience

There were no major or submajor injuries in the Separations Section in September. At the close of the month, both 200 Areas had operated 702 days without a lost time injury, an outstanding achievement since it involves approximately 8,306,531 exposure man hours.

C. Radiation Experience

One Class II and five Class I radiation incidents occurred and included: (1) localized overexposure to the skin to an operations employee from undetected skin contamination following diversion box work at 241-S (Class II, No. 96-C); (2) an employee at the UO₃ Plant failed to detect

C. Radiation Experience (Continued)

uranium contamination on his personal sock before going home. A home survey by Radiological Sciences did not reveal any contamination (No. 519-C); (3) exposure of an operator at Z Plant to Pu contaminated air when he handled crucible fragments which were not properly sealed in plastic bags (No. 518-C); (4) a Maintenance employee entered the Redox railroad cut during charging operations. The employee, who was not wearing his personnel meters, received an estimated 5 mr (No. 508-R); (5) an Operations employee received gross plutonium contamination on his protective clothing and assault mask at the Redox Plant when the L-6 product sampler vessel was pressurized during sample recirculation. Plutonium solution (27% nitric acid) splattered over the employee and his clothing. One spot of skin contamination (100,000 g/m Pu) occurred and was difficult to remove. A tender skin condition prevented decontamination to less than 500 d/m (No. 516-C) and (6) during repair of a valve on a differential pressure instrument air line on the 101-SX waste tank, positive air pressure in the tank forces process waste up the air line contaminating the protective clothing of the maintenance personnel up to 5 rads/hr.

D. Personnel Activities

1. Personnel Programs and Training

During the month the training program activities were as follows:

<u>Program</u>	<u>Attendance</u>
For exempt roll:	
Accident Prevention	17
Job Relations Development	19
Pension and Insurance Plan	210
For non-exempt roll:	
GE Selection Program	8 (1 P&M, 3 Anal., 4 Operations)
Nine Week Instrument Training	4
New Employee Orientation	12
Manhours Training given (Work Simp.)	34

2. Visitations

R. A. Kennedy conferred in Los Angeles on 9-20 to 9-22 with Johnston Pump Company and G. E. Inspection on pump procurement problems.

R. H. Silletto visited the Overall Cleaning and Supply Company of Seattle, Washington to observe the commercial linen-service operation.

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2. Visitations (Continued)

L. M. Knights spent September 21, 22, and 23 traveling and attending an AEC Accountability Committee in Washington, D.C.

D. G. Eidenhaek from the DuPont Plant at Savannah River, visited the laboratories of the Sub-Section on September 27, 28 and 29 to observe analytical procedures and equipment and to discuss analytical problems.

Messrs. J. T. Bobbitt, L. R. Kelman and R. J. Smith from the Argonne National Laboratories visited the Z Plant on September 22, 1955. Details of the work which they wish HAPD to do as well as primary specifications for this work will be published under a separate report by O. J. Wick.

Mr. Bernie Weidebaum of the Dow Chemical Company from Rocky Flats, Colorado, was also a visitor at Z Plant.

3. Public Relations

One model fabrication of the HAPD plastic man was prepared and submitted to the AEC for shipment to the forthcoming World Trade Fair in Columbia, South America.

October 6, 1955

ELECTRICAL UTILITY SECTION

MONTHLY REPORT

September, 1955

I. RESPONSIBILITY

There were no changes in Section responsibility.

II. ACHIEVEMENT

A. Operating Experience

Power Statistics (See last page for details)

Plant Contract

Probable time of September Peak . . . 12:00 - 12:30 a.m., September 29
Telemetered peak for September. 178,000 KW
Probable Billing Demand for September 181,000 KW
Probable energy consumption for September . . . 101,624 MWH

Actual BPA Metered demand for August. 174,409 KW
Actual Billing Demand for August. 178,000 KW
Actual energy consumption for August. 111,058 MWH
Average monthly energy consumption-2 months-
FY '56 108,725 MWH
Cost of purchased electricity for August. . . . \$260,415
Actual cost of purchased electricity for 2
months of Fiscal Year '56. \$518,959

* * * *

While making a routine yard inspection Saturday night, September 17, the 151-B-C substation operator noted an abnormal condition on the 13.8 KV bus at the #3 230 KV/13.8 KV transformer. All station load was transferred to the #1 and #2 transformers without disturbance to production.

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Subsequent inspection by maintenance personnel revealed that a high resistance contact had developed at the bus and a transformer jumper connection. The jumper had partially melted. Apparently the clamp bolt threads had been fouled at time of installation making a poor pressure contact.

The alert observation and judgment of the operator averted a potential outage and considerable damage to equipment.

* * * *

On September 4, system frequency dropped to 59.45 cycles when generation was lost at McNary Dam. Lightning on the Midway-Coulee #2 line caused a system surge on September 6. In either case, there was no adverse effect upon Plant operations.

* * * *

A three hour lightning storm moving across the project the morning of September 8, caused considerable disturbance on both the BPA and HAPO electrical systems. BPA lines into their Midway substation relayed out for a total of eleven times. Normal power was momentarily lost to parts of the 200-W Area three times around 4:30 a.m. and nearly all street and fence lights in 200-W and 100-D were out of service. No trouble was reported in the other areas.

* * * *

B. Equipment Experience

Routine maintenance tests on circuit breaker A-325 in the 151-B-C Substation revealed that there was no voltage, instead of a normal 3,600 volts, on the capacitance tap of the #6 230 KV bushing.

Upon removing the tap mechanism, it was found that an internal insulating cylinder shield had slipped, resulting in a poor contact and arcing which had burned a hole in the shield. It is suspected that spacer blocks loosened allowing the shield to shift. The bushing was replaced with the remaining plant spare and was shipped to the General Electric Co. for repair.

There is no relationship between this and the recent other bushing trouble where the insulation within the cylinders was found to be deteriorating rapidly. However, the insulation in this bushing will be factory examined and tested also during repairs.

The disclosure of this fault and other recent equipment defects are indications of the importance of the testing and preventive maintenance program now employed; that this is the proper approach to minimize the risk involved in the capacity loading of aging electrical equipment.

* * * *

C. Improvement Experience

The fault tests on the 13.8 KV and 4.16 KV installation at 100-KE and KW and the 230 KV system performed, September 20, 28, and 29, measured the degree of proper operability and functioning of the equipment as designed and installed, and equally important, the quality of subsequent calibration and maintenance of relaying components, circuit breakers, and associated equipment. Except for relatively minor improvements which may be developed by the final analysis of the test data, the performance of the involved equipment was generally quite satisfactory in terms of design and operational requirements.

Following are other observations directly and indirectly related which have occurred to the writer.

Performance of the tests on an extended, tiring schedule was executed in an efficient, safe, and informed manner. The co-operative attitude of the participants: representatives of Power, Reactor Maintenance, Reactor Engineering, Design Engineering, Plant Engineering, Electrical Utility Section, AEC, and BPA, was very notable and effective.

The various phases of the tests sampled and proved the degree of effectiveness of the Section's participation in design scoping and user acceptance, and subsequent efforts in training, Operation and Maintenance. The resultant score was high: relaying components functioned close to design and operating requirements; circuit breakers interrupted the fault currents capably and timely, and the 230 KV circuit breakers, A-325 and A-326, at 151 B-C, inspected and overhauled within the past 3 months, performed their interrupting duty as required.

The Engineering Design Section, in co-operation with operating and maintenance groups, is in the process of analyzing test data and compiling a comprehensive report for further study.

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D. Events Influencing Costs

Discussions are underway with Engineering to establish a control on power to be utilized by the Construction Contractor in testing the CG-558 4,500 HP motors. An allowance was made in the Plant contracted electricity for the simultaneous testing of no more than two motors. Construction testing will be kept off of Plant peaks and their other activities, which could jeopardize operations, will be controlled through a liaison engineer.

* * * *

Overtime hours expended were approximately 4.6% of the total regular hours worked.

Attendance for the month was 98.12%.

* * * *

E. Plant Development and Expansion

CG-558 100-B: All cubicles for the new lines to the 190-B Building are in place and we are awaiting an outage in order to tie in temporary feeder cables. The 13.8 KV bus sections then will be rearranged and connected to the new switchgear by Section forces.

CG-558 100-D: Switchgear and materials for the 151-D substation alteration have been received. Minor Construction forces are completing the building addition which will house the 230 KV and 13.8 KV switchgear. Site clearance work for the lump sum contractor has been completed.

CG-558 100-F: Approximately one-third of a mile of new line for the river pump feeder has been completed by Minor Construction. This and other feeder relocations are scheduled for cut-over October 17 in order to clear the site for the contractor by November 1.

CG-558 100-H: Minor Construction is starting site clearance work which involves temporary feeders and relocation of the primaries to the 190-H Building transformers.

* * * *

CG-586 (Third 230 KV line): Minor Construction has begun work at the 100-K Areas which consists of a ten foot duct extension and installation of cables for the new substation.

* * * *

Hanford and BPA engineers met in Portland September 6 and 7 to complete the necessary joint analyzer board study of the future BPA and HAPO electrical systems. BPA now has further engineering and economic decisions to evolve regarding their system, after which we will be aware of future operating conditions and requirements of the HAPO system.

* * * *

F. Significant Reports

"Overhead Line Icing - 107 Basins", September 27, 1955, O Mageehon to A. R. Maguire. Presents problem, solution and requests confirmation of desirable quality of electrical service.

* * * *

III. ORGANIZATION AND PERSONNEL

A. Organization

No changes in structure or nomenclature.

B. Force Summary

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

There were no changes during the month.

C. Safety Experience

On September 3, the 200-E Area completed its 10th year without a major injury. The Electrical Utility Section's contribution in attaining this record was approximately one-fifth of the total injury-free man hours.

* * * *

Three minor injuries were reported.

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D. Radiation Experience

No incidents were reported during the month.

E. Personnel Activities

The first of a series of five training films produced by a manufacturer of hot line tools was shown at the Section monthly informative meeting. It is felt that this general recognition of lineman's work produced a desirable morale effect in addition to the training in work methods and safety. Two additional films were viewed by linemen during September and the final two are scheduled for October.

* * * *

R. F. Haynes completed HAPO analyzer board study at Portland on September 6 and 7, 1955.

O. Mageehon
ELECTRICAL UTILITY SECTION

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POWER STATISTICS
ELECTRICAL UTILITY SECTION
FOR MONTH ENDING SEPTEMBER 30, 1955

	ENERGY - MW HRS.		MAXIMUM DEMAND-KW		LOAD FACTOR-%	
	Last Month	This Month	Last Month	This Month	Last Month	This Month
230 KV System						
A-2 Out (100-B)	29080	26200	47600	46800	82.1	77.8
A-4 Out (100-D)	16400	15010	27900	27600	79.0	75.5
A-5 Out (100-H)	8040	8800	15200	15300	71.1	79.9
A-6 Out (100-F)	7380	5690	13400	13400	74.0	59.0
A-7 Out (100-KW)	17856	15648	33000	42000	72.7	51.7
A-8 Out (200 Area)	6250	6140	10100	10000	83.2	85.3
A-9 Out (100-KE)	19968	20340	35000	33000	76.7	85.6
TOTAL OUT	104974	97828	182200*	188100*	--	--
MIDWAY IN	106386	99167	169600	174400	84.3	78.9
115 KV System (300 Area)						
BB3-S4 Out	2512	2320	4400	4400	76.7	73.2
115-66 KV System						
B7-S10 Out (W. Bluffs)	132	123	473	495	37.4	34.5
Hanford Out (7200 V.)	27	29	--	--	--	--
Hanford In	140	137	700	700	26.9	27.2
Project Total In	109038	101624	174700*	179500*	--	--

* Denotes Non-Coincidental Demand

Average Power Factor - 230 KV System 86.4

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MANUFACTURING DEPARTMENT
PURCHASING AND STORES SECTION
MONTHLY REPORT SEPTEMBER, 1955

I Responsibility

Stores has assumed custody of the zirconium inventory transferred from the Engineering Department, Technology Section. Special warehousing facilities for this material have been provided and proper control records established.

II Achievement

STATISTICS

	<u>July</u>	<u>August</u>	<u>September</u>	<u>FY 1956 Average</u>
<u>Purchasing Sub-Section</u>				
<u>Emergency requisitions received</u>				
Employee & Public Relations	5	6	13	8
Engineering	32	48	56	45
Manufacturing	45	81	55	60
Medical	4	5	4	4
Minor Construction	166	144	159	156
Radiological Sciences	6	5	8	6
Stores	104	92	93	96
Total	362	381	388	375
Average per day	18.1	16.6	18.5	17.7
<u>Total requisitions*</u>				
On hand start of month	1,094	1,056	844	998
Received	2,797	2,673	2,509	2,660
Placed	2,835	2,885	2,337	2,686
On hand end of month	1,056	884	1,016	972
*Do not include those assigned to AEC, Viz:				
	313	320	471	368
<u>Number of purchase orders placed</u>				
General Supplies Unit	1,788	1,970	1,434	1,731
Process Equipment Unit	525	583	455	521
Essential Material Unit	28	26	26	27
Local Purchase	53	86	77	72
Total	2,394	2,665	1,992	2,351
<u>Value of purchase orders placed</u>				
General Supplies Unit	\$ 496,497	\$ 591,257	\$ 474,788	\$ 520,847
Process Equipment Unit	901,986	1,139,566	469,513	837,022
Essential Material Unit	605,501	562,409	569,690	579,200
Local Purchase	423	668	578	556
Total	\$2,004,407	\$2,293,900	\$1,514,569	\$1,937,625
<u>Purchase order alterations</u>				
Number	201	297	231	243
Gross value	\$ 98,495	\$ 211,160	\$ 590,229	\$ 299,961

II Purchasing Sub-Section (Cont.)

	<u>July</u>	<u>August</u>	<u>September</u>	<u>FY 1956 Average</u>
<u>Expediting</u>				
Orders on hand start of month	2,803	2,846	2,731	2,793
Orders received	2,396	2,569	2,002	2,322
Orders completed	2,353	2,684	2,005	2,347
Orders on hand end of month	2,846	2,731	2,728	2,768

Stores Sub-Section

General Supplies

Store orders processed	27,058	25,277	26,912	26,416
Value of issues	\$ 285,597	\$ 280,241	\$ 319,494	\$ 295,110
Line items in account	30,041	30,164	30,195	30,133
Back orders on hand	303	355	275	311
Out of stock items	154	181	148	261
Percent of line items out of stock	.5	.6	.4.	.4

Spare Parts

Store orders processed	1,211	1,439	1,536	1,412
Value of issues	\$ 62,319	\$ 102,148	\$ 110,944	\$ 91,803
Line items in account	29,530	29,803	29,988	29,774
Back orders on hand	219	306	356	294
Out of stock items	332	231	273	279
Percent of line items out of stock	1.1	.8	.9	1.1

Receiving

Shipments received	5,819	7,174	6,138	6,377
Receiving reports issued	6,075	6,965	5,740	6,260

Excess Material & Equipment

Received	\$ 128,643	\$ 201,070	\$ 297,556	\$ 209,089
Issues to Project	3,206	2,779	17,951	7,979
Shipped off-Project	109,807	13,847	23,363	49,005

Revenue from scrap and surplus sales

\$ 4,765	\$ -	\$ 63,354	\$ 22,706
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Requisitions screened

2,470	2,611	2,566	2,549
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Items screened

7,132	7,634	7,230	7,332
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Items furnished

935	308	905	883
-----	-----	-----	-----

Traffic

Savings

Rate reductions	\$ 3,659	\$ 4,394	\$ 1,972	\$ 3,338
Freight bill audit	3,380	664	744	1,596

Savings since - September 1, 1946 to date \$1,966,972

II Achievement - (Cont.)

Traffic (Cont.)

	<u>July</u>	<u>August</u>	<u>September</u>	<u>FY 1956 Average</u>
<u>Money recovered - Claims</u>				
Loss, damage & overcharge	\$ 1,863	\$ 200	\$ 316	\$ 793
Ticket refunds	321	1,592	264	726
Household goods	-	-	\$ 39	\$ 13

Money recovered - September 1, 1946 to date \$213,932*

*Correction of \$83,580 overstatement in August

<u>Work Volume</u>				
Travel requests	94	136	178	136
Reservations made	251	417	602	423
Expense accounts checked	183	165	229	192
Shipments traced	83	119	166	123
Quotations furnished				
rates and routes	568	677	553	599
Freight bills approved	1,168	1,797	1,346	1,437
Amounts	\$ 187,268	\$ 311,758	\$ 292,478	\$ 263,835
Carload shipments received	503	941	829	757

<u>Tonnage Report</u>				
Tons received by common carrier	31,813	59,832	54,508	48,718
Total Cost	\$ 208,949	\$ 338,327	\$ 301,055	\$ 282,777
Average cost per ton	\$ 6.568	\$ 5.655	\$ 5.523	\$ 5.915

High level contacts were made with the Milwaukee Railroad in an endeavor to obtain better equipment for delivery of coal. It is expected that an improvement in equipment will result.

The need for expediting services, both technical and administrative, has been at its highest during the months of August and September. Project CG-558 and CG-613, and the 105 KW and KE shutdowns have required constant attention through visits at vendors' plants and telephone contact.

When a fluid drive failed in 190-C building, the negotiation for purchase of immediate replacements was handled by A.E.C. in accordance with regulations. The transaction was assigned to G. E. Purchasing for administration. Through expediting efforts, the first unit was received five days ahead of schedule and has already been installed.

The main pumps for Project CG-558 continue to be extremely critical. J. R. Kelly continues in his assignment on this particular order and will remain at the vendor and sub-vendor plants until we are assured that our requirements will be met. Continual liaison is being maintained with the Project Section and with A.E.C. and every effort is being made to improve delivery.

A review of all materials in the Spare Parts Caption 92, Special Mechanical Development Materials, was completed by representatives of the Technical Shops Unit. Approximately 370 line items are to be deleted from stock and the remaining 800 are to be transferred to General Supplies inventories.

II Achievement (Cont.)

The physical inventory of Medical Supplies Class 24 was taken on September 23, 1955. All other classes of General Supplies materials except Automotive Parts (08) and Heavy Equipment Parts (12) were inventoried on September 29 & 30, 1955. Considering the large number of items (18,000) and the volume of material on hand, the completion of these inventories was accomplished very satisfactorily.

Status of Contracts

Liquid Carbon Dioxide - Contract RO-20, with Cascade Fire Equipment Company, has been completed and is in force.

Chlorine - Bids have been received and submitted to A.E.C. for approval.

Caustic Soda - Our estimated requirements have been received from the using sections and invitations to bid will be mailed at once.

Safety Shoes - Contract RO-21, with International Shoe Company, is still in the process of negotiation for terms and conditions.

Safety Shoes - Contract RO-22, with Lehigh Safety Shoe Company has been submitted to AEC for approval on our record of purchase.

Telephone Directory - Contract G-50, Supplement 1, is being negotiated to extend the term of the plant telephone directory contract to December 31, 1955.

Representatives of the Inspection and Stores Sub-Sections agreed to establishing the main on-site inspection station in Receiving to provide inspection services prior to receiving report write-up and delivery of material for Minor Construction. This arrangement will reduce handling costs and permit better control of material than was possible with the inspection station at White Bluffs.

The 100 Area process tubes were moved from the 1713 AH Building to 2101-E Building. The former building was turned over to the Reactor Section thereby reducing Spare Parts warehouse space by 3400 square feet.

A container properly insulated for the purpose of storing Dry ice in Central Stores warehouse has been constructed and put into use. This type of container will eliminate most of the shrinkage of dry ice experienced with the previous method of using a walk-in ice box. Employees will not be required to leave the building to make disbursements or to de-ice the walk-in box which was required once or twice a month. This change will result in more efficient and economical storage of dry ice.

Through negotiations with the rail carriers the rate of Sulphuric Acid from Silver King, Idaho and Tacoma, Washington was reduced which will result in a savings of \$100.00 per car or approximately \$2,600 for a year's movement.

Utilization of offsite excess reached a new high during September amounting to a total savings of \$267,260.

II Achievement (Cont.)

Preparatory work was begun during the month by Project Engineering for preparing estimates and specifications for the following:

1. Stabilization and improvement of grounds inside the fence behind the Central Stores Building.
2. Improving the parking area in front of Central Stores.
3. Modifying the lighting in the Automotive Parts Room in Building 1171.

III Organization and Personnel

Force Summary

Component	8-31-55			9-30-55			Change		
	Ex.	N.Ex.	T	Ex.	N.Ex.	T	Ex.	N.Ex.	T
General	3	3	6	3	3	6	-	-	-
Traffic	3	6	9	3	6	9	-	-	-
Purchasing Sub-Section	43	54	97	43	53	96	-	(1)	(1)
Stores Sub-Section	12	160	172	12	157	169	-	(3)	(3)
Total	61	223	284	61	219	280	-	(4)	(4)

Safety Experience

One minor injury was reported during the month.

Seven safety meetings were held with a total of 205 employees attending.

The committee appointed to prepare Job Hazard Breakdowns for specific jobs within Stores completed its assignment with JHB's prepared on fourteen different jobs. It will be the practice to review these breakdowns in safety meetings periodically and to make them available to individual employees assigned to these specific jobs.

Traffic lines have been painted in the roadway around the northeast corner of the Central Stores Building. This was done to correct a potential safety hazard.

Personnel Activities

J. I. Moffett visited the General Services Administration installation in Seattle, Washington on September 27 and 28, 1955 along with W. M. Hunt of Purchasing, R. Hoglund and R. R. Edwards of AEC.

The purpose of this trip was to inspect the GSA facilities and review their warehousing and procurement operations. Plans are being made to have certain Stores' Unit Heads visit the GSA installation later this year for a closer review of their systems.

**TRANSPORTATION SECTION
MONTHLY REPORT
September 1955**

Transportation Section personnel forces increased from 486 to 488 by one new hire, four transfers in, one reactivation - personal illness, three terminations, and one transfer out.

Transportation Section expenditures totaled \$2,674,697 for the first eight months of the calendar year and are down \$25,293 or 0.94% over the same period in 1954. The following indicates comparative costs by major service functions:

<u>Function</u>	<u>CY 1955 1st 8 mos.</u>	<u>CY 1954 1st 8 mos.</u>	<u>% of variance</u>
Railroad	\$ 483,042	\$ 501,153	- 3.61 %
Plant Bus	911,810	885,957	+ 2.92 %
Heavy Equipment Maintenance	397,981	403,116	- 1.27 %
Light Equipment Maintenance	425,495	472,936	- 10.03 %
Road Maintenance	76,163	91,083	- 16.38 %

Listed below are the Transportation Section unit cost performance statistics for the first two months of FY 1956 compared with the FY 1956 bogeys and FY 1955 actual:

	<u>FY 1956 To Date</u>	<u>FY 1956 Bogey</u>	<u>FY 1955 Actual</u>
<u>Railroad</u>			
Cost per car handled - Commercial	\$ 31.56	\$ 29.73	\$ 31.46
Process	278.98	232.40	241.89
Average	54.78	52.34	52.97
<u>Plant Bus</u>			
Cost per mile - Operating	.4292	.4173	.4043
Maintenance	.1409	.1281	.1268
Total	.5701	.5454	.5311
<u>Light Equipment</u>			
Cost per mile - maintenance	.0642	.0689	.0614
<u>Road Maintenance</u>			
Cost per mile - yearly (Primary roads based on 20' roadway — seal coating not included)	178.23	317.74	250.67
Seal Coating - per square yard for surfaced areas	not available	.1108	.1134
<u>Track Maintenance</u>			
Cost per mile - yearly	2,397.66	2,577.18	2,698.82

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Transportation Section

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Established a revised system for processing material credits between cost accounts as an outgrowth from the physical inventory of railroad track materials.

Established a code system on store orders to identify various types of equipment maintenance materials on IBM reports.

Prepared a formal analysis on light equipment maintenance costs for FY 1955 and set forth reasons for the expected increase in the cost per mile for FY 1956.

Made fuel consumption and allied records available to auditors from the Liquid Fuel Tax Division, Department of Licenses, State of Washington. The Commission receives a tax refund on all gasoline consumed on-plant. This audit covered the period from January 1, 1953 through June 30, 1955.

Revised the accident damage procedure to charge the responsible organization for major repairs (normally \$100 or more). Such costs were previously chargeable to the using organization regardless of responsibility when only government vehicles were involved.

Conferred with the Commission and the Financial Department on the preparation of the annual AEC Equipment Report. Received and discussed revised reporting requirements with respect to accounting practices.

Furnished operating statistics and cost data on the Plant and Richland Bus Systems for FY 1955 as requested by the Commission.

Information and records have been made available to the Commission representatives for a property management appraisal. This action is in compliance with the Commission's letter dated August 1, 1955 and has required considerable time in answering questions and outlining procedures.

Completed the annual physical inventory of automotive and heavy equipment which consists of 2,564 units. All equipment was located except one dragline bucket which was missing last year. Necessary papers to remove this unit from the records are in process.

Plant operating needs permitted fifty-eight units of automotive and construction type equipment to be excessed or transferred to Minor Construction between January 1 and September 12, 1955. An additional 145 units displaced by new equipment have been excessed. This exceeded the Commission's request of 125 units for the sale on October 11 and 12.

Roof repairs (necessitated by wind damage in March) to the 1170 and 1171 Buildings have been completed by the contractor.

Completed the reconditioning of the hot air furnaces in the 1171 Building. Technical assistance was supplied by the vendor. Full details of changes, findings, and control settings were furnished to the Commission, Maintenance supervision, and the landlord. Specific instructions have been issued to insure operability.

Transportation Section

Completed the installation of additional duct work for the paint spray booth to prevent any harmful accumulation of fumes. Tests had indicated a lack of proper ventilation.

Bituminous materials have been applied in bus loading and unloading lanes to afford maximum passenger protection from surface water and to correct a construction deficiency. This is expected to do much toward improved customer relations as this has been a disagreeable situation.

Completed a study of the travel time from the Bus Terminal to the Outer Areas which disclosed that it would be possible to make the departure five minutes later; however, no change will be made due to the approaching winter season. The matter will be observed further and a summer schedule appears to be in the offing inasmuch as any refinement is important to alleviate the inherent dislike of riding buses.

Supervisory personnel attended a job relations training program and presentations of the revised pension and new insurance plans in addition to the regularly scheduled training programs. A special training program was presented to female stenographic and clerical employees. This program required four hours and featured personal attributes, appearance, courtesy, office responsibilities, correspondence, telephone technique, security, office services, and business English.

Made an analysis of the Heavy Mobile and Construction Equipment Parts Inventory. Obsolete and inactive stock will be excessed. Further study is contemplated with the ultimate objective of a 50% reduction through the elimination of slow moving items.

Commercial rail traffic during September decreased approximately 10% over August as coal receipts steadied from the high volume following the miner's annual holiday. The following recapitulation indicates the distribution of commercial cars handled:

<u>Carload Movement</u>	<u>Loads In</u>	<u>Empties In</u>	<u>Loads Out</u>	<u>Empties Out</u>
General Electric Company	878	15	12	889
L. H. Hoffman Co.	12	0	0	10
U. S. Army	<u>42</u>	<u>0</u>	<u>0</u>	<u>49</u>
	932	15	12	948

Railroad process service during September returned to near normal following production difficulties and increased almost 74% over August.

Railroad car movements consisting of process, commercial, and special service totaled 2,282 in September compared to 2,424 in August, 1,631 in July, 2,673 in June, 2,843 in May, 2,463 in April, 2,106 in March, 2,354 in February, and 2,288 in January.

Routine Maintenance of plant railroad trackage during September required 5,556 man-hours. Relaid a mile of main line track while in train service. Installed 205 tons of new steel and accessories between mileposts A-20 and A-21, which completes the major share of the rehabilitation work for FY 1956 in the long range program.

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Transportation Section

The Plant Bus System transported 4.28% fewer passengers in September than in August because of fewer week days and one holiday in the reporting period. The following statistics indicate the magnitude of service rendered:

Passenger Volume	165,388
Revenue - Bus Fares	\$ 8,269.38
Earnings - Transit Advertising (August)	\$ 112.28
Bus Trips	7,115
Bus Miles - Passenger Carrying	201,513
Passenger Miles	5,275,522

A greater percentage of the buses from the 100 Areas have been placed in express service thus further expediting the "to home" transportation of area personnel.

General Motors coach 1B 5102 incurred fire damages of about \$2250 while parked in the 100-B Area on August 30. The fire apparently resulted from a smoldering cigarette lodged between the seat and the wall of the vehicle which was not noticed on the driver's post-trip inspection.

The Richland Bus System transported 52.74% more passengers in September than in August due to the resumption of school. The following statistics indicate the volume of service rendered:

Total Passengers Including Transfers	8,995
Revenue - Bus Fares	\$ 523.25
Earnings - Transit Advertising (August)	\$ 5.10
Bus Trips	1,035
Bus Miles - Passenger Carrying	5,485
Passenger Miles	23,557

Off Plant chauffeured automobile trips (Company business and/or official visitors) totaled 186 which were rendered to the following locations:

AEC Airport	1
Benton City, Washington	21
Enterprise, Washington	1
Grandview, Washington	7
Hinkle, Oregon	10
Kennewick, Washington	59
Mabton, Washington	1
Pasco, Washington	44
Pendleton Oregon	9
Prosser, Washington	8
Richland Y, Washington	2
Spokane, Washington	3
Sunnyside, Washington	4
Walla Walla, Washington	1
West Richland, Washington	9
Yakima, Washington	6

Transportation Section

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

	<u>Gasoline</u>	<u>Diesel Fuel</u>	<u>50 Cetane</u>	<u>Kerosene</u>	<u>White Gas</u>
Stock at Start of Month	75,650	15,280	13,550	4,415	225
Received During Month	101,939	24,400	33,378	0	318
Disbursed During Month	105,517	23,415	37,028	1,448	191
Stock at End of Month	72,072	16,265	9,900	2,967	352

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

Motor Overhauls	62
Class A Inspections and Repairs	71
Class B Inspections and Lubrications	1111
Weekly Inspections - Fuel Trucks and Off Plant Vehicles	53
Semimonthly Inspections - Buses	192
Monthly Inspections - Railroad Rolling Stock	14
Front End Alignment and Wheel Balance	127
Routine Maintenance Repairs and Service Calls	1952
Accident Repairs and Paint Jobs	41
Tire Repairs	789
Wash Jobs	<u>494</u>
	4,906

The winterizing of all water cooled HO equipment was begun on September 19 and is approximately 40% complete. The remaining units are to be serviced by October 23.

The frequency for changing oil and filter elements has been extended from 2000 to 4000 miles on all diesel buses. This will result in a material savings and a lower maintenance cost per mile.

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

Evacuation buses recently assigned to the 300 Area have been equipped with water immersion heaters to facilitate starting.

Transportation Section

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

<u>Code</u>	<u>Type</u>	<u>No. of Units</u>	<u>Total Mileage</u>
1A	Sedans	377	435,497
1B	Buses	92	215,830
1C	Pickups	530	210,124
1D	Panel, Carryall, Sta. Wagon	159	111,667
1G	Jeeps	3	1,231
1H	Power Wagons	50	18,127
68 Series	Trucks	<u>224</u>	<u>86,938</u>
		1,435	1,079,414

Hauled three truckloads of electrical testing equipment from the Bonneville Power Administration at Vancouver, Washington to the 100-K Area.

Completed a new burial pit for the 300 Area which required the excavation of 11,000 cubic yards of material.

Maintenance of plant roads and the production of road aggregate materials required 1200 man-hours.

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

	<u>MC 3</u>	<u>MC 5</u>
Stock at Start of Month	13.07	17.21
Received During Month	38.08	38.74
Used During Month	10	0
Stock at End of Month	41.15	55.95

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

	<u>3/4" to 0</u>	<u>1/2" to 0</u>	<u>5/8"</u>	<u>1/4"</u>	<u>3/4"</u>
	<u>Pre-mix</u>	<u>Pre-mix</u>	<u>Chips</u>	<u>Crushed</u>	<u>Crushed</u>
	<u>Tons</u>	<u>Tons</u>	<u>Cu. Yd.</u>	<u>Rock</u>	<u>Rock</u>
Stock at Start of Month	780	906	874	14	2,688
Made During Month	0	225	850	625	719
Used During Month	243	15	89	140	469
Stock at End of Month	537	1,116	1,635	499	2,938

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ENGINEERING DEPARTMENT

SEPTEMBER 1955

PILE TECHNOLOGY SECTION

Data on 18 tubes of triple dip and rod transformed slugs showed (1) there was no difference in the tendency to break transversely during irradiation between rod transformed and triple dipped material, (2) the effect of power and exposure on tendency to break could not be separated, (3) the position (per se) of the slug in the tube had no effect, and (4) the proportion of slugs expected to break increases rapidly above specific exposures of 900 MWD/T and at 1500 MWD/T, all should be broken.

The first irradiated slugs were processed through basins I and II of the 105-C Metal Examination Facility. These tests were primarily to test the equipment and revealed some minor mechanical difficulties which are now being adjusted.

Loading of fuel into the Lattice Testing Reactor has begun. Present plans are to load the front and rear faces of the reactor first and then reach critical by loading the driver rods. The complete procedure to ensure safety is being employed at all stages of the loading.

Calculations have been completed to determine the effective mass of a proton bound in the water molecule. This result is needed in estimating the scattering of neutrons by the cooling water annulus and its variation with the temperature of the neutrons.

Progress has been made in the evaluation of the economic and technical aspects of conversion of a K Pile to recirculation. From the study it appears that the two most serious problems are the development of a suitable fuel element for the very high specific powers and temperatures, and the decreasing time operated efficiency at high fuel throughputs, with the possibility of the need for remote charge-discharge operations.

The first visual observation of the graphite moderator during pile operation was made. While C Pile was operating at approximately 1400 MW, observation of the center zone graphite in channel 2773-C was made through a periscope bayonet. At an indicated temperature of 640 C, the graphite was barely visible. At a temperature of 685 C, the graphite showed clearly to be a dull red.

During the month maximum power levels were achieved at all piles up to limits of the Technical Process Specifications. These were 105 C tube outlet temperatures at B, D, DR, F, and H Piles and front face connector limits at the KE and KW Piles.

Thirteen slug failures occurred during the month. A large percentage of these ruptured pieces showed excessive corrosion between the rib marks with the rupture occurring in this highly corroded area. There is a strong indication that these high exposure side failures were caused by excessive

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corrosion resulting from exposure in old process tubes in which the ribs had been badly worn.

The KAPL-120 loop was operated at full temperature and pressure at month's end. All components of the loop operated satisfactorily. Test sections containing fuel elements and corrosion specimens have been charged for the first irradiation.

SEPARATIONS TECHNOLOGY SECTION

A revised Redox flowsheet has been issued making possible a 10% increase in instantaneous capacity by alterations in flows and concentrations in the solvent extraction equipment. The continued high waste losses (2 to 8%) from the Metal Recovery RC Column led to the decision to replace it with the spare. RCW losses since replacement have averaged 0.5% during normal equilibrium operation. Good results (500,000 gal. test) were obtained in the scavenging of metal recovery wastes using strontium nitrate with the nickel ferrocyanide. In the uranium conversion process, an 80% increase in electric pot capacity was demonstrated in a third semi-continuous calcining test.

The Recuplex solvent extraction facility was operated 380 hours during the month. Losses averaged 0.3% of the feed.

An exhaustive study of the mechanism of fission product decontamination in Purex systems is being carried out on a laboratory scale. Intensive efforts are being given the removal and recovery of cesium from Redox and Purex wastes.

Flowsheets for iodine-131 emission control under future separation loads were issued to the Design Section for design scoping purposes.

DESIGN SECTION

The Design Section effort on the 4X Program and Reactor Plant Modification Program decreased during the month as these programs approach design completion. Customer work and design development showed a corresponding increase. Distribution of effort was as follows:

	<u>Percent of Total Effort</u>
Design Development	38.8
4X Program	6.0
Reactor Plant Modifications for Increased Production	9.2
Purex Modifications	8.7
Other Design Projects	14.3
Customer Work and Miscellaneous	23.0

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The total design for Project CG-558, Reactor Plant Modification for Increased Production, was advanced to 92.5% complete.

Authorization was received from HOO-AEC during September for CA-512 Project Proposal, Revision 4, which requested the modification, correction and installation of various systems necessary for satisfactory completion of the 100-K Area Facilities. The design items included in Revision 4 which were started during September were Retention Basin Foundations - 107-K, Acid Addition Facilities - 183-K, and Gamma Monitoring System - 105-K.

The necessary revisions were made to the construction drawings and the acceptance test procedures for lump sum construction of a major portion of the 1706-KER Building.

The 4X Program detailed design is complete with the exception of the Metal Conversion Plant Expansion, which is 90% complete.

Work was started on the preparation of project proposals for the performance of design during FY 1956 for items submitted in the FY-1957 Plant and Equipment Budget. In addition, Engineering studies were started on the proposed items for the FY-1958 Plant and Equipment Budget.

Basic design criteria are being developed for a supplementary production reactor; the feasibility of power generation from high temperature reactor effluent; and an alternate method for reducing HAPD reactor effluent radioactivity.

Technical direction was furnished for the continuing program for testing high density concrete at the Corps of Engineers, Troutdale, Oregon.

The preliminary design scope studies for a new integrated plutonium separations facility was continued. Design development studies on existing separations plants included: Iodine removal and nitric acid recovery for Redox; back-up iodine removal facilities for Purex; Redox Phase III capacity increase; and installation of coalescers in Purex extraction columns.

PROJECT SECTION

At the end of the month the completion status of major construction is:

<u>Project No.</u>	<u>Title</u>	<u>Completion</u>	
		<u>Scheduled</u>	<u>Actual</u>
	1706 KER Recirculation Facilities		14%
CA-513-E	Purex Facilities, Part E		54%
CA-539	Additional Waste Storage Facilities, Redox	100%	89%
CA-546	Fuel Element Pilot Plant	73%	73%
CG-558	Reactor Plant Modifications, Phase I	19%	26%
CG-558	Reactor Plant Modifications, Phase II		1%
CG-603	Hanford 4X Program, Bismuth Phosphate Plants	72%	83%
CG-613	Hanford 4X Program, Metal Conversion Plant		4%

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During the month there was reaffirmation of the policy that all fabrications of pipe two inches or less should be done on site, and it was agreed that "on site" allows fabrication in the Minor Construction shops.

Replacement of front face connectors was accomplished at 105-KW between September 19-27, inclusive, and 105-KE was scheduled for replacements, beginning October 5, 1955. The 3,300 connectors for 105-KE were shipped on September 29.

The target date for completion of the Minor Construction work in the canyon of Purex is October 10, 1955.

ADVANCE ENGINEERING SECTION

IBM-702 programming of rigorous equations for the computation of reactivity changes and isotope production during long pile exposures are essentially complete. Rapid solutions for any chosen values of pile parameters will be possible.

ORGANIZATION AND PERSONNEL

Total on Roll, September 1, 1955	1,442
Net Change	-41

Total on Roll September 30, 1955	1,401
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D. W. McLenegan has transferred to the Design Section to assume the position of Specialist - Design Engineering.

Five exempt personnel were transferred to the Commonwealth-Edison Project, San Jose, Calif., during September 1955.

A. B. GRENINGER, MANAGER
ENGINEERING DEPARTMENT

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ENGINEERING ADMINISTRATION SECTION

SEPTEMBER 1955

Information was received during the month that the forthcoming edition of the Standard Distribution List (M-3679, 17th Edition) will have a number of new categories designed to more effectively pinpoint distribution of reports under the Civilian Application Program. Further, a number of the older categories (Technology - Hanford Processes, for example) are being subdivided into more specific subject areas.

The Library's film program has been growing steadily since taking over this activity from the Employee Communications Unit on April 25, 1955. During the summer the Library began to publicize in "What's New" notices of new industrial films appearing in trade and technical journals. The last three months, 16 orders have been received, as many as three or four coming in for such films as "Electrical Circuit Faults," "The Transistor," and "Dye Penetrants for Crack Detection." A total of approximately 25 to 30 films are borrowed from offsite each month.

A complete set of the Geneva Papers is available at the Classified Files reference desk, as well as a reasonably good subject index. Additional copies of the HAPC papers have been ordered from TIS, and other papers will be reproduced as necessary. There is considerable interest at the moment in the papers.

During the month the following major contract activities were handled:

1. Modification No. 1 to Special Agreement No. G-24 between General Electric and the State College of Washington providing for an extension of time and modification of terms was signed by the Contractor on September 2.
2. Modification No. 2 to Special Agreement No. G-30 between General Electric and Charles Bruning Company providing for a one-year extension of the agreement was signed by the Contractor on September 7.
3. Special Agreement No. G-70 between General Electric and McCray Marine Construction Company providing for diving services which may be needed in the Plant for a one-year period was signed by the Contractor on September 6.
4. Modification No. 2 to Consultant Agreement No. 116 between General Electric and George W. Watt providing for an extension of time and modification of terms and conditions was signed by the Consultant on September 26.

A total of 23 Special Agreements has been turned over to the Purchasing and Stores Section. The transfer of such agreements was completed this month.

R. J. SCHIER, MANAGER

ENGINEERING ADMINISTRATION SECTION

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FILE TECHNOLOGY SECTION

MONTHLY REPORT

September 1955

VISITORS & TRIPS

J. O. Blomeke and J. Halperin, ORNL, visited HAP0 to discuss neutron cross sections on Sept. 28.

J. T. Bobbitt, L. R. Kelman and David Okrent, ANL, Lemont, Ill. visited HAP0 to discuss plutonium metallurgy and fabrication of fuel elements, Sept. 21-22.

J. Crouthers, L. Germain, W. J. Ramsey, M. A. Ryan and E. Wittry, UCRL, Livermore, California, spent Sept. 28-30 at HAP0 discussing Whitney work.

R. H. Fillnow and W. H. Pennington, Westinghouse, visited HAP0 to discuss future APD-PWR irradiation program, Sept. 14-15.

A. J. Hill, duPont-Savannah River Plant, Augusta, Georgia, visited HAP0, Sept. 14 to inspect underwater high level activity facilities.

P. E. Merrill, National Lead, Fernald, Ohio, visited HAP0 on Sept. 12 to discuss sonotest instrument design.

R. Plunkett, GEL-Schenectady, spent Sept. 30 at HAP0 consulting on instrument development.

Paul Rapitski, KAPL, visited HAP0, Sept. 19-20. The purpose of his trip was to deliver a KAPL-120 fuel element.

B. Weidenbaum, Dow Chemical, Rocky Flats, Colorado, visited HAP0 regarding plutonium fabrication, Sept. 19-23.

G. C. Westfall, KAPL, spent Sept. 6-9 at HAP0 discussing KAPL-120.

C. Zabel, Los Alamos, visited HAP0 regarding reactor physics experiments, Sept. 29.

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J. M. Atwood attended the National AIChE meeting at Lake Placid, N. Y., Sept. 26-28, and discussed high temperature water technology at KAPL, Sept. 29-30.

J. A. Ayres consulted on coating and corrosion problems at Iowa State College, Ames, Iowa, Sept. 26; ANL on Sept. 27; GE Research Lab. and KAPL, Sept. 28-29.

L. P. Bupp attended Reactor Handbook Chapter Editors' meeting at ANL, Sept. 22-23.

L. P. Bupp and J. M. Atwood visited ANL-Arco, ANP-Arco, and Phillips Petroleum, Idaho Falls, regarding Borax experiments; MTR pressurized water loops and GEH-9 experiment; and to review ANP facilities, Sept. 19-21.

T. K. Bierlein attended AEC Hot Laboratory Symposium, Washington, D. C. and discussed electron microscope problems at North American Phillips Co., Mt. Vernon, N. Y., Sept. 28.

W. B. Farrand visited Goodyear Aircraft, Seattle, Sept. 21 to discuss analog computers.

M. C. Fraser and W. L. Walker attended Short Course on Corrosion, Washington University, St. Louis, Sept. 12-16.

J. M. Fouts presented a paper at AEC Fourth Symposium of Hot Laboratories and Equipment, Washington, D. C., Sept. 27-30.

R. L. Hales attended Norelco X-ray Diffraction Symposium, Norelco Company, San Francisco, Sept. 26-30.

K. D. Hayden visited Westinghouse, Cheswick, Pa., Babcock & Wilcox at Barberton and Alliance, Ohio, and ANL, Lemont, Ill., to inspect and discuss high temperature, high pressure testing facilities for water technology, Sept. 12-16.

W. T. Kattner visited Mallinckrodt Chemical, St. Louis, and National Lead, Fernald, Ohio, Sept. 6-16, to discuss uranium technology.

D. C. Kaulitz discussed special types of equipment for Metallurgy Research at American Instrument Co., Silver Springs, Md., Sept. 15-16; Stokes Vacuum Equipment and Brown Instrument Co., Philadelphia, Sept. 19-20; Norton Company, Worcester, Mass., Sept. 22; Stanat Rolling Mill Co., Finn Machinery & Blickman Co., and Baker & Co., New York, Sept. 26-28. He inspected vacuum furnace at National Research Corp., Boston, Sept. 21-23-24, and discussed fuel element fabrication at KAPL, Sept. 26-27.

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K. R. Merckx attended professional meeting of ASME at Monterey, California, Sept. 12-14.

L. C. Merker inspected machinery suitable for plutonium fabrication at the Machine Tool Show, Chicago, Sept. 13-15, and discussed hood fabrication for plutonium laboratories at ANL, Sept. 15-16.

W. J. Morris and R. V. Dulin attended Fourth Symposium on Hot Laboratories and Equipment, American Nuclear Society, Washington, D.C., Sept. 29-30.

R. E. Nightingale discussed radiation damage to graphite at ANL, Sept. 12; he also presented a paper at American Chemical Society meeting held at Minneapolis, Sept. 13-16.

W. J. Ozeroff attended a meeting on critical mass problems at ORNL, Sept. 26.

R. H. Purcell attended National AIChE meeting, Lake Placid, N. Y., Sept. 26-28 and discussed high temperature water technology at KAPL, Sept. 29, and at Illinois Water Treatment Company, Rockford, Illinois, Sept. 30.

O. W. Rathbun observed special processing of uranium at National Lead, Fernald, Ohio, Sept. 26-28.

P. H. Reinker and L. H. McEwen visited Phillips Petroleum, Idaho Falls, regarding Borax experiments, review of ANP facilities, and pressurized water loops at MTR, Sept. 19-21.

J. W. Riches attended meeting of Working Committee for Uranium Quality and Fabrication at National Lead, Fernald, Ohio, Sept. 12-16.

M. J. Sanderson and T. W. Evans visited Phillips Petroleum, Idaho Falls, to observe ruptured slug in MTR, Sept. 1-2.

M. J. Sanderson and W. E. Roake discussed fuel element fabrication, Sept. 22-30, at Norton Company, Worcester, Mass., National Research, Boston, KAPL at Schenectady, WAPD at Pittsburgh, and Mallinckrodt Chemical, St. Louis.

J. M. Skarpelos attended a Carbon Steel Committee Meeting at KAPL, Sept. 15-16.

C. N. Spalaris attended American Chemical Society meeting held at Minneapolis, Sept. 12-16, and presented a paper.

L. D. Turner and R. E. Field attended AEC Hot Laboratory Symposium, Washington, D. C., Sept. 28.

R. E. Wilson visited Babcock & Wilcox at Alliance, Ohio, Sept. 13-15, and ANL, Sept. 15-16, to consult on reactions at high temperatures and pressures.

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ORGANIZATION & PERSONNEL

Personnel totals are as follow:

	<u>August 31</u>	<u>September 30</u>
Administrative	2	2
Pile Engineering	92	94
Pile Materials	60	58
Fuel Technology	121	119
Physics Research	41	40
Metallurgy Research	78	79
Contact Engineering	3	2
Technical Administration	<u>10</u>	<u>10</u>
Totals	407	404

Pile Engineering: P. R. McCarthy, Engineer, transferred in from Chemical Development Sub-Section, Sept. 1; L. J. Blakeney, R. W. Lewis and H. W. Resseguie, Technician Trainees, transferred in from Education & Training Section, Sept. 12, and C. E. Walker, Technician Trainee, transferred in from Education & Training Section, Sept. 19; J. L. Bond, Engineering Assistant, transferred to Education & Training Section and was reassigned to Pile Engineering as Technician Trainee, Sept. 12. H. H. Hylen, M. F. Gillis, W. J. Hendrickson, Tech Grads (summer employees), terminated Sept. 16, 23 and 30, respectively; R. L. Tomlinson and W. F. Ekern, Engineers, terminated Sept. 9 and 16, respectively; T. G. Harbour, Engineering Assistant, terminated Sept. 27; M. V. Davis and W. D. Gilbert were deactivated Sept. 23; W. L. Thorne, Jr. Engineer, was transferred from weekly to monthly, Sept. 1.

Pile Materials: L. A. Jobe, Engineer I (summer employee), terminated Sept. 12; S. W. Yerrington, Engineering Assistant, M. S. James Stenographer, and M. B. Trott, Secretary C, terminated Sept. 2, 3 and 16, respectively.

Fuel Technology: H. J. Pierce, Technician Trainee, transferred in from Radiological Sciences, Sept. 26; E. R. Gilbert, Technician Trainee, transferred in from Design Planning, Sept. 27; S. B. Crisp, Stenographer, transferred in from Office Auxiliaries, Sept. 26; C. P. Teter was reactivated Sept. 23. T. F. Doupe, L. B. Szymanski and A. K. Polson, Engineering Assistants, terminated Sept. 2, 9 and 16, respectively; R. F. Durnford, Engineer I, terminated Sept. 16; D. F. Snoeberger and E. C. Pitzer, Sr. Engineers, terminated Sept. 9 and 30, respectively; J. E. Mullendore, Tech Grad (summer employee), terminated Sept. 7;

B. S. Seppi, Secretary B, terminated Sept. 22; D. D. Landry and J. Farrimond, Stenographers, terminated Sept. 2 and 9, respectively; K. P. Bokish, Engineer II, was transferred from weekly to monthly, Sept. 1.

Physics Research: C. R. Lagergren, Engineer I, was hired Sept. 19. J. J. Regimbal, Engineering Assistant (summer employee), terminated Sept. 22, and G. M. Mullar, Engineer I, terminated Sept. 30.

Metallurgy Research: D. H. Parks, Engineering Assistant, and B. M. Rouse, Stenographer, were hired Sept. 1; E. G. Sullivan, Engineering Assistant, transferred in from Project Section, Sept. 12; O. K. Shupe, Engineer II, terminated Sept. 16; W. R. DeHollander, Sr. Scientist, and R. P. Dunn, Secretary B, transferred to Separations Technology Section, Sept. 6 and 19, respectively; J. F. Shipman, Field Clerk C, transferred to Plant Accounting, Sept. 26.

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PILE ENGINEERING SUB-SECTION

PROCESS TECHNOLOGY

Power Level Limitations

The maximum operating power level, during September 1955, was limited by 105 C tube outlet temperatures at B, D, DR, F, and H Piles. The allowable tube outlet temperature at C Pile was increased by Manufacturing from 100 C to 105 C during the month. At KE and KW Piles the power was limited to 500 KW/tube to prevent extensive damage to the reactor in the event of a sudden and complete loss of water to the tube. At month's end, the change of front face pigtails at KW reactor was completed which will allow operation at a higher limit.

Process Specification Changes

Specification 31.00, "Composition of the Reactor Gas" - The specification was revised to allow the use of 15 per cent more helium at the B, D, DR, F, and H reactors. Added were requirements for reactor shutdown in the event of existing water leaks into the reactor gas system, the requirements for shutdown depending on the magnitude of the leak.

Pile Operation

Large scale tube replacement has begun with 63 tubes at F Pile and 30 tubes at D Pile being replaced on a scheduled basis.

At KW Pile all front face pigtails and all process tube temperature sensing elements were replaced. These changes will allow operation at trip-before-instability limits unless some lower temporary limit is deemed advisable.

Process Tube Leaks

Eight pile shutdowns were required due to process tube leaks during September 1955.

<u>Date</u>	<u>Pile</u>	<u>No. Leaking Tubes Replaced</u>
9-1	DR	1
9-1	F	17
9-7	D	2
9-13	H	0
9-22	H	1
9-23	D	2
9-24	F	7
9-28	C	1

Ruptured Slugs

Thirteen slug failures occurred during the month. These consisted of 12 failures of normal uranium slugs, two of which had been given special examinations and were

being irradiated under a "to-rupture" test, PT 105-7-MR, and the failure of two "C" metal pieces in one enrichment column. The rupture experience for the month of September is summarized in Table I. Included in this tabulation are data for four August failures which occurred too late to be included in the Monthly Report for August.

TABLE I

SLUG RUPTURE EXPERIENCE
SEPTEMBER, 1955

<u>Type of Metal</u>	<u>Tube No.</u>	<u>Failure Date</u>	<u>Exposure</u>	<u>Failure Type</u>
8" Normal U - "A" Lot	2470-F	8-26-55	773	Cap
8" Normal U - "A" Lot	2869-F	8-27-55	788	Side
8" Normal U - "A" Lot	3069-F	8-28-55	733	Side
8" Normal U - "A" Lot	2370-F	8-29-55	762	Cap
8" Normal U - "K" Lot	1574-DR	9-1-55	972	Split
8" Normal U - "A" Lot	3266-F	9-1-55	750	Side
8" Normal U - "A" Lot	3373-F	9-1-55	806	Side
8" Normal U - "K" Lot	3764-D	9-3-55	928	*
8" Normal U - "N" Lot	1379-D	9-3-55	878	*
8" Normal U - Group 9	4562-DR	9-3-55	1066	Side
8" Normal U - "M" Lot	1468-C	9-4-55	164	*
A1-U-235 Alloy - C Slug	2789-DR	9-5-55	168.59	(1)
8" Normal U - *	1382-D	9-7-55	268	Side
8" Normal U - *	2776-H	9-11-55	1386	Cap
8" Normal U - "K" Lot	3666-B	9-12-55	914	Unclass.
8" Normal U - "C" Lot	0773-H	9-17-55	1474	Unclass.
8" Normal U - *	1778-C	9-18-55	84	*
8" Normal U - "L" Lot	2272-F	9-18-55	836	Side

*The metal from these tubes has not been examined; therefore, these data are not yet available.

(1) Two failures were found in the metal from this tube, a side and a cap failure.

The seven F Pile failures listed in Table I all occurred in metal charged on 12-28-54, bringing the number of recent failures in metal charged at F on this date to a total of 13. At the present time, this charge comprises the highest exposure metal in the pile. The majority of these failures, as in the case of failures from the D Pile charges of 11-18-54 and 12-12-54, were of the side type. A large percentage of these ruptured pieces exhibited excessive corrosion between the rib marks, with the rupture occurring in this highly corroded area. On the basis of the appearances of these pieces, it is hypothesized that the failures resulted from the irradiation of these slugs in old tubes whose rib height had been decreased by corrosion. This would decrease the flow between the ribs, increasing the temperature of the water in this region, and thus, cause the slug jackets to corrode at a relatively high rate. Preliminary investigations have shown that all

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ruptures of this type which were studied did, indeed, occur in tubes which one would expect to be rather heavily corroded. Two leaking tubes removed during September 1955 had sustained ruptured slugs with between-the-rib attack within the past two months.

Production Tests

See following pages.

<u>Test No.</u>	<u>Type Metal</u>	<u>No. of Tubes</u>	<u>Pile</u>	<u>Goal Exposure</u>	<u>Present Exposure</u>	<u>Remarks</u>
105-570-A	Cored-Lead Dip	4	2-C	2 ruptures	Discharged 1550-1610	Ruptured at 1158 & 1173 MWD/T
	Control	4	2-C	"	1 discharged at 1046	1 ruptured at 1128 MWD/T
			2-F	"	1420-1450	
105-586-A	U-Si Ingots	1	B	900	Discharged at 1007 MWD/T	
	U-Si Dingots	4	2 ruptures			Not yet charged
	U-Si Cored	3	900			Not yet charged
	Control	4	2 ruptures			Not yet charged
105-587-A	Internally and Externally	7	C	600		3 tubes charged 8-16-55. 3/8" hole size found to provide optimum heat distribution. Discharged 9-23-55.
105-588-A	Development Test of Extruded and Drilled Cored Slugs	3 tubes per mo.	1-C	900	Discharged 680-600	Ruptured at 797 MWD/T
			3-C	1100		
			3-D	900	650-680	Charged 3-7-55. 1 ruptured at 174 MWD/T.
			5-D	900	480-540	Charged 3-30-55.
			3-D	900	220-240	Charged 7-10-55.
			9-D	900	--	Charged 9-28-55.
105-590-A	Extruded Cored	4	C	Ruptures	not yet charged	Compares performance of extruded and drilled cored slugs
105-591-A	Cored	Approx. 300	KE	900		Authorizes irradiation of production quantities of cored slugs. One tube ruptured at 505 MWD/T at C Pile.
		209	D			
		18	C			
		184	F			
		140	B			
105-593-A	Cored-Al. end plugs	4	C	1-200	Discharged at 213	
				1-600	510-530	
				2-900		

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105-596-A	Dingot Slugs	9	F	2-300	Discharged at 300	Slugs charged alternately with control slugs from rod-transformed and slug-transformed metal.
				2-600		
				5-900	380-540	
105-597-A	Mg.-U Matrix 4 slugs	1	B or D	3000	Not yet loaded	2 Matrix slugs + 31 reg. slugs
		1	B or D	6000	Not yet loaded	10 enriched matrix and 12 normal matrix slugs.
105-601-A53-MT	Solid	12	D	6-600		Delay of 30, 43, 50 and 80 seconds between salt bath and water quench. Charged 6-28-55.
				6-900		
105-603-A47-MT	Cored-Crimped U. end plugs	4	C	1-300	120-140	Charged 8-25
				1-600		
				2-900		
105-607-A-57-MT	Cored-Enriched Welded U. and Al. end Plugs 3/8" & 5/8" core dia.	6	C	Ruptures	Circulating for approval	Compares performance of welded U. and Al. end plugs and a larger core diameter.
105-608-A-56MT	Dingot Slugs	16		7-600	Approved	Compares various mechanical and heat treatments of Dingot U.
				9-900		
105-608-A-56MT	Dingot Slugs			Both low & high goal	Circulating for approval	Authorizes irradiation of production quantities of Dingot slugs.
Supp. A						
105-608-A-56MT	Dingot Slugs	8	C	Ruptures	Circulating for approval	Compares performance of dingot and ingot U. slugs.
Supp. B						
105-610-A-60MT	Vertically Heat Treated U	10		2-400	Circulating for approval	Rod heat treated in vertical positions.
				4-600		
				4-900		
105-611-A	Reg. Production	33		500	Circulating for approval	Investigates the effects of pile variables upon slug stability.
				900		
				1100		

HEAT TRANSFER

Steam Loss Transients

Study of the tests on the low pressure full scale mock-up to simulate steam failure transients at the old piles has been completed and a report draft prepared. Analysis is continuing on the tests to simulate cone screen and tube plugging transients.

K Pile Instability Limits

Using both the hydraulics mock-up and the low pressure electrically heated mock-up, tests were performed to determine the steady-state boiling curves for the K Pile geometry at tube powers far in excess of electrical heating capacity. The technique calls for use of the electrically heated system to establish active zone hydraulics and the hydraulic mock-up to establish rear piping hydraulics. Tests are substantially complete.

Cooling-by-Boiling Equipment Development

Heavy pile maintenance schedules diverted craft manpower and caused work to complete the assembly to proceed slowly. The process section is now in place and the electrical connections are ready for completion. Fabrication of safety shielding proceeded satisfactorily. Power shake-down tests at intermediate pressures are scheduled for early execution even though delivery of one pre-heater and strainer has not yet been made.

Hydraulic and Associated Studies

Tests were made at H Pile on September 16 to determine the response characteristics of Project CG-558 Panellit gages throttled to the point where gage oscillation was exceptionally small. Of six such gages tested, all gave the 25 psi change from normal to low trip within 1/3 second after applied pressure was lowered suddenly from normal to atmospheric. Two non-throttled gages, showing negligible oscillation due to deliberate insertion of oil into the capillary, were also found to respond in 1/3 second. It thus appears that gage oscillation sufficient to be visible is prima facie evidence of satisfactory gage response. Laboratory studies of response characteristics of oil filled gages is underway. Preliminary results tend to confirm the on-pile observation that insertion of oil of proper viscosity coupled with no throttling should effectively damp oscillations with little effect on response characteristics.

Internal - External Cooled Slug Irradiation

Three shortened columns of I & E slugs of varying inner hole diameters were irradiated in C Pile under the provisions of PT 105-587-A, Supplement A. Distributions of water flow and heat flow to annulus and hole were found to be as predicted by theory. Outlet temperatures in the annulus and hole of the column with the 3/8 inch diameter inner hole were found to be well balanced, indicating this to be the proper geometry for further testing. The total heat output from each of the columns was about 15 per cent greater than would be expected from standard solid slug columns of the same

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length, although a part of the observed effect may have been caused by front-to-rear flux distortion. The irradiation was terminated on September 23 after only 7 days due to the front nozzle insert on one of the test tubes washing down and plugging the hole flow stream. A scram resulted immediately and all three columns were discharged since the desired data had been secured.

K Pile Water Plant Reliability

Study continued on the characteristics of the emergency pumping capability of the K Pile water plant. This indicated that changes in procedures, operation, or equipment arrangement could lessen the probability of emergency pumping failure. First approximation calculations were made to establish tube power limits to permit safe operation for the case of simultaneous failure of BPA at both K areas and emergency pumping failure at one.

Other Studies

In conjunction with Physics Development personnel, tentative equipment designs were studied to permit experimental determination of reactivity transients following boil-off of water from a process tube. Bonding difficulties prevented completion of the contact pressure and surface finish thermal resistance specimens to be tested for Metallurgy Research. Assistance was rendered to Design Section personnel in computing calibration curves for Project CG-558 venturi meters and on an operating manual for the electrical analogue computer. Attention was given to the effect of substituting an orifice adapter for a venturi adapter on K Pile front fittings and an unusual cone-screen plugging occurrence at C Pile. Maximum expected graphite temperatures for proposed tests in the KAPL-120 loop were calculated for the Special Irradiations Unit.

PILE PHYSICS

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

In the fourth measurement under this production test September 1-2, an apparent loss of 74 inhours resulted from a reduction in CO₂ content in the pile atmosphere from 60 to 41 per cent. Preliminary analysis of the results to date show that the graphite coefficient is definitely increasing with exposure. The following table shows the results obtained using 22 graphite thermocouple readings from central vertical and horizontal traverses taken in the plane midway from front-to-rear of the pile.

PRELIMINARY KE COEFFICIENT RESULTS

<u>Test</u>	<u>Reactivity-Weighted Exposure</u>	<u>Apparent C_G-ih/°C</u>
1	39	.77
2	128	.93
3	209	1.18
4	293	1.80

Because of a preceding change in the flattening pattern, the rod system calibration may be overly strong in the case of the fourth test; in this case, the last value of the coefficient would be too high. Front-to-rear distribution weightings have not yet been performed for any of the four tests.

BNL Temperature Coefficient Data Analysis

The data from the first Brookhaven graphite annealing run has arrived and has been examined. As better rod calibration information will be required for complete analysis, a preliminary analysis was made only of a five hour period during which very little rod movement was experienced. Indications from this rough analysis were that the graphite reactivity coefficient in the dry lattice was approximately zero at the 254 g/t average concentration existing at the time of this test. Further information to aid in this analysis has been requested from Brookhaven (HW-38928). A report of the contacts made at Brookhaven and ORNL on the dry lattice coefficient problem are given in HW-38988. Present indications are that the next Brookhaven annealing experiment will be performed near the end of November.

Pile Safety Studies

Work has proceeded on preparation of a graphic presentation of the control capacity requirements and capabilities of the Hanford reactors and of the sequence, timing, and magnitude of reactivity changes which a pile would undergo in the event of water loss. This presentation is intended as an aid to management when establishing policy regarding plant nuclear safety requirements and when programming control system and emergency backup developmental work. Much of this work will also be covered in a discussion to be presented at a Manufacturing Department reactor safety meeting in the near future.

Data Processing Needs of Pile Technology

In conjunction with the integrated data processing scheme for the 702 computer proposed by the Statistical and Computing Unit (HW-35997), a survey has been made of the pile data requirements of the various units of Pile Technology. Following some additional study of these needs and of the tabulating methods employed, recommendations will be prepared concerning the form, frequency, amount, and distribution of pile data reports to be used by the Pile Technology Section.

K Pile Enrichment Plans

The higher pile power levels which will be allowed following the installation of the new connectors at the K Piles will require that more enrichment be added to the KW Pile (low goal exposure) enrichment pattern. The proposed pattern, which calls for the use of up to 80 "C" columns in the 7th and 8th lattice units in place of the present 32-column pattern, was reviewed from the standpoint of pile safety.

On the basis of flux matching calculations, made by the same method successfully employed to describe the KE startup enriched pile control test results, it was concluded that the proposed pattern was acceptable safety-wise.

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High Exposure Yield and Quality Measurements - PT 105-598-A

Because of a presently heavy work load, the Hot Semi-Works will not be able to process the 13 tubes of 1100 MWD material held under this production test for isotopic yield studies until after the first of the year.

Iron-Masonite Shield Temperature Studies - PT 105-604-A

The data obtained under PT 105-604-A, under which a combination of fringe poison and additional nearby enrichment were loaded to reduce the shield temperature in the far side of the H Pile, have been examined from the standpoint of product economics. It appears that U-233 produced by this method costs from 10 to 20 per cent more per gram than that produced in a J-Q loading. On the assumption of equivalent economics for other products and of a continuing demand for isotope production, reduction of shield heating by approximately one-third costs about \$5,000 per pile face protected per year at present power levels. For the case of burnout conditions contemplated under Project CG-558 conditions, shield "patching" would probably be a more economical approach. However, black body radiation from the graphite would probably become sufficiently significant in the event of recirculation that shield protection by fringe poisoning would be desirable in addition to shield patching.

Concrete Shield Attenuation Measurements

Foils placed outside the iron limonite concrete shield at the KW Pile failed to detect any leakage through an imperforate section on the experimental side of the pile. Based on the sensitivity of the measuring method employed, it is concluded that the thermal neutron leakage from the pile is less than 0.1 mrem/hr equivalent. Foils were also placed against the magnetite limonite shield in the inner rod room during a recent KW outage.

One of the iron limonite concrete slabs which had been subjected to 325 C heating for an extended period and had been employed in subsequent attenuation measurements has been broken up to permit a determination of retained water content.

MECHANICAL EQUIPMENT DEVELOPMENTCharging and Discharging Studies

Test runs have been made to determine damage to slugs flushed through a stainless steel tube, and through a stainless steel tube into a process tube. Flow and differential pressure data were obtained. X-ray photographs indicated that slug cocking resulted when a charge is loaded and seated by water flow.

One-Header-at-a-Time Leak Detector

Very encouraging results were obtained in tests on the 189-D mockup, using a helium detector. A simulated rear Van Stone leak of two gallons per hour showed up in the helium detector in 4-1/2 minutes in spite of the fact that 10 g.p.m. water was flowing through the process tube at the time of the test.

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Testing the system at 105 H assisted in locating pile water leaks. On-pile application is feasible and development will continue to make further improvements.

Vertical Rod Studies

Tests of the present "K" type latch for VSR are now in progress. In the absence of a tower to work from, a mockup has been arranged in the 186-D Building by using the top section of tubing and one section of the rod and arranging a method of using a hydraulic jack to simulate pressure applied to the piston. It is proposed to find how much force the present latch will hold before releasing the rod.

Disaster Control

Studies continued during the month in an attempt to evaluate the quantities of fission products and uranium released from a pile during a runaway and the rates of release of both material and heat to the pile building air. The effort is directed at finding whether or not the release can be contained in the building and the necessary changes to accomplish this objective. No significant results can be reported at this time.

Gas Seal Heat Shield

Design Test Request #1706-KER-3 consisting of a functional test of 105-KE, gas seal heat shield, has been completed and results reported to Reactor Design and Development Unit. The test indicated that the temperature of the gas seals adjacent to 1706 recirculation tubes would not be troublesome.

Process Tube Assembly and Piping

The three tubes to be installed in the 1706-K flow laboratory out of pile loop, were prepared for use in creep measurements and are awaiting installation. Preparation included obtaining measurements of tube wall thickness and tube diameters as well as installing strain gages on the inlet and outlet ends of the tubes.

The final report on allowable tube inlet pressures is in process of preparation and should be issued within the next month.

Physical Constants Test Reactor

The source mechanism has been installed. One horizontal rod was found to be bad and has been replaced. The movable leveling slug cans have been loaded. Revised spring housings of the control rods have been installed and the springs changed so as to reduce the bounce when the rod is scrambled.

Sub-Critical Counter

The mechanical components are almost complete and are to be assembled in the 189-D laboratory for final testing and development of the special pigtail which will be required.

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Core Borer

A new cutter was fabricated and will be tested. It is anticipated this cutter will provide a better indication when it is retracted.

Graphite Miner

Tests were made in the 189-D laboratory and it was determined that the present length of the cutter is too great to traverse channels of maximum distortion. A short head has been designed and is now being fabricated in Technical Shops.

High Pressure-High Temperature Loop

Modifications to the loop are being completed by Minor Construction.

Flanging of Zircaloy-2 Tubing

An induction heater has been set up to anneal the tube ends. Tests with the manual flange rolling tools are continuing on a mock-up to determine the operability of the tools on a process unit.

SPECIAL IRRADIATIONS

KAPL-120 Loop

Following the removal of difficulties with instrumentation, the KAPL-120 loop was operated at full temperature and pressure from September 9 to 26. During this period of operation, heat studies tests were performed to evaluate the peak characteristics of the loop. On September 26, a valve started leaking, necessitating operation at reduced temperature and pressure.

Test sections containing fuel elements and corrosion specimens have been received from KAPL and have been charged for the first irradiation since the loop has been modified.

Minor changes and repairs to secondary components in the loop are still in progress. The gamma monitoring system still awaits vendor delivery and installation of gamma chambers before being put into service.

Gamma Irradiation Studies

The irradiation request from the Air Force at Wright Field (AF-100) for the gamma irradiation of large numbers of samples of oils, lubricants, and fuels has been evaluated and is being prepared for approval. The preliminary design of gamma irradiation facilities to accommodate this request has been completed. Cost estimates have also been made and transmitted in the customary manner.

The two experimental assemblies for studying zirconium-gas reactions (HAPO-105) were discharged from F Pile. Plans are in progress for charging two additional test assemblies at the earliest possible date.

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The charging of uranium samples for studying the effects of irradiation on crystal structures at low temperatures (HAPO-108 and HAPO-145) at B Pile has been delayed again due to a neutron leak in the region of the poison column control facility which is used in such irradiations.

At an outage of C Pile in August, it was determined that the Y test hole was blocked by a piece of the aluminum reflector which had slipped out of place. This blockage prevented the charging of graphite boats containing graphite samples (HAPO-128). At a recent outage, this piece of reflector was removed and five boats with samples were charged.

Following the completion of a special furnace by Graphite personnel, a dry run of all equipment for isolating radiation effects to graphite was successfully completed. With this equipment, graphite samples out-of-pile are maintained under conditions identical to those of samples in-pile but with the absence of pile irradiations (HAPO-158). Samples were charged in-pile and in the furnace at the middle of the month and full operation is now in progress.

Three experimental assemblies consisting of cored slugs with three different core diameters and thermocouple assemblies for measuring annular and cored temperatures were charged into C Pile on 9-16-55. Data obtained from this irradiation has shown that the temperatures, flows, and heat flux distributions were in good agreement with values obtained from theoretical considerations made by the Heat Studies Unit. It was also noted that the heat generation rate in these slugs was slightly higher than had been predicted. Slugs were discharged September 24 after an indication of a rupture in one of the tubes was obtained. Later it was determined that this indication had been due to the reduction of coolant flow by a dislodged front-face shielding piece.

Instrumentation for the NAA pile safety fuse (HAPO-162) has been completed and the arrival of the fuse assemblies from NAA is awaited. It has not been possible to obtain a date for this arrival from NAA.

An experiment to provide information relative to the diffusion of krypton gas within uranium metal (HAPO-166) has been designed. The production test has been drafted and will be sent out for formal approvals.

Eight cobalt sources having an intensity of 1500 mr/hr at 2 inches in air have been prepared for the Radiological Monitoring Unit. These sources will be used as reference "bugs" for checking monitoring instruments.

At the request of the Biology Section, studies are in progress to determine the feasibility of exposing sheep to gamma irradiation from spent fuel elements. There is an interest in this information by the Atomic Energy Commission to evaluate claims of damage to livestock in atomic bomb test areas.

Facilities and Equipment

Provisions and modifications have been made in the beta water monitoring equipment at the K Piles. This equipment will be placed in service again in the near future for testing to determine its functioning and to evaluate the need for further revisions.

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The feasibility of using calorimetric methods for gamma dosage measurements is being studied. Calorimeters offer a potential of higher stability as compared with ionization chambers. Calorimeters for routine measurements and for calibration purposes are being designed.

Fabrication of a 26 liter ionization chamber having a 4 geometry is nearing completion. Testing will follow the completion of fabrication.

The design of a high intensity cobalt irradiation facility has been completed and procedures to establish its location in one of the K Pile basins are in progress. Efforts are also being extended to prepare cobalt samples to be used in this facility for irradiation.

Design of a "Quicky" facility for KE Pile was begun. Plans for the new unit will circumvent disadvantages of the present facility at F Pile by providing a high neutron flux, a water-cooled unit, and a sample capsule of 500 per cent more volume.

In the month of August, it was noted that there was considerable film built up in the general purpose test facilities at KE Pile. On September 8, a 10 per cent chromic sulfuric acid solution was used successfully to remove this film.

Data based on the activation analysis to date indicate that unusually high activation will be encountered upon the removal of thermal shield pieces from KW Pile. To avoid undue hazard, mock-up of a proposed method is being planned.

PHYSICS DEVELOPMENT

Prototype Physical Constants Test Reactor

All fuel for the reactor is at Hanford and performance tests of the mechanical, electrical and instrument systems completed. All systems functioned as designed except the control rod system which is prone to mechanical damage due to essentially impact deceleration; methods of providing improved deceleration characteristics are being developed.

The time response of the instrument systems and safety circuits have been determined and the relationship between neutron flux level and level trip setting to insure that prompt critical is not reached for maximum rates of reactivity addition has been established.

Gamma Monitor Projects

The gamma spectrometer slug rupture detection units installed at H Pile under Project CG-578 have operated with no failures in the instrument components. A portion of the scintillating crystals provided by Harshaw Chemical Co. were found defective and replaced. Two natural uranium slug ruptures were detected with good sensitivity. The replacement of the beta monitor systems at other piles are tentatively scheduled as follows:

DR - 9/29, B - 10/7, and D - 12/5

The design of a gamma monitor installation for the K Piles has begun. The major modification of the systems being installed in the older piles which is desired for the K Piles application is a reduction of the scanning time per cross header point to increase the monitor frequency.

The delayed neutron fuel element rupture detector has operated satisfactorily in the KAPL-120 loop at H Pile. A B^{10} lined neutron proportional counter is the detector in this system.

Reactor Safety - Nuclear Instrumentation

A production test supplement has been prepared to authorize the on pile demonstration of an operational prototype of the sub-critical pile neutron multiplication monitor to be provided at each pile under a project being initiated by Engineering at the request of Manufacturing. The mechanical aspects of this system, developed by the Mechanical Equipment Development Unit, are expected to be complete for installation at D Pile during October. The circuitry is essentially that functionally demonstrated at DR Pile last year with some component redesign to facilitate maintenance.

The component for the test of an octant monitoring system for the B, D, and F Piles are being fabricated and will be ready for installation at F Pile late in October.

Nuclear Safety - Tube Outlet Temperature Instrumentation

A project proposal has been prepared by Design for the installation of cell type temperature monitors on all older reactors. The system is presently scoped to consist of a nominal 200 points per pile and is estimated to cost about \$900,000; it is currently planned to be financed from Project 558 funds. The temperature monitor will place the outlet water temperatures from approximately one tube in nine in the safety circuit continuously and will also provide a visual display of the approach to trip temperatures.

Lattice Neutron Economy

Calculations have been made giving the approximate reactor loading to produce tritium in an "E-N" type load - "E" metal is uranium enriched in U-235 and "N" material is lithium-aluminum alloy containing about 3.5 weight per cent lithium. For the case of "E" metal containing 0.94 per cent U-235 the reactor will contain about 8.36 parts of "E" metal to one part "N" metal to yield a k of 1.05. The initial atomwise conversion efficiency under these conditions is 0.16 atoms of tritium and 0.675 atoms of Pu per atom of U-235 depleted. Cases have been developed for other "E" metal enrichments and experiments to confirm these calculations are planned.

General Plant Assistance

A cooperative study is underway with the Heat Transfer Unit to develop methods of measuring the volume of water in a process tube as a function of time after instantaneous loss of inlet pressures. These data are basic in the computation of power excursions in the Hanford reactors. Experimental methods reviewed include (1) radiation attenuation, (2) visual and photographic observations through transparent process tube sections, and (3) the changes in capacitance between slug column and

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process tube walls as the volume fraction of water changes. The latter alternative appears promising and an appropriate circuitry is being constructed.

A study was completed indicating the feasibility of measuring stainless steel corrosion rates quickly via radioactive tracer techniques. It is estimated that corrosion rates as low as one-tenth mil per month should be measurable in a matter of minutes. This work is reported in HW-39045, "Feasibility Report - Measurement of Stainless Steel Corrosion Rates by Activation Analysis," R.S. Paul.

Hanford test pile measurements have been completed to yield the reactivity loss expected at KE Pile if the zirconium process tubes in the KER recirculating loop were replaced with stainless steel. The effect on power generation rates within the KER tubes as well as surrounding uranium tubes was also determined for both the enriched and unenriched cases. The results are given in HW-39046, "Alternate KER Process Tubes," A.W. Thiele.

Reactor Safety Project

Analyses are underway to determine the feasibility and costs of loading a production reactor with NAA safety fuse elements for a full reactor demonstration as per the request of the Advisory Committee on Reactor Safeguards. North American Aviation has submitted their analysis of fuse element cost, delivery time schedules, and a resume of predicted element performance. In general, the fuse element costs are ten-fold higher than those quoted for presentation in the December, 1954 meeting with the ACRS.

Test Pile - Routine Tests

Uranium slug testing proceeded routinely. Four lots of Mallinckrodt billet eggs yielded TDS values ranging from 13 to 16. Twenty-four lots of Fernald billet eggs yielded TDS values from 13 to 20 with 15 of the values in the 17 to 20 range.

PILE MATERIALS SUB-SECTION

PILE COOLANT STUDIES

Production Tests

Development Test 105-558-E, initiated to make a plant scale test of activated silica production with 92 to 96 per cent neutralization, was terminated September 20. This test demonstrated that highly neutralized silica is at least as good as our present silica with respect to ease of preparation, film formation tendencies, and flocculation aid efficiency. These favorable results have led to changes in the design of equipment for the preparation of activated silica at D and F Areas permitting the use of package silica units available from Omega Machine Company. These units should give substantial savings in equipment cost, installation cost, and maintenance costs.

An interim report has been issued on the first phase of PT 105-542-E, testing 0.5 ppm of sodium dichromate as an inhibitor in the process water. The results of the test were somewhat inconclusive, but no positive evidence of higher corrosion rates in low dichromate water was observed. A supplement to this test has been written authorizing continued testing for a period of one year.

The zircaloy-2 tube, operating in channel 3586-D under PT 105-555-E, has operated normally during the month. Exposure of the weighed regular metal charge as of September 15 is at about one-third of the 600 MWD/T goal exposure. Maximum outlet temperature of the tube has been approximately 96 C.

Corrosion Monitoring

Twenty process tubes were examined during the month. Medium to heavy corrosion was found on all but one of the twelve F Pile tubes examined. Graphite-aluminum galvanic corrosion of the outside of the process tubes appears to be getting more severe at F Pile, particularly in the lower third of the pile. Indications of cocked slugs were found in all C Pile tubes examined, but otherwise, no new or unusual type of attack was observed. A hole, apparently the result of mechanical damage, was found in rupture-leaker tube 4562-DR.

In the examination of pile process tubes it has been noted that the corrosion attack is more severe between the ribs than above the ribs. This accelerated attack was found where the rib height had been reduced. Many tubes have been examined in which the rib height was reduced as much as 45 to 50 mils. Examination of some recent slug ruptures has shown that the jacket area between the process tube ribs was more severely corroded than the remainder of the jacket. The consequences of reduced rib height support these observations. Worn down ribs cause a reduction of the annulus area between the ribs and an increase of the annulus area above the ribs, resulting in disproportionate coolant flow in the two areas. The reduced coolant flow between the ribs should result in local water temperatures considerably higher than the tube outlet water temperatures. This higher local water temperature will cause the corrosion rate to be accelerated at this point.

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Laboratory Corrosion Tests

An apparatus has been built and put in operation for testing the corrosion of aluminum under flow conditions and with heat transfer. The apparatus essentially consists of an aluminum test sample mounted between two flanges in such a manner that steam is directed against one side and water against the other. The steam side of the sample is nickel plated to minimize corrosion of this surface. A thermocouple located inside of the sample is used to measure the surface temperature, and the power generation is computed from the rise in temperature of the water passing over the sample. The initial run is with process water, 7.3 pH, 2.0 ppm sodium dichromate at a water temperature of 115 C. The power generation rate is 60 watts/sq.cm.

Process water with low pH, 7.3, will effect the corrosion rates of mild steel and stainless steel in the external reactor piping. A test program to investigate this effect has been initiated. Stainless steel and mild steel samples were exposed for six weeks to pH 7.6 water at 110 C. No detectable corrosion occurred on the stainless steel. The mild steel corrosion rate was 0.13 mils/mo. Samples will soon be exposed at pH's 5.5, 6.5, and 7.0 and temperatures up to 115 C.

Exposures of minislugs up to 40 days in pH 6.5 and 7.0, 2.0 ppm sodium dichromate, process water have been attained. Boiler scale formed on the minislugs in pH 7.0 water at 165 C and that portion of the test was discontinued. No scale formation has been observed in the tubes operating at temperatures up to 175 C with pH 6.5 water.

Flow laboratory corrosion tests of slugs canned by various methods have been completed. The slugs were exposed for 45 days to process water, 7.65 pH, 2.0 ppm sodium dichromate, at 110 C. The observed corrosion rates are listed below:

	<u>Mils/Mo.</u>
Hot Press, thin wall cans (Alloy M329)	
Cleaned by vapor blasting	.29
Cleaned by R-3	.25
Cleaned by vapor blasting and R-3	.31
Cleaned by electropolishing	.32
Hot Press, thick wall cans (Alloy M329)	
Cleaned by vapor blasting	.38
Cleaned by R-3	.33
Cleaned by vapor blasting and R-3	.42
Cleaned by electropolishing	.27
Dip canned pieces	.24
Dip canned, vapor blasted pieces	.12
Dip canned cored slugs	.21
"C" process canned uranium pieces	.21
"C" process canned aluminum dummies	.10

In most cases the corrosion rates were determined from only one or two samples, which may give misleading results due to the scatter normally found in corrosion tests.

1706-KE Operation

Malfunction of the air operated control valve on tube 4355 gave a panellit trip on the 105-KE panel board, scrambling the pile on September 21. The pile recovered in approximately twenty minutes. Cause of the malfunction was believed to be air in the impulse line to the controller. Operation of the in-pile facilities was normal during the rest of the month.

A document "Allowable Outlet Temperatures for 1706-KE In-Pile Tubes" will be issued soon. This document outlines a proposed method of operation to obtain outlet temperatures as high as practical without rear tube pressurization.

Preparations have been made to perform necessary maintenance, in-pile facility modifications and charging of weighed metal into the tubes at the 105-KE pigtail outage. These changes will allow operation under the new outlet temperature limit after the increase in power level following the outage.

RECIRCULATION TECHNOLOGY

Recirculation Studies

The H In-Pile Loop operated satisfactorily during the month at 200 C. The current charge includes standard aluminum clad slugs and aluminum-nickel alloy coupons. Water quality is maintained at pH 5. A production test was proposed to authorize exposure of nickel alloy jacketed slugs and KER prototype slugs in the loop.

Several activity and decontamination studies were made on the loop. It was found that regeneration of the by-pass cation exchanger reduced the activity level from 3000 to less than 30 mr/hr. Chemical tests of corrosion products deposited in the loop piping showed them to be highly resistant to HCl and aqua regia. A report is in preparation regarding activity problems in recirculating water in reactor cooling systems.

Tests were made with a high pressure sampling bomb to establish the techniques for obtaining representative water samples. Early attempts resulted in excessive air contamination of the sample, and efforts are being aimed at improving the sampling procedure. Several carbon steel samples exposed to high purity water in autoclaves have been examined and electron microscopic photographs made on corrosion film surface.

Two slug rupture examinations were performed in Elmo-4 during the month. The first was a cluster type KER prototype element with two of the rods defected. After exposure for ten minutes at 280 C, one of the rods failed, and apparently blocked the hole in the second defected rod, preventing the access of water to the core. Only slight water flow reductions were observed. The second test was made with an I&E wafer fuel element with 1/4 inch uranium wafer, 1/16 inch Al-Si spacers. On failure the slug broke into two sections and about 2/3 of the outside flowing annulus was blocked; the internal annulus was not affected. Piston pump in the Elmo-4 loop failed during a long exposure test of oxide element.

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DECLASSIFIED 1706-KE Semi-Works

Seven in-pile tubes were operated throughout the month at pH's of 7.0, 6.5, and 6.0 with 2 ppm dichromate added. Continued difficulty was experienced with the air operated valves, and failure of one of the valves caused a pile scram. Replacement of the defective valves is scheduled during October.

The Carbon Steel Loop, Elmo-5, was installed in the loop room, and installation of demineralized water facilities for make-up water to the loop progressed. Progress was made on installation of the thermal convection loop. The main loop has been fabricated and installed, the instrument panel has been installed, and the electrical work has been completed. Piping for the Single Pass Boiling Facility is now being fabricated. The facility will be entirely mocked up in the Semi-Works, and tested prior to installation in-pile.

1706-KER Recirculation Test Facility

Invitations to bid on a "lump sum" basis for completion in the KER Building were extended this month. Work is scheduled to commence by the first of November, with physical completion of the work scheduled for next April. An order has been placed for fabrication of six Zircaloy-2 Ribless Process Tubes for KER.

Economic Analysis of Recirculation

A study is in progress to define more clearly both the economic gain and the technological difficulties which would be associated with the conversion of a K reactor to a recirculation system. Several points of interest, although preliminary in nature, have been revealed by the study.

The potential capacity of a K area water treating plant (having a filtration area of 30,000 feet and increased times for flocculation and sedimentation as compared to the older areas) and the possibility of higher effluent bulk water temperatures (ca. 140 C) combine to provide the possibility of obtaining greatly increased power levels (ca. 7500 MW) for single-pass operation. The increased power level for single pass operation could be accomplished at a much lower cost than would be required for a K pile conversion to a recirculation system rated at 10,000 MW.

The problems associated with the conversion and high power level operation of a K reactor with a recirculation system can be placed in three categories: (1) those problems which appear amenable to technical solution, (2) problems requiring additional data to define the feasibility of solution, (3) problems which currently appear as seriously limiting.

Based upon the premise that the presently considered goals for reactor operation in 1960 can be accomplished, nuclear and engineering safety and reactor structural considerations appear to fall in the first grouping. Additional data are required to clarify the problems of graphite distortion and the graphite stack-water reaction rate at high temperatures, the effect of specific power upon fuel element performance, the effect of specific power upon aluminum jacketing corrosion rate,

and front face activity resulting from crud and/or fission product deposition in the piping. The problems which presently appear as seriously limiting are those aggravated by the factors of high fuel throughput rates, a minimum outage time of 45 to 50 hours, and the possibility that it might be necessary to perform charge-discharge operations by remote methods.

It is anticipated that the study will be completed and reported within two months.

PILE GRAPHITE STUDIES

Graphite Temperature Distribution

A review of graphite temperature measurement and distribution in the various piles is now being prepared. Comparison of chromel-alumel and iron-constantan couples show that they generally agree at DR, C, KE and KW Piles, but do not agree well at B, D, or F Piles. The unreliability of chromel-alumel at the latter piles is probably related to the manner in which they are installed.

Study of the temperature distribution shows that the unusual pattern observed in the K piles can be altered considerably by displacement of the metal and by poisoning. Details will be given in the forthcoming reports.

K Pile Thermal Shield Cooling

Effluent water is now circulated through the bottom thermal shield at the K Piles to keep the bottom reflector graphite warm. Graphite temperature in the reflector is 20 to 80 C hotter than the water. It was concluded that hot water circulation is not required since operation of these few layers of graphite at 100 C or less will have little effect on overall stack distortion.

Overboring

A study is being made of effect of overboring tube blocks in the old piles. The effect in tube curvature will be tested in the graphite mockup in 189-D. Effect on graphite temperature at present and future power levels is being calculated.

Borescopic Examination of Channels 2475 and 0964 at 100-H

Considerable difficulty was experienced in discharging the aluminum process tubes from channels 2475 and 0964, especially in pushing the last ten feet of both tubes. The tube removal operation was done by pushing the tubes from front toward the rear.

It was decided that a borescopic examination was necessary to determine the condition of the graphite tube blocks in these channels. The borescopic examination was made from the rear in both channels up to a distance of 17 feet from the rear Van Stone flange.

In both channels, there exists a one to one and a half inch separation between the rear entry graphite block and the first trunnion block. In both channels, small size graphite clips were visible in the space between the gunbarrel and the graphite entry block. No other abnormal conditions were observed in either channel.

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The possibility exists that since the process tube removal was done from the front toward the rear, the key holding the last graphite tube block in place might have been sheered as a result of the force used.

Surface Area Method for Determining Graphite Oxidation

The surface area method was used to determine the per cent oxidation for four experimental samples oxidized in the pile. The results obtained were as follows:

<u>Sample Number</u>	<u>Oxidation by Weight Loss (Per Cent)</u>	<u>Oxidation by Surface Area (Per Cent)</u>
20	0.107	0.10
21	0.17	0.13-0.15
26	0.1024	0.13-0.15
C-27	0.1023	0.13-0.15

The results obtained by the surface area method are considered to be in excellent agreement with the per cent oxidation obtained by weight loss.

Graphite-Water Reaction

A preliminary study of the water-graphite reaction has been completed. The details of the method used, results, and pile implications are reported in HW-38924.

A quantitative analysis for the CO₂ gas used in these experiments shows that the oxygen content is 0.07 per cent, and CO₂ 99.84 per cent.

PT 105-532-E. Graphite Burnout Monitoring

Weighed graphite samples, which were charged into bare process tube channels 1075-F and 3580-F on April 4, were discharged on August 27, after an exposure of 91.5 operating days to the prevailing temperatures, radiation fluxes, and gas composition in the F Pile. Following the discharge of these samples, channel 3580-F was re-charged and channel 1075-F was returned to Operations. The current burnout rates, as measured by sample weight changes, are tabulated below:

Channel 1075-F

<u>Position in Feet From Front Van Stone Flange</u>	<u>Sample Diameter In Inches</u>	<u>Average Burnout Rate in % Per 1000 Operating Days</u>
11.0	1.125	0.18
19.5	0.40	1.06
21.8	1.125	0.44
30.3	1.125	0.15

In view of these and other routine monitoring data, the number of process channels used for monitoring has been reduced to one per pile, and the exposure period

extended from three to six months. The following channels are currently being used for routine monitoring: 3461-B, 1960-C, 3478-D, 2577-DR, 3580-F, 2577-H, and 4165-H. The latter will be discharged and returned to Operations during October.

C Pile Graphite Burnout Test

Burnout samples were discharged from 2785-C and were displaced from the center 2773-C into the rear gunbarrel on 7/18/55. The latter were discharged on 9/16/55. The weight loss measurements are tabulated below:

<u>Sample Number</u>		<u>Identity</u>	<u>% Weight Loss</u>	
<u>2785-C</u>	<u>2773-C</u>		<u>2785-C</u>	<u>2773-C</u>
21	18	Previously Irradiated	0.17	0.29
27	24	Virgin	0.09	0.25
26	25	Virgin	0.09	0.22
20	19	Previously Irradiated	0.11	0.33

Since the temperature of these samples varied as the pile power level varied, the temperature fluctuation is great due to the large number of scrams and unscheduled outages at C Pile. From the daily temperature readings of TC-59-G-1, the exposure time for various temperature ranges has been estimated. These along with the calculated burnout rates are summarized in the following table:

2785-C

<u>Temperature Range</u>	<u>Exposure Time Days</u>	<u>%/1000 Days for Sample Number</u>			
		<u>21</u>	<u>27</u>	<u>26</u>	<u>20</u>
Above Room Temperature	100	1.7	0.9	0.9	1.1
≧ 500	56	3.0	1.7	1.6	1.9
≧ 550	32	5.3	2.9	2.8	3.4
≧ 600	2	85	47	45	54

2773-C

<u>Temperature Range</u>	<u>Exposure Time Days</u>	<u>%/1000 Days for Sample Number</u>			
		<u>18</u>	<u>24</u>	<u>25</u>	<u>19</u>
Above Room Temperature	100	2.9	2.5	2.2	3.3
≧ 500	61	4.8	4.1	3.4	5.4
≧ 600	37	7.7	6.8	5.9	8.9
≧ 650	15	19	17	15	22
≧ 715	2	140	120	110	160

The higher weight losses observed for samples in channel 2773-C might be explained by the somewhat higher temperature history as well as the somewhat greater gamma flux.

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The thermocouple assembly was installed into the rear of channel 2773-C and connected to the control equipment in the -9 level laboratory on 9/6/55. An optical periscope plug was used as front shielding in this channel. No samples were charged into the channel at this time pending the successful outcome of the "shakedown-operation" of the furnace and control system. This "shakedown-operation" of the furnace system lasted for a week and proved satisfactory. With a fervent prayer for continued satisfactory operation; the samples were charged into channels 2773-C, 2785-C and the follower furnace. The furnace follows the pile temperature quite well (approximately ± 4 degrees and the linearity of the temperature distribution within the central region of the furnace is $\pm 5^\circ\text{C}$). For short periods of time, variations up to 25°C have been observed during startups or following scrams. Gas flow through the channels and the furnace are equivalent and are approximately 10 L/Min. Thus a direct comparison of the data from these samples should elucidate the contribution of radiation to pile graphite oxidation.

Visual observation into 2773-C while the pile was operating showed that the graphite samples in this channel and the channel itself indeed were RED hot. The periscope plug allowed approximately 50 mrem/hour of intermediate neutrons, and over 200 mrem/hour thermal neutrons to escape from the pile. The paraffin beam catcher lowered the exposure rate to 10 mr/hour but precluded observation directly into the plug. A water filled beam catcher with lucite windows was attached to the pile in place of the paraffin beam catcher. This water beam catcher cut the exposure rates down to levels comparable with other areas of the pile face, while allowing direct visual observation to be made into the pile. This is the first known visual observation into an operating Hanford pile.

Oxygen Analyzer for Pile Gas System

A recording oxygen analyzer, modified by the A.O. Beckman Company, has been evaluated during the past six weeks of continuous operation. The instrument has a dual range of 0-0.2 per cent or 0-1.0 per cent full scale and is capable of continuously detecting 0.01 per cent oxygen with a drift of less than 0.002 per cent. Span adjustments and compensation for operation with carbon dioxide, helium or mixtures of these two gases have been completed. Automatic standardization with an oxygen-free gas once per hour is accomplished by passing the gas through a chromous chloride solution to remove oxygen. The instrument will be placed in operation at 105-DR when installation of an inlet gas sample line is completed.

In-Pile Testing of Thermocouples

Stainless steel sheathed chromel-alumel thermocouple wire will be compared with asbestos insulated chromel-alumel and iron-constantan wire in a half-stringer to be installed in channel 2682-D. The metal sheathed wire consists of 24 gage chromel and alumel wires surrounded by magnesium oxide for insulation and enclosed in a 0.125 inch O.D. stainless steel sheath. Graphite stringer pieces are being fabricated and range changes for continuous temperature monitoring instruments are being made. Installation of this half stringer is planned for November 1.

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Graphite samples from the radiation annealing experiment in channel 1467-F have been discharged, but the high radiation levels have delayed measurements in the laboratory.

Stability of Chromel-Alumel Thermocouples in CO₂ at 1000 C

A second series of Chromel-Alumel thermocouples has been prepared and is currently being compared with nominal standards. In the first series all couples exposed to CO₂ for 21 or 100 hours at 1000 C became brittle and subsequently broke during the necessary handling prior to recalibration. The apparatus and the method of handling the couples have been improved and it is hoped that little breakage will be encountered after long exposures in CO₂ so that any changes in thermoelectric power can be measured. Barring casualties, all data will be in triplicate. Nine couples will be exposed bare in CO₂ for 2, 20 and 200 hours at 1000 C and nine others will be exposed in a like manner with the beads buried about 1/2 inch deep in clearance holes drilled in small graphite cylinders. Following the CO₂ exposures the thermal emfs of the couples at 1000 C will again be compared, nine at a time, with a tenth reference thermocouple which had been compared to the nine prior to CO₂ exposure.

No additional exposures in air or helium are planned at this time.

GRAPHITE AND MATERIALS DEVELOPMENT

Uncooled Test Hole

The aluminum obstruction in the Y test hole at 105 C pile was successfully removed, allowing the graphite samples to be charged. The samples are being irradiated in ambient pile temperature and atmosphere. Temperature is being monitored by pile filler block thermocouples and the exposure data are being collected from the water temperature rise of surrounding process tubes.

Effect of Temperature of Graphitization

The series of graphites in which Battelle graphitized a Texas coke-standard pitch mixture at various temperatures was removed from 105 F Pile with an accumulated exposure of 1135 MD/CT. Various physical properties were measured as appear in Table I. The virgin property values are also listed for comparison of effect of graphitization temperature on the unirradiated product.

Under cold test hole exposure the following property changes are observed:

1. Physical distortion increases with graphitization temperature to 2570 C then falls off between this value and 2700 C.
2. Thermal conductivity increases, as expected, with graphitization temperature. Damage to thermal conductivity also increases with graphitization temperature, as indicated by the progressing values of K_D/K_I . The saturation values appear very close. It appears that disorder in graphite crystallites after low temperature graphitization or radiation damage is similar. Co values will be determined as a check.
3. Electrical conductivity follows an identical pattern to thermal conductivity.

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High Temperature Graphite Irradiations - GEH-9

One of four control panels for the GEH-9 irradiations at the MTR has been completed and is undergoing functional test with a mock-up of the in-pile assembly. The other three control panels are undergoing assembly and are about 98 per cent complete.

All components have been received for the in-pile assembly; physical properties of the graphite samples are being measured in the laboratory. Assembly of the in-pile unit will be undertaken at the completion of these measurements.

It is planned to ship all equipment for the first GEH-9 irradiation to the MTR prior to October 1.

Thermal Annealing of Irradiated Graphite

About twenty isothermal annealing runs have been completed on graphite samples which have received 233 MD/CT cooled test hole exposure. These data will be used to calculate the activation energy spectrum for Co annealing as part of the program to determine the effect of exposure on the activation energy spectrum.

Annealing runs on a 68 MD/CT sample resulted in too small a change in Co to be analyzed in this way.

Room Temperature Annealing of Irradiated Graphite

Physical properties of seven samples were determined about three years ago prior to and following an irradiation of 68 MD/CT in a cooled test hole. These properties (thermal and electrical conductivities, physical length and Co spacing) have been re-determined recently after storage at room temperature. On the average of eight per cent of the thermal conductivity damage and six per cent of the electrical resistivity damage measured three years ago has been annealed out. No detectable changes were found in the physical length or Co measurements. None could be expected since a ten per cent change in these properties would be too small to detect.

These data will be examined further to see how they agree with the theory of radiation damage recently presented by Primark (ANL-OCS-422).

Stored Energy of Irradiated Graphite

Work on annealing studies being performed by R. E. Nightingale was supported with stored energy determinations on specially selected samples. Six determinations were made on samples of Speer graphite exposed to 68 MD/CT. They showed broad peaks of stored energy release with maxima from 190 to 210 C.

Further calibration of the apparatus was made. A copper sample was run for specific heat through the temperature range 25 to 600 C. The specific heat curve obtained was of the correct shape, but displaced in absolute value. This was expected, since no correction was made for the mass of the heater or thermocouples. A sample of beta brass was requested from Chalk River investigators to obtain a cross-calibration of equipment.

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DECLASSIFIEDPhysical Properties Measurements

Thermal conductivity measurements were made on 55 graphite samples. Four of the samples were unirradiated with a high temperature of graphitization. Thirty-five samples had cold test hole exposures and the remaining sixteen were exposed at elevated temperatures under PT 105-535-E.

C₀ measurements were made on 21 graphite samples which included four unirradiated and 17 irradiated samples. The unirradiated samples and eight irradiated samples were also run for A₀, L_a and L_c dimensions. Twenty-five samples were thermally annealed with observation of the shift of the C₀ peak.

Visit to Argonne National Laboratory and American Chemical Society Meeting

A visit to the Argonne National Laboratory was made September 12 for technical discussions with Dr. W. Primark (see trip report HW-39167). September 13-16 were spent in Minneapolis, Minnesota, to attend the 128th National Meeting of the American Chemical Society and present a paper entitled "Thermal Annealing Kinetics of C₀ Spacing Damage in Irradiated Graphite."

FUEL TECHNOLOGY SUB-SECTION

FUEL ELEMENT DEVELOPMENT

New Fuel Elements.

Objectives and assembly techniques for hot dip internally and externally cooled wafer slugs were previously described.(1) Due to a delay for equipment revisions at the MTR, the two hot dip wafer slugs assembled for test are scheduled to be charged on October 10.

Uranium sheet 0.035 inch thick was rolled and satisfactorily stamped into wafers. The grain size and orientation in these wafers is being determined by x-ray and metallographic examination. Equipment is being ordered for stamping wafers from the 1/16 and 1/8 inch uranium sheet scheduled for delivery during October.

Fifteen slugs with uranium wafers and aluminum spacers of various dimensions and geometries have been canned and autoclaved to determine the best design for achieving compartmentation. Holes 0.03 inch in diameter were drilled through the jackets prior to autoclaving in 170 C water. One general conclusion from these preliminary studies is that aluminum spacers less than about 0.03 inch thick do not consistently prevent water from getting from one uranium wafer to the next. It may be possible to increase the uranium-to-aluminum ratio in wafer slugs by substituting a number of thin ($\sim 1/32$ inch) uranium wafers for one relatively thick ($\sim 1/8$ inch) uranium wafer; however, water entering between the thin wafers and reacting to form uranium oxide increases the longitudinal stress and the tendency for the slug to break transversely rather than to simply swell and stick in the process tubing.

The most interesting observation from these experiments has been that slugs containing 1/16 inch uranium wafers, no aluminum spacers, fail in the autoclave without swelling sufficiently to stick in surrounding process tubing. The significance of this result is that it may be possible to dip can wafer slugs without losing reactivity by introducing spacers, and yet gain (1) greater dimensional stability, (2) greater resistance to failure of the fuel element core by cleavage, and (3) slugs which do not stick in the process tube even though the jacket fails.

Additional hot dip slugs, with and without aluminum spacers between the uranium wafers, are being canned for evaluation.

Calculations have been made of the relative neutron economy of wafer slugs. The case considered was a solid fuel element in the 8 3/8 inch (i.e., old pile)

(1) HW-38828-G, "Fuel Technology Section Monthly Report, August 1955".

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lattice with varying amounts of spacer material replacing uranium. Aluminum, zirconium, and nickel have been considered as spacer materials. For purposes of calculation it was assumed that the uranium and spacer material were homogeneously mixed to make up the fuel element, an assumption which should be reasonably good for thin spacers.

The estimates for aluminum as the spacer material are in good agreement with the measurements by Thiele(1) on the effect of changes in end cap thickness. Additional measurements in the 305 pile are planned to check the calculations for various spacer materials. Several estimates for cases of possible interest are presented below in Table I. This study is being issued as HW-39219, "Relative Economics of Wafer Slugs".

TABLE I

<u>Thickness of U Wafers</u>	<u>Spacer Material and Thickness</u>	<u>Loss of Reactivity in 105 Pile Load</u>	<u>Conversion Ratio Loss</u>
Normal solid slug	None	0	0
1/8 inch	Al, 5 mils	~ 100 inhours	~ 0.7%
1/8 inch	Zr, 5 mils	70	0.7%
1/8 inch	Al, 10 mils	200	1.2%
1/8 inch	Ni, 0.5 mils	170	0.1%

Metallurgy of Core Materials

Results to date have shown no apparent reason why vacuum annealed uranium slugs should warp less than unannealed slugs during irradiation. An integral part of this investigation is a search for a property or testing method that will predict the warp characteristics of uranium.

The initial objective of the heavy walled tube extrusion program was achieved. Tubing can be produced from which cored slugs can be machined with a good slug yield of 85 percent. No further irradiation of extruded slugs is planned until the variables in the process have been fully investigated.

Rapid quenching of the U + 1.5 atomic percent silicon alloy from 950 C retains silicon in solid solution while slow cooling results in precipitation at grain boundaries that existed in either the beta or gamma phases. Aging of the rapidly quenched alloy causes severe distortion of the sample.

Metallurgy of Jacket and Process Tube Materials

Aluminum Alloys. Fifty caps and cans of alloy M-388 (1% Ni) were received and are being evaluated. It appears that these 1% Ni cans and caps can be used

(1) HW-33088, "Reactivity Effect of Uranium Diameter and Cap Thickness Changes," A. W. Thiele.

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with the present canning process requiring only minor modifications. Welded samples of this alloy are performing approximately as well at 350 C in distilled water as the unwelded controls. Weldability and wettability of this alloy appears to be satisfactory.

The sheet and rod of alloy M-388 have been received, and the material is being evaluated.

A new alloy, Alcoa's X2219 is being ordered for experimental investigation. The mechanical properties of this alloy at elevated temperatures are from 50 to 100 percent better than any previous aluminum alloys.

Some hardeners, or master alloys, of copper, nickel, and iron have been ordered for investigations of additional alloys which we plan to cast at HAPO.

Alternate Vendor Evaluation. To date, three lots of cored slugs have been charged into the piles using Harvey Aluminum Company caps. The Harvey cans have arrived on site and their evaluation is underway. Hunter Douglas has an order for cans only, and 300 of the first 4000 have already been received. The can stock used by Hunter Douglas was purchased from Reynolds, and does not appear to be as homogeneous as the M-329 used by Alcoa; however, no difficulties are expected to arise from the existing inhomogeneities. Hunter Douglas will ship the balance of the 4000 as soon as possible.

Reynolds has shipped to HAPO samples of the bar stock which will be used in the production of cans. Metallographically, this material appears to be cleaner than Alcoa's M-329.

MIZ-1 Evaluation of Cans. Indications to date are that the MIZ-1 is too sensitive to surface imperfections to be used to indicate small internal inclusions. If any jackets with hidden wall inclusions are canned up, they will likely be rejected by the MIZ-1 at the Al-Si penetration detection station. It is felt now that the number of jackets in this condition would more economically be detected after canning than if a separate MIZ-1 was set up for 100 percent inspection of the cans prior to canning.

Zirconium Alloys. Approximately 70 zirconium cans 0.017"-0.020" wall thickness 9-10 inches long were produced by uniskanning from partially drawn cans supplied by Bridgeport Brass Company. A shipment of some 110 partially drawn cans were received recently; these, also, will be uniskanned as soon as new uniskan equipment is available.

Two short lengths of zircaloy-2 process tubing of KER cross-section (approximately 5 and 17 feet) were received from Bridgeport Brass Company. These lengths represent tube reducing trials at Tube Reducing Corporation. Measurements and analyses of extruded and tube reduced dimensions indicate that the process for the production of full length KER tubes is progressing satisfactorily.

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DECLASSIFIEDFUEL ASSEMBLYCored Slugs with Aluminum End Plugs

In the August-September period fabrication of production quantities of cored slugs with aluminum end plugs was started and the remaining inventory of cored slugs with welded in uranium end plugs was depleted. About 26,000 pieces with aluminum end plugs have been canned to date.

The temperature distribution of an aluminum end plug cored slug was calculated using an electrical analogue computer and the following estimated power conditions: 1460 KW per tube (51.8 KW/ft); 95 C temperature difference between outlet and inlet water; 48 gpm of water per tube; 15 C inlet water temperature.

The temperature rise above local water temperature was calculated to be a maximum of 523 C at the center of the slug, 440 C one-fourth inch from the end plug and from 240 to 270 C at the plug/core interface.

Hot Press Canning of "C" Slugs

About 1600 of 5000 small (1.343" diameter) "C" cores, which were originally procured for unbonded canning, have been hot press canned. These 1600 slugs were bond tested with a new ultrasonic bond tester being developed for Al-Si canned uranium slugs. A bond test reject rate of 32.5 percent was obtained. The high rejection rate was attributed to the new bond tester which can not be adjusted to distinguish between a defect in the alloy core and a defect at the can-core junction.

Metallographic examination of cross-sections of ultrasonically-detectable unbonded areas showed that the gap between the core and can wall is less than 0.1 mil. Heat transfer calculations for surface temperatures of "C" slugs with concentric bands of unbonded areas showed that for 0.1 mil air gaps and for specific powers of 45 KW/ft the maximum surface temperature differences between the unbond area and adjacent areas for band widths of 3/16", 7/16", 7/8", and 1 3/4" was 14, 21, and 22 C respectively.

PT 313-58-MT, Fabrication of Double Length "C" Slugs

Work towards fabrication of double length "C" alloy slugs, PT 313-58-MT, was suspended on September 23, 1955, pending consultation with the manufacturers of the Fillerarc equipment. Sufficient reproducibility to obtain a high sustained yield of acceptable welded pairs has not been achieved.

Double length "C" slugs are to be fabricated by joining together, end to end, two fuel elements with Fillerarc (inert-consumable arc) welding. Welds made during the initial stages of the test indicated that the semi-automatic equipment would not be satisfactory for production purposes, due to poor starting characteristics of the generator and erratic wire feeding. Automatic Fillerarc

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equipment, installed to overcome difficulties encountered with the semi-automatic equipment, provided a more advantageous method of wire feeding and a greater measure of control over the entire welding process. The quality of the weld deposited was, in general, better than that of the semi-automatic equipment. However, the poor starting characteristics of the welding generator were still attendant, resulting in inconsistent performance.

Preliminary Evaluation of Linde HW-17 Gas-Cooled Welding Torch

A Linde HW-17 gas-cooled welding torch (argon-arc welding) was evaluated to estimate its ability to withstand continuous operation. Seventy-five slugs were successfully welded using a current of 125 amperes. At the completion of the test no change was noted in the performance or physical condition of the torch.

The HW-17 welding torch is completely gas-cooled and eliminates the hazard of moisture contamination of the weld encountered with the HW-13 water-cooled torch currently used in production. The HW-17 is rated at 130 amperes continuous duty or 150 amperes intermittent duty and does not appear to be as rugged as the HW-13 torch. The ceramic parts of the torch are particularly fragile, but are easily replaced.

Surface Defects in Autoclaved Slugs

The reject rate during the month for surface defects in autoclaved slugs declined from an average of 6.0 percent to a level of less than 3.0 percent. A comparative test to distinguish between inclusions in "as received" cans and inclusions picked up during the canning process was run. One thousand cans from the same lot were separated into two equal groups. The first group was annealed and 0.3 mils of the surface metal removed with nitric acid (this is approximately the amount removed during normal processing). The second group was used for production slugs. Alternate baskets of "as received" cans and the canned production slugs were placed in two autoclaves. The inclusion reject rate for canned slugs was 1.04 percent as compared to 3.0 percent for the "as received" cans.

Autoclave Operation

A method approved by the Travelers Insurance boiler inspector for de-scaling and protecting the 313 Building autoclaves against rusting was developed. This method consists of the following steps: de-scaling with an inhibited hydrochloric acid compound, rinsing with water, alkaline rinse, water rinse, formation of a heavy (1000 to 3000 mg/ft²) phosphate film on the autoclave walls using Turco #3557, rinse with warm sodium chromate solution to seal the phosphate film, and air dry followed by several water rinses. Two autoclaves have been satisfactorily cleaned by this procedure and run for six and three weeks, respectively, as a steam autoclave with no noticeable rusting. Silicone rubber "O" ring gaskets for the 313 Building autoclaves as supplied by the

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Patterson-Kelly Company become hard and brittle after one or two forty hour runs. Teflon gaskets are now being used with no excessive steam leakage or apparent distortion, hardening, or other evidence of decomposition.

Delay Quench Heat Treatment of Uranium in Slug Form

About 95 percent of the 28,000 slugs fabricated with slug cores beta treated using the delayed quench technique have been lot charged. The majority of these slugs have reached an exposure of about 500 MWD/T. Two of twelve available control tubes were charged in D pile September 23.

Delay Quench Heat Treatment of Uranium in Rod Form

Uranium was delay quench heat treated in rod form at Fernald late in September. Air cooling periods prior to quenching were 35, 50, and 80 seconds (a delay of 18-20 seconds is standard in the current production process).

In-pile evaluation will be based on basin examination of 20 tubes charged to various exposures. The charging pattern for the tubes will be as follows:

1. A latin square pattern will be used for 12 of the 20 tubes. One four tube latin square will be discharged at 400 MWD/T, one at 600 MWD/T, and one at 1200 MWD/T.
2. One block of four tubes charged as nearly adjacent as possible such that each element and the standard is represented in the block, but such that only one type of element appears in a given tube will be discharged at 600 MWD/T and another will be discharged at 900 MWD/T.

The latin square offers the best possibility for detecting a difference in the elements tested. However, there is an inherent disadvantage. If one element in the test is poor, and is found to be a threat to pile operation on examination of a low exposure discharge, the entire test would have to be discharged because each element appears in each tube. Therefore, appreciable assurance is given to the test through the loading of the eight extra tubes.

Hydrogen in Uranium

The investigation to establish a firm basis for a hydrogen specification for HAPO fuel cores by correlating total and surface outgas measurements on slugs with braze porosity on canned adjacent pieces has not produced a firm value as yet. Although much of the laboratory and production data indicate that a maximum of 2.2 ppm hydrogen will keep canning losses due to hydrogen induced porosity at a workable level, there are not enough data on the variation in hydrogen from piece to piece in production metal to establish a sampling frequency that will assure control.

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Hot Press Canning

Hot press internally and externally cooled fuel elements with three hole sizes (3.8", 7/16" and 1/2") were charged into C pile on September 16 to establish the dimensions of the I & E fuel element which will give approximately equal hole and annulus outlet water temperatures. Temperature data obtained during the six day exposure indicated that the 3/8 inch size gave the most balanced temperature distribution - approximately equal. In the 7/16 inch piece the annulus outlet water temperature was about 15 C higher than the hole effluent water; in the half inch piece about 20 C higher. These data were obtained from a 19-21 piece column of fuel elements, so that any differences in temperature would be magnified with a full 32 piece charge. The three tubes of material were discharged somewhat prematurely when the cylindrical piece attached to the front nozzle cap apparently washed downstream, blocking the hole flow, giving false rupture indications to control room personnel. As a result of this test a tube of 3/8 inch pieces with an anodized aluminum jacket will be charged and monitored to an exposure of 600 MWD/T to determine the effect of the anodized layer on temperature distribution.

Canning of fuel elements for the second hot press solid core production test has commenced. The cause of the hot press solid core ruptures experienced in the first production test, believed to have resulted from penetration of the jacket by intergranular attack at a point of elevated water temperature, will be circumvented by trulining and anodizing the fuel element, and subjecting them to a more rigorous bond test. The truline feature will help prevent possible cocking and the anodizing will lessen the possibility of charging damage and bowing (by permitting the fuel elements to slide more readily on the ribs). The more rigorous bond test will insure uniform heat transfer. Prior to commencing the canning operation the temperature gradient within the four unit press at equilibrium was measured to be 12 C (+ 6 C) over the length of the fuel element. On the basis of our present technology this gradient is not sufficient to cause a detectable variation in the quality of product.

The twelve four-inch nickel plated uranium cores jacketed by the point closure method and diffusion bonded in duPont's fluid pressure apparatus were destructively tested at Hanford. Essentially the tests showed the pieces to be bonded, but not as strongly as mechanically hot pressed nickel plated fuel elements. The weaker bond probably resulted because of air entrapped in the closed piece and because the fabrication procedure extended over too long a period.

Development of the induct-o-bond bond tester (an induction heating device which causes the jacket to melt or blister where no bond exists) is continuing. Unbonded or poorly bonded areas appear to be readily detected. The induction coil has been lengthened so that an eight-inch fuel element is tested over its entire length. Some difficulty is being experienced in obtaining a uniform heat input to the fuel element during the cycle; however, inserts are being fabricated to properly space the coils. Tests are being conducted to detect any harmful effects to the bonding layers of hot press fuel elements when cycled through the induct-o-bond tester.

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DECLASSIFIEDZirconium Clad Fuel Elements

Jackets of zircaloy-2 have been wet with Al-Si by vibrating a steel plate inside a submerged can. An etched can (wire brushed and etched with 25% HNO₃ - 7.5% HF for 30 seconds) was submerged without preheat in Al-Si at 630 C for one minute; then a 1 3/8" diameter vibrating disk was traversed the length of the can for one minute. Metallurgical examination of the bond revealed a structure as good or better than the bonds previously obtained using ZnCl₂ as a flux.

Uniskan

The installation of the spindle and hydraulic drive pump and motor for the Uniskan assembly is completed. Preliminary operation was satisfactory and revealed no unusual operating characteristics.

Dip Canned I & E Fuel Elements

Approximately 20 eight-inch I & E fuel elements have been lead dip canned using a two piece bayonet type can (outer shell containing receptacle base; inner tube welded to well-type can). The major difficulty of the inner tube breaking near the weld on the fabricated cap-type assembly is expected to be remedied by the use of cap tongs with an integral tube guide rod. Wetting of the tube is not expected to be a problem when extruded cap-type assemblies of 2S or M-329 aluminum are received to replace welded 3S assemblies. Metallographic examination and chiseling tests on sectioned I & E slugs indicated that the bonds on both inner and outer jackets are comparable to those on solid production slugs.

Vacuum Braze Canning

Equipment for canning slugs at reduced pressure using Al-Si as a bonding medium is expected to be completed in November 1955.

Project Activities

All 304 Building equipment was removed and the building released for use as a graphite storage facility.

Design for additional offices in the Pilot Plant and other information pertinent to the lump sum contract bid assembly was completed and given to the Commission.

Construction by a lump sum contractor on modifications to roof ventilating units (306 Building) and structural work in the chemical processing room (plating room) of the Pilot Plant got underway during the month.

Pilot Plant Operation

The 306 and 314 Buildings operated on a one shift, five day per week basis during the month.

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FUEL EVALUATIONLow Exposure Failures

The frequency of low exposure failures declined during August and September to two per month at C pile, compared to six per month for the four months preceding. It is speculated that the decline might be due to (1) the seasonal tube power reduction (~ 10 percent from February-March levels) resulting in reduced slug surface temperatures, and (2) better quality slugs resulting from resuming 100 percent precharging inspection at C pile (about June 1) and more routine operation of the new slug canning facilities. The failures which have occurred during the past two months appear to be typical low exposure side failures with the can wall penetrated by corrosion in a "hot spot".

Failures of Regular Production Slugs

A recent survey of regular production slug failures indicates:

1. Exclusive of C pile, the failure rate for K, L, M, and N lot slugs (fabricated from seven-inch diameter ingots and lead dip canned) is considerably higher (possibly ten fold) than for preceding types including B lot (five-inch diameter ingots, lead dip canned) and triple dip canned slugs charged since March 31, 1954.
2. Jacket failures predominate with a jacket core cleavage ratio of 8:1 in K, L, M, and N lots (exclusive of C pile) and 12:1 at C pile.

The relatively high failure rate for K, L, M, and N lots does not necessarily indicate poorer slug quality, since the bulk of these were irradiated at higher tube powers and water temperatures than the other three types. The failure rate of A lot slugs charged in latter 1954 and irradiated concurrently with most of the K, L, M, and N lots appears to be high.

Cored Slug Performance

A review of the status and performance of cored slugs is underway. Production tests comparing four-inch cored slugs (3/8" I.D. with welded uranium end plugs) with four-inch solid slugs and hot-press canned eight-inch cored slugs (3/8" I.D.) with eight-inch lead dip canned solid slugs indicate the 3/8" I.D. core does not improve resistance to cleavage failures. These results are anomalous compared to those from testing enriched slugs⁽¹⁾ where four cored Ike slugs (3/8" I.D. threaded end plugs) were failed at exposures comparable to the maximum in a full tube at 1150 MWD/T, whereas solid Ike slugs failed at about 650 MWD/T (tube average exposure). It has been speculated that the confidence level of the cored Ike test may be low, since only four cored slugs were used. A statistical analysis of the results is underway.

(1) HW-32430, "Irradiation of Cored Slugs, Interim Report PT 105-513-SI," J. E. Minor.

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Cleavage failure performance of ~ 750 tubes of regular production cored slugs (3/8" I.D., both drilled and extruded uranium with aluminum and welded uranium end plugs) is inconclusive, with the bulk at ~ 600 MWD/T exposure, as tabulated below. However, 18 tubes have been irradiated to ~ 800 MWD/T in C pile sustaining two failures at 500 and 700 MWD/T giving a tube failure rate of ~ 0.2 at 850 MWD/T, about the same or greater than for older vintage slugs in the C pile "hot spot". Confidence limits for this result have not been established, nor has the fabrication history of the slugs been reviewed.

Run-to-failure tests are underway for eight-inch cored (3/8" I.D.) slugs with aluminum end plugs, and a goal exposure of 600-900 MWD/T is planned for several tubes with crimped uranium end plugs. Irradiation of cored like slugs is planned to compare aluminum and welded uranium end plugs and 3/8" and 5/8" I.D.'s.

STANDARD PRODUCTION CORED SLUG STATUS AS OF 9/30/55
ESTIMATED TUBES/EXPOSURE RANGE (MWD/T)

Reactor	Slug Type	100-300	300-500	500-700	700-900	1400-1600
KE	8" welded U		285	10		
F	8" welded U	70	40			
	4" welded U					2
D	8" welded U	125	100			
	8" Al plugs	64				
C	8" welded U			3	16	
	8" crimped U	4				
	8" Al plugs		3			
		263	483	13	16	2

Examination of Cored Slugs with Aluminum End Plugs

Examination of one tube (2180-C) of cored slugs with aluminum end plugs at 213 MWD/T and 755 KW showed four slugs, numbers 12, 16, 18, and 25 from the downstream end, to be cracked in the longitudinal direction inside the cans. There was no visible damage to the cans. These data were compiled from inspection of the fractured surface of the slugs after breaking in the slug breaker. The slugs showed no change in dimensions with the exception that two of the cracked slugs (18 and 25) were elliptical (difference between major and minor diameters) to the extent of 12 mils. Warp ranged from 0-28 mils which is similar to that expected of solid slugs at these conditions.

Warp of Hot Pressed Slugs

Dimensional measurements on hot press canned slugs show a greater warp on slugs in tubes at 600 MWD/T than was found in the standard lead dip material at 950 MWD/T. The maximum warp of the hot pressed pieces was 57 mils compared to 30 mils with the standards. While only one slug (1%) from three

tubes of lead dip slugs warped as much as 30 mils, about 25 percent of the hot pressed slugs warped between 30 and 57 mils. Both the test and control pieces were given a 5-6 hour vacuum anneal at 600 C. Warp data compiled on the lead dip pieces⁽¹⁾ showed considerably less warp than experienced with slugs not given the annealing treatment. The hot press pieces (also given vacuum anneal prior to canning) showed as much warp as standard production material which was not annealed and which was irradiated under similar conditions in C pile.

Effect of Slug Power and Slug Exposure on Tendency for Slugs to Break Transversely During Irradiation

Date on eighteen tubes of triple dip and rod transformed slugs were analyzed by the Statistics Unit to determine the effect of specific power and exposure on the tendency for slugs to break transversely during irradiation.

The analysis⁽²⁾ showed:

1. There was no difference in the tendency to break transversely during irradiation between rod transformed and triple dipped material at average tube powers from 425 to 530 KW/tube and average tube exposures from 625 to 800 MWD/ton.
2. The effect of power on the tendency to break could not be separated from the effect of exposure.
3. The position of the slug in the tube had no effect on the tendency to break during irradiation apart from the effect of the slug exposure associated with the position.
4. The proportion of slugs expected to break increases rapidly above specific slug exposures of 900 MWD/T, and at exposures of 1500 MWD/T, all should be broken.

Examination of High Exposure Metal Discharged under PT-7MR

Nine tubes of slugs between 1316 and 1598 MWD/T were discharged from 105-H under PT-7MR. These slugs were divided into groups with and without surface defects by Zyglo and visual inspection after pickling, and into slugs with and without internal flaws by the MIZ-2. The surface flaws on the X type slugs were carefully mapped prior to canning. Two of the tubes containing slugs rated as "free from visual surface defects" were discharged this month with ruptures; one a cap failure and the other a uranium split. The tube of slugs which contained the cap failure (2776-H) has been examined.

(1) HW-38702, "The Warp of Vacuum Annealed Slugs," P. A. Carlson.

(2) HW-38965-RD, "Breaking Strength Problem," J. L. Jaech.

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Fuel Technology Sub-Section

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Visual examination of these slugs showed the areas of scale and flow patterns commonly referred to as "hot spots" which usually are found in high exposure metal. Diameter losses, attributed mainly to aluminum corrosion, ranged up to 30 mils. The maximum warp measured in these slugs was 57 mils, 16 percent of the slugs warped greater than 50 mils and 75 percent more than 30 mils.

It is planned to strip the slugs with mapped surface defects to determine the extent of cracking along surface striation, seams, etc. Dimensional and slug breaking data will be compiled on all the slugs.

105-C Metal Examination Facility

The first irradiated slugs were processed through Basins I and II to test the routine examination equipment. With the exception of some mechanical difficulties, performance was satisfactory. Maintenance personnel are now completing the necessary work to eliminate the mechanical difficulties which were indicated by the tests.

Outside piping work on the Project CG-589 slug dejacketer, which is seventy-five percent complete is continuing. The installation of the ultrasonic equipment in Basin IV is eighty percent complete and work towards its completion is in progress.

TESTING METHODS

Ultrasonic Bond Test

After the close correspondence between ultrasonic maps and actual unbonded areas was obtained last month, some minor circuit modifications to the instrument were made to improve the mapped response, and the equipment was returned to the 313 Building for test. Results of tests for stability and reproducibility were excellent, but even with the count rate readout which responds with a no-go signal only to voids or unbonded areas having a dimension greater than about one centimeter (measured around the circumference of the slug), the rejection rate is still five to six times the frost test rate. A detailed examination of a number of ultrasonic rejects which the frost test had passed showed only one case where the slug was not clearly rejectable - and this was rejected by frost test once in three tests. On the basis of the current criterion that no single unbonded area should be greater than one square centimeter, the ultrasonic test is far superior to the frost test.

Eddy Current Development

In an effort to avoid the difficulties inherent in the oscillating probe described last month, a differential probe was conceived consisting of a single driven coil and two sensitive pickup coils slightly separated in space. Where the preliminary experiments demonstrated the usefulness of this

idea, it became evident that it might be possible to use it on an eddy current can test to minimize the effects of probe bounce and purely superficial flaws. A breadboard of such a test has been constructed with the thought in mind that the demonstration of this principal on a can test would overcome objections based on excessive sensitivity to trivial defects which were encountered with MIZ-1. The principal would be applicable either to a can test, if this is found necessary, or, with a slight modification, to the penetration test.

Internal Friction

In a further effort to tie internal friction and internal stress together, measurements were made on a slug immediately after it had been plastically deformed about one percent in compression along its axis. The internal friction increased markedly after deformation as expected; and then, surprisingly, decreased as a linear function of log time over a three day period. By extrapolation the internal friction would return to its former value in about three months at room temperature. An exponential decay would not have been surprising, but no physical interpretation has yet been found for the observed mode of recovery.

COATINGS AND CORROSION

Corrosion Testing Equipment

Equipment for the autoclave installation in 1706-KE Flow Lab is on order except for the autoclave and the heat exchanger, for which suitable bids have not been received. New requests for bids were sent out and should be back for review by the first of October.

The #1 autoclave in the 326 Building is now back in service with flowing water. A new heat exchanger which has a greater surface for scale deposit and a convenient means for mechanically or chemically removing the scale was designed and built.

The glass autoclaves in the 314 Building and the small autoclaves in the 3732 Building are now in operating condition and can be used for general autoclaving.

Scoping of the revisions to the 314 Building is now in progress. The second high pressure autoclave in the 326 Building is now used to determine the corrosion rates of selected alloys at 300 C in flowing deionized water.

Corrosion Product Film Studies

The aluminum present in corrosion product film can be determined by stripping the film into 2% chromic-5% phosphoric acid stripping solution, removing the chromic acid with an anion exchange resin, and analyzing the remaining solution colorimetrically for aluminum. Commercial resins contain aluminum, giving

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high results but an analytical grade resin was found free of aluminum. Synthetic samples of corrosion products containing 0.1 mg of aluminum were analyzed with 97 percent recovery, and samples containing 20 mg were analyzed with 99.8 percent recovery by the new procedure.

Tests in 300 Area water at pH 8.9 and 90 C show very low corrosion rates of less than 0.2 mils per year compared to the expected rate of 5.0 mils per year. This low rate seems associated with thin films of boiler scale. This method of corrosion control is effective, but may not permit sufficiently high ratio of heat transfer for pile use.

When commercial aluminum alloys are placed in hot tap water, a black to bronze colored film develops on their surfaces. This film is produced in water at pH 8 to 9 at temperatures above 70 C. The coloration cannot be obtained in water of other pH whether the impurities expected in tap water are present or not. The coloration does not occur with high purity aluminum indicating that the color is produced by the impurities present in aluminum metal. Spectrographic analysis of this film show iron and nickel. This film may be connected with the difficulties encountered in autoclaving slugs in 300 Area tap water.

Intergranular Corrosion

Tensile testing is a method for measuring intergranular corrosion. However, at 150 C, some aluminum alloys change in tensile strength without being corroded. Alloy 75S-T6 decreased 44 percent and K-155 decreased 10 percent in an oven at 180 C for 70 hours. To separate the effects of heat treatment from those of corrosion, blanks must run under the same time-temperature cycle as the corroding specimens. In current experiments, the blanks are sealed in glass tubes and are in the autoclaves with the corrosion specimens.

Corrosion Testing

The final report on the Flow Cup Laboratory was issued (C. Groot and R. M. Peekema, "The Corrosion of Aluminum and Its Alloy," May 15, 1955, HW-36692). The corrosion of 26 aluminum alloys were studied from 2 to 181 days and from 20 C to 120 C. Galvanic currents were measured between different alloys. Solution potentials were measured for a total of about 2500 experiments.

The corrosion rate increased exponentially with temperature, decreased with time, and was little affected by alloy composition. Galvanic currents were small and uncertain, but never corresponded to more than 2 mils per year. The solution potentials increased with temperature.

High Temperature Corrosion Studies

An experimental Alcoa alloy X-2219 is being corrosion tested at 350 C. This alloy has good mechanical properties at high temperatures.

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Nickel has good corrosion resistance and good heat transfer properties in high temperature water, where aluminum tends to grow a thick non-conducting film. Thus a nickel plated aluminum fuel element might have the clean surface of nickel with the integrity and low cross section of aluminum. However, accelerated galvanic corrosion occurs at breaks in the nickel plate on M-388 (2S aluminum-1% nickel) when exposed to 350 C distilled water. The accelerated attack stops when the aluminum is insulated from the nickel by corrosion products. The most successful plate was electroless nickel over a zinc displacement coat. This plate showed very low weight gain and good adherence after 40 days in 350 C distilled water.

Welded M-388 alloy is being corrosion tested in 350 C distilled water. Samples of fusion welds and filter weld with 2S filler rod showed no intergranular attack after 80 hours.

Anodizing

Production test 313-105-37-M (supplement B) studies the use of anodized slugs in the pile. The second charge under this test was anodized and loaded into two production test 519 tubes in C pile. A short charge of 29 slugs was used to prevent a re-occurrence of the premature discharge for high outlet temperature. Part of the anodized slugs are sealed by the high temperature silicic acid technique developed at BML. The remaining slugs are anodized pieces sealed in water at 170 C and autoclave control pieces. The test should be completed in December.

Seventy reject slugs were anodized and sealed for charging studies at D pile by the Pile Engineering Sub-Section.

An ampere-hour meter with a warning switch has been installed to permit more accurate control of the anodizing operation. This instrument has one dial for recording the individual batch data and an accumulating dial which will permit evaluation of the service life of the bath.

Thermal Conductivity

To determine the thermal conductivity of the aluminum oxide alyer used in the preparation of the insulated slug, several samples of anodized aluminum have been submitted to the Heat Transfer Group.

Thermal Stability

Six aluminum dummies simulating four-inch slugs have been anodized and canned. These canned dummies will be subjected to thermal cycling, and examined for damage to the anodized film.

Plating Activity

One hundred twenty-eight uranium pieces were nickel plated this month. Distribution of these pieces was as follows:

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<u>Piece</u>	<u>Unit</u>	<u>Purpose</u>
108	Fuel Assembly	9 for canning studies - Ni alloy cans 3 for canning studies - unetched uranium 10 tensile specimens for bond studies 30 assembly of I & E wafer fuel elements 50 failure test of hot press water slug in ELMO loop 6 bond testing of hot press fuel element
2	Fuel Element Development	studies of warp at elevated temperatures
18	Coatings & Corrosion	high temperature bond deterioration

Ceramic Coatings

The KAPL procedure for the application of a modified sodium-lead silicate glaze to uranium was reviewed. The air brush and accessory equipment required for the operation have been ordered. Pending the arrival of this equipment, attempts were made to apply the frit by other methods. Simple immersion or painting with a bristle brush did not result in a satisfactory product. Upon heating, the glaze cracked and peeled from the uranium.

Several samples of the enamel have been submitted to the Heat Transfer Group for measurements of thermal conductivity.

Process Assistance

Weld beads formed by filler-welding with 99.6 percent aluminum and with 95 percent aluminum-5 percent silicon were compared for corrosion resistance. No difference was found in three months at 120 C in out-of-pile tests with pile coolant water.

The spray pickling machines are inadequate because air drawn through the spray by the ventilating equipment removes the nitrous acid catalyst. Closing off the ventilating air from the Metalwash laboratory scale spray pickling chamber in the 314 Building did not increase the pickling rate.

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PHYSICS RESEARCH SUB-SECTION

Reactor Physics

The Lattice Testing Reactor has been completed and the loading of fuel has begun. The two end faces have been loaded. The critical configuration will be reached by loading the driving rods in a cylindrical array.

The $\text{UO}_2\text{-Pb}$ slugs used in the LTR have the shape of thin-walled hollow cylinders. It is expected that, in a possible runaway, these slugs will melt in a puddle and thereby shut the reactor down before excessive energy is developed. It is of interest to determine the melting characteristics of these slugs. An experiment was carried out in which induction heating was used to melt the slugs and a high speed camera to record the motion as they collapsed. This work leads to the conclusions that the $\text{UO}_2\text{-Pb}$ collapses freely without sticking to the aluminum tube in which it is held and that collapse takes place before the slug has melted completely. These results reinforce the conclusion that this design will stop a possible runaway of the reactor.

Design of a furnace for raising the temperature of the core of the LTR continued. A test model was heated to 385°C . It was found that about one quarter of the heat supplied was lost through the insulation. This makes it necessary to cool the outer walls in order to avoid heating the reactor itself.

Measurements were begun on the buckling of lattices loaded with C slugs. The first lattice is the $8\text{-}3/8"$ for which the values are: wet, $709 \times 10^{-6} \text{ cm}^{-2}$ and dry, $736 \times 10^{-6} \text{ cm}^{-2}$.

A four-foot graphite pile has been laid up at the target of the van de Graaf generator. This will be used to investigate the neutron pulse technique for measuring diffusion length and to measure neutron distributions inside metal slugs.

An experimental investigation of the streaming of neutrons in air channels in a stack of graphite has been completed. The results are that the effects of streaming are well predicted by a formula developed by Behrens. Simple density corrections to account for the presence of voids in a pile can be seriously in error if some of the voids are large such as in the 105 piles.

Nuclear Physics

An attempt was made to fit a theoretical curve to the experimental measurements of the fission cross section of Pu-239 . The theoretical curve is intended to take into account the interference of a resonance at negative energy with the observed resonance at 0.3 ev. The best fit with experimental data was obtained with the following negative energy resonance parameters:

$$\begin{aligned} E_{20} &= 0.30 \text{ ev.} \\ \sigma_{20} \Gamma_2^2 &= 37.7 \text{ barn ev}^2. \end{aligned}$$

The general features of the cross-section curve are reproduced by this analysis, but poor fitting around the peak of the 0.3 ev resonance throws doubt on the assumption of interference.

The investigation of the behavior of BF_3 counters at high temperatures (up to 500°C) has been continued. A counter was built with long glass insulators to reduce electrical breakdown. With this counter it was shown that both the pulse height and breadth of plateau were reduced as the temperature rose, the plateau finally disappearing entirely at about 300°C . Thus no assurance is yet possible that a counter, which will work well at elevated temperatures, can be built.

Physics Problems Connected with Plant Operation

A number of critical mass limits were worked out for the Separations plants.

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METALLURGY RESEARCH SUB-SECTION

Fundamental Studies

A terminal report on the ex-pile diffusion of uranium into aluminum has been completed. This phase of the ex-pile diffusion studies will be discontinued unless a need for more information is indicated by the in-pile diffusion experiments. Laboratory investigations on the ex-pile rate of diffusion of uranium into AlSi and zirconium are continuing. X-ray analysis of the adjacent uranium and AlSi interfaces, in a U/AlSi diffusion couple that was vacuum annealed 317 hours at 200 C, gave no evidence of U-Si or U-Al compounds.

The first in-pile diffusion capsule (GEH-3-3) has been opened, and the two U/Al diffusion couples that it contained are being cross sectioned and polished to permit examination of the diffusion zones. This capsule was irradiated 16.6 days in the MTR at a flux of about 4×10^{13} nv. Temperatures at the diffusion interfaces were below 270 C during irradiation as indicated by small eutectic alloy temperature monitors. The actual temperatures that probably existed at these interfaces will be calculated after determination of the atomic burnup and subsequent estimation of the flux level during irradiation. A detailed description of the capsule (GEH-3-3) is contained in HW-34120.

In an effort to gain more knowledge concerning the mode and dynamics of deformation and fracture in uranium and other reactor materials, a program has been initiated to study the microstructure of uranium during the application of a tensile or bending stress. It is hoped that this technique will provide a sensitive method for comparing the behavior of unirradiated and irradiated uranium. A small tensile testing fixture was developed in collaboration with Dr. J. Washburn of the University of California to permit simultaneous microscopic observation and straining of the specimen. The small uranium specimen, polished and cathodically etched, is studied by (1) faxfilm replication, (2) still photography, and (3) motion picture camera techniques before, during, and after fracture. Analysis of the photographs taken of a beta heat-treated specimen and its replicas is now in progress.

Analytical or approximate methods for calculating fission product concentrations have been developed for handling those five or six fission product chains which are more complex than usual. Thus, the quantities of all species of all chains can now be determined to a degree which is limited principally by the accuracy of the fission yield, half-life, and cross section data. The calculations performed to date have been made with the average exposure as the independent variable. Using experimental data obtained by W. E. Niemuth of Pile Technology Section on the radial variation of the fission rate in a slug, a factor has been included to allow application of the concentration calculations to cover the radial variation in a slug. It is shown that in a process tube which has been irradiated to a tube exposure of 900 MWD/T, the maximum power slug has accumulated an average exposure of 1300 MWD/T, and the radial variation in this slug is from 1050 MWD/T at the axis to 1600 MWD/T at the surface. In experimental studies of the effect of irradiation on the properties of uranium, in fuel element design studies, and in attempts to explain the behavior of fuel elements, it should be recognized that an appreciable quantity of Hanford uranium is routinely being exposed to nearly 1600 MWD/T. This material is in the form of a cylindrical shell around several central slugs in each tube of the flattened zone.

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Metallurgy Research Sub-Section

Reactor Structural Materials

Changes in the rate of reaction of zirconium with gases such as air as a result of ionization of the gas are explained by assuming that the availability of anions on the surface of the specimen is rate controlling. A different explanation of these changes is possible if the specimen is not electrically neutral with respect to its ionized gas atmosphere so that it is either cathodically protected from oxidation or the reaction is anodically accelerated. Two tests in nonionized air at 600 C (1112 F) were run in which a 400-volt potential initially and a 3000-volt potential later was maintained between two specimens of Zircaloy-2 exposed in the gas. The fact that essentially no difference in weight gain between the positively and negatively charged specimens was observed is thought to be due to the blanket of nonionized air between the zirconium anode and cathode preventing a closed electrical circuit. The prospect of cathodically protecting zirconium from scaling during heat treatment in a salt bath such as NaOH saturated with zirconia instead of in a gas appears worthy of some experimental effort. In this case the salt will act as a conductor to complete the circuit between anode and cathode.

Zirconium alloys exposed in-pile experience a change in mechanical properties as a result of heat treatment, solution of impurities, and irradiation. Although the kinetics of scale formation on the zirconium is becoming established, it has not been shown that the amount of scale formed per unit volume of metal is a good measure of damage to the metal by solution of a particular gas. A series of tests on Zircaloy-2 have revealed that the notch bend fracture angle is much more sensitive to dissolved gases than Rockwell G or H hardness tests, i.e., the fracture angles of cold worked Zircaloy-2 strips annealed in air at 500 C show a maximum ductility in less than one hour of anneal, whereas the Rockwell G hardness measurements reach a minimum after more than four hours' anneal. Comparison between vacuum anneals and air anneals for the purpose of establishing threshold times for damage to occur as a result of gas solution were started.

Fuel Materials

A study of the reaction kinetics between hot (up to 300 C) water and uranium metal heated 300-400 C above water temperature has been initiated. Initial experiments in the high pressure loop facility allowed water at 280 and 300 C to react with bare uranium heated to 660 C. In these experiments, at the instant of reaction, the pressure in the loop increased momentarily by 300-500 psi. To check the source of this high pressure transient, an experiment was performed allowing water at 300 C to contact a stainless steel specimen at ambient water temperature. At the instant water was admitted to the chamber, pressure in the loop increased momentarily from 1600 psi to 1900 psi and loop shutdown occurred. Thus, the high pressure transient previously observed is caused by valve operation and introduction of helium from the reaction chamber into the line, and the reaction between uranium at 660 C and water at 300 C caused no rapid pressure increase. The instantaneous reaction between heated massive uranium and hot pressurized water is apparently not a hazard to the continuity of pile operation. Reaction rates will now be determined by allowing heated uranium to be contacted by water for a predetermined period of time. The facility is being modified to permit the reaction chamber, after admission of water, to be flushed out with helium while the loop is at temperature.

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Metallurgy Research Sub-Section

A program aimed at evaluating UO_2 as a fuel material is actively being investigated at Hanford. Another oxide material on which very limited data is available is uranium monoxide. X-ray diffraction data indicating the presence of UO have been obtained by various workers. However, only film quantities of UO have been prepared in most cases. On two occasions gross quantities of the material were reported. In one case uranium was heated to 2000 C in a uranium dioxide crucible (1) with the resulting product containing approximately 30 w/o monoxide. Heating $\text{UO}_2 + \text{U}$ to 1900 C gave a similar yield of UO . However, in this case 0.24% carbon was present which resulted in 5% UC in the product (2). Difficulty in obtaining appreciable quantities of UO at room temperature may be due to the instability of the monoxide at low temperature or the original formation of UO may, itself, be intrinsically difficult. Several experiments have been performed in an attempt to obtain gram quantities of UO by taking advantage of the following reactions:

Compacts of uranium, UO_2 , and magnesium powders were prepared and fired at 1000 C. The resulting compact should contain $\text{U} + \text{MgO}$. The excess magnesium used in the UO_2 reduction was volatilized. The temperature was then raised to 1500 C where the following reaction may take place

X-ray data indicated there was about five percent UO in the product. The bulk appeared to be UO_2 . Firing above 1360 C could only be run for about two minutes as the quartz hood was rapidly attacked by magnesium vapors. Additional experiments are planned in a 1700 C hydrogen atmosphere furnace which should be available shortly.

The use of a uranium oxide cermet fuel material may have application in high temperature pile operation. Studies have been initiated to evaluate some cermet elements. Aside from the bonding considerations in cermet fabrication, several other factors affect the choice of metal to be used. First, the cross section must not result in too great a loss in reactivity; the thermal conductivity and the density are also factors to be reckoned with. Several cermet pieces have been fabricated. Compacts of UO_2 containing 10, 5, and 2 wt percent iron and one compact of UO_2 and 10 wt percent molybdenum were prepared. The powders were mixed and compacted at 16,000 psi. These were heated in argon to approximately 1700 C for about two minutes. Future experiments are planned using the hydrogen atmosphere furnace previously mentioned. The five and ten wt percent iron compacts appear to have fair strength. However, no real evaluation of these cermets have as yet been made.

(1) Rundle, R.E., Boenziger, N.C., and Wilson, A.S., cc. 1984.

(2) Katz, I.J. and Rabinowitch, E., The Chemistry of Uranium, N.N.E.S. (McGraw-Hill 1951), Div. VIII, Vol. 5.

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Metallurgy Research Sub-Section

An eight-pound sample of uranium shot was received from the Fernald (NLO) pilot plant. About 60% of this material separated into good shot in the size range 400 to 2400 microns. The remainder is tailings of odd shapes. Packing densities are about 62% of uranium density. It is understood that this material was prepared by a shotting technique and that approximately a half ton of uranium was poured in preparing the shot.

Fuel Element Evaluation

Two cored insulated slugs have been irradiated at the MTR, one having the cored uranium plugged with welded uranium end plugs and one having a uniform core without end plugs. The slugs are insulated by four mils of Al_2O_3 on the interior surface of the can. Zirconium disks were placed at each end of the uranium for base and end cap insulation, and in the case of the open uranium cylinder, the zirconium disks served to prevent flow of aluminum into the core during the cold canning process. Calculated operating temperatures for these slugs at the estimated specific power of 65 kw/ft are 380 C uranium surface temperature and 790 C maximum uranium temperature. The slugs increased about one percent in length and diameter during the first 90 MWD/T exposure and were then dimensionally stable up to 600 MWD/T. During the August 22 shutdown of the MTR, a zirconium canned oxide slug was charged into the Test Facility. Failure of the oxide slug on August 30 required removal of the loading. The insulated slugs could not be recharged because of a projected power increase in the MTR at the next regular shutdown. The slugs have been returned to Hanford. Visual examination of the pieces in Radiometallurgy revealed a small pit in the closure area of the welded end plug specimen. No other damage aside from mechanical damage has been noted. The slugs are scheduled for immediate sectioning and evaluation. A second loading of insulated slugs is being prepared for MTR irradiation. Three slugs will be loaded; one containing uranium representative of current production; one uranium with abnormally large grains; and one uranium of high preferred orientation. This test will determine whether massive uranium slugs irradiated at high temperature exhibit the bumping and dimensional instability normally associated with large grain size or high preferred orientation.

An UO_2 slug, 1.285" diameter and 4.00" long, sintered to 85 percent of theoretical density and jacketed in a 0.075" thick Zircaloy can was charged into the MTR Fuel Element Testing Facility prior to the August 29, 1955, startup. After an accumulated exposure of about 2.5 MWD/T of UO_2 and after ten minutes of operation at full power (maximum of 20 kw/ft in oxide, core temperature calculated to be 2000 C) a hairline crack developed in the vicinity of a weld. Radioactive gases were emitted through this crack. It is calculated that the amount of fission product gas produced during the short irradiation amounted to about 0.7 cc at S.T.P. No quantitative measurement was made at the MTR of the amount of activity released from the slug. The release of gas from the oxide piece is in agreement with the large surface area associated with oxides of medium sintered density. The specimen has been returned to HAPO for post-irradiation examination.

The examination of the four unbonded point-closed slugs from Tube 1073-H (PT-105-590-A) continued. In addition, two cored natural and two cored enriched slugs from Tube 1675-C were received and examination initiated. Three of the slugs from Tube 1073-H were sectioned and examined. No extensive cracking was observed in the uranium of these sections. A number of black spots were found on

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Metallurgy Research Sub-Section

the inside surface of the jacket from one of the slugs. Metallographic examination of a section through one of these spots revealed nothing unusual in the micro-structure. Visual examination of the four cored slugs from Tube 1675-C indicated that they may have grown in diameter. Both diameter and length measurements are being presently made.

A design of a coaxial fuel element has been proposed by T. W. Evans⁽¹⁾. A series of scoping stress calculations for the coaxial fuel element have been completed⁽²⁾. These calculations indicated that the concentric uranium pieces should have the following dimensions:

Outer tube OD = 1.36", ID = 1.088"

Inner tube OD = 1.080±0.0015, ID = 0.375".

The above dimensions are for a test specimen which will operate at a power level 85 kw/ft with the inner cylinder in the γ -phase. The gap between inner and outer cylinders provides a space for the thermal expansion of the inner cylinder.

A series of calculations have been initiated which will compare plastic strains and stresses for solid, cored, and coaxial fuel elements. The calculations use strength properties which are approximated by a temperature, strain, and stress dependent strain-rate. An analysis of creep tests conducted at BMI yielded the following relation for the above dependence:

$$\frac{dE_p}{d\theta} = 4.81 \times 10^{-8} E_p^{-11.5} \sinh \left[0.946 \left(\frac{\sigma}{1000} \right) \right]$$

where σ = tensile stress [psi]

E_p = plastic strain [%]

$\theta = \int_0^t \exp \left[-10,380/T \right] dt$

T = temperature [°K]

t = time [min]

This equation applies in the temperature range of 100 C to 300 C.

(1) Evans, T.W., A Coaxial Fuel Element Design, HW-39036, 8/15/55 (SECRET).

(2) Merckx, K.R., Stress Distribution in Coaxial Fuel Elements, HW-38794, 8/16/55 (SECRET).

Metallurgy Research Sub-Section

DECLASSIFIEDRadiometallurgy Examination

Three test assemblies from PT-105-530, containing samples of irradiated horizontal rod coatings, were examined during the month. Assembly No. 1 consisted of eight rings of sintered aluminum and boron threaded on a 2S aluminum tube. Examination revealed that the rings were cemented to the inside of the aluminum can by a white substance. On removal of the can wall four of the rings were found to be fragmented. The remaining four fell apart during subsequent handling operations. All of the inside surfaces of the assembly were covered with a thick deposit of white material except one end, which was covered with a band of jet black material. Spectrochemical analysis of the substances showed that the major constituents were boron, aluminum, and lead. Smaller amounts of calcium, copper, iron, magnesium, manganese, silicon, sodium, and chromium were found. The only detectable difference between the black and white compounds was in the chromium content. The chromium content of the white compound varied from 1.0 to 0.01 percent as compared with less than 0.01 percent found in the black compound. Assembly No. 2 consisted of eight rings of Armstrong plastic and boron. These rings were also fragmented and were very brittle. There was no evidence of any foreign substance such as that found in assemblies No. 1 and 3. Assembly No. 3 consisted of glyptal and boron painted on four aluminum rings. Examination revealed that the coatings had completely disintegrated, and the interior of the assembly was covered with a white substance similar to that found in assembly No. 1.

Four Co-60 capsules, which had been irradiated at 100-H to an estimated activity of 5.9, 140, 260, and 1,200 curies, respectively, were received for examination. The sources were removed from the capsules and transferred to a special radiochemistry irradiation cask for use in radiation damage studies. Activity measurements at a distance of one foot were approximately 63 percent lower than estimated values. A report summarizing the results of the examination is in progress.

The examination of two unruptured Ni plated hot-pressed slugs (PT-105-577A) was requested by Fuel Technology to determine the condition of the nickel bond underneath a "hot spot" observed on the first slug and to investigate the unusual condition of the jacket of the second slug. The first slug was discharged from Tube 3287-C after an exposure of 573 MWD/T, and the second from Tube 3272-C after an exposure of 549 MWD/T. The "hot spot" is a large elliptically shaped zone located near the cap end of the slug. This spot was located diametrically opposite the rib marks. The slug was severely warped (visually estimated at 50-100 mils), and the plane of warp was vertical. The "hot spot" is believed to have resulted from severe warpage of the slug which forced its upper surface very close to the top of the tube, thereby restricting the water flow in this zone. A small sample of can wall was obtained from the "hot spot" area for metallographic examination. The difficulty encountered in obtaining this sample indicated that the bond in this area was sound. No evidence of intergranular attack was observed in this sample. Examination of a transverse section through the uranium below the "hot spot" zone revealed no macro cracking. The second slug was selected for examination because of the exceptionally rough or bumpy appearance of the jacket. The cause of this unusual appearance has not been definitely established; however, it appears to be a corrosion phenomenon. A large number of closely spaced longitudinal scratches were also observed, and the metal in the vicinity of these scratches appeared to have undergone considerable corrosive attack. Examination of transverse sections of this slug revealed a large number of macro cracks in the center of the uranium.

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Examination was started on the three pieces comprising the "Notched Slug Experiment" irradiated in the MTR. One slug, which had been fabricated with three 40-mil deep longitudinal V-notches at 120° spacing, was found to have completely split on the diameter along one of the notches. No cracking of the uranium or significant dimensional changes were observed on the remaining two slugs. One of these slugs was unnotched and the other had two notches at 135° spacing.

Initial examination was made on two internally and externally cooled, hollow fuel elements (PT-103-587-A). No significant dimensional change or other exposure damage was apparent in the visual examination.

A rupture J-slug from 1064-DR was examined to determine the cause of fracture. The jacket of this slug was found to have been mechanically worn along one rib mark. One split in the jacket was coincident with the rib mark, and it is possible that the initial jacket penetration was the result of mechanical wear. A circumferential fold in the jacket adjacent to the base of the slug appeared to have been the result of expansion of the jacket. Corrosion product was present beneath the jacket, but it could not be determined whether corrosion product buildup or another agent was responsible for the initial jacket expansion. Deformation of the jacket was either accompanied by or followed by recrystallization of the aluminum.

Separations Plant Structural Materials

In an attempt to alleviate the corrosion problem in Purex fractionating equipment, a preliminary survey of the inhibitory effects of urea, oxygen purge, air purge, and helium purge upon wrought Type 304L stainless steel in Purex 2WW waste acid concentrate was performed in sealed glass capsules, identical to those used in the factorially designed static corrosion tests. Urea concentrations of 0.2 M, 0.1 M, 0.01 M, and 0.001 M were used. The oxygen, air, and helium purges were performed for two to three minutes on 25 ml portions of Purex 2WW. The results of this survey indicate that none of the treatments tested offers any substantial gain in service life of Type 304L in Purex 2WW. Further work is planned to determine the value of the use of urea in nitric acid.

Laboratory data have been collected which indicate that wrought Type 347 stainless steel which has been subjected to a sensitizing heat treatment and exposed to boiling Purex 2WW waste acid concentrate under heat transfer conditions will exhibit a greater degree of corrosive attack than Type 347 weld deposits in the as-welded condition under the same corrosive conditions.

Welding Development

Three Type E347-15, five Type E308 ELC-15, and four Type E308ELC-16, 5/32-inch diameter covered welding electrodes were evaluated for cracking susceptibility by use of the Arcos Segmented Circular Groove Crack Sensitivity Test. There were no cracks except crater cracks evident in any of the test specimens. The tests indicate that the welds will be crack resistant irrespective of the type coating if the chemical composition of the weld deposit conforms to ASTM specification A298-55T and the Cr/Ni ratio is greater than 1.8.

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Metallurgy Research Sub-Section

In an effort to further facilitate fabrication of the GE joint, as part of the Welded Pipe Butt Joint Evaluation Program, a slight modification of the joint design has evolved in which the amount of total deposited metal is substantially reduced. This new design will require less filler metal to complete the joint and lessen the total welding time. Also, satisfactory welds have resulted from a GE joint preparation on one pipe and a standard bevel joint preparation on the other.

Samples of Types 308L and 347 stainless steel all weld metal pads made by the metal inert gas welding process with two percent and five percent oxygen in the argon shielding gas have shown no detectable difference in chemical composition from those made with pure argon. No apparent difference in corrosion resistance exists in the welds made with the different gas mixtures as measured by the standard boiling 65 percent nitric acid test.

Metallurgical Laboratory Examination

Twenty samples of production flexible connectors, manufactured by the Resistoflex Corporation and consisting of a Teflon tube with a stainless steel wire braid sheath, were submitted to the Corrosion and Welding Unit for evaluation of the susceptibility of these connectors toward stress corrosion cracking. Twelve of the samples exhibited fractured wires within 15 minutes in boiling 42 percent $MgCl_2$; the standard stress corrosion cracking test. Five of the samples fractured within 20 minutes, one within 25 minutes, one within 30 minutes, and one within 50 minutes; however, cracks were visible on all of the connectors after 20 minutes of exposure. This evaluation indicates that the braided wire sheath flexible connectors currently being installed are extremely susceptible to stress corrosion cracking.

Plutonium Metallurgy

The 3.9 weight percent plutonium-aluminum alloy for PCTR monitor foils was cast and given a normalizing anneal. Three sections of the mold released enough gas to either blow the metal out of the cavity or leave the residual metal full of gas pockets. These gassy billets are being recast. One sound billet is ready for rolling to foil. The new set of rolls for producing these foils could not be used until a new sprocket was made to match the existing drive sprocket.

Attempts to produce small diameter holes in uranium for PCTR monitor slugs continued. Uranium was chill cast at about 1200 C around eight wires, rods, and tubes, namely: an 11-mil molybdenum wire with two mils of electrolytic nickel deposited on an alcohol slag parting layer, a seven-mil tungsten wire with a similar slag and nickel cover, two 14-mil graphite and clay rods with two mils of electrolytic nickel deposited on their surface, two bare 14-mil graphite and clay rods, and two 26-mil, 6-mil wall, stainless steel tubes packed with colloidal size graphite particles. The nickel surfaces were annealed under graphite powder for 30 minutes at 500 C. The metallography of the casting about the rods, wires, and tubes has not been completed. About 40 inches of nickel tubing of 21.5 mils ID and 24.5 mils OD were electroformed in three-inch lengths for hole sleeves.

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Metallurgy Research Sub-Section

A fire occurred on September 19, while machining an alpha plutonium casting. Unusually reactive material was encountered while making the initial cut at the surface of the casting. This reactive material burned violently, throwing burning particles to all corners of the hood. These sparks ignited plutonium turnings stored in an aluminum chip can. A rubber glove resting against the chip can was burned through. The hood exhaust filter was clogged with particles from the fire permitting the hood pressure to become positive to the room. Gross contamination of the laboratory resulted when air from the hood discharged into the laboratory through the hole in the burned glove. Personnel evacuated the laboratory before contamination was spread. The plutonium casting itself was undamaged and except for contamination, no equipment was damaged. Decontamination of the laboratory is under way.

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CONTACT ENGINEERING UNIT

PROJECT ACTIVITIES

Project CA-512

The KW pile was completely equipped with resistoflex pigtails during the month. During the pigtail outage all the original temperature monitor bulbs were replaced with so-called "Interim" bulbs. These will be replaced at some time in the future with permanent ones.

The Beckman system is being modified. Some trouble has been experienced with the instrument power supply and it will not be possible to utilize the more sensitive controllers until a more stable power supply is available.

Project CG-558

DR pile was shut down at month end for installation of new Panellit gages. The problem of fluctuation has been overcome by putting a small amount of oil in the sensing line which has a dampening effect on the gage.

The construction phase of the project is slightly ahead of schedule and is approximately 30% complete.

The bid invitations for lump sum work at 100 F and H Areas, under Phase II of CG-558, have not yet been put out but should be very soon.

The pump vendor is experiencing trouble in meeting specifications but there is no indication yet that the main outages will be delayed on this account.

Project CG-600

The Washington AEC has approved new pumps for C Area but has withheld approval of new nozzles until the possibility of bar stock nozzles has been investigated more fully. If high rates of tube replacement require bar stock nozzles before the proposed 558 nozzles pay for themselves, then nozzle replacement should not be a part of this program.

Zone Temperature Monitor

This installation has now been made part of CG-558. The estimated cost is now \$900,000. A revised project proposal for CG-558 is being circulated for approval. Installation will be concurrent with 558 outages.

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PILE TECHNOLOGY SECTION

INVENTIONS

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

Inventors

Title

F. B. Quinlan

Rotary Gas or Vacuum Seal

W. B. Tolley

Process for Uranium Metal Recovery
(HW-38713)

O. H. Dinger 1955

Manager - Pile Technology
ENGINEERING DEPARTMENT

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VISITORS AND BUSINESS TRIPS

R. L. Tower, Tower Equipment Co., Seattle, Washington visited Hanford on 9-1-55 to inspect a pump.

E. Block, AEC Washington, D. C. visited Hanford on 9-8-55 to discuss calcination and the Purex process.

A. J. Hill, Jr., du Pont, Savannah, Ga. visited Hanford on 9-13-55 through 9-15-55 to inspect the Hot Semi-works facilities and the remote handling of equipment.

Stephen Hawxhurst, Crane Packing Co., Chicago, Illinois visited Hanford on 9-19-55 and 9-20-55 for consultations on Teflon bellows and teflon components.

D.B.F. Dodge, Yale University, visited Hanford on 9-21-55 to discuss separations development activities.

B. Weidenbaum, Dow Chemical Co., Rocky Flats Plant, Boulder, Colorado visited Hanford on 9-19-55 thru 9-23-55 for consultations and technical discussions of separations processes.

A. M. Platt visited the Argonne National Laboratory on 9-12-55 and the AEC, Washington D.C. on 9-13-55 to consult on separations technology matters on chemical processing of power reactor fuel elements.

M. H. Curtis and O. F. Hill visited Minneapolis, Minn. on 9-11 through 9-15-55 to attend the annual meeting of the American Chemical Society.

O. F. Hill visited the Dow Chemical Co., Rocky Flats Plant, Boulder, Colo. on 9-16-55 to discuss measurements methods.

R. E. Isaacson visited the Dow Chemical Co., Rocky Flats Plant, Boulder, Colo. on 9-27 and 9-28-55 to attend meeting on development and application of Magnegage techniques and discuss inspection procedures. Mr. Isaacson also visited the Los Alamos Scientific Laboratory, Los Alamos, New Mexico on 9-29 and 9-30-55 to discuss neutron counting constants.

W. P. VanMeter and A. S. Wilson visited Minneapolis, Minn. on 9-11 through 9-16-55 to attend National Meeting of American Chemical Society.

R. E. Connally visited Oak Ridge National Laboratory, Oak Ridge, Tenn. on 9-12 through 9-16-55 to discuss analytical instrumentation and also to attend the instrumentation meeting sponsored by the Institute of Radio Engineers.

L. F. Miller visited Washington, D. C. on 9-26 through 9-30-55 to attend the Atomic Industrial Forum-Symposium of Hot Labs and Equipment.

P.F.X. Dunigan visited Washington, D. C. on 9-28-55 to attend the Atomic Industrial Forum and on 9-29 and 9-30-55 he attended the Fourth Symposium on Hot Laboratories and Equipment there.

E. W. Christopherson visited the University of Minnesota, Minneapolis, Minn. on 9-11 through 9-18-55 to attend the national American Chemical Society convention.

ORGANIZATION AND PERSONNEL

	<u>August</u>	<u>September</u>
Separations Technology General	2	2
Plant Processes Sub-Section	58	58
Chemical Development Sub-Section	80	78
Chemical Research Sub-Section	62	64
Contact Engineering Unit	6	6
Analytical Laboratory Unit	33	34
Technical Shops Unit	31	31
	<u>272</u>	<u>273</u>

Plant Processes Sub-Section: R. S. Rosenfels, Engineer I transferred 9/19 into the Sub-Section from Chemical Research. W. L. Lyon, Engineer I transferred from the Sub-Section to Chemical Research on 9-1-55.

Chemical Development Sub-Section: Kenneth J. Hahn, Engineer II transferred into the Sub-Section from Design Drafting on 9/12/55. A. L. Babb, Sr. Engineer (summer employee) terminated on 9/16. W. N. Carson, Sr. Engineer terminated 9/30/55 to accept position with the Commonwealth Engineering Co. of Ohio. P. B. McCarthy, Engineer II transferred to Pile Engineering, Pile Technology on 9/1/55.

Chemical Research Sub-Section: R. E. Coffman, Tech. Grad transferred into the Sub-Section from Radiological Sciences on 9/19/55. R. P. Dunn, Secretary B, transferred into the Sub-Section from Pile Technology on 9/19/55. W. R. DeHollander, Sr. Scientist transferred into the Sub-Section from Pile Technology on 9/6/55 and W. L. Lyon, Engineer transferred into the Sub-Section from Plant Processes on 9/1/55. MM Jones, Engineer II transferred out of the Sub-Section to Analytical Labs on 9/15/55 and R. S. Rosenfels, Engineer I transferred out of the Sub-Section to Plant Processes on 9/12/55.

Analytical Laboratory Unit: MM Jones, Engineer II transferred into the Unit from Chemical Research on 9-15-55.

Technical Shops Unit: Z. R. Zook, Jr. Drafting Trainee transferred into the Unit from Project-Inspection on 9-19-55. B. B. Martinez, Gen. Clerk "C" terminated from the Unit on 9-23-55.

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DECLASSIFIEDPLANT PROCESSES SUB-SECTIONREDOX PROCESS TECHNOLOGYSummary

Document HW-39120, "Addendumⁱ to Process Specifications for Critical Mass Control in the Redox Plant", in which the effects of Redox Chemical Flowsheet HW No. 5 on critical mass have been evaluated, is being approved for issuance at the end of the report period. A plan for increasing Redox solvent extraction capacity by about 10 per cent without need for equipment changes was issued during the month as HW-38979, "An Integrated Redox Plant Capacity Study". Due to the change in production policy, the installation of the Backcycle Waste Concentrator and conversion to the Precycle Flowsheet were postponed until December, 1955, and thus necessitated revision of the original draft of the waste storage production test, 202-S-2. This is again in rough draft and is to be issued during the coming month.

No major changes were made in the flowsheet, and processing continued uninterruptedly throughout the entire report period at 11 tons of uranium per day. Minor adjustments, however, were made in the third plutonium cycle stream flows in attempt to reduce the amount of nitric acid through the plutonium concentrator, and, at the end of the report period, 10 to 15 per cent improvement was indicated by the latest product analyses. Early in the month, a significant reduction (by 30 to 50 per cent) of the iron concentration in the final plutonium product was also observed, presumably as a result of lowering the operating liquid level in the concentrator as mentioned in last month's report.

The average exposure of the uranium charged to the dissolvers was 258 (254 to 265) MWD/T, its average cooling time was 102 (87 to 136) days, and the over-all plutonium and uranium recoveries were 99.4 and 99.6 per cent, respectively. Concentrated plutonium product ranged from 76.6 to 122.4 grams of plutonium per liter, with an average of 98.9 grams per liter.

Although the iodine emission problem appeared to be well under control during the first half of the report period, during the latter part, an average of about three curies per day reached the stack, for an average silver reactor efficiency of 98.5 per cent in this period.

Feed Preparation

To assure an adequate feed supply at the present high processing rate, some shortcuts were used in feed preparation steps to reduce time cycles. The two hour oxidation period was shortened to 45 minutes, but was restored when uranium product decontamination dropped slightly despite the fact that the relative proportions of fission products had not significantly changed. Although no satisfactory technological explanation for the results has been advanced, the lengthening of the oxidation period was followed by an improvement in decontamination. No serious curtailment of feed preparation resulted from the restoration of the longer oxidation cycle.

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Decontamination

The first half of the report period was characterized by excellent uranium decontamination with an average gamma ratio of less than one. Due, however, to almost continuous flooding and instrumentation troubles (principally in the IA, 2D, and 2E Columns) throughout the last half of the period, uranium decontamination was markedly poorer, with an average gamma ratio in the final product of about 2.5. A maximum of 11.3 was reached on one batch. Approximately 78 tons of uranium product having an average gamma ratio of 3.4 were stored in the 204 tanks awaiting processing through the new 205-S silica gel facility at the end of the report period. Solvent extraction decontamination of plutonium was excellent throughout the month, showing no significant variations corresponding to those observed in the uranium streams.

Solvent Extraction

Probably as a result of the sustained high processing rate with no interruptions for equipment cleanout and column flushes, the gradual consequent accumulation of solids and emulsoids resulted in frequent local floods and emulsions, particularly in the IA Column, making operation extremely difficult in this column. At report time the rate in IA Column was reduced slightly and the rate in the IS Column slightly increased to maintain the present total processing rate. These operational upsets are believed to have contributed significantly also to the subsequent poor decontamination of uranium, as discussed above.

The higher acid concentrations employed in the IBX and IBS streams (mentioned in last month's report) were not changed, and no recurrence of the IB overflow restriction was encountered.

Iodine-131 Emission Problem

Due in large measure to the addition of sodium hydroxide to the sodium nitrate solution used for coating removal (as discussed in last month's report), control of iodine-131 emission through the first half of the current report period was good, with the amount of radioiodine to the stack ranging from about 0.1 to 0.6 curie per day. Subsequent performance, however, was unsatisfactory and, through a combination of operating errors, silver reactor degeneration, reduced average metal cooling times, and increased dissolving rates, the average amount of iodine-131 going to the stack rose sharply to about 3.3 curies per day for the last ten days.

Plutonium Concentration

The average nitric acid concentration in the final concentrated plutonium product from the 233-S Building was 7.3 molar with a range from 6.6 to 7.8 molar. Minor adjustments in the third plutonium cycle stream flows which were made near the end of the report period apparently succeeded in reducing the amount of acid going to the concentrator by an estimated 10 to 20 per cent, based on latest available analytical results at report time. It is expected that this will significantly reduce the corrosion rate in the concentrator, thereby reducing the amount of metallic impurity in the product.

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During the month, a decrease in the iron content was noted in the plutonium product which averaged about 118,000 (69,000 to 163,000) parts of iron per million parts of plutonium, down from the 160,000 average reported for the previous month. This is attributed largely to the lower liquid level now employed in the continuous concentrator. It is hoped that, during the coming month, uniformity of operation combined with the lower liquid level in the concentrator and reduced acid concentration in the feed to the concentrator will produce a final Redox plutonium solution meeting the requirements for the production test (HW-38555) covering direct concentration and off-site shipment.

Waste Storage

Production Test 202-S-2, which was in rough draft form, was revised to conform to the new requirements for waste storage. These new requirements stem from a change in operating schedules which involves continued production through the first week in December before the installation of the D-14 Backcycle Waste Concentrator and conversion to precycle. Part I of the revised test, which covers the balance of 1955, is expected to be issued during the coming month.

On September 19, 1955, the filling of the 241-SX, 101-102-103 cascade was completed, and extraction waste was then diverted to Tank 109-SX, the first of the remaining nine SX tanks to be made available. This tank, equipped with four air-lift circulators, is expected to be essentially full of single stage back-cycle waste from the processing of low (average 255) MWD/T metal, by the first of November, at which time processing will again revert to high exposure metal for the balance of calendar 1955. This waste will be stored in Tank 108-SX under the terms of the production test.

Evaluation of the performance of the circulator in the 101-SX tank is not now possible since approximately 10 to 20 gallons of stored waste were ejected from the tank when Maintenance personnel attempted to remove a block valve from the circulator differential pressure air supply line without first shutting off the air flow to the circulator itself. The resulting contamination levels required back-filling the contaminated area with dirt and emulsified asphalt to a depth of about five feet. In the process of back-filling, the air line to the circulator was damaged and this, combined with the "burial" of the area in general means that the circulator is permanently out of service. Operation of the auger was recommenced, and no pressurizations have since been noted. As a result of this incident, any further evaluations from the test tank installed within the 101-SX tank are limited.

PUREX PROCESS TECHNOLOGY

Operability testing of the equipment in portions of the plant (primarily R and L cells) was resumed after Minor Construction forces completed work in these locations. Operation of the R cell organic treatment equipment with Shell diluent and sodium carbonate aided in evaluation of two phase operating problems. Boilup testing of the L cell product concentration equipment has been made preparatory to corrosion testing of components of the system.

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Lengthening of the HA and IA Columns by seven feet, nine inches has been in progress during the month. Cartridge specifications (both extraction and scrub section cartridges for the HA, IA, and 2D Columns) have been transmitted to Project Section, and prints have been approved as specified by Chemical Development Sub-Section personnel.

A recommendation of the Chemical Development and Plant Processes Sub-Sections that the Purex diluent be Shell E-2342 (Essential Material No. 46) instead of Soltrol-170 was transmitted to the Separations Section. Considerations of the safety of organic centrifuges in the Purex Plant were presented in an unclassified letter to Separations Section management.

BISMUTH PHOSPHATE PROCESS TECHNOLOGY

The iodine removal facilities continued to operate at the same level of iodine removal as experienced in the previous three months (98+ per cent). Changes incorporated in process procedures to reduce the iodine emissions are (1) reducing the silver reactor inlet temperature to 300 F during coating removal and (2) the addition of 75 pounds of caustic to the sodium nitrate solution. These changes are still too novel for interpretation, but will be continued for further observations.

The iodine monitor has been operating satisfactorily for short periods of time. Sticking relays, faulty cams, valve failures, etc., have been causing some erroneous readings. The cell, which has been lined with fluorothene for containing the gas to be monitored for radioactivity, has satisfactorily purged itself of background activity. A visual inspection of this cell will be done in the near future for future leads to an even better counting chamber.

URANIUM RECOVERY PROCESS TECHNOLOGY

Summary

During the first week of the month, the RC Column uranium losses became exceptionally high (daily losses generally two to eight per cent). When normal corrective measures (e.g., system flushes, solvent replacement, modifications of vent line and column variables changed) failed to reduce the losses, the column was replaced. Since the column replacement, the losses have been acceptable. Except for three periods of process upset, RCW losses during the last twelve days of the report period have consistently ranged between 0.1 and 1.0 per cent, averaging 0.5 per cent.

Although UNH solution suitable for processing in the 224-U Building was consistently produced, there has been a general upward trend in product activity (average 150 per cent aged natural uranium fission product activity). This increase probably comes from the occasional breakthrough of "hot" solids (filterable activity) known to be accumulating in the intercycle holdup tanks.

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A large scale scavenging test (500,000 gallons) using nickel ferrocyanide supplemented by inert strontium scavenging was completed during the month. Strontium and cesium concentrations in the scavenged supernatant were 0.15 and less than 0.01 microcuries per milliliter, respectively. Soil column tests indicated satisfactory soil retention, and the tank is currently being cribbed.

Metal Removal

A summary of the source, age, and irradiation history of the metal removed from the two operating tank farms is given below:

<u>Tank Sluiced</u>	<u>Fraction of Uranium Removed</u>	<u>Minimum Age From Pile Discharge, Months</u>	<u>Average Exposure Level of Uranium, MWD/T</u>
101-102-U	0.68	18	444
105-106-115-TX	0.32	30	506

Metal removal operations were completed in Tank 101-U in preparation for receiving metal waste from T Plant.

Solvent Extraction

Solvent extraction operations were carried out under essentially HW No. 6 TBP Flowsheet conditions.

The RA Column extraction conditions ($K^{1/2}NO_3$, per cent of pinching L/V, and the extraction factor, L/Vm, averaging 5.1 M, 58, and 0.06, respectively) favored good uranium transfer and low waste losses. The uranium content of the RAW varied rather erratically from 0.1 to ten per cent, and averaged 0.8 per cent of the feed uranium. The higher losses are attributed to occasional high uranium feed rates and frequent periods of column instability encountered during operation of the entire first cycle.

The RCW losses were high and erratic. During the first sixteen days of the month, the losses averaged 5.5 per cent, ranging from one to fifteen per cent. During this period, unstable column operation was frequently encountered, and emulsions occurred in the solvent treatment system. Laboratory studies confirmed the tendency of the solvent to emulsify with disengagement times of 40 seconds reported (25 seconds normal). After minor process modifications failed to reduce the loss, (1) the first cycle solvent extraction system was flushed (RA Column with 30 per cent nitric acid; RC Column and organic treatment system with 30 per cent nitric acid, 10 per cent hot caustic and water), (2) the first cycle solvent was replaced with virgin solvent, and (3) the RCF standpipe (aspiration leg) was modified to minimize possible carryover of RCU into the top of the RC Column and to permit detection of carryover if it occurred. When these remedies failed to reduce the losses or detect RAU bypassing of the RC Column, the RC Column was replaced. A significant reduction in RCW losses resulted. During steady

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state periods of operation since the column replacement, RC Column losses have averaged 0.5 per cent, but high RCX rates (80 to 90 per cent HW No. 6 Flowsheet rates) have been required to sustain these losses. These high RCX rates produce intercycle boiloff limitations at a uranium production rate of approximately six tons per day.

The replacement RC Column was modified before installation. Modifications included:

- (1) Removal of the "jet out" nozzle. This nozzle was never used on the old column and had been always suspected as an air pocket which absorbed RC Column pulse.
- (2) Installation of a modified RCF standpipe and RAU sampler similar to that recently installed on the original RC Column. The old RC Column will be inspected for gross internal failure by x-ray and, if possible, a small hole will be cut in its side to permit visual observation of the plate condition.

Second cycle uranium losses were consistently low and averaged 0.8 and 0.06 per cent of the feed uranium in the RDW and REW, respectively.

Gamma decontamination performance was fairly consistent, giving over-all (RAF/REU) logarithmic decontamination factors of about 4.8. The gamma activity of the first and second cycle products averaged 200 and 1.5 times that of aged natural uranium, respectively. An arithmetic decontamination factor of about two was achieved in the intercycle feed preparation system. The second cycle feed and product activities both increased rather consistently during September, probably because of increased breakthrough of "active" solids from the first cycle.

The first cycle RAX removed from the system and replaced with fresh solvent was washed in the solvent treatment area, using three per cent sodium carbonate, ten per cent caustic, and two one per cent nitric acid washes. The washed organic phase contained 4×10^{-6} pounds of uranium and 400 gamma microcuries per gallon. Normal disengaging times and an $E_{0/a}$ of 0.01 were reported. It was used as make-up organic in both cycles with no deleterious effects.

Intercycle Concentration and Stripping

Uranium losses based on analysis of grab samples from the intercycle stripper tower (T-8-4) overheads averaged 0.2 per cent of the feed uranium this month, compared to 0.4 per cent during August. The pooled condensate loss averaged 1.0 per cent of the feed uranium, compared to 0.4 per cent in August. Sampling of individual condensate streams failed to locate the contributor to the high composite loss.

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Waste Handling

Approximately 8,000 gallons of scavenged waste (both dilute nickel ferrocyanide-strontium nitrate scavenged and concentrated nickel ferrocyanide-calcium nitrate scavenged) per ton of uranium at an average pH of 8.9 were returned to storage for settling in Tanks 107 and 110-BY. The average compositions of the supernatants were:

<u>Tank No.</u>	<u>Sr⁹⁰, micro- curies per ml</u>	<u>Cs¹³⁷, micro- curies per ml</u>	<u>PO₄⁼, M</u>
14-108-BY	0.20	<0.01	0.13
15-110-BY	0.15	<0.01	0.10
16-107-BY	To be sampled October 2, 1955.		

Soil column tests of the supernatants from 14-108-BY and 15-110-BY indicated that the supernatants were suitable for ground disposal up to 1.5 column volumes.

Routine inert strontium scavenging will begin upon receipt of strontium nitrate currently on order.

A report containing the recommended scavenging conditions and operating procedures for "in-farm scavenging" at the CR facility was issued in HW-38955. It is expected that actual scavenging will start during the first two weeks of October.

Equipment Notes

The steam chest of the Section 7 dilute feed evaporator, E-7-1, was hydrostatically tested during the month with a KMnO₄ dyed solution at 200 psi. The unit was found to be leak-free and was returned to service.

The renovation of the Section 6 feed evaporator unit was started during the month. The renovation will include the replacement of the E-6-1 evaporator, modification of the seal pot and vent duct work (in a manner similar to the Section 7 and Section 10 modifications), and the scraping and repainting of the cell walls.

In-Line Monitors

On September 22, 1955, after monitoring almost two million gallons of dilute waste since August 1, 1955, the pH electrode and sampler cell assembly of the 11-6 pH monitor was replaced as a result of a failure in the piping of the 11-6 pH monitor automatic flushing system. The 11-6 pH monitor and the pH controlled neutralization system had performed satisfactorily during this period with the exception that a steadily increasing difference was exhibited between the 11-6 monitor record and the 11-6 laboratory control samples. The maximum deviation amounted to about 1.5 pH units. This difference of pH is not understood, but it was effectively eliminated during the electrode replacement and the repair of the buffer system.

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The REU gamma scintillation monitor was returned to service with the replacement of the 19-3 REU transfer pump and has been operating satisfactorily and exhibiting reasonable agreement with the laboratory REU control samples.

URANIUM CONVERSION PROCESS TECHNOLOGY

Process

Except for car 319, which exceeded particle size when the X-5 cyclone plugged, allowing unmilled powder to reach the unloading bag filter (X-3), and one lot of car 321, which was low in uranium purity because of high water and HNO_3 content, plant shipments have met specifications. These shipments included about 2.5 weight per cent 321 Building continuous calciner product blended with pot powder. Adding a nominal 0.05 weight per cent sulfamic acid (U basis) to the calcining pot charges produced an average product reactivity of 1.08.

An 80 per cent increase in electric pot capacity was demonstrated in a third 43 hour semi-continuous calcining test. A granular product (up to 1/16 inch in diameter), similar in appearance to continuous calciner product was made. Under the conditions of the test, using no pot additives, the product (milled to 325 mesh) exhibited a laboratory reduction time approximately six times longer than that of normal batch powder.

Although the powder reactivity and reduction characteristics were poorer than normal pot powder, consideration is being given to modification of the Luckey pots to permit semi-continuous operation. If the Luckey pot capacity could be increased 50 to 100 per cent, it might be possible to raise the 224-U production enough to prevent the accumulation of uranium at Hanford during the critical period before the expansion facilities are available.

Routine 60 per cent UNH tank (C-1) sampling for TBP and DBP has been discontinued. Average TBP and DBP concentrations reported were 19 and 29 parts per million parts of uranium, respectively, over the two month sampling period.

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

Oxalate Precipitation (Task I)

Recycle losses from the plutonium(IV) oxalate precipitation in Task I showed a downward trend at month's end (from six to four per cent), probably as a result of the emphasis placed upon careful installation and replacement of in-line filter blocks. The iron content of the feed remained high, ranging between 10 and 20 per cent of the plutonium weight.

Hydrofluorination (Task II)

The refluorination rate averaged 15 per cent in September, as compared with 18 per cent in August and 30 per cent in July. Seven of the fourteen filter boats now in use have been lip-soldered (the liner gold-soldered to the shell), a factor partly responsible for the increased efficiency.

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A Kel-F coated, silicone rubber "O" ring furnace door gasket is being tested and has now been used for nine runs without significant deformation. The Tygon gaskets which are normally used need replacement after two runs. Because of their greater cost, the silicone-Kel-F gaskets will need to stand up for about twenty runs before their use will become economical.

Metal Reduction (Task III)

Ground Nelco calcium (unrefined) was used as reductant in two metal reductions. Buttons of satisfactory purity and appearance were produced, with yields of 97.4 and 97.9 per cent (compared with the average yield for the month of 96.3 per cent). From these preliminary results, it appears that it will no longer be necessary to use redistilled calcium in Task III.

Iodine boosters will be used in all future reductions. This decision was based on the observations that (1) iodine-containing charges give about one per cent higher yields, and (2) the plutonium held up in Task IV skulls averaged three per cent when casting buttons made with iodine and seven per cent for those without.

Product Quality

By careful selection of pieces, it has been possible to mate them to give assemblies meeting the neutron emissivity specification with the low pile exposure material being processed; nevertheless, the product quality relative to neutron emission has been marginal for this material. Thus, in anticipation of a change in model, for which the neutron emission will be specified on a piece, rather than assembly, basis, the recommendation made in August for a reduction in MWD/T exposure remains valid.

RECUPLEX DEVELOPMENT

Plant Operations

The Recuplex solvent extraction facility was operated 380 hours during the month (August 29 to September 26) for an on-stream efficiency of 87 per cent. Sources of feed included dissolved skulls, fluoride powders, crucible materials, and miscellaneous liquid wastes from production and laboratory operations. Total feed input to the solvent extraction system was 21,000 liters containing 15.4 kilograms plutonium (including recycled product, which amounted to about one-third of the plutonium in the feed). Cribbed waste losses totalled 52 grams,

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representing 0.3 per cent of the feed. The concentration of the product stream was generally maintained at 70-80 g/l plutonium by operating at total reflux during periods of low plutonium input. The 7.1 kilograms of plutonium (as nitrate) loaded out into sample cans ranged in average purity from 84.7 (at the beginning of the month) to 96.7 per cent (at month's end). Physical operation of the system was generally stable, with the exception of intermittent flooding in the extraction columns during the processing of some powder solutions from Hood 41. The satisfactory operation of the facility during the month demonstrated the versatility of the system as a multi-purpose recovery unit.

Twelve reduction-crucible and eighteen fluoride-powder runs were processed without incident through the slag-and-crucible hood. Plutonium recovered from the solid waste materials totalled 6.1 kilograms.

Operating responsibility for the slag-and-crucible process hood and the chemical storage and preparation areas was assumed by the Manufacturing Department at month's end. Run planning and process control functions remained under the direction of the Engineering Department.

Process Studies

The solvent extraction system was operated on a semi-production basis during the month, with no studies made of throughput capacities, HTU's, etc. Process studies were instead directed toward crucible recovery, feed preparations, product concentration, and solvent degradation.

Slag-and-Crucible Recovery

Plutonium recovery data for all the solid feed materials processed through the slag-and-crucible hood as of September 23, 1955, are summarized in the following table:

SC Process Hood Recovery Data

<u>No. of Charges</u>	<u>Type Material</u>	<u>Book Value (gms)</u>	<u>Recovered Pu (gms)</u>	<u>Per Cent Recovered</u>
14	Old crucibles and slag	1399	1864	133
23	New crucibles and slag	2173	3304	152
23	Fluoride powders	6686	4654	70

NOTE: The majority of fluoride powder charges were processed in a separate dissolver to prevent possible carryover into the crucible runs.

Total analyses of silica slurry samples from 31 dissolver runs were completed by personnel in the 234-5 Development Laboratory. From RCDS-110-2 crucibles, the average analysis is 0.032 g/l in the slurry, whereas from RS-4 crucibles, the average is 0.027 g/l. Slurries from powder dissolutions are averaging 0.039 g/l.

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These results indicate an approximate plutonium loss of one per cent to the slurry waste. These data will be submitted for statistical analysis to determine a waste loss "accountability factor", and the slurry analysis procedure will be submitted to the Analytical Laboratory.

Corrosion data have been obtained from coupons suspended in one of the slag-and-crucible dissolvers during the "cold" acid and uranium runs and during the plutonium runs of July and August. The results indicate that severe corrosion of Type 309 SCB stainless steel (ca. 15 mils per month) occurs under the conditions of dissolving. In view of the high plutonium recovery values, the low slurry losses, and the high corrosion rates, a program was initiated at month's end to determine the effect of a higher Al/F mole ratio during the dissolution cycle.

Feed Preparation

On a trial basis, the use of hydrogen peroxide for plutonium valence adjustment and as a general purpose reductant in Recuplex has been discontinued. To compensate for the probable increase in plutonium(VI) content of column feeds, salting strengths were increased. Thus far, however, the plutonium(VI) content of the feeds has been low enough that the test has not given significant results.

Product Concentration

During the month, a considerable improvement in the purity of the final evaporated product solution (from 85 to 96 per cent) was achieved by (1) reducing the stripping time for a 25 liter batch from two hours to one hour, and (2) stripping column product solutions having higher plutonium concentrations (ca. 75 vs 25 g/l).

Studies of the pickup of iron by plutonium product solutions in the steam stripper have shown that corrosion of poor quality Raschig rings by nitric acid, per se, is not a prime factor. Metallographic analysis of Raschig rings which were part of the batch employed in the steam stripper has shown that the material is Type 304 stainless steel. Furthermore, steam stripping of 1.0 M nitric acid gave an iron pickup only one-tenth as great as that obtained during plutonium runs, indicating that something in the column product (perhaps chloride ion) is responsible for the high corrosion rates in the steam stripper.

Foaming of the product solution in the steam stripper and evaporator has been alleviated by reducing the holdup time of the column product solution prior to steam stripping.

Solvent Degradation

The problem of plutonium buildup in the solvent was met with partial success during the month. The average amount of plutonium removed from the solvent by periodic treatment with oxalic acid and sodium carbonate was 58 grams per week during August and the first week of September (98 per cent of this plutonium was recycled to the feed). The use of a stabilized ferrous ion solution, rather than

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oxalic acid, as the solvent wash solution reduced the average amount removed to 48 grams per week during the next two week period (presumably by recycling less DBP to the aqueous feed). During the last week of the month, 0.20 M nitric acid-0.01 M sulfuric acid was employed as the stripping agent in the C Column in an attempt to complex the plutonium in the dilute region and thus increase the column efficiency. The amount of plutonium removed from the solvent during the week was reduced to 24 grams, while the instantaneous losses from the extraction columns were reduced by approximately 40 per cent.

Equipment Maintenance

The solvent extraction system was shut down 57 hours during the month for equipment maintenance. The majority of the down time was for a scheduled cleanout of the columns, necessitated by the accumulation of solids on the walls of the extraction-scrub column and the deposition of solids in the solvent flow rotameter. Two other shutdowns of short duration were caused by valve diaphragm failures.

The three glass vessels in the RB-SE Cold Chemical Enclosure that were shattered by the hydrogen peroxide explosion of August 24, 1955, were replaced. Three samplers were replaced as part of a general program to substitute "screw-cap" samplers for the "double-needle" samplers.

As of September 23, 1955, the pulse generator bellows in the H-1 and H-2 columns and in the H-3 column had operated 6.2×10^6 and 9.0×10^6 cycles, respectively.

Process Chemistry

Extraction coefficients have been measured for Recuplex CAW contacted with fresh CAX. The CAW samples were spiked, respectively, with two g/l, 0.5 g/l, and 0 g/l plutonium. The $E^{o/a}$ values were 27, 17, and 22, indicating no lack of salting strength in the CAW. Thus, the lower efficiency of the H-2 column is due to another cause.

Small scale oxalate precipitations were made with Recuplex concentrated CCP. Although the plutonium in the feed was only 83 per cent pure, low waste losses and satisfactory filtration rates were observed. Satisfactory oxalate cake purity resulted. Precipitation conditions were not critical to the excess oxalic acid concentration or to use of pre-reduction.

234-5 DEVELOPMENT

Task I Process Chemistry

A proposed change in the Redox flowsheet would increase the aluminum content of the PR solution to approximately 100,000 ppm and decrease the iron to 70,000 ppm. The effect of this change on Task I was tested, and no significant differences were found. A waste loss of 0.95 per cent and filtration and settling characteristics comparable to oxalate precipitated from current production were observed.

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The concentration of Task I filtrates by evaporation would permit use of larger batch sizes and use of the same PR cans for shipment of the concentrated supernatant. Laboratory tests were made to determine the limit of concentration possible with high impurity Task I feeds containing 200,000 ppm iron and 10,000 ppm each aluminum, chromium, and nickel. A concentration factor of three can be obtained relative to the original feed volume. With the above impurities, oxalate is completely destroyed during the concentration steps. This effect is dependent upon the concentration of impurities as well as nitric acid since, in the absence of the impurities, decomposition of the oxalate is nil until concentration is nearly completed.

Since it is not desirable to count on oxalate decomposition and plutonium oxalate dissolution during the concentration step, a positive kill procedure was sought. Potassium permanganate decomposes soluble and insoluble oxalate in the filtrate at room temperature; however, 66 per cent excess over the stoichiometric amount should be added to insure a rapid reaction. All manganous ion must be oxidized to manganese dioxide before an excess of permanganate can be maintained in solution.

Chemistry Assistance to Metallurgical Studies

The preparations of one kilogram of high purity plutonium for physical measurements by the Product Metallurgy group has started. Approximately 500 grams has been dissolved from alpha phase turnings and carried through one peroxide cycle. A second precipitation will be performed to reduce the iron, aluminum, and sodium content before the fluorination step.

Recovery of alpha phase turnings is complicated by the tendency to oxidize rapidly. Work is under way to define conditions of controlled oxidation of fluorination as the first step in the recovery process. Oxidation by heating in a bomb with water-vapor and argon has been reported from other sites, but the reaction was found, here, to be too slow. The present work will define the temperature and oxygen concentration in argon which will result in a steady low temperature reaction. The goal is to produce an oxide which can be fluorinated in the continuous fluorinator.

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CHEMICAL DEVELOPMENT SUB-SECTION

HOT SEMIWORKS PUREX STUDIES

During the month three Hot Semiworks Runs PX-7, 8, and 9 were completed. PX-7 was the first Hot Semiworks run made employing new anti-backmixing caps, installed in the midcolumn feed sections, of the HA and IA decontamination columns. Over-all performance data from Runs PX-7 and 8 are attached as Tables I and II. Similar data for Run PX-9 will be reported next month.

A number of significant findings have resulted from these three runs and are highlighted below:

1. The anti-backmixing caps have apparently effectively minimized the former adverse effect on scrub-section performance of back-mixing fission products in the aqueous phase from the mid-column feed point into the scrub section, thus permitting the relatively short (8 to 13-ft.) Hot Semiworks scrub sections to perform a more effective scrubbing job.
2. With the scrub sections operating effectively, for the first time the HA and IA Columns have responded properly to changing pulsing conditions, i.e., the overall decontamination factor increases with increasing amplitude-frequency product.
3. With "good" solvent (see below) and optimum pulsing conditions, the HA and IA Column gross gamma decontamination factors at 10 tons of uranium/day equivalent plant rates were 500 and 160, respectively, essentially duplicating Flowsheet D.F.'s even with the short (8.3-ft.) HA scrub section.
4. The use of Phillips Soltrol-170 diluent resulted in lower HA and IA Column decontamination factors than when Shell E-2342 hydrocarbon was employed as the diluent. The decontamination performance of these two columns using either fresh Soltrol diluent or Hot Semiworks recycled Shell E-2342 diluent could be made approximately as good as when employing fresh Shell diluent if the pulse frequency was raised to 70-to-80 cycles/min. (scrub section pulse amplitude = 0.6 in.). However, HA and IA Column decontamination factors employing Hot Semiworks recycled Soltrol diluent were a factor of two poorer and could not be improved by raising the amplitude-frequency product because each such attempt resulted in flooding the column. Although this factor of two poorer decontamination employing recycled Soltrol diluent was apparently picked up in the uranium stripping columns so that overall cycle D.F.'s were essentially equivalent with both diluents, it has been recommended that the Purex Plant be started up employing Shell E-2342 diluent rather than Soltrol-170.

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Present plans are to decontaminate "A" and "B" Cells in the Hot Semiworks and enter them during October for planned process equipment changes and necessary maintenance work, including the following major items:

- a) Installation of new extraction-section cartridges in the HA and IA Columns to permit higher pulse frequencies without flooding.
- b) Lengthening the HA Column scrub section from 8.3 ft. to approximately 13 ft.
- c) Revamp the pulse generators on the remaining 6 pulse columns to use new-type teflon bellows (Columns IA, IBX, IBS, IC, 2A, and 2B), and replace a ruptured bellows on the HC Column.
- d) Install stainless steel nozzle plates in place of all-fluorothene perforated plates in the IO, HC, and IC Columns. This change will duplicate the Purex Plant in the IO and HC Columns, and will permit operation of these three columns with either the aqueous or organic phase continuous.
- e) Repair two inoperative samplers in A-Cell.

After the above equipment and maintenance changes Hot Semiworks experimental studies are expected to be resumed in November.

Run PX-9 was operated at a high throughput rate corresponding to 20 to 25 tons/day in the Purex Plant. The HA Column flooding frequency was determined to be 54 ± 4 cycles/min. at an amplitude of 1.07 in. in the extraction section (0.6 in. in the scrub section) and a 25 ton/day equivalent Purex plant uranium processing rate. An eight-hour run employing recycled Soltrol solvent at a frequency of 50 cycles/min. resulted in an HA Column decontamination factor of 110; however, when the test was repeated with recycled Shell solvent the D.F. increased to 240.

Intermittent flooding was experienced in all of the aqueous continuous columns and the 2A Column during Runs PX-8 and 9. This was mainly due to an attempt to operate the columns as close to the flooding frequency as possible. HA Column plutonium and uranium waste losses ranged from 0.1 to 5 per cent and 0.02 to 6 per cent, respectively, which reflect numerous changes in operating conditions, flooding in the column, and samples taken at other than optimum and/or equilibrium operating conditions. The IA Column plutonium and uranium waste losses ranged from 0.1 to 1.0 per cent and 0.03 to 0.3 per cent, respectively. The high 2AW plutonium waste loss reported for PX-8 and the increased uranium in the IBP for all runs reported are believed to be due to unstable column operating conditions.

PUREX DEVELOPMENT

Process Chemistry

Batch Contact Studies. Laboratory batch contacts simulating HA Column conditions were made as a function of feed (Redox dissolver solution vs. Hot Semiworks HAF) and diluent (new Soltrol vs. new Shell E-2342). The activity level was 33 per cent of normal full HAF level. Feed point and overall (HAF-HAP) decontamination factors were essentially identical in all runs.

Batch contacts simulating IA-IC Column conditions have been made as a function of solvent type and history using HSW HAF from Run PX-7. Results to date indicate three-fold better decontamination with Shell E-2342 as compared to new Soltrol, seven-fold better than with a sample of used Soltrol from HSW Run PX-7, and 30-fold better than with Uranium Recovery Plant solvent (a sample of ROO from 18-1 tank butted to 30% TBP). The apparent discrepancy between the HA and IA contacts as regards the affect of diluent type may be due partially to the kinetics of transfer (see below) since the HA contacts were made with ten minute agitation periods, whereas two minute contacts were used in the IA equilibrations.

Kinetics of Scrubbing. Synthetic, unscrubbed IAU was prepared from Hot Semiworks IAF and the following solvents: 1) laboratory 30% TBP-Soltrol, 2) HSW IOO (Soltrol) from Run PX-7, 3) laboratory 30% TBP-Shell E-2342 after aromatic and olefinic removal by adsorption on Al_2O_3 , and 4) U.R. Plant ROO butted to 30% TBP. Portions of each IAU solution were then contacted with an equal volume of IAS, for times ranging from 15 seconds to five minutes, using pulse-column-type agitation. Aqueous phase analyses for uranium and gross gamma ($>95\%$ Zr-Nb) showed both uranium and gross gamma transfer to be appreciably faster for the IAU's prepared from Shell solvent. Also, the transfer rates were faster for the IAU prepared from used Shell solvent than for that prepared from new Shell diluent. In all cases, the approach to equilibrium transfer was more rapid for uranium than for zirconium. On the assumption that equilibrium was reached in both cases after five minutes contact, the ratio "% equilibrium zirconium transfer/% equilibrium uranium transfer" was 0.28, 0.23, 0.34 and 0.45 after 15 seconds contact and 0.44, 0.41, 0.56, and 0.92, after one minute contact for cases (1), (2), (3) and (4) respectively. It is considered significant that the slower rate of transfer of Zr-Nb relative to uranium was more pronounced with Soltrol as diluent than with Shell E-2342. Further data are being obtained in an attempt to correlate this effect with observed column behavior and to evaluate this rate-sensitive test as an additional test of solvent quality.

Preparation of Zr Tracer. Approximately 350 millicuries of Zr^{95} have been prepared by TTA extraction of Redox IAW. Since the radioactive zirconium was to be used for tracer level pulse column studies in the Cold Semiworks, it was desired that it be in a form similar to that found in dissolver solution. Low distribution ratios under HA extraction (E_d^0 = approximately 0.005) and scrub (E_d^0 = approximately 0.01) conditions were exhibited by the "as produced" zirconium. These distribution ratios have remained essentially unchanged employing zirconium tracer which has been pre-digested at acidities ranging from 1.0 to 10 M HNO_3 for as long as five days.

DECLASSIFIEDChemical Engineering Development

The following items directed toward improving Purex A-type column decontamination performance were investigated during the month:

- (1) The insertion of an anti-backmixing cap between the extraction and scrub sections (above the HAF feed point) to minimize backmixing of fission products from the feed zone into the scrub section.
- (2) The evaluation and the use of a dilute uranium flowsheet, in which uranium is used as the transferring component, to measure the efficiency of scrub section cartridges.
- (3) A modified extraction column cartridge which would permit the use of higher pulse frequencies in the A-type columns.

Highlights of 50 runs carried out in the 321 Building Demonstration Unit and Prototype columns are as follows:

Backmixing. The effect of an anti-backmixing cap, inserted between the bottom of the scrub section cartridge and the HAF feedpoint, on backmixing from the feed point into the scrub section was investigated in 3-in. and 4-in. diameter glass columns. The data obtained using sodium as the backmixed component are given in Table III. It was found that the anti-backmixing cap reduced the sodium concentration immediately above the cap to about one per cent of the sodium concentration found at the same location in the scrub section without the anti-backmixing cap.

Despite the large reduction in sodium concentration in the lower section of the scrub section, at nine feet above the cap the sodium concentration was approximately equal to that obtained with no anti-backmixing cap. The concentration of sodium in the aqueous phase 3 ft. above the cap was essentially independent of flow rate over a four-fold range of flow rates. This is taken to indicate that the anti-backmixing cap was fairly effectively preventing backmixing in the aqueous phase by eddy diffusion, and that the small amount of sodium found above the cap was transported there by entrainment in the organic phase.

The anti-backmixing cap proved to be just as effective in a column pulsed by a hydraulic (nonsinusoidal wave shape) pulse generator as on a column pulsed by a mechanical (sinusoidal wave shape) pulse generator. A scrub section cartridge consisting of plates having 0.080-in.-diameter holes, 23% free area, and a 1-in. spacing gave anti-backmixing cap results comparable to those obtained with a standard cartridge. The use of HAX pre-equilibrated with 3 M HNO_3 and heated to 50°C. increased the sodium concentration in the aqueous phase above the bubble cap by a factor of 7.

An anti-backmixing cap installed in the full Purex Plant scale Prototype HA Column was tested at frequencies of 70 and 90 cycles per minute and a 10 ton U/day rate. Although of short duration, the tests indicated that the seal was not as effective in reducing backmixing as had been the case in small columns. On the basis of these tests the cap was modified to increase the effective overlap of the cap and internal riser from 2.5 to 4.5 inches. Testing of the modified cap is in progress.

Scrub Section Efficiency Studies. Scrub section efficiency was tested in a 3-in. diameter glass column by modifying the scrub section flowsheet so that uranium transfer unit height could be measured. This was done by reducing the uranium concentration in the organic feed to the bottom of the scrub section to 1 g./l. and the nitric acid concentration in the aqueous scrub to 0.01 M. Although the physical properties of this dilute C-type system differ from those encountered in a normal A-type scrub section, employment of this flowsheet for scrub cartridge efficiency studies permits the evaluation of relative cartridge efficiencies and is believed to apply at least qualitatively for scrubbing of fission products.

The complete data obtained during the investigation of the two following cartridges are given in Table IV:

- (1) "Standard cartridge", plates having 0.125-in.-diameter holes, 23% free area, and 2-in. spacing.
- (2) Plates having 0.080-in.-diameter holes, 23% free area, and 1-in. spacing.

As shown in the following table, the H.T.U. values obtained for the 0.08-in.-diameter hole cartridge were about 60 per cent of those for the standard cartridge at comparable pulsing and flow rate conditions.

Equivalent Rate, Tons U/Day	Pulse Frequency, Cycles/Min.	H.T.U., Ft.	
		Std. Cart.	0.08-in.-diam. holes plates
10	40	---	≤ 1.5
	60	2.5	1.1
	70	---	≤ 1.4
	80	---	1.2
20	50	1.8	1.1

Extraction Cartridge. When employing a "standard cartridge" (at rates below 10 tons of U/day), the Purex A-type column extraction sections will flood at frequencies well below the flooding frequency of the scrub section. Therefore, frequencies suitable for good extraction performance (85% of flooding frequency) do not produce optimum performance in the scrub section.

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A variety of extraction cartridges were tested in a 3-in.-diameter glass column in an attempt to increase the flooding frequency to approximately that of the scrub section cartridge. All of the cartridges were similar in that the middle section of the 9 ft. column was of more "open" design. The cartridge producing the best results from the combined standpoints of flooding and waste loss performance was assembled as follows (top to bottom):

No. of Plates	Plate Geometry and Spacing
8	0.125-in.-diameter holes, 23% free area (standard) plates on 2-in. spacing.
4	0.157-in.-diameter holes, 33% free area plates on 2-in. spacing.
5	0.157-in.-diameter holes, 33% free area plates on 4-in. spacing.
10	Standard plates on 4-in. spacing.
12	Standard plates on 2-in. spacing.

This cartridge increased the extraction section flooding frequency at 10 tons U/day from approximately 90 cycles/min. to 110 ± 5 cycles/min. and at 20 tons U/day from approximately 70 cycles/min. to 95 ± 5 cycles/min. The frequency rangeability of the cartridge appears to be very good. For example, at frequencies as much as 30 cycles/min. below the flooding frequency the uranium waste losses were below 0.05%. At optimum frequencies (80 to 90% of flooding frequency), uranium waste losses ranged between 0.001 and 0.01%.

A cartridge similar to the one described above (except for the inclusion of louver plates) was installed in the Purex Prototype HA Column and is currently being tested. Preliminary indications are that at a processing rate of 20 tons of U/day, the scrub section floods first, and at 10 tons U/day the extraction section is operable at 90 cycles/min. but floods before the scrub section.

Separations Equipment Development

Hot Semiworks Pulse Generator Pilot Valve Counterbalance. A spring-type counterbalance to replace the mass-type counterbalances now in service has been designed and constructed. The spring-type units will be tested when the pulse generators are in the hot shop for conversion to "U"-type bellows. Malfunctioning of the present mass-type pilot valve counterbalance probably has caused the recently noted erratic operation of the Hot Semiworks IA, 2B, and IBX pulse generators.

URANIUM RECOVERY DEVELOPMENT

Process Chemistry

Solids in Uranium Recovery Plant Solutions. Seven RCU samples (containing from 42 to 245 times the gamma activity of aged natural uranium) obtained during the month were filtered through glass wool. An average gross gamma decontamination factor of two was obtained (from 1.3 to 3.0). Similar filtration of REU samples (0.85 to 2.9 times the gamma activity of equilibrium uranium) gave an average D.F. of 4.0 (from 1.3 to 8.2). Ruthenium accounted for more than 95 per cent of the removable activity. No filterable activity was found in either first or second cycle ROO (recovered solvent). Black, very radioactive solids have been found in RAF, RDF, and RAU samples. Spectrographic analyses of these solids are being obtained. Centrifugation of concentrated RAF appears impractical because the solids are less dense than the solution. Contact of RAF with diluent to remove the solids as an interfacial crud prior to solvent extraction is being investigated.

RC Column Uranium Losses. A ten-fold decrease in RC Column uranium loss (from approximately 5 to 0.5 per cent of the feed uranium) occurred when the RC Column was replaced with its spare column on September 17, 1955. A gamma D.F. of 20 was obtained by filtering plant RAU (obtained just prior to the change) through either glass wool or sintered glass. Centrifugation for one minute at 1000 x G gave similar decontamination. Equilibrium uranium distribution ratios obtained at 50°C. on each of three consecutive strips of plant RAU were found to agree with values previously obtained with a synthetic RAU prepared from laboratory reagents. Dispersion and disengaging time measurements made on the "as received" RAU showed the disengaging time to be higher than normal for the system by a factor of about 1.5. It is significant that the wetting characteristics of the stainless steel agitator plates were changed sufficiently by contact with the plant RAU to give high disengaging times on subsequent use with laboratory solutions. Treating the agitator with hot concentrated nitric acid restored the normal wetting properties of the plates. Radioactivity which plated out on the agitator during the course of the measurements made on plant RAU was not removed by the nitric acid treatment. Results similar to those above were obtained, using Kel-F (vs. stainless steel) agitator plates, except that adsorbed radioactivity was removed from the plates with comparative ease.

Miniature pulse column runs simulating RC Column operation were made using plant RAU (filtered and unfiltered) as feed. Waste losses were no higher than those obtained with a synthetic RAU prepared from laboratory chemicals. However, column operation differed when using the plant RAU in that the sieve plates became organic-wet producing a tendency toward phase inversion in the region of the plates. During the second run made with plant RAU it was necessary to increase the pulse amplitude by a factor of 1.5 to break up the coalesced organic phase which had wetted onto the plates. It is

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believed that this tendency of the TBP Plant RAU to wet on the stainless steel perforated plates will cause increased dispersed phase droplet size in the plant contactors. Based on these laboratory studies, it would appear that the maximum feasible pulse amplitude-frequency product should be employed in the plant RC Column. In the miniature pulse column runs no significant amount of filterable activity was found in either the RCW or RCU. However, considerable settling of solids from the RAU occurred in the feed manifold.

Solvent Quality. In the TBP Plant an increase in the residual organic phase radioactivity and emulsion tendencies in the solvent recovery system has been noted during the month, possibly as a result of inadvertent agitation of the RAF feed tank (which normally contains some solvent). Of the treatments tried for regenerating the solvent (strong acids, caustic, $\text{HNO}_3\text{-K}_2\text{Cr}_2\text{O}_7$, $\text{Ca}(\text{OH})_2$ slurry, and contact with activated carbon), ten per cent NaOH was found to be the most effective.

Laboratory Scale Continuous Calciner. Introduction of a filter in the feed line prior to the feed control valve and rotameter appears to have eliminated most of the erratic feed flow difficulties experienced in previous runs made in the laboratory-scale continuous calciner. Smooth operation has been experienced in a series of runs designed to relate laboratory calciner results to those obtained in the 321 Building semi-plant scale 16-in.-diameter calciner. A series of runs currently under way will test the effect of various additives on UO_3 quality.

WASTE TREATMENT DEVELOPMENT

Process Chemistry

Iodine Emission. Further studies were made during the month of the retention in and release of radiiodine from a laboratory-scale silver reactor (reactor volume = 490 cc.). The reactor was loaded with 0.4 gram of radiochemically inert iodine traced with I^{131} . This loading corresponds, on a volume basis, to the loading of a plant reactor after processing the dissolver off-gas from approximately 130 tons of uranium irradiated to 600 MWD/T. In calculating this total loading of the plant silver reactor, the cooling time of the metal processed is not believed significant since greater than 99 per cent of the total halide deposited in the plant silver reactors is inactive iodine and chlorine and essentially unaffected by cooling time. Plant-coated Berl and Intalox saddles were used in the reactor.

To load the reactor, iodine was volatilized from KI solution and passed through the reactor, at 180°C ., in a gas mixture of about 6% NO_2 and 94% air. Although the laboratory reactor was loaded much more rapidly (3.5 hours) than the plant reactors, iodine retention efficiency was from 99.90 to 99.99 per cent.

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A gas mixture, at 190°C., containing 0.02 per cent Cl_2 in dry air (dew point 25°C.) removed some iodine from the reactor (approximately 0.1 per cent per hour of the total iodine present). Increasing the dew point of the mixture to 60°C. decreased the iodine evolution by greater than 10-fold. When using the moist air, water which condensed in the gas line leading to the preheater absorbed some of the Cl_2 thus reducing the amount of Cl_2 reaching the reactor.

Release of iodine from the reactor by an air- NO_2 (14%) mixture increased from less than 0.002 per cent per hour at 23°C. to a maximum of about 0.01 per cent per hour at temperatures from 70 to 140°C. and decreased to less than 0.002 per cent per hour at temperatures from 170 to 240°C. It was observed during these runs that iodine was released from the reactor during the period between runs when only air was passing through the reactor and the temperature was being adjusted for the next run. The release was greatest at low temperatures (less than 100°C.) but was detectable at plant operating temperatures. This effect will be studied further.

Stored Redox Waste Solutions. A sample of waste solution from the 101-SX tank (first in a cascade of three tanks), taken near the air lift recirculator, had a specific gravity of 1.59 ± 0.10 at 115°C. It contained, at 115°C., a black solid which settled to about 20 volume per cent. When cooled to room temperature, the settled solid volume was about 80 volume per cent of the sample, and the specific gravity and pH of the supernatant liquid were 1.474 and 12.1, respectively. Gamma activity present in the supernatant liquid was largely cesium.

Samples of supernatant liquid from tanks 102-SX and 103-SX (second and third tanks in the cascade) were at pH 12.8. These samples contained a large amount of aluminum (settled volume of alumina at a pH of approximately 8.5 was about 50 per cent of the sample volume). For this reason, cesium removal from these wastes by metal ferrocyanide scavenging without acidification appears impractical. Other Redox tanks will be sampled as part of a program of study on methods of decontaminating stored Redox waste.

Process Planning

Cribbing Coating Wastes. Plans are being firmed up for the installation of an experimental test crib facility for dissolver coating wastes. The planned location has been changed from south of the 241-T Farm to a proposed site east of the 241-A Farm. The relocation will assure that test programs employing the cribs are not adversely affected in the event that T Plant is shut down in early 1956.

According to the present scope, the test facility will consist of four small (8-ft. diameter by 10-ft. high) cribs connected to the 241-A-152 diversion box by a "valved" manifold. In this manner, each batch of coating waste with test additives may be segregated. Migration of the radio-elements will be determined by test wells to be drilled in the vicinity of the cribs.

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Two parallel discharge routes are provided from the coating waste tank to the 241-A-152 diversion box to preclude interference with normal Purex Plant operations during test operation of the cribs.

MISCELLANEOUS SEPARATIONS PROCESS DEVELOPMENT

Process Planning

Criticality Considerations In Processing Enriched Uranium. Personnel of the Chemical Development and Physics Sub-Sections are currently conducting studies of the criticality limitation encountered when processing irradiated enriched uranium. The studies include estimates of the maximum safe solution concentrations, batch sizes, and equipment sizes versus varying U-235 and Pu-239 concentrations in the irradiated metal and metal solutions after dissolution. Approximations are also being developed for situations where only the U-235 enrichment level prior to irradiation is known (i.e., the final U-235 and Pu-239 content is unknown).

Although subject to further firming up, preliminary conclusions from the study are:

- a) With the exception of the dissolvers, enrichment levels of fuel to be processed by the present Purex and Redox Plants are limited by nuclear safety considerations to slightly more than 0.9% U-235. However, for the dissolving step, enrichments greater than natural uranium would probably require replacement of the dissolvers (possibly with continuous dissolvers) to avoid reducing the processing capacities of these plants.
- b) No criticality hazard is involved in handling the uranium-plutonium dissolver solutions or precipitates (as long as no uranium is present as metal) if the effective enrichment is equal to or less than about 0.94 per cent U-235.
- c) The estimated "always safe" cylinder diameter for about 1% effective enrichment is about 30 inches. This applies tentatively even when uranium is present in metal form, such as in a continuous dissolver.

Separations Equipment Development

Johnston Test Pump No. 2. A three-stage 6AC deepwell turbine pump with set length of about nine feet has been equipped with a 7.5 horsepower, 3450 rpm motor. Preliminary test data show that the capacity is double and head is three times that obtained from the same pump equipped with a 1750 rpm motor. The original pump (1750 rpm motor) was prototypical of Purex Plant units. Life testing of this unit equipped with porcelain enamel bearings is now in progress.

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Porcelain-Enamel Bearings. Very satisfactory service was obtained from five porcelain-enamel bearings supplied by the Glas-Kote Corporation during the initial 260-hour test period. These bearings were installed in the bowl and column positions of Johnston Pump Test Unit No. 2 which is equipped with a Type 347 stainless steel shaft. The unit was operated at 1750 rpm., pumping simulated Purex IAX at 43 gpm. against a 35-ft. discharge head. No measurable and only slight visual wear of the bearings and shaft was evidenced.

Westphalia Centrifuge. Operation on synthetic HAP feed disclosed that effective phase separation is realized at feed rates up to a maximum of 1.86 ± 0.14 liters/minute. When this unit was operated on feed consisting of dispersed water in 30 per cent TBP-Soltrol, a maximum feed rate of 2.25 ± 0.25 liter/minute was realized. Operation on synthetic HAP feed was discontinued when the nitric acid in the feed attacked the tin-lead solder used to assemble the Type 316 stainless steel parts.

Material Evaluation. "Hypolon" rubber and "Gilbreth" Teflon adhesive, two potential materials for separations plant application, were tested for resistance to attack by typical Hanford process solutions at room temperature.

A sample of "Hypolon" chloro-sulphonated polyethylene compounded for acid resistance by Huntington Rubber Mills, Portland, Oregon was virtually unaffected by tributyl phosphate, 60 per cent nitric acid, 50 per cent caustic, and 10 per cent nitric acid after 43 days immersion at room temperature. On the other hand, Hypolon immersed in Purex organic (30% TBP-hydrocarbon diluent) saturated with nitric acid swelled and lost all strength. Similar swelling and embrittlement occurred when the material was immersed in carbon tetrachloride. Exposure to air at 134°C . for 8 days caused the material to harden and become very brittle.

"Gilbreth" Teflon adhesive was found to be useless when immersed in typical process solutions (60% nitric acid, kerosene-30% TBP, 50% caustics, etc.). It lost all strength after short periods of immersion. Water, 10 per cent nitric acid and air did not affect the strength of the material.

Iodine Monitor. The prototype off-gas iodine monitor installed at T-Plant has responded rapidly to changes of radioiodine concentration in the off-gas line. To date, the monitor has shown increased iodine counts concurrent with increased gamma activity in the off-gas line. (Off-gas line gamma activity is determined with an ion chamber placed on the line.) On the other hand, the background count rate has never exceeded 15,000 c/m even though the total count rate (background plus iodine and compton continuum) has on one occasion exceeded 200,000 c/m and on several occasions has been as high as 140,000 c/m. The geometry of the counting system has been estimated from preliminary data to be one per cent over-all and the volume of the gas sample is about 0.1 cubic feet. Firmer geometry and volume figures will be available when calibration of the system is completed.

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Operation of the unit has been limited by failures which have occurred in the control system. These failures are being eliminated by circuit changes and adjustments as they occur and should be minimized in the near future.

Hot Semiworks In-Line Instruments. The gamma and alpha monitors continued to operate satisfactorily. The reliability of these instruments has increased significantly as a result of the debugging and development efforts of Chemical Research and Chemical Development personnel. Increased operating efficiency of the gamma monitors, alpha printer, and uranium photometers has allowed further debugging of the IAP gamma absorbtometer and the IAW uranium polarograph. At months end, the HAW uranium polarograph was the only unit not in service.

TABLE I

HOT SEMIWORKS RUN PX-7

Dissolving

860 pounds dissolved in 3 cuts with an average acid consumption of 2.73 moles HNO_3 /mole U and a residual acidity of 0.38 moles HNO_3 /mole U. Slugs = 263 MWD/T, cooled 157 days at dissolving.

Equipment and Flowsheet

1. Anti-backmixing caps added to HA and IA Columns. HA scrub height = 8 ft. 4 in.; IA = 12 ft.-10 in.
2. HW No. 3 Flowsheet except:
 - (a) HAS = 3.0 M HNO_3 ; HAF:HAS:HAIS = 100:67:0.
 - (b) NaNO_2 flow to No. 1 waste concentrator = 0.025 M based on HAW flow.
 - (c) IOF:IOS:IOR = 100:25:49.
 - (d) Flow ratios for the last 11 hrs. of PX-7A; HAF:HAS:HAIS:HAX = 100:133:0:400.

Operation

1. HA (extraction) rate = 494 gal./(hr.)(sq.ft.).
2. PX-7A⁽¹⁾ = Recycled Soltrol (33 hr.), PX-7B = Fresh Shell E-2342 (11 hr.), PX-7C = Recycled Shell (13 hr.).
3. HA and IA pulse amplitude = 1.0 in. in the extraction section, 0.56 in. in the scrub section; pulse frequency = 60 cycles/min.

Results

	PX-7A ⁽¹⁾	HA		IA ⁽²⁾		
		PX-7B	PX-7C	PX-7A	PX-7B	PX-7C
Column Log D.F.	1.8	2.7	1.9	1.4	2.2	1.1
Pu Loss-%	0.1	3	0.6-2	1	0.3	0.1
U Loss-%	0.02	0.3-3	0.1	0.3	0.1	0.03
F.P. Distribution - % Zr	84	60	85	90	95	>95
% Ru	13	40	15	10	5	-
% Ce	3	-	<2	-	-	-

Log D.F.'s By Cycles

Process Cycle	Run 7A (Recycled Soltrol-170)	Run 7C Recycled Shell E-2342
HAF-HCP	1.6	2.0
IAF-IBP	1.6	1.7
IAF-ICU	2.5	2.8
IAF-2BP	3.5	3.9

Notes: See following page.

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TABLE I (Cont'd)

Notes:

- (1) Waste losses during the last 11 hrs. of PX-7A, which operated at an increased scrub and extractant rate, ranged as follows: U, 0.02-0.2%; and Pu, 0.1-6%. The D.F. remained unchanged.
- (2) IAF during PX-7B and PX-7C was more representative of PX-7A than of the later parts (IAF Log D.F. = 1.9, HAF = 0.0).
- (3) Solvent activity:
 - (a) Run 7A (Recycled Soltrol): 500 microcuries/l. and 66 microcuries/l., respectively in IOF and in centrifuged IOO.
 - (b) Run 7C (Recycled Shell E-2342): 186 microcuries/l. and 57 microcuries/l., respectively in IOF and in centrifuged IOO.
- (4) IBU Pu loss = 0.7%. IBP U loss = 0.0002%. 2AW Pu loss = 1.0%.

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TABLE II

HOT SEMIWORKS RUN PX-8

Dissolving

935 pounds dissolved in three cuts with an average acid consumption of 2.59 moles HNO_3 /mole U and a residual acidity of 0.27 mole HNO_3 /mole U. Slugs = 263 MWD/T, cooled 165 days at dissolving.

Equipment and Flowsheet

1. Equipment as for PX-7.
2. HW No. 3 flowsheet except:
 - (a) HAS = 3.0 M HNO_3 ; HAF:HAS:HAIS = 100:67:0.
 - (b) No H_2O or NaNO_2 to No. 1 waste concentrator.
 - (c) IOF:IOS:IOR = 100:44:56.

Operation

1. HA (extraction) volume velocity, sum of both phases = 494 gal./((hr.)(sq.ft.)).
2. HA and IA pulse amplitude = 1.07 in. (extraction section), 0.60 in. (scrub section); frequencies: HA = 60 to 80, IA = 60 to 70.
3. HA flooded at amp. = 1.07 in., $f = 80-85$; and at amp. = 1.4 in., $f = 58$, with Shell E-2342 solvent.
4. PX-8A = Shell E-2342 (fresh and recycled, 25 hr.)
 PX-8B = Fresh Soltrol (7 hr. after breaking flood)
 PX-8C = Recycled Soltrol (9 hr.)

Results

	HA			IA ⁽¹⁾		
	PX-8A	PX-8B	PX-8C	PX-8A	PX-8B	PX-8C
Column Log D.F.	2.7	2.7	2.4	1.5	1.4	1.2
Pu Loss - %	0.1-1.0	3	5	0.2	0.4	0.3
U Loss - %	0.02-3	3	6	0.1	0.05	0.1
F.P. Distribution:						
% Zr	75	70	85	85	85	90
% Ru	25	25	15	15	15	10
% Ce	-	5	-	-	-	-

Log D.F.'s By Cycles

Process Cycle	Run 8A (Fresh & Recycle Shell E-2342)	Run 8C (Recycle Soltrol-170)
HAF-HCP	2.6	2.5
IAF-IBP	1.7	2.0
IAF-ICU	2.9	2.5
IAF-2BP	2.8	3.9

Notes: See following page.

TABLE II (Cont'd)

Notes:

- (1) In-line instrument log D.F.'s were about 0.2 to 0.6 higher than the laboratory figures given (IAF Log D.F. = 1.1 to 1.5, HAF = 0.0).
- (2) Solvent Activity:
 - (a) Run 8A (Shell E-2342): 106 microcuries/l. and 37 microcuries/l., respectively, in IOF and in centrifuged IOO.
 - (b) Run 8C (Soltrol-170): 232 microcuries/l. and 29 microcuries/l., respectively in IOF and in centrifuged IOO.
- (3) IBU Pu loss = 0.3%. IBP U loss = 2×10^{-4} to 2×10^{-3} . 2AW Pu loss = 0.01 to 60%.

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TABLE III
BACKMIXING STUDIES IN A PUREX A-TYPE COLUMN SCRUB SECTION

Flowsheet: Purex HW #3 with Pu and F.P.'s omitted. Ca. 1 M NaNO_3 added to feed to serve as the backmixed component. Interface at top.
Equipment: Dual-purpose glass column. Extraction section cartridge: 9 ft. of "standard" cartridge, 3-in.-diameter. Scrub section: 3-in. or 4-in. diameter with cartridges as indicated below. Anti-backmixing cap located between scrub and extraction section.
Pulse Amplitude = 0.6 in. in the scrub section.

Run No.	Freq., Cyc./Min.	Equivalent U Production Rate, Tons/Day(d)	HAS/HAX Volume Flow Ratio	C/C ₀ (a)			Nominal C/C ₀ without Bubble-cap Seal(b)	
				3 Ft.	6 Ft.	9 Ft.	3 Ft.	9 Ft.
Scrub Section Cartridge: 8.5 ft. of standard cartridge, 3-in. diameter								
3"-143-AH	60	10	0.18	0.0038	0.0019	0.0007	0.08	0.0006
3"-144-AH	60	20	0.18	0.0093	0.0051	0.0022	0.007	≤0.0001
3"-146-AH(c)	60	20	0.19	0.0059	0.0015	<0.001	0.007	≤0.0001
Scrub Section Cartridge: 8.5 ft. of standard cartridge, 4-in. diameter.								
3"-147a-AH	80	5	0.17	0.0067(e)	0.0035	≤0.001	0.3	0.02
3"-147b-AH	80	5	0.18	0.0044	0.0022	0.0010	0.3	0.02
3"-148-AH(f)	60	10	0.19	0.0049	0.0025	0.0018	0.08	0.0006
3"-149-AH	40	10	0.17	≤0.017(e)	≤0.0058	≤0.0026	0.08	0.0006
3"-150-AH(f)	60	20	0.18	0.0094	0.0038	0.0007	0.007	≤0.0001
3"-151-AH(g)	≥70	30	0.20	--	--	--	--	--
Scrub Section Cartridge: 8.5 ft. of 0.08-in.-hole stainless steel plates, 23% free area, 1-in. plate spacing, 4-in. diameter.								
3"-152-AH	60	20	0.22	0.0047	0.0029	0.0007	0.007	≤0.0001
3"-153-AH(h)	80	10	0.20	0.0051	0.0008	≤0.0002	0.08	0.0006
3"-166-AH	60	20	0.19	0.033	0.019	0.0068	0.007	≤0.0001

Notes:

- (a) Ratio of Na concentration at the indicated height (above anti-backmixing cap) to that just below cap.
- (b) Calculated using eddy diffusivity coefficient = 15 sq.in./min.
- (c) The feed contained 1530 counts/(min.)(mil.) tracer Zr. Feed point distribution ratio was 0.03 to 0.04. Overall Zr D.F. = 47.
- (d) In the 32-in.-diameter Purex Plant scrub section.
- (e) Probably not at steady state.
- (f) Hydraulic (non-sinusoidal) pulser.
- (g) Flooding threshold.
- (h) HAX was heated to 50°C., resulting in the column temperature being 40°C.

TABLE IV

PUREX A-TYPE COLUMN SCRUB SECTION EFFICIENCY STUDIES

Flowsheet: Dilute U; HASF Organic Feed = 1 g. U/l., 0.3 to 0.7 g. HNO₃/l. in 30% TBP in Soltrol-170 diluent; HAS = 0.6 to 1.6 g. HNO₃/l. in water.

Equipment: Single glass column; plate section height = 9 ft.

Interface Position: Top

Run No.	Pulse		Volume Velocity GPH/Sq. Ft., Sum of Flows	HAS/HASF Volume Flow Ratio	% U Loss	H.T.U., Ft.
	Ampl., In.	Freq., Cyc./Min.				
Cartridge: Standard cartridge, 3-in.-diameter.						
3"-131-AH	0.65	50	460	0.20	15	≤2.6(a)
3"-154-AH	0.6	50	495	0.18	1.3	1.8
3"-155-AH	0.6	60	240	0.28	2.2	2.5

Cartridge: 0.08-in.-hole stainless steel plates, 23% free area, 1-in. plate spacing, 3-in.-diameter.

3"-156a-AH	0.6	60	250	0.28	0.042	1.1
3"-156b-AH	0.6	80	240	0.23	0.31	1.2
3"-157-AH	0.6	50	480	0.22	0.051	1.1(a)
3"-161-AH	0.6	40	250	0.24	3.0	≤1.5(a)
3"-162-AH	0.6	70	240	0.22	3.6	≤1.4(a)
3"-163-AH	0.6	60	280	0.28	0.12	1.1

Cartridge: Same as above except diameter = 4 in.

3"-164-AH	0.56	80	130	0.18	3.3	≤1.5(a)
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Note:

(a) High HNO₃ concentration at the feed point caused an operating diagram "pinch" preventing exact H.T.U. calculation.

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Ten first cycle runs were made in the HA-EC Mini units during the month to compare decontamination performance for solvents of various origin. Flowsheet HW #2 conditions were employed in these runs with eleven Mini scrub stages and ten Mini extraction stages in the HA unit. Decontamination factors obtained in these runs are summarized in the accompanying table. For comparison, results of runs 811 and 812, reported last month, are included.

The wide, and as yet unexplained, variation in the HAP uranium concentration observed in these runs makes it difficult to draw any definitive conclusions from these data. In general, however, it may be noted that decontamination performance was essentially identical for "CP" solvents employing either Shell Spray base or Soltrol 170 as diluent (cf. Runs 811 and 915 versus Run 922 and Run 98 versus Run 99). Similarly, no significant change in decontamination was noted with Hot Semi-Works feeds on recycling batch-washed solvent through the HA Mini unit, employing either "CP" sodium carbonate or "technical grade" sodium carbonate in the solvent regeneration step.

Significantly greater Zr-Nb decontamination was observed in the runs employing feed prepared from Redox dissolver solution than in those using feeds prepared from Hot Semi-Works solutions (cf., Run 812 versus Run 911). Improved extraction section decontamination accounted entirely for the increased Zr-Nb decontamination with this feed. The rate of scrubbing of Zr-Nb was actually lower with the feed prepared from Redox dissolver solution than with feeds prepared from Hot Semi-Works solutions.

It will be noted that an appreciable decrease in decontamination was obtained in Run 910 when the HCW from Run 98 was batch-regenerated with "technical grade" sodium carbonate and recycled through the HA Mini unit. Unfortunately, it is not known to what extent this effect can be attributed to the lower solvent saturation in Run 910. However, it may be noted that decontamination with recycled "CP" solvent was essentially the same as that obtained with recycled Hot Semi-Works solvent at an even lower solvent saturation (Run 911). Thus it may be inferred from these two runs that recycled "CP" solvent was certainly no better than recycled Hot Semi-Works solvent, and might actually have been worse at the same solvent saturation. It should be noted that attempts to reproduce this effect with Hot Semi-Works feeds and recycled "CP" solvents were unsuccessful (cf. Runs 922, 923, 924).

A batch countercurrent run simulating the Purex HA column was made to define the extraction equilibria for fission products in this system. The feed for this run was identical with that used in Mini Run 811 and was prepared from Hot Semi-Works dissolver solution obtained during HSW Run PX-6. The solvent used was "CP" 30% TBP-Soltrol 170. Flowsheet HW #2 conditions were used. With four

MINIATURE MIXER-SETTLER HA-HC DECONTAMINATION STUDIES

Run No.	Feed Prepared From	Solvent (30% TBP)	Log DF, HAF to HAP		Log DF, HAF to HCP	U Conc in HAP	U Conc in HAW			
			Zr-Nb	Ru-Rh	Gamma	g/l	g/l			
811	HSW Dissolver Sol'n (HSW Run PX-6)	"CP" TBP-Solntrol 170	3.48	3.22	3.60	3.48	3.97	98	--	
812	HSW Dissolver Sol'n (HSW Run PX-6)	Recycled HSW TBP-Solntrol 170 (HSW Run PX-6)	2.93	2.68	3.00	2.95	3.40	88	--	
98	Redox Dissolver Sol'n	"CP" TBP-Shell Spray base	4.26	3.39	3.85	4.57	3.86	4.28	100	0.0036
99	Redox Dissolver Sol'n	"CP" TBP-Solntrol 170	4.00	3.40	3.78	4.46	3.68	4.08	92	0.0005
910	Redox Dissolver Sol'n	Recycled HSW from Run 98	3.15	2.90	3.08	3.70	3.23	3.48	86	0.0004
911	Redox Dissolver Sol'n	Recycled HSW TBP-Solntrol 170 (HSW Run PX-6)	3.48	2.72	3.18	4.04	3.11	3.64	80	0.001
915	HSW Dissolver Sol'n (HSW Run PX-7)	"CP" TBP-Solntrol	3.43	3.18	3.43	3.53	3.28	3.64	98	0.003
916	HSW Dissolver Sol'n (HSW Run PX-7)	"CP" TBP-Solntrol Recycled through 2 1/2 Passes ^c	3.38	3.04	3.40	3.46	3.23	3.60	94	0.002
917	HSW Dissolver Sol'n (HSW Run PX-7)	"CP" TBP-Shell Spray base recycled through 3 Passes	3.32	3.00	3.34	3.56	3.36	3.61	84	--
922 ^a	HSW HAF (HSW Run PX-7)	"CP" TBP-Shell Spray base	3.78	3.56	3.65	4.19	3.81	3.94	94	0.012
923 ^a	HSW HAF (HSW Run PX-7)	"CP" TBP-Shell Spray base recycled through 1 Pass ^c	3.69	3.28	3.59	--	--	3.83	94	0.002
924 ^a	HSW HAF (HSW Run PX-7)	"CP" TBP-Shell Spray base recycled through 1 pass ^d	3.60	3.47	3.47	3.81	4.37	3.95	93	--

- ^a HAP stripped batchwise in these runs
^b HCW from Run 98 washed batchwise with tech. grade Na₂CO₃ and H₂O prior to recycling to HA unit.
^c HCW washed batchwise with CP Na₂CO₃ and H₂O prior to recycling to HA unit.
^d HCW washed batchwise with tech. grade Na₂CO₃ and H₂O prior to recycling to HA unit

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extraction and eight scrub stages overall decontamination factors were 3.4×10^4 for Zr-Nb and 1.9×10^4 for Ru-Rh. Decontamination factors of 320 for Zr-Nb and 78 for Ru-Rh were obtained in the extraction section. By comparison, Mini Run 811 gave overall decontamination factors of 3×10^3 for Zr-Nb and 1.7×10^3 for Ru-Rh, extraction section decontamination factors in this case being ca. 200 for Zr-Nb and ca. 100 for Ru-Rh. Comparing the decontamination in Mini Run 811 with that obtained in the batch countercurrent run, it is found that five equilibrium stages are required to yield the same scrub section decontamination obtained in the eleven Mini scrub stages, corresponding to an average Mini scrub section stage efficiency of 45 percent for these fission products.

Distribution ratios for Zr-Nb and Ru-Rh through the twelve stages employed in this batch countercurrent run were as follows:

	<u>Scrub Section</u>							
Stage No.	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
E_a^O (Zr-Nb)	--	--	--	0.39	0.19	0.09	0.03	0.01
E_a^O (Ru-Rh)	--	0.40	0.22	0.23	0.14	0.08	0.06	0.03

	<u>Extraction Section</u>			
Stage No.	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
E_a^O (Zr-Nb)	1.2×10^{-3}	5×10^{-3}	1×10^{-3}	1.1×10^{-3}
E_a^O (Ru-Rh)	0.01	0.07	0.09	0.14

Solvent Quality

Solvent quality studies have been initiated with the objective of identifying the impurities which arise through chemical attack of the diluent by aqueous nitrate systems and devising means of pre-conditioning the diluent to stabilize it toward such attack.

Preliminary examination of recycled Hot Semi-Works 30% TBP-Soltrol solvent has revealed the presence of nitroso compounds in this solvent, presumably arising through reaction of the Soltrol diluent with nitrous acid.

"As received" Soltrol 170 was contacted with 4 M HNO_3 - 0.05 M $NaNO_2$ for 17 hours at 85 C, and the course of reaction was followed spectrophotometrically. Color develops in the Soltrol at an initially rapid rate which tapers off to a lower (and constant) rate after ca. 10 hours. It is inferred that the constant rate of color development observed after 10 hours represents attack of the bulk constituents of the Soltrol while the initial rapid rate of color development arises from attack of more reactive impurities by the nitric acid-nitrous acid mixture.

Unsuccessful attempts were made to remove the colored impurities resulting from this treatment by atmospheric distillation and by chromatography on alumina and silica gel. Distillation resulted in a very rapid decomposition of the diluent, and the chromatographic techniques yielded only low yields of colorless material. The colorless fractions obtained in the chromatographic separations still contained aromatic impurities but their concentration was substantially lower than in "as received" Soltrol, indicating that they had been preferentially attacked.

Such pretreatment techniques will be studied further with more selective oxidants.

Entrainment in A and O Column Systems

The possible contribution of entrainment in the organic phase to the observed poor decontamination behavior in the Hot Semi-Works was investigated. On the basis of comparative measurements, no significant effect on Purex A or O column operations was indicated on replacing pure TBP-Soltrol 170 with recycled TBP-Soltrol 170 or Shell E-2342.

The tests involved stirring an organic and an aqueous phase with a perforated plate stirrer at 120 cpm for 30 seconds, determining the time required for coalescence, then analyzing the organic phase for the non-distributing aqueous tracer, potassium. With 3 M HNO_3 and 30% TBP, the entrainment in the organic phase after any reasonable settling time (60 seconds) was in general less than 0.1 percent and thus probably not important. HSW recycled Soltrol was perceptibly worse than pure Soltrol or Shell solvent, but not significantly so. Aqueous-continuous dispersions showed 0.1-0.2 percent entrainment after 20 seconds settling and 0.02 percent after 60 seconds (dispersion times and disengaging times were normal and nearly the same for these solvents). Entrainment after short settling times with organic-continuous dispersions was higher by a factor of two to five than for aqueous-continuous dispersions.

Simulating O column systems with 2 percent sodium carbonate solution as the aqueous phase gave higher entrainment; again much higher with organic-continuous dispersions, where it averaged about 0.6 percent after the 60 seconds settling time required for coalescence. In the latter case, the entrainment appears to be aggravated by organic impurities. For example, a sample of Uranium Recovery Plant solvent (20/R - 1100 - 9/12/55) which showed no difference with the above acid system, had a coalescence time of 250 seconds at which time it gave one percent entrainment with the sodium carbonate solution. This could become of possible concern at Uranium Recovery on continued operation with shorter-cooled feeds.

Entrainment of aqueous may be increased by any factor which will promote organic-continuous dispersions. Thus a non-equilibrium extraction system is worse than an equilibrium one and a "dirty" stainless steel stirrer (or extraction column) is worse than a clean one. These conditions were simulated by employing a stirrer (for the aqueous-continuous dispersions) which included one organophilic plate and stirring was stopped short of equilibrium. Hydrophilic solids such as silica

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raise the entrainment, but in the present cases a factor of not more than two was found.

Entrainment is defined as hold-up of droplets of one liquid phase in the opposite separated bulk phase and does not include carry over of solid "cruds" which always form in a countercurrent system. Due to the adsorption properties of these solids, this may be more important than simple entrainment.

Ruthenium Behavior in Acid Recovery

The suppressing effect of solvent (30% TBP-Soltrol) on ruthenium volatilization during Purex nitric acid recovery was confirmed in a 27 hour continuous still operation. Although some bumping occurred during this run, several low activity samples were collected and in general the ruthenium decontamination factors closely followed those of tracer cerium, indicating entrainment to be limiting at least up to decontamination factors of 2×10^4 . The highest decontamination factors observed over a three hour collection period were 1×10^5 and 5×10^5 for ruthenium and cerium, respectively. No further experimental work on this problem is currently scheduled.

NEW PROCESSES

Additional tracer studies have been made to characterize the fission product distribution between TBP solvent systems and aqueous chloride systems. Zirconium tracer prepared by TTA extraction of uranium dissolver solution was employed for these studies. Distribution ratios for zirconium were measured over the range 2 to 6 M total chloride, acidities 0.3 to 3.1 M and up to ionic strengths of ten. Neither the variation in acidity nor ionic strength produced any variation in the distribution coefficient, which appeared to be a function only of total chloride concentration in the aqueous phase. Also, digestion of the zirconium tracer for five hours at 70 C in the aqueous phase prior to extraction gave results identical with those obtained when the tracer was spiked into the aqueous phase immediately prior to the extraction. Extrapolation of the straight line obtained by plotting $\log E_d^0(\text{Zr})$ versus total chloride concentration yields an estimated $E_d^0(\text{Zr})$ of ca. 0.7 at 7 M total chloride. At 7 M total chloride with 1 M U (IV) the distribution ratio for U(IV) is in the range 0.025 to 0.05, corresponding to a separation factor $E_d^0(\text{Zr})/E_d^0(\text{U})$ of 14 to 28. Thus, there appears to be some basis for optimism that zirconium could be selectively extracted away from U(IV) in a "pre-extraction" step.

It is planned to explore the feasibility of such a "pre-extraction" decontamination step by means of exhaustive extractions employing spectrum fission product activities.

FUEL ELEMENT PROCESSING

In connection with the current interest in processing power reactor fuel elements (including uranium-zirconium alloys) in the Redox plant, dissolution studies have been made to determine the feasibility of dissolving such alloys to normal Redox

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terminal dissolver acidities. It was found, in co-dissolving uranium and zirconium in nitric acid-hydrofluoric acid mixtures that dissolution proceeds smoothly until the nitric acid concentration is reduced below ca. 1 M (at 2 M U), at which point zirconium begins to precipitate. On further digestion or on neutralizing to an acid-deficient condition, the zirconium is precipitated essentially quantitatively as a tan, voluminous solid, presumably a hydrous oxide. The material was difficult to remove by either centrifugation or filtration.

In other experiments it was found that "catalytic" amounts of fluoride suffice to permit dissolution of zirconium in phosphoric acid-nitric acid mixtures. Precipitation of zirconium as the phosphate occurs throughout the dissolution, continuously freeing the fluoride to dissolve more zirconium. It is thought that such an operation might reduce the corrosion problem by permitting the use of lower concentrations of fluoride. However, the zirconium phosphate precipitate would presumably carry plutonium so such a technique would be applicable only in instances where recovery of plutonium is not economical. Also, the handling characteristics of the zirconium phosphate precipitate have not yet been evaluated.

WASTE TREATMENT

Silver Reactor

Removal of radio-iodine from the dissolver off-gas stream by isotopic exchange with inactive silver iodide is under investigation. Evidence that this exchange occurs with reasonable rapidity at elevated temperature is provided by the pre-coating removal displacement bursts (the converse exchange in this case) and by studies recently reported by Russian chemists.

Since the generation of gaseous iodine at simulated dissolver off-gas conditions (very low pressure, high and known specific activity) is experimentally difficult, the converse exchange was investigated first. Air containing inactive iodine was passed through a bed of silver iodide held at 200 ± 5 C which had been prepared by precipitation in silica gel and contained tracer I-131 also as silver iodide. The effluent gas from the bed was passed through two caustic scrubbers in series. Samples were taken periodically from both scrubbers for determination of displaced radio-iodine (the first scrubber consistently absorbed > 99.95 percent of the activity). After 6.4 hours operation, 70 ± 10 percent of the activity originally in the silver iodide bed was found in the caustic scrubber. The effluent gaseous iodine containing this 70 percent of the activity constituted but 37 percent of the total iodine (molecular iodine plus silver iodide) in the system, thus indicating that isotopic exchange had been very effective. Further experiments are planned using gaseous radio-iodine and designed to permit extrapolation to plant scale operation.

Cesium Removal from Purex Wastes

The effect of various Purex process waste stream constituents on the carrying of

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cesium by 0.01 M nickel ferrocyanide from 0.01 to 3 M HNO_3 solutions was determined. Addition of up to 8 M NaNO_3 , 1 M Na_2SO_4 , 0.01 M UNH or 0.01 M $\text{Fe}(\text{NO}_3)_3$ does not affect cesium carrying appreciably. Unfortunately, the decontamination factor of over 100 obtained under the above conditions is reduced to ca. 2 in the presence of 1 M UNH, thus indicating difficulty in recovering cesium from dissolver solution or Purex HAF. More important, the cesium decontamination factor is reduced to ca. 7 by 0.1 M $\text{Fe}(\text{NO}_3)_3$, the iron concentration anticipated in Purex IWW. Attempts to improve decontamination by complexing the iron with up to 1 M oxalate, phosphate, fluoride or versene were unsuccessful. However, the decontamination factors were increased to ca. 1000 when IWW neutralized to pH 3 to 8 was scavenged with nickel ferrocyanide, either with or without removal of the basic precipitate before scavenging. Versene prevented precipitation of iron or uranium from neutral solutions thus reducing the precipitate volumes, but also produced poor cesium carrying.

Preliminary experiments with synthetic HAW indicate that 0.01 M NaNO_2 also reduces cesium carrying, in this case to a decontamination factor of ca. 20 in 2.2 M HNO_3 . In the absence of nitrite, decontamination factors of ca. 1000 are obtained. The interferences from sodium nitrite (HAW) and ferric nitrate (IWW) are not fully understood and appear at variance with some previously reported results (HW-31444). Difficulty with nitrite should be easily overcome but that with ferric may prove more serious.

In all of the above experiments, the use of preformed instead of coformed nickel ferrocyanide, the order of reagent addition, the mole ratio of nickel to ferrocyanide (0.5 to 2), and time between precipitation and centrifugation (5 min. to 24 hr.) did not affect results greatly. The use of ferricyanide instead of ferrocyanide, or the presence of oxidizing conditions (nitrite, high acidity) sufficient to form ferricyanide led to inferior cesium removal.

Cesium Removal from Redox Wastes

The removal of cesium from synthetic Redox IAW was studied as a function of several possible process variables. On scavenging with 0.01 M coformed nickel ferrocyanide, decontamination factors in the range of 20 to 30 were obtained on varying the pH from 0 to 2.5, above which large volumes of alumina are precipitated. No significant trend with pH over this range was indicated. On varying the nickel ferrocyanide concentration from 0.005 M to 0.01 M the cesium removal increased slightly; cesium decontamination changed negligibly on further increase of the nickel ferrocyanide concentration to 0.04 M. Although preliminary evidence indicated interference with cesium scavenging due to dichromate in the IAW, further investigation failed to support this conclusion. Omission of dichromate or removal by lead chromate precipitation did not consistently improve cesium removal; substitution of chromic for dichromate ion (simulating reduction) produced poorer cesium decontamination.

On increasing the stirring time with 0.01 M coformed nickel ferrocyanide from the four hours used in the previously cited experiments to a period of twenty

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hours, an erratic but definite increase in cesium decontamination was observed, from approximately 25 to 65. If slurries were permitted to settle for some time after stirring and before centrifugation, inferior decontamination resulted. On reslurrying immediately prior to centrifugation, high decontamination factors are again obtained, presumably indicating a "filter aid" effect of the bulk precipitate in removing fines from the supernate. With regard to centrifuged precipitate volume, it remains less than 5 percent below a pH of ca. 2, increases to ca. 15 percent at pH 2.5 and reaches a value of ca. 35 percent at pH 4 where it remains until at very high pH's where the alumina dissolves with formation of aluminate. Thus, operation at a pH less than two is to be recommended to minimize storage of recovery process volumes.

A few additional experiments involving cesium scavenging from synthetic IAW by cesium silicotungstate ($4 \text{ Cs}_2\text{O} \cdot \text{SiO}_2 \cdot 12 \text{ WO}_3 \cdot x\text{H}_2\text{O}$) were also performed. With 0.005 M silicotungstate, poor cesium decontamination factors (≤ 3) were obtained over the entire pH range from 0 to 13. However, factors of 25 to 75 were obtained in the pH range 0 to 2 using 0.05 M silicotungstate. Above pH 2, cesium removal dropped off rapidly, reflecting the alkaline solubility of this reagent. Further investigation will be made at higher pH's, as well as with multiple scavenging using both silicotungstate and nickel ferrocyanide.

URANIUM PROCESSING

Uranium Reduction

This study has two principle objectives: elucidation of the mechanism of bomb reduction processes, particularly with respect to uranium oxides, and an understanding of the electrometallurgical behavior of uranium. It is hoped that the knowledge gained will lead to (1) a process for the direct production of uranium metal from its oxides, (2) a continuous uranium metal production process, (3) a metallurgical process for fuel elements, particularly enriched ones, and (4) improvement in the capacity of HAPO reduction processes as well as the quality of the product.

Preliminary experiments have shown that successful bomb reduction of uranium oxides by calcium metal requires a temperature high enough to fluidize the calcium oxide. Temperatures can be increased by the addition of "booster" (reactants of high exothermicity) or by increasing the firing temperature. This latter approach is now under study and has resulted in metal yields as high as 35 percent metal (ca. 20 g.) not as powder; the largest piece weighing about five grams.

The increased firing temperature was accomplished by means of a "layered" charge. Calcium was fused into the bottom of a magnesium lined bomb and cooled. Fused calcium chloride was then added and cooled to form a second layer upon which uranium trioxide was placed. Ignition occurred slightly above the melting point

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of calcium (810 C) and gave rise to a very sharp heat pulse. The internal temperature at the core was greater than 2570 C (the melting point of calcium oxide) as evidenced from the appearance of the slag, but dropped below that temperature several millimeters from the wall. The 35 percent yield is the highest so far obtained in the absence of booster and is quite satisfactory since it probably represents metal produced in the hot core of the bomb. The experiment showed that intimate mixing of components was not essential to good reduction and that diffusion evidently occurs rapidly in the system.

Chemical Preparation of Uranium(IV) Fluorides

Continued work on the reduction of uranyl nitrate with lead metal has resulted in a method which will produce high purity sodium uranic fluoride in 99.9 percent yield. Solutions containing 0.6 molar uranyl nitrate, 5.3 molar acetic acid and various concentrations of urea were passed through a column (22 mm in diameter and 30 cm long) containing lead shot (one millimeter in diameter). The effluent solution was passed directly into an approximately equal volume of stirred 0.12-0.18 molar sulfuric acid. This effectively separated the lead as lead sulfate, leaving only a few milligrams per liter in solution. The presence of urea was essential for high reduction yields. Reduction yields were ca. 95, 99.5 and 99.8 percent in the presence of 0.0 M, 0.5 M and 1.4 M urea, respectively.

Two procedures were used in preparing the sodium uranium double fluoride. In the first, sodium ion was introduced as the sulfate and then concentrated hydrofluoric acid was very slowly added to the cold (25 C), violently stirred uranium(IV) solution. The precipitate, which formed over two or three hours, was dense and bright green. However, if the hydrofluoric acid was added too quickly or stirring was inefficient, a bluish-green flocculent precipitate occurred which sometimes converted to the dense species after 20 to 30 hours stirring. This flocculent precipitate probably contains hydrated uranium tetrafluoride. The second method differed only in that the uranium(IV) solution was heated to 70 to 80 C before precipitation of the double salt. In this case the acid could be added at a much greater rate and a satisfactory precipitate formed in 15 to 20 minutes.

The product of the cold precipitation was more dense than that of the hot precipitation (1.5 to 1.8 g/cc as compared to 0.6 to 0.7 g/cc) and fired at a higher temperature and pressure in subsequent bomb reduction reactions. In either case, however, the metal buttons obtained on reduction were good both in quality and yield (88 to 95 percent). It is interesting to note that the compositions of the double salts obtained by both the hot and cold methods were identical and were not significantly different from NaUF_5 . This constancy of composition held despite the fact that relatively high sodium to uranium mole ratios (3.5 and 7) were used.

It is doubtful whether this process can be adapted to large scale production of alkali uranium double fluoride from uranyl nitrate because of economic

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considerations. However, for a small scale operation where complete recovery is essential, such as the processing of highly enriched uranium, it might be extremely useful. Although optimization of variables in this process has not been done, it is believed that sufficient information has been gathered to confirm its chemical feasibility. Until future developments justify it, further work on this process will not be done.

Preliminary experiments have indicated that uranyl nitrate can be reduced by the use of copper metal. Extension of this work will utilize the copper complex of a weak anion exchange resin. Such a system is capable of oxidation-reduction cycles, and it is hoped will produce high purity uranium(IV) solution.

ISOTOPE SEPARATION

Ion Exchange

Further analytical results have been obtained pertaining to the equilibrium experiment between uranium(IV) chloride and uranium(IV) Dowex-50 at pH 1.6.

In the experiment U(IV) chloride at pH 1.6 was contacted with a quantity of resin such that half of the uranium was removed from the solution. After 12 to 16 hours, the solution was removed, adjusted to the starting conditions and contacted with fresh resin. Five such batch contactings were made. The third and fifth stage solutions contained 0.6946 and 0.6942 percent uranium-235. This indicated a very small separation effect since the starting material contained 0.6950 percent uranium-235. The uranium on the resin was recovered, adjusted to the starting conditions and reabsorbed on fresh resin. Three such contactings, following the resin, were made. The uranium-235 contents of the resin samples on the order of contacting were 0.6949, 0.6920 and 0.6926 percent.

The relatively large separation occurring in the second stage was substantiated by the fact that the solution in the equilibrium with the resin contained 0.6956 percent uranium-235, thus showing enrichment of the entering material. The fact that resin of the following stage contained uranium-235 significantly lower than the original starting material is also indicative of a real effect.

At first glance, it is surprising that the separation occurs only in the one stage and that it is so appreciable. It is also surprising that enrichment of uranium-238 occurs in the resin phase, contrary to the prediction of chemical exchange theory. However, a more complete analyses of the system, based on the results of further individual experiments showed (1) that slow pH changes occurred on addition of ammonium hydroxide, thus indicating slow transformation in the uranium(IV) chloride-uranium(IV) polymer system, and (2) that atmospheric oxidation to uranyl ion may slowly occur. Because of these complicating reactions, it is perhaps not so surprising that the anomalous result occurred.

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Experiments have been performed to establish the direction of exchange at various pH's; at pH 2.85 to 3.20 between uranyl and uranium(IV) polymer, at pH 2.00 to 2.56 between uranyl and uranium(IV) chloride and polymer, and at pH 1.31 to 1.39 between uranium(IV) chloride and polymer.

The "sharp band" plutonium experiment previously reported has been satisfactorily concluded. After elution through about 40 band lengths, the plutonium(III) band was fractionated. The plutonium fractions changed from blue to gray after contacting air suggesting oxidation to plutonium(IV). As indicated before, the samples will be sent to KAPL for isotopic analysis.

Samarium, to be used as a plutonium stand-in in isotope separation work, has been purified by the ion exchange technique of Spedding. Fractionation of the band has been accomplished, but no analyses of purity have been obtained.

Haefner Experiment

Gallium trichloride has been successfully synthesized by heating gallium metal in the presence of lead chloride. Preliminary mass spectrographic analyses indicate this material will be satisfactory for mass analysis.

The first run with gallium has been started in an apparatus consisting of a two millimeter capillary packed with glass powder and operating at a current of 50 amperes. It is expected that a run of seven to ten days should result in a measurable isotopic effect.

Isoelectromigration

Since a previously reported experiment with the sulfosalicylate system gave a real isotope separation despite a rather continuous bleed-off of the uranium catholyte, a way of controlling this loss was sought. The cathode compartment was isolated by means of an anion exchange membrane, however, this failed to contain the uranium. Further experiments indicated that the uranium passes the membrane either as an anionic complex (which is unlikely from pH considerations) or as a cation (UO_2^{++}) due to modification of the anion exchange membrane to the cationic form because of absorption of sulfosalicylic acid. An experimental survey of the electromigration behavior of a number of anionic uranium species was made to determine possible systems for use in isoelectromigration processes. Sulfite, thiosulfate, fluosilicate and acetate complexes appeared to be useful species.

Experiments were performed to determine the electromigration behavior of uranyl ion through cationic resin dispersed in water. Under the influence of an applied EMF, uranyl migrated from a sulfate solution through a cation exchange membrane into the column of Dowex 50 which contacted both membrane and cathode.

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Hydrogen was immediately discharged and after six hours (as compared with 40 hours calculated) uranium appeared at the cathode where it was reduced and permeated the surrounding resin. This experiment was interpreted as evidence for passage of the uranyl ion on the surface of the resin rather than through the resin.

ANALYTICAL DEVELOPMENT

Since the usual spectrographic method for plutonium analysis by carrier concentration can not be applied to calcium, aluminum, strontium, and lanthanum, a method based on TTA extraction is being developed for application to plutonium for these elements. The basic method, developed in this group several years ago, has been modified, and tests with synthetic samples are promising.

The equipment has been assembled for studying the coulometric determination of plutonium with the objective of developing a more precise method than now available. The titration studies which have been started will include reviews of the procedure by Carson (HW-34040) and a modified reductimetric procedure and an oxidimetric procedure, both developed in the Analytical Control Sub-Section, 234-5 Laboratory.

The rapid method for nitrite in Purex HAF discussed last month was established as a Purex control procedure in a cooperative effort with Analytical Control Sub-Section personnel who made an independent laboratory investigation. The rapid, semi-quantitative spot plate method is being used successfully in the 325 Building analytical laboratories on certain samples.

A method for the determination of chlorine in uranium metal which is used at the Fernald laboratory has been proposed for use by the 300 Area process control laboratory. An evaluation of this method is underway, and the results to date indicate that the method is quite satisfactory. With carefully controlled techniques, a precision better than ± 4 percent is possible for the turbidimetric part of the method. In the sample dissolution step, a moderate but constant loss of chlorine was demonstrated, with spike recoveries being about 70 percent. The procedural conditions established at Fernald were found to be nearly optimum.

The complete results of the research program on the development of a more precise uranium determination by the fluorimetric method have been published in a formal report, document HW-36831.

Additional analytical activities included assistance to the 100-K water quality laboratory in applying the ion exchange method for concentration of water samples, collaboration with Analytical Laboratories Unit personnel in designing gas analysis facilities for the determination of oxygen in plutonium, and further development work on a prototype fission counter. A method for greatly reducing the outgassing time of iron baths used in the vacuum fusion determination of oxygen in refractory metals was devised. It consists of pre-annealing the iron

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in a hydrogen atmosphere.

Equipment design activities included (1) apparatus for the determination of surface area of UO_2 powders, (2) an x-ray diffraction attachment for obtaining patterns of samples at elevated temperatures, (3) the design of miscellaneous instrument parts for the adaptation of a 325 Building spectrograph for plutonium metal analysis, and (4) the design of a prototype direct-reading attachment for the spectrograph used in isotopic analysis studies.

Special analyses performed to assist other research and development programs included the determination of the spectrophotometric properties of several glass samples having various gamma irradiation dosages and the recording of the infra-red spectra of samples of Metal Recovery plant solvent and of Redox organic stream cruds.

IN-LINE ANALYSIS

All but two of the in-line analytical instruments in the Hot Semi-Works are operating routinely. The uranium monitor on the HAW stream remains out of service, and the pH monitor on tank No. 69 is inoperative due to sampler system difficulties. The LAW uranium monitor was re-activated early in the month, and its performance was excellent. A gamma absorptometer was installed on the LAP stream in order to test it as a uranium monitor. At present, the precision and sensitivity are less than desired, but several design changes which may improve these factors are under study. An instruction and maintenance manual for the Hot Semi-Works in-line instruments was issued during the month with five of the planned eight chapters complete.

Fluorothene coated glass gamma monitor cells were installed and tested on five organic streams in the Hot Semi-Works for cell material evaluation study. These cells are the most successful of any type studied thus far for organic streams. There is no evidence of an unlimited increase of empty cell reading or cell contamination, and the signal to background ratios are still satisfactory after more than two weeks of continuous plant operation. Aluminum cells continue to serve well on aqueous streams, and glass and polyethylene cells are working successfully on some streams. The results of these tests may not be applicable to cases of fission products other than zirconium and niobium.

Studies of the application cadmium sulfide photocells to uranium photometer instrumentation were concluded, and sensing unit and controller designs were completed. Prototype units are being made for plant testing. A commercial in-line colorimeter manufactured by the Beckman Instrument Company was tested in the laboratory. The reproducibility and stability of the instrument when applied to uranium analysis are comparable to that of the in-line photometers of local design. The instrument is simple and well designed and can be recommended for in-line colorimetry and turbidimetry on streams of low radioactivity. Some sample cell modifications would be necessary if application to highly radioactive

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streams is desired.

Other activities related to in-line analysis include the issuing of an informal report detailing design and component recommendations for gamma scintillation monitor systems (Document HW-38636), the completion of as-built pipe and sampler drawings for the Hot Semi-Works and of the Purex gamma monitor installations, and the procurement of a sample of americium-241 from ORNL and of 50 curies of thulium-170 from a commercial supplier to conduct further research in gamma absorptometry for in-line analysis.

Continued work in polarography involved testing the effect of process organic phase at the amalgamated gold electrode and of the effect of two types of salt bridges in the solution. Equipment was built for conducting studies by means of single drop or oscillographic polarography.

LABORATORY SERVICES

Activities of Laboratory Services for September may be summarized as follows:

One hundred twenty thousand (120,000) gallons of "crib" level waste was transported to 200 West Area for disposal. This is the largest volume of crib waste that has been discarded in any month. Average plutonium analysis was 3.5×10^{-4} uc/ml, and average gross beta analysis was 2.9×10^{-3} uc/ml.

Approximately 2,500,000 gallons of "retention" level waste was discharged to 300 Area ponds. The average alpha and beta contents were less than 4.5×10^{-7} and 8.0×10^{-7} uc/ml, respectively. This volume is an increase of about one-third from previous months.

Eight barrels containing miscellaneous radioactive waste which exceeded cribbing limits were concreted and buried at the 300 North Burial pit. Arrangements have been completed to get excess barrels at no cost from the 100 Areas. This will result in some savings and expedite barrel concreting. Five to eight tons of excess lead sheeting was procured from 300 Area Maintenance at no cost. This will aid in making preformed shielding drums for high level waste discard.

Three slug cut-off filters from Building 327 requiring special handling were concreted at 300 North Burial Ground. Survey readings for these units were about 500 rads/hr.

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

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ANALYTICAL LABORATORIES UNIT

General Chemical Laboratory

The majority of available time was spent in support of cold semi-works Purex runs including short-term swing shift and overtime coverage. Additional analysis on back-mixing samples included the determination of water and sodium in the organic phase.

Sodium analysis of the organic phase (30% TBP in Soltrol) involved preparation of sodium standards, reasonably soluble in both aqueous phase, for precise assay of the sodium content, and organic phase to allow direct spiking techniques to be used. Sodium metal was reacted with n-butyl alcohol to obtain the desired standard. Dibutyl-phosphate was used to increase the solubility of the sodium alcoholate in the organic phase to 10 to 15 micrograms sodium per ml. Spiking of uranium standards in organic solution with the above standard allowed sodium analysis by the flame photometer directly with recoveries of 100% $\pm$ 10% obtained.

An Analytical Manual for the laboratory was completed and placed in use. The manual includes standard analytical procedures, job hazard breakdowns, and standard solution preparation data. While no single manual can cover all the situations and samples encountered by the laboratory, it is intended that the manual be used for training purposes and that laboratory personnel with some experience can use the procedures as written, or obviate special difficulty with a minimum of supplemental information by performing some required pretreatment of the sample and then following the procedure as written.

Radiochemical Laboratory

About half the months effort was taken to support Purex studies being conducted by the Chemical Research Sub-Section. To provide desired coverage for this component and Hot Semi-Works operations, the laboratory was placed on an overtime basis.

Dibutyl-phosphate (DBP) and tributyl-phosphate (TBP) assays of C-1 (60% UNH) solution in support of the investigation to determine the effect of these contaminants on the conversion of uranium nitrate to UO_3 were discontinued because of lack of correlation between DBP and TBP concentrations and blow-backs in the manufacture of UO_3 .

Iodine and DBP measurements are being made on plutonium products (CCP) from the Recuplex Process. The standard DBP method exhibits some irregularities although the 80 to 100 grams plutonium per liter does not seem to be an interference. The iodine was determined by reduction to iodide followed by a turbidimetric method. Both methods are still under study.

Spectrochemical Laboratory

Work continued on preparation of gloved boxes for spectrochemical assay of plutonium samples. This facility should be ready for use early next month.

Preparation of a working curve for iron, nickel, chromium, and zirconium in the parts per billion range in water samples was started.

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Mass Spectrometry

Calibration of the revised sample manifold for the Consolidated-Nier mass spectrometer referred to in last months report was completed. One (1) test sample of water taken at about 1300 psi was analyzed. Although the samples proved to be air contaminated, the method for handling the sample was satisfactory.

For some time poor sensitivity in the G.E. mass spectrometer has been evident. It appears to be due to partial plugging of the molecular leak. A spare leak was revised (according to Suggestion No. 17596) and installed along with a new ion source. The gain in sensitivity enabled this instrument again to be used effectively in analyzing very low pressure gas samples including off gases from metals prepared by the vacuum fusion technique and the isotopic content of gallium in gallium chloride.

Significant progress was made during the month for impurity gases in zirconium metal by vacuum fusion. The iron bath technique previously reported has proved to be satisfactory. As many as eight (8) samples were analyzed before solidification of the iron bath, due to reaction of the iron with the graphite crucible, occurred. The apparatus has been dismantled and is being reassembled to allow analysis of plutonium metal as well as nonradioactive metals. The analysis of the extracted gases by the mass spectrometer appears to be an improvement over normal analyzing techniques.

Water Quality Laboratory

Testing of ion exchange columns for concentrating water samples on a laboratory scale continued. Bugs in the operations procedure were worked out and a series of standard samples prepared for the spectrochemical phase of the method.

Sampling techniques described in KAPL-1131, "A Method for the Determination of Dissolved Oxygen in Water," were tried and found to be superior to techniques now in use. New sample bulbs were constructed to allow sampling by the improved method.

Work volume statistics for the Analytical Laboratories Unit are as follows:

	AUGUST		SEPTEMBER	
	No. of Samples	No. of Determinations	No. of Samples	No. of Determinations
<u>Research & Development</u>				
<u>File Technology</u>				
Metallurgy Research	72	207	20	286
File Materials	171	808	50	1192
Fuel Technology	41	228	43	408
<u>Separations Technology</u>				
Chemical Research	654	1103	234	439
Chemical Development	1256	2671	934	1933
Plant Processes	53	81	103	199
<u>Process Technology</u>	196	640	730	1885
<u>Other Customers</u>	73	285	128	2573
TOTAL	2516	6023	2242	8915

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CONTACT ENGINEERING UNIT

Flowsheets for iodine-131 emission control under future separations loads were issued to the Design Section for design scoping purposes. The proposed control methods are documented in HW-39261 "Flowsheets for Iodine-131 Emission Control at 1961 Power and Enrichment Levels".

Specifications for new extraction section cartridge designs in the Purex large A-Type columns were transmitted to the Project Section. The extraction section cartridge modifications were made concurrently with other column changes required to improve decontamination performance.

The supporting frame work for the prototype continuous calciner assembly and drive mechanism is about 30 per cent completed. Revised furnace procurement schedules for the prototype unit have extended the delivery date from October 15 to November 15.

TECHNICAL SHOPS UNIT - L. J. LUCAS

Mechanical Shops

A request has been forwarded to the Manager, Metal Preparation Section to assist in expediting the procurement of six journeyman machinists. These men are required to replace personnel who have been removed from the shop roster due to promotions, terminations etc. The replacement personnel will permit improved service with less overtime work being necessary.

An improved safety program has been formulated for the shops and will commence November 1, 1955. The regular safety program will be supplemented by a safety forum which will be held periodically to discuss some phase of the shop operation. Members of the forum will consist of scientific personnel with appropriate backgrounds, interested operating personnel, and safety engineers. The forum will be conducted by a moderator who will select and notify the members and direct the discussion toward the revelation of common and uncommon facts concerning the operation with emphasis being placed on possible hazards. A recording will be made of the discussion and transcribed for distribution to operating personnel.

A practical set of safety precautions to be observed in the operation will be composed using the forum discussion as a source of information. It is believed that a program of this type will materially assist operating personnel who do not generally have a scientific background to recognize hazards in operations involving chemicals or materials which under certain conditions can become dangerous.

Buildings and Grounds

The design for Project CG-576 "General Improvements to Laboratory Area Buildings" is essentially complete except for the detailed installation of the tensile machine shielding cell. Field progress is about 81% complete or about 3% behind schedule.

The rough draft of the project proposal for the "Graphite Machining Facility in 300 Area" (ER No.-3124) has been prepared and is being circulated for comment. Preliminary scoping of the project "alterations in the Laboratory Area Bldgs." was

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Separations Technology Section

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started during the month. The major items in this project are: 1. A gas loading dock for 328 Bldg. 2. An access balcony to the pipe gallery and equipment room in 326 Bldg. 3. Electrification of Elevator Doors in 325 Bldg.

Drafting and Design

Total productive man-hours for the month were 2867 including 106 hours overtime. This total includes the productive time of a loaned man from the Graphics Unit and of two loaned men from the Design Section. The input of new work was below the average received in the last three months and the work backlog in the central drafting room has been reduced to an estimated six weeks.

Glass Shop

Total productive man-hours for the month were 1168 with no overtime work necessary. 115 jobs were processed with no unusual type work encountered.

Photo Laboratory

The photo laboratory in 300 Area is now adequately staffed and has modern facilities and equipment. A total of 994 sq. ft. is utilized in 3706 Bldg. to house the operation, three full time photographers are employed and one laboratory assistant. Approximately 99% of the work performed by the laboratory originates in the Technology Sections with the Film Technology Section the major customer. The services performed by this group are proving to be a valuable asset to the technology sections in the preparation of reports and the pictorial recording of complex experiments. An additional service function is offered in the development of negatives and preparation of prints for those customers who operate metallographs or specialized cameras.

INVENTIONS

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

<u>Inventor(s)</u>	<u>Title</u>
GB Barton, FJ Leitz, and ED McClanahan	Recovery of Radio-Iodine from Silver Reactors by Halogen Displacement
E. J. Wheelwright	A Process for Preparation of Uranium (IV) Fluorides from Aqueous Uranyl Nitrate

R. B. Richards

Manager, Separations Technology
ENGINEERING DEPARTMENT

RB Richards:khs

DECLASSIFIEDMONTHLY REPORT
DESIGN SECTIONVISITORS AND BUSINESS TRIPS

L. W. Armstrong of the Builders Iron Foundry, Seattle, Washington visited Hanford September 13th and 14th for consultation on maintenance problems on installed equipment.

R. L. Tower of the Tower Equipment Company, Seattle, Washington visited Hanford September 19th through 21st for consultation on installation of interim temperature detectors.

A. J. McCrocklin of the General Electric Company, San Jose, California visited Hanford September 19th and 20th for 100-K reactor staged fault tests.

L. P. Sharts of the L. H. Butcher Company, Seattle, Washington and G. Kentta of the Udylite Corporation, Detroit, Michigan visited Hanford September 26th and 27th to discuss ventilation and operation of Udylite equipment in the 313 Building.

Dr. R. Plunkett and H. B. Avery of the General Electric Company, Schenectady, New York visited Hanford September 26th through October 8th for vibration testing of the 190-C process pumps.

E. B. LaVelle attended a meeting of AEC Welding Committee, Savannah River Plant, Augusta, Georgia September 7 and 8, 1955.

H. S. Davis visited the U. S. Corps of Engineers, Troutdale, Oregon September 1st and 2nd to review progress and give technical direction of test program on high density concrete.

C. F. Quackenbush visited the General Electric Company, Schenectady, New York September 6th through 8th to confer with General Engineering Laboratory personnel concerning vibration tests for the 190-C process pumps.

D. S. Baker visited the Bonneville Power Administration, Portland, Oregon September 6th and 7th to assist on board study.

E. B. LaVelle visited the Consolidated Steel Company, San Francisco, California October 31st and September 1st for engineering assistance on welding fabrication problems.

G. U. Udine visited the Pacific Car and Foundry, Seattle, Washington September 6th through 9th to review structural steel fabrication drawings for the 224-UA Building.

E. S. Day, Jr. attended the 10th Annual Instrument Automation Conference and Exhibit at Los Angeles, California September 10th through 16th as an official delegate.

G. R. Wilde visited the Pacific Scientific Company, Portland, Oregon September 8, 1955 to inspect special coolers for moisture detection equipment.

J. H. Snyder visited the General Electric Company, San Francisco, California September 11th and 12th to confer with Bechtel Construction Corporation on Commonwealth Edison Project coordination.

N. T. Hildreth attended the I. S. A. Convention, Los Angeles, California September 11th and 12th.

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M. H. Russ visited the DeLaval Company, Trenton, New Jersey September 12th through 18th to witness speed tests of CG-558 process water pumps.

B. R. Elder visited the Everett Foundry, Everett, Massachusetts September 12th and 13th to inspect repair procedures for CG-558 pump castings; and the Resistoflex Corporation, Belleville, New Jersey September 14th to inspect flexible connector fabrication.

H. J. Bellarts attended the Power Machinery Show, Chicago, Illinois September 12th through 13th to obtain information on equipment that could be adapted to plutonium fabrication.

N. T. Hildreth visited the Consolidate Engineering Corporation, Los Angeles, California September 17, 1955 to review instrument proposal and equipment; and the Landsverk Electrometer Company, Los Angeles, California to discuss improved instruments.

G. R. Wilde visited the Royson Engineering Company, Philadelphia, Pennsylvania September 17th through 21st to inspect segmental recorders.

G. L. Locke and W. J. Love visited the Argonne National Laboratory, Idaho Falls, Idaho; Phillips Petroleum Company, Idaho; and the General Electric Company, Idaho September 19th and 20th to discuss reactor problems associated with high pressure, high temperature operations.

J. O. Ludlow and R. T. Jaske visited the Carbide & Carbon Chemicals Corporation, Oak Ridge, Tennessee; and E. I. duPont de Nemours & Company, Inc., Savannah River, Georgia on September 20th through 23rd for consultation on reactor and separations design development problems.

J. G. Bennett visited Panellit, Incorporated, Chicago, Illinois September 26th through 29th to inspect pressure monitoring equipment.

L. T. Pedersen attended the American Nuclear Society Meeting, Washington, D. C. September 27th through October 2nd to present a technical paper.

ORGANIZATION AND PERSONNEL

<u>Personnel Statistics:</u>	<u>August 31</u>			<u>September 30</u>		
	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>
Design Management	2	1	3	2	1	3
Process Engineering Sub-Section	68	13	81	64	12	76
Design Planning Unit	17	14	31	16	14	30
Design Engineering Sub-Section	78	11	89	79	11	90
Design Drafting Unit	7	82	89	7	76	83
Total Section Personnel	172	121	293	168	114	282
Technical Graduates (Rotational)	-	3	3	-	3	3
Total	172	124	296	168	117	285

Accessions - 5

Separations - 16

D. W. McLennan transferred to the Design Section during the month to assume the position of Specialist - Design Engineering.

Five exempt personnel transferred to the Atomic Power Equipment Department.

GENERAL

Design Section engineering and drafting manpower effort on Design projects decreased during September as major programs such as 4-X and Reactor Plant Modifications advanced to the final stages of detailed design. Customer work and design development activity showed a corresponding increase in terms of Section effort:

	<u>Engineering Man Months Expended</u>	<u>Drafting Man Months Expended</u>	<u>% of Section Effort</u>
Design Development Programs	69.3	20.0	38.3
Design Section Projects	59.1	32.2	38.1
Customer Work & Miscellaneous	26.1	32.7	23.6
	<u>154.5*</u>	<u>84.9*</u>	<u>100.0</u>

*Equivalent man months expended included 192 hours of engineering and 478 hours of drafting overtime, which represents 1.1% of the Section based on the total available hours for a normal 40 hour week.

The Design Drafting Unit production for September was 368 new drawings and 563 drawing revisions for an equivalent of 3.7 man days per drawing.

DESIGN DEVELOPMENTStatistics:

The total number of engineering and drafting man months applied to design development activities for September were 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	2.7	3.9	0.2	1.0
Reactor Design Development	33.9	48.9	7.1	35.5
Separations Design Development	27.9	40.3	12.1	60.5
Chemical Processing & Reduction Design Development	3.0	4.3	0.5	2.5
234-5 Development	1.8	2.6	0.1	.5
	<u>69.3</u>	<u>100.0</u>	<u>20.0</u>	<u>100.0</u>

Metallurgical Design Development

The investigation of the problem of air contamination by oxides of nitrogen in the 323 Building continued. Various alternates for reducing the oxide fumes are being studied. These include an exhaust stack, a plate or packed tower and the use of caustic spray in the air washer units installed on the slug pickle machines.

Preliminary design scope was prepared for conversion of the present 300 area slug pickling equipment from spray processing to dip processing. Specifications were submitted to vendors to obtain cost estimates for the equipment conversion.

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DECLASSIFIEDReactor Design Development

Preliminary design criteria have been established for a new reactor plant to provide supplementary plutonium production at H.A.P.O. The design criteria provides for a graphite moderated, pressurized water reactor using horizontal process tubes. The original proposal specified a cluster-type fuel element utilizing a stainless steel jacket. The high enrichment required for this fuel element was not compatible with available 200 Area separations facilities. The use of zirconium jacket, however, would reduce the amount of enrichment so that separation could be achieved in existing 200 Area facilities.

Design Section continued to review progress and give technical direction to the extended program for testing high density concrete at the North Pacific Division Laboratory Corps of Engineers, Troutdale, Oregon. This program will determine the physical behavior of various types of high density concrete when subjected to temperature cycles in the range of 100°C to 350°C.

The study of engineering and economic feasibility of power recovery from high temperature reactor effluent at 100-C was completed. Results are summarized in HM-38968 which is scheduled for issue early in October, 1955.

Work is proceeding on a feasibility study for increasing the production capacity of existing reactors by means of rear face pressurization. Efforts to date have been concentrated on establishing a basis for the study and further definition of various plant and process limitations. Initially the study will be based on 100-H Area, Project CG-558 pumping capacity, the present process tubes with an annulus slightly larger than a "C" annulus, and the existing rear face nozzle assemblies, pigtails, and crossheader fittings. This will result in a maximum production gain at a bulk outlet temperature of 140°C and a process water flow of 80,000 GPM. At a later date the study will be expanded to examine technical and economic feasibility of further plant modification including replacement of rear face nozzles, pigtails, and crossheader fittings and the use of zirconium process tubes.

Work was initiated during the month on a study of alternate methods of reducing H.A.P.O. reactor effluent radioactivity. This study is necessitated by the fact that higher flows and higher power levels established by the Reactor Plant Modification Program and other possible future expansion programs and/or lower river flows would increase the concentration of harmful isotopes in the river beyond that tolerated by present radiological standards.

Limited activity continued on preliminary design scope for the 100-C continuous charge-discharge facilities. The proposed scope provides for procurement and testing of component parts off-pile, detailed plans and specifications for 100 tube demonstration installation and ultimate design modifications for full reactor installation. Major emphasis during September was concentrated on the vertical safety systems.

The preparation of preliminary design criteria for a zone temperature monitoring system for existing reactor application was completed. A prototype of a differential temperature readout display was completed and is ready for test.

Preliminary designs were completed for modification of flow facilities in the 189-D Building for a proposed process tube flow monitoring facility. This test facility will be used to evaluate components for process tube flow instrumentation.

Mechanical Development items active during September included resistance temperature detectors, analog-to-digital converters and alternate facilities for 100 Area dummy decontamination.

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DECLASSIFIEDSeparations Design Development

Work was in progress during the month on the first of several studies of new integrated plutonium separations facilities. The objectives of these studies are to (1) establish the minimum capital cost of a new facility and (2) set forth technical features which are deemed worthy of development for reduction in cost of future separations plants. Initial work is based on assumed technical advances which will require a period of two years or less for successful development. Further studies of new separations plants will be made on the basis of obtaining a minimum cost plant assuming a development period in excess of two years, possibly as high as four or five years.

Preliminary scope designs were completed for iodine removal and nitric acid recovery for the Redox Plant. This installation, as proposed, would include the following major equipment: (1) a gas cooler, (2) nitrogen oxide absorber, (3) nitric acid receiver, and (4) an alkaline scrubber for iodine clean-up.

The study of Redox Phase III capacity increase continued. A process flowsheet and design criteria document were completed and approved. Preliminary scope is pointed toward a capacity goal of $1\frac{1}{2}$ times the Phase II design rate.

A study was initiated to determine the type and method of installation of coalescers in the Purex extraction columns. Various coalescing media are being investigated together with possible means of installing these media in column solvent outlet streams.

A study was completed on the feasibility of segregating Redox cooling water. It is proposed to segregate all waters having high potential for contamination from those of low potential. On this basis the existing underground disposal basins would receive a relative small flow of potentially contaminated cooling water (5 to 10 per cent of total) and the remaining large volume of water could be delivered to a swamp area or recirculated through an industrial type cooling tower.

Work was initiated on preliminary scope of a second remote crane for the Purex Plant. Presently the possibilities and costs of modifying the temporary wall at the east end of Purex to facilitate the later addition of a crane maintenance platform are being investigated.

A preliminary scope design for improvement to the slug charging facilities at Redox was issued for comment. This improvement comprises a modified cover block from which only a plug needs to be removed in order to load the dissolver through a tall charging chute. At present, dissolver charging requires the removal and replacement of the large cell cover blocks.

The scope document covering alternate methods of obtaining the required downward air velocities in open cells at Redox during maintenance or inspection was issued. The recommended alternate involved provision of portable filtration units which would fit over the space normally occupied by one cover block. For large cells, two units would be installed and operated during maintenance.

Mechanical development studies in progress include alpha monitor for Purex, UO_3 specific gravity recording equipment, column interface monitor and improved process agitators.

Chemical Processing and Reduction Program

Studies have been started on methods for improving the efficiency and capacity of Task I equipment. Included in the items being studied are supernatant concentration facilities, ion exchange treatment for supernates, new filtering methods and equipment. The

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Design Section

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elimination of liquid shipments between Z Plant and the existing separations plants by installation of continuous precipitation, filtration and calcination equipment in these separations plants is also being studied.

Machine work has started in the 200-W shop on the continuous spiral feeder-type fluorination furnace. This initial test model is to be made with a plexiglas cover in order that movement of the powder through the spiral may be absorbed.

Study stage drawings for a simplified reduction process have been started. Initial efforts are directed toward a continuous or semi-continuous reduction process. The program goal is the development of equipment that will reduce any future Task III replacement costs by a factor of at least five.

234-5 Design Development

A report recommending improvements of the RM Line Conveyor System was approved and issued. In this report it is recommended that a slat-type conveyor be installed in the area now serviced by the folding arm conveyors #1 and #2. The folding arm conveyor and the express car conveyor would be removed in this area.

Engineering Standards and Materials Development

The status of progress on standards during September is as follows:

- a. Fourteen electrical standards were completed.
- b. The preparation of a standard specification for stainless steel tubing advanced to 90% complete. The specification for stainless steel fittings is 60% complete.
- c. Preliminary work has been done on the preparation of a Standard Specification for Corrosion Testing of Stainless Steel.
- d. Work has been started on the preparation of a new Electrical Engineering Standard Specification, HWS-8001-S, Metal-Clad Switchgear - 600 Volt.
- e. Work continued on standard drawings for Five-Fold Hand and Foot counters. This work, which includes the preparation of 24 drawings, is 65% complete.
- f. The preparation of specifications for austenitic stainless steel welding electrodes and filter rod advanced to 95% complete.

DESIGN PROJECTS

Statistics

Engineering and Drafting effort of the Section on project activity for the month of September was as follows:

	<u>Engineering</u>		<u>Drafting</u>	
	<u>Man Months</u>	<u>% of Total</u>	<u>Man Months</u>	<u>% of Total</u>
4-X Program	11.2	13.1	2.2	3.4
Reactor Plant Modification for Increased Production	14.2	16.7	6.9	10.6
100-K Reactor Plants	10.9	12.8	3.2	4.9
Purser Modifications	11.8	13.9	10.0	15.4
Other Design Projects	11.0	12.9	9.9	15.3
Uncover Work and Miscellaneous	26.1	30.6	32.7	50.4
	<u>85.2</u>	<u>100.0</u>	<u>64.9</u>	<u>100.0</u>

CA-512 - 100-K Area Facilities

Work continued on the preparation of construction as-built drawings. The as-built program is 97.3% complete. A total of 2031 drawings have been completed and the remaining 118 drawings are in various stages of completion.

Authorization was received from HOO-AEC during the month for CA-512 Project Proposal, Revision 4, which requested the modification, correction and installation of various systems necessary for satisfactory completion of the 100-K Area Facilities. Major design items authorized by Revision 4, which were started during September, included Retention Basin Foundations - 107-K, Acid Addition Facilities - 183-D, and Gamma Monitoring System - 105-K.

Fault tests were completed on the 100-K Area electrical system and the results are being analyzed.

Construction drawings and acceptance test procedures were revised in order to provide for lump sum construction of a major portion of the 1706-KER Building.

CA-513 - Purex Separations Facility

Design assistance was furnished in the field to resolve problems encountered during pre-start-up testing of the Purex Plant. Contractor's shop drawing for the Purex Disposal Tunnel were reviewed prior to approval. Design for the Industrial Burial Garden advanced to 80% completion.

Design for CA-513-E, Expansion of 200 Area Facilities was authorized during August. Design completion status for this phase of the project is as follows:

Iodine Monitoring Facilities	93%
Continuous Sampling Facilities	80%
Waste Storage Tank Circulators	75%

CA-514 - 300 Area Expansion

Design modifications were completed for the cap and can cleaning equipment in order to comply with the fire code for a hazardous area. Design for the addition of a caustic waste station is 80% complete. Work on the radiographic trays was completed during September.

CA-539 - Additional Waste Storage Facilities - Redox

Additional design work to provide for waste tank recirculation facilities was completed. Design is proceeding with Phase II for recirculation installation. The instrument flow diagram was approved and instrument requisitions were prepared and issued.

CA-546 - Fuel Element Pilot Plant

Total design advanced to 98% complete. Drawings and specifications for the second floor office and the development equipment design were completed. Revisions are being made to the anodizing equipment.

CG-558 - Reactor Plant Modifications for Increased Production

Total design advanced to 92.5% complete. Drawings and specifications for the 190-F and H Buildings were completed and the bid package for lump sum construction of these facilities is currently being assembled. Other major effort included the review and approval of vendor drawings. A total of 22 construction drawings were approved during the month. This increases the total number of drawings approved through September to 882.

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Design Section

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CG-578 & 579 - Effluent Water Monitoring Improvements, 100-B, C, D, DR, F and H Areas

Design effort during the month was limited to design field liaison in support of equipment installation and start-up.

CG-586 - First Capacity Increase - 230 KV System

General Electric detailed design for the project reached completion in August. Requisitions for engineered equipment were completed during September.

CG-600 - Hanford 4-X Program, 100 Areas

Design completion status remained at 96%. Further design progress is dependent upon receipt of data from the pump vendor.

CG-603 - Hanford 4-X Program - Bismuth Phosphate Plants

Detailed design advanced to 99.6% complete. Minor changes in the scope for the 244-CR vault pH instrumentation resulted in drawing revisions. Additional drawings were revised to provide cathodic protection for the tank farm buried piping.

CG-613 - Hanford 4-X Program - Metal Conversion Plant

Metal Conversion Plant detailed design is 90% complete. The project scope has been revised to include 224-U bulk handling, an acid addition system, and a new maintenance facility.

The remaining vendor drawings for the continuous calciner and furnaces were approved during the month. Certified vendor drawings for the 13.8 KV switching structure and two 1500 KVA sub-stations were reviewed and approved.

CG-616 - Installation of Acid Feed Equipment - 100-B, C, DR, F and H Areas

Detailed design advanced 50% during the month to 75% complete.

CG-621 - Redox Contamination Control Facilities

Total project design advanced to 48% complete. Detailed design for E Cell Ozonization - Phase I and Precycle Jumpers is complete. Detailed design status for the remaining phases of the project is as follows:

J-6 Pre-condenser	44%
Canyon Washdown Facilities	31%
E Cell Ozonization - Phase II	Not Started
Disposal of Contaminated Equipment	Not Started

A work order was issued for the spray nozzle test facility.

CG-624 - Redox Railroad Tunnel Ventilation Barrier

Five electrical drawings were revised and one new electrical drawing was approved during September. Detailed design is 99% complete.

CG-625 - Additional Waste Disposal Facilities - 200 Areas

Detailed design for Phase I, which includes an eight tank farm addition to the existing 241-SX Tank Farm remained at 96% complete. All drawings have been issued for comment. Design approval of these drawings has been delayed pending completion of revisions due to scope modifications.

A design study for reinforcing the tanks is being made.

CG-626 - Alterations to Redox Inert Gas System

The 28 required drawings for this facility are either approved or in the comment stage. The completion of detailed design is scheduled for early in October.

CG-631 - Crib Replacement Facilities - 241-T Tank Farm

Work started on the preparation of design scope and a project proposal to provide for the installation of facilities for transferring supernate from the 112-T tank to the existing 241-TX crib and tile field instead of the routing to the 241-T-3 crib and tile field as currently proposed.

CG-634 - Replacement of Redox 216-S-1 and 2 Crib

Design was started and check prints have been completed. Detailed design is 60% complete.

CG-635 - Redox Stack Particulate Sampler

Work was initiated during September on drawings required for the sampler. Nine drawings are scheduled for the project. Detailed design is approximately 3% complete.

D. O. 100757 - As-Built Area Maps

As of the end of September, 348 of 358 required drawings had been completed. Drafting work on this project was limited during the month due to higher priority work.

D. O. 101283 - Building 327 - Cell for Tensile Testing Machine (CG-576)

The shielding pedestal design was issued for comment during the month. This work is 95% complete.

D. O. 101362 - Power Factor Study of Electrical System

An Analyzer Board Study of the H.A.P.O. electrical system was completed during September. Preparation of a report on the analysis of data accumulated in the Board Study was 30% complete at the end of the month.

D. O. 101373 - Yakima River Pumping Facility

Design is 90% complete. Specifications and all architectural and electrical drawings have been issued for comment.

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D. O. 101378 - TBP Plant - Augmented Intercycle Stripping - Project Proposal

Approval of a project proposal, completed during July, requesting \$203,000 for the conversion of Section 9, 221-U Building, to an intercycle concentration section has been delayed pending completion of a study of the merits and costs of series operation versus parallel operation of the proposed Section 9 facility.

D. O. 101380 - Shielded Personnel Monitoring Station - Project Proposal

A project proposal for the provision of a shielded personnel monitoring station for the Radiological Sciences Department was completed during September and routed for approval by G.E. Management.

D. O. 101398 - Feasibility Study - Dummy Decontamination Facilities - 100 Areas

During the month, a rough draft of the final recommendation report on the feasibility and economics of methods for decontamination of aluminum dummies used in the 105 Buildings was issued for comment.

D. O. 101399 - Modifications to Industrial Medical Facilities - Kadlec Hospital

During September, a project proposal for modifications to the industrial medical facilities at Kadlec Hospital was completed and routed for approval.

D. O. 101410 - Redox Plant Iodine Monitors - Detailed Design

Detailed design of iodine monitors for the Redox Plant advanced to 95% complete during September.

D. O. A-00101 - Redox Capacity Increase - Phase III - Project Proposal (CG-643)

A preliminary project proposal requesting \$100,000 for design and \$400,000 for procurement of critical materials and limited on-site fabrication for Redox Capacity Increase - Phase III, completed and issued for G.E. Management review in August, was approved by G.E. and transmitted to AEC-HOO for approval at the end of September.

D. O. A-00102 - TBP Plant Tail-End Treatment - Project Proposal (CG-637)

Work continued during the month on a project proposal to provide facilities for tail-end treatment of the TBP Plant product. At the request of the Manufacturing Department, the proposal is being revised to provide for silica-gel treatment facilities only, with ozonization and segregation facilities being excluded from the proposal.

D. O. A-00140 - Modifications to Slug Pickling Machines, 313 Building - Project Proposal

During September, a preliminary project proposal requesting \$12,500 for initiation of design and critical procurement of material was completed and routed to G.E. Management for approval.

D. O. A-00144 - Redox Stack Spray Modifications

Design work was initiated during September for Redox stack spray modifications, and a purchase specification for a centrifugal pump was prepared. Overall completion for this work is 60%.

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D. O. A-00153 - Design of Stored Energy Apparatus

At the request of the Pile Technology Section, work was started during the month on the refinement of existing stored energy apparatus.

D. O. A-00157 - Auxiliary Radioiodine Removal Facilities for Redox - Project Proposal

During September, a preliminary project proposal to provide auxiliary radioiodine removal facilities for the Redox Plant was prepared and routed for Management approval.

D. O. A-00158 - Preparation of Project Proposals for Plant & Equipment Budget Items

Work was started during the month on the preparation of project proposals to obtain advance Design funds for the following items which are included in the Plant and Equipment Budget:

1. Critical Mass Laboratory
2. Reactor Gas Instrumentation
3. Horizontal Rod Instrumentation
4. Reactor Test Facility
5. Vertical Safety Rod Improvements
6. Automatic Sampling & Monitoring of
Radioactive Process Streams - 100 Areas
7. Automatic Sampling & Monitoring of
Radioactive Process Streams - 200 Areas
8. Additional Purex Waste Disposal Facilities
9. Increased Ventilation Facilities - Redox
10. Auxiliary Process Crane - Redox
11. Plutonium Purification Facility - Purex
12. Organic Clean-up Facility - Purex

D. O. A-00159 - Plutonium Fabrication Laboratory - Project Proposal (CG-645)

During September design scope studies were completed for installation of experimental plutonium fabrication facilities and a project proposal requesting total project funds of \$85,000 was prepared on an expedited basis. It is expected that this proposal will be transmitted to AEC-HOO for approval early in October.

D. O. A-00164 - Flow Loop, 314 Building - Project Proposal & Preliminary Design

Work was started during September on a project proposal requesting total project funds for the installation in the 314 Building, 300 Area, of a test loop to simulate pile conditions.

D. O. A-12884 - Purex Plant - Prototype In-Line Alpha Monitor

During September, at the request of the Separations Technology Section, design, procurement and fabrication were started for an alpha monitor which is to be installed on the 2AW stream in the Purex Plant as an aid to establishing optimum processing conditions and to gain experience with a production installation to serve as a basis for additional future application. The design for the Purex Alpha Monitor will be based on the design of and the operating experience gained with the prototype In-Line Alpha Monitor, developed under the Design Section Metallurgy Design Development Program.

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D. O. C-79796 - Ventilating System Study - 3760 Building

A design study of the 3760 Building ventilation system was approximately 75% complete at the end of September.

D. O. C-96297 - 190-C Pumping Equipment - Engineering Analysis

During September, an engineering study of vibration problems of process pumping units was begun to determine the cause of recent failures of process pump drives in the 190-C Building. This study is being conducted jointly by personnel of Design Section and Manufacturing Department at H.A.P.O., and the General Engineering Laboratory in Schenectady, New York.

D. O. C-98383 - T Plant - Drawings for Silver Reactor

Design work was initiated during September for modifications to the existing T Plant silver reactor installation to provide for more efficient operation and additional capacity.

D. O. C-98574 - 300 Area - Engineering Study of Construction Budget Items

Preparation of a study of proposed modifications to the 327 Building advanced to 25% complete during the month.

Design Work Completed During September

D. O. 101218	General Improvements to Laboratory Area Buildings (CG-576)
D. O. 101355	Redox Production Facilities - Part II, Field Liaison
D. O. 101373	- Yakima River Pumping Station
D. O. 101379	Z Plant - Sketches for PCTR Development
D. O. 101388	Redox Plant - Concrete Pad and Access Stairs
D. O. 101400	Intercommunications Systems for 189-D Building
D. O. 101414	Redox Plant - Storage Area Frame
D. O. A-00121	Painting Two High Tanks - 105-C
D. O. A-00123	Crib Methods Selection Tests - Project Proposal
D. O. A-00147	Redox Production Facilities - Jumper Design
D. O. A-12566	Redox Plant - Cell Connector Design
D. O. A-12597	Redox Plant - Jumper Design, 241-SX
D. O. C-85889	Redox Plant - Jumper Design
D. O. C-96784	Z Plant - Whitney Development Sketches
D. O. C-98213	U Plant - Print Revisions
D. O. C-98309	Redox Plant - Check Cell Layout Drawings
D. O. C-98349	Redox Plant - Gasket Design
D. O. C-98454	Purex Plant - Waste Routing Diagrams

INVENTIONS

All persons in the Design Section engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during the period covered by this report 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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Design Section

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Inventor

W. A. Richards
R. K. Bollinger

Title

Photoelectric Analog Digital Encoder

RH Beaton

Manager - Design
ENGINEERING DEPARTMENT

RH Beaton:HDT:md

DESIGN SECTION WORK STATUS

ENGINEERING MAN MONTHS
PROCESS ENGINEERING SUB-SECTION

Description	Backlog Start of Mo.	Work Sch'd Dur. Mo.	Time Spent Dur. Mo.	% of Total Effort	Backlog End of Month	Bal. of FY 1956					Total	
						Oct.	Nov.	Dec.	Jan.	Feb.		Mar.
Purex Modifications	20.1		4.1	6.2	16.0	4	4	3	2	1	1	16.0
CG-558 & CG-600	22.7		1.5	2.3	21.2	2	2	2	1	1	1	21.2
4-x Program	21.5		1.5	2.3	20.0	2	2	1	1	1	1	20.0
Reactor Design Dev.	244.2		27.6	42.1	216.6	20	20	21	23	23	23	216.6
Separations Design Dev.	198.3		20.5	31.2	177.8	20	20	21	21	21	21	177.8
Metallurgy Design Dev.	25.1		.8	1.2	24.3	1	1	1	2	2	2	24.3
234-5 Design Dev.	16.5		1.5	2.3	15.0	2	2	2	1	1	1	15.0
Weapons Design Dev.	10.4		.6	.9	9.8	1	1	1	1	1	1	9.8
Other Proj. & Misc.	23.3	5.5	7.5	11.4	21.3	6	5	5	4	4	4	12.0****
Ant. Future Work	582.1		65.6	100.0	522.0	1	2	3	5	7	8	78.0
						59	59	60	61	62	63	618.7

DESIGN ENGINEERING SUB-SECTION

Purex Modifications	67.2	7.0	7	6	5	5	5	5	5	5	5	27.2	60.2
CG-558 & CG-600	150.0	11.6	11	10	9	11	10	9	8	7	6	87.4	138.4
CG-616 1	16.4	2.2	3	3	3	3	3	3	2	1	-	2.2	14.2
CG-621	31.9	1.9	3	3	3	3	3	3	3	3	3	12.0	30.0
CG-625	37.2	1.0	2	2	2	2	2	2	3	3	3	21.2	36.2
CG-634		5.5	0.1	2	2	2	2	1				.4	5.4
CG-635		3.6	0.3	1	1	1	1	1				.3	3.3
4-X Program	39.1	8.3	6	6	4	8	6	4	2	1	1	8.2	30.8
Design Development	141.1	11.5	12	13	14	12	13	14	14	14	14	48.6	129.6
Other Maj. Minor, Misc.*	142.2	29.1	22	20	19	22	20	19	18	17	16	45****	159.0
Ant. Future Work		4.5	2	8	15	2	8	15	20	22	24	87	178.0
			73.0	74	76	73	74	76	75	73	72	339.5	785.1

Present total backlog is distributed over the five engineering branches in terms of man months as follows:

	Authorized Work		Anticipated Future	
	FY 1956		FY 1956	
Arch. & Civil	114		31	
Mechanical	194		60	
Electrical	84		54	
Instrument	125		60	
Standards	42		14	
	566**		219***	
Totals				
	145		145	
	254		254	
	138		138	
	185		185	
	63		63	
	785		785	

*Includes 1706-KER, CA-512, CA-514, 586, 598, 624, 626

**Includes Design Development

***Includes Other Major & Miscellaneous Work for FY 1956

****Includes Minor & Miscellaneous Work Budgeted for FY 1956

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REF

I. SUMMARY

A. Organization and Personnel

Following is a summary of personnel changes in Project Section during the month:

	<u>August 31, 1955</u>	<u>September 30, 1955</u>	<u>Net Change</u>
Employees on payroll	351	342	-9
Technical Graduates, Rotational	7	8	+1

The end-of-month status involved these changes:

	<u>Project Section</u>	<u>Technical Graduates Rotational</u>
Payroll additions	5	
Payroll removals	12	
Transfers into Section	4	2
Transfers from Section	6	1
Transfers within Section	2	

At the end of September 1955, five vendor inspectors were being added to the payroll, and two others were on requisition. Also, there were requisitions for six non-exempt persons. The engineering files in 100 and 200 Areas were transferred to Manufacturing, with a corresponding transfer of two people.

B. Scope of Activities

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

<u>Project No.</u>	<u>Title</u>	<u>Completion</u>	
		<u>Scheduled</u>	<u>Actual</u>
CA-512	100-K Area Facilities	100%	100% ^a
	1706 KEER Recirculation Facilities	2	1- ^b
CA-513-A	Purex Facilities, Part A	100%	100% ^c
CA-513-E	Purex Facilities, Part E	d	54%
CA-539	Additional Waste Storage Facilities, Redox	100% ^e	84%
CA-546	Fuel Element Pilot Plant	73%	73%
CG-558	Reactor Plant Modifications, Phase I	14%	16%
CG-558	Reactor Plant Modifications, Phase II	f	1%
CG-603	Hanford 4X Program, Bismuth Phosphate Plants	72%	83%
CG-613	Hanford 4X Program, Metal Conversion Plant	8	4%

- a Complete except for start-up and clean-up items.
- b Schedule is to be prepared after award of a fixed-price contract.
- c Complete except for start-up and design changes.
- d Schedule is being prepared as work is determined.
- e Schedule being revised to incorporate additional work.
- f Schedule has not been approved.
- g Schedule is to be issued after revision of project proposal.

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C. Craft Labor

Following installation of time clocks at White Bluffs, the shop craftsmen have refused to use them, although other employees in the warehouse have accepted the time clocks. The local J. A. Jones Company management is attempting to arrive at a new agreement with the crafts. During the month there was reaffirmation of the policy that all fabrications of pipe two inches or less should be done on site, and it was agreed that "on site" allows fabrication in the Minor Construction shops.

D. Safety and Security

Nine regular meetings for discussions of safety, security, and health topics were attended by about 190 Project Section employees. Three tool box and five area mass meetings were conducted in the field for labor service contractor personnel. One Special Hazards orientation was given to seven new and rehired employees. Radiation control in contaminated areas was generally good, with only two incidents requiring Class I investigation. Project Section has completed its eighth consecutive month without a security violation.

E. Highlights

Project Auxiliaries Sub-Section

Reproduction output increased sharply because of orders from AEC to an average daily rate of 21,914 square feet. Distribution by Engineering Files also increased to a total of 211,854 prints, including more than 5,000 classified items. For the tracing rehabilitation program, 58 linen reproducibles were processed. The workload for Estimating Unit remained high at 70 on schedule, of which 31 have been completed, and nine were for project proposals. Field Surveys provided routine field services and assistance, started the coal inventory in the 100 Areas, and continued with assistance to the resurvey of Richland, Washington. The assigned work was 98% complete, and some additions are being received. Activities of Project Control Unit included transmittal of seven project proposals to Financial Department and six to the AEC. Property evaluation work was continued on recent projects, and a general reworking of data was initiated for the 100-K Area Facilities and Purex Facilities, Part "A".

Inspection Sub-Section

For this reporting period, the number of orders requiring inspection increased by more than 100 to a total of 734. Of these orders, 639 have been assigned to inspection as follows: off-site, 574; on-site, 61; and government agency, 4. The Corrosion Testing Program increased to the following totals of tests performed: 217 Huey tests, 26 macro-etch tests, and 70 chemical determinations. There was also a substantial increase to the workload for the on-site inspection staff. To meet this increased demand, vendor inspectors were obliged to work overtime and to service greater areas. Efforts were continued to increase the inspection staff, particularly in eastern and north central industrial areas. Inspection was completed on reactor components for the F Area, and shipments were completed for connectors, adapters, and nozzles. Inspection current emphasis is on process water pumps and ball valves for the Reactor Plant Rehabilitation Program. The revised Inspection Manual was distributed to all off-site inspectors, and its provisions are to become effective October 1, 1955.

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Minor Construction Sub-Section

A business review of Minor Construction was conducted on September 16, 1955, and results are being evaluated. The total work assigned to Minor Construction forces represented about \$16,033,000, and the service contractor's total force averaged between 1,090 and 1,100. New work consisted of 19 work orders and several rush jobs for the shops. During the month work was completed on 22 work orders and four project assignments. As represented by assigned manpower, the major projects in progress were Reactor Plant Modifications, 105-KW Connector Replacement, Hanford 4X Program - Bismuth Phosphate Plants, Hanford 4X Program - Metal Conversion Plant, Purex Facilities, and completion of 300 Area work orders. From other AEC installations, Minor Construction has received 55 pieces of heavy construction equipment. Three items have been placed in service.

Project Engineering Sub-Section

The workload remained about level, with work being done on 37 projects, four informal requests, and miscellaneous engineering requests. The Sub-Section completed work on three projects, one informal request, and one engineering request. New work assignments were accepted on one project and five engineering requests. Major emphasis was placed on process water pumps for the Reactor Plant Modifications. One pump has been delivered, but the casting and machining of other pumps have been delayed by many repairs. Replacement of front face connectors was accomplished at 105-KW between September 19-27, inclusive, and 105-KE was scheduled for replacements, beginning October 5, 1955. The 3,300 connectors for 105-KE were shipped on September 29.

Work on the "B" Plant was put on a two-shift basis to compensate for time lost because of late material deliveries. For the Metal Conversion Plant, foundations were completed, and the steel contractor began erection of structural steel on September 26.

Separations Projects Sub-Section

With work on Part "A" of Purex Facilities essentially completed, the minor remaining items were coordinated with modifications to accomplish the 2.75 factor capacity increases. The target date for completion of the Minor Construction work in the canyon is October 10, 1955. Installation of the modified HA column was started September 12. Agreement was reached to modify the charging cartridge of the 2D column. Fixed-price contract work for the 202-A Building disposal tunnel was about 36% complete. The contractor for the 216-A-9 Waste Crib began work on September 7, 1955, and was about 48% complete at the end of the month. For the Purex Vacuum Acid Fractionator, work was stopped on September 2, 1955, in order to accomplish a complete analysis of project status. According to present information, the fractionator can be delivered during April 1956. Other procurement efforts were continued, and a revised project proposal is being prepared.

Monthly Report of Inventions and Discoveries

All persons in Project Section engaged in work that might reasonably be expected to result in inventions or discoveries 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 connection with their work have been examined for possible inventions or discoveries.

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Wm. M. McManis
W. M. McManis, Manager, Project Section

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II. STATISTICAL AND GENERAL

A. Significant Assignments

1. Initial Reporting

CG-618, Replacement of Steam Line Support Poles

Management of the project was transferred from Manufacturing Department to Project Section, effective September 1, 1955. Detailed design has been completed. The established directive completion date is January 15, 1956, and the total authorized funds \$95,000. The schedule and work is being analyzed to determine if the completion date is realistic.

ER 2770, Redox Ventilation Study

A construction schedule was prepared by the Project Engineering Sub-Section to accomplish the study, which has been issued by the Design Section.

ER 3130, Conversion of Sprinkler System and Rewiring of Old Portion of Kadlec Hospital

The rough draft of Revision #1 to the project proposal is being routed for comment. This revision includes additional work to be performed concurrently with other items included in the remodeling of Kadlec Hospital. The combination was planned in order to realize more satisfactory architect-engineering and construction contracts.

ER 3131, Shielded Personnel Monitoring Station, 747 Building Addition

The project proposal is being prepared by Design Section.

ER 3134, General Improvements, Central Stores

The Field Surveys Unit was requested to provide a topographic map of the area in order to improve plans for drainage.

2. Final Reporting

CG-610, Replacement of 313 Building Roof

Construction progressed 5% to completion, and the project was accepted as of September 7, 1955. Information for the physical completion notice was assembled.

CG-611, Mobile Laboratory

Following decision by the Radiological Sciences Department against resubmitting the project proposal, all further work was cancelled.

CA-610, Alterations to 186-D Building

Following AEC disapproval of the original project proposal, the engineering order is being closed out.

IR-196, Surfacing Roads and Parking Areas, Minor Construction, White Bluffs

The work was completed except for final portions which are being completed by work orders. Information for the physical completion notice is being assembled.

ER 490, Zone Temperature Monitoring, 105-B, C, D, DR, F, and H

Since the zone temperature monitoring is to be accomplished as a part of the Reactor Plant Modification Program, this work was included in the revised project proposal.

3. Current Projects

3A-512, 100-K Reactor Facilities

With both design and construction nominally completed, Revision #4 to the project proposal was approved by AEC on September 12, 1955. This revision requested additional funds of \$2,000,000 for completion of 25 engineering improvements and changes. A work authority dated September 28, 1955, authorized plant forces to perform the connection of the base block cooling system to the water supply and sewer systems in the KW-KE Areas. No additional funds are authorized for this work.

Replacement of the front face connectors on 105-KW was completed between September 17 and September 27. Replacements of the resistance temperature detectors and the filter plant backwash valves were completed during the outage. Also, the transformers for the 10,000 HP motors in 190-KW Building were installed.

Replacement of the connectors in 105-KE was scheduled to begin October 5, 1955, and preparations are being made at the site. On September 29, 3,300 connectors were shipped for installation at 105-KE.

Other major items to be accomplished in 100-K Area are gamma monitoring, temperature monitoring, acid feed, flame failure detection, and Dowtherm equipment. Diving services have been contracted for work on the downstream outfall line at KW. Soundings of the 101 channel have indicated that the KE Jetty has not created any abnormal silt deposits.

3A-511, 1706 KEER Remediation Facilities

Except for installation of temporary fencing and security barricades, no construction was performed during the month. Bid assemblies have been prepared and issued. The bid opening has been scheduled for October 24, 1955. Completion of the project by a fixed-price contractor is now being tentatively scheduled.

3A-513-A, Purex Facility

As originally designed, the Purex Facility has been essentially completed. Construction work during the month consisted of clean-up and completion of modifications. These miscellaneous items are being coordinated with other work in the 202-A Building, which is considered as Part "E". The extension to the 202-A Building railroad tunnel for disposal of contaminated equipment was about 36% complete. Design on the industrial burial ground was about 80% complete, and the specifications are being prepared. The present target date for completion of work in the canyon of the 202-A Building is October 10, 1955.

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CA-513-E, Expansion of 200 Area Facilities

Design has been completed, and construction was about 54% complete, as compared to scheduled completion of 48%. Construction work in connection with equipment modifications and replacement to accomplish the 2.75 capacity increase and the modifications to the three pulse columns was estimated at 71% complete. Installation of the modified HA column was started on September 29. An agreement was made to modify the charging cartridge of the 2D column, and Minor Construction forces are now engaged in this work. Other work to be completed by Minor Construction has been scheduled through the middle of November 1955.

The fixed-price contractor for the 216-A-9 Waste Disposal Crib began work on September 7, 1955, and was about 48% complete at the end of the month.

Project proposals are being prepared for the design of iodine back-up facilities and silica gel tail-end treatment.

CA-519, Additional Waste Storage Facilities for Redox

Design had been completed previously; construction progressed 14% to a total of 96%. Minor Construction was authorized to install an airlift circulator and appurtenances in Tank 109. This was accomplished in time for the tank to be placed in service on September 19, 1955. Phase II work is now being done on Tanks 108 and 109, and this includes additions which must be completed before a fixed-price contract can be let. Revision #7 to the project proposal was approved by AEC on September 13, 1955. A work authority was issued the following date to provide for liquid circulators, measuring devices, temperature instrumentation, and vapor manifold stubs.

CA-546, Fuel Element Pilot Plant

Design progressed 10% to a total of 99%; construction progressed 3% to a total of 81%. Drawings and specifications for the second floor offices and the development equipment design have been completed. Revisions are being made to the anodizing equipment.

Minor Construction forces continued with equipment relocation work and tie-ins. On September 20, the contractor started work in the plating room area. Actual excavation began on September 23, 1955. This contract work is being impeded by delays in obtaining security clearances.

Relocation of the fence was essentially completed.

CG-558, Reactor Plant Modification for Increased Production, Phase I

Design progressed 3% to a total of 92%; construction progressed 4% to a total of 26%. Design work was continued for buildings and installations in the water plants. Design of the 183-F Building is being modified to provide for placing Anthraflit by a lump-sum contractor. Vendor information on the solids feed pump has been received, and foundations are now being designed for 105-B, D, and F Buildings.

Fabrication of the process water pumps still continues as the major problem for this project. One pump has been delivered to the site, but other pumps which had been scheduled for delivery are still being repaired at the foundry. It is now planned to

divide repair and machine work among the vendor's shops so that deliveries can be made. Negotiations have been continued with the vendor.

At 190-B Annex, the contractor is placing forms and reinforcing steel at the 0'0" level, and aligning the structural steel. Concrete placement and backfilling were continued. Underground ducts and pipe gallery cable trays at 190-B Building were essentially complete. Erection of the overhead crane in 190-B Annex was started September 27. Recharging of the 183-B filter bed was completed.

In 100-D Area, progress consisted of raw water line tie-ins, installation of the 66-inch effluent line to the new junction box in the 105 exclusion area, and electrical service installation. The fixed-price contractor continued with placement of equipment foundations and piping at 190-D Annex. Minor Construction proceeded with walls and roof of 151-D Sub-Station, and also preparation for electrical services.

At 105-DR, the outage for Panellit installation began September 29, 1955. Two filter beds at 183-DR were recharged, and work was continued on the others. The fixed-price contractor for 190-DR Annex is placing concrete and steel at the floor slab level of No. 1 pump room, and for equipment foundations for No. 2 pump room. Bid assemblies have been prepared for the outfall system, but problems concerning radiation control have not yet been resolved.

Following studies of the oscillation problem on Panellit gauges installed in 105-H, the gauges were improved by the introduction of oil. Outages are now being scheduled between September 29, 1955, and January 23, 1956, to accomplish these installations at 105-DR, B, D, and F Reactors.

CG-558, Reactor Plant Modification for Increased Production, Phase II

Design is being managed by Design Section. Preparatory work for the fixed-price contractor proceeded rapidly for 100-F and H Areas. New underground ducts are being constructed at 190-H Building. At 190-F Building preliminary cut-over of electrical lines was made the week of September 26, 1955, and the Z outage for final change-over was scheduled for October 17, 1955.

CG-603, Hanford 4X Program, Bismuth Phosphate Plants

Design remained at 99%; construction progressed 6% to a total of 83%. The contractor's work on the cross-country line was completed September 6, 1955. Beneficial use of "C" Farm TBP Scavenging was realized the week of September 26, 1955.

At the request of AEC, the work in "B" Plant was put on a two-shift basis on September 19 to compensate for time lost because of late material deliveries. Acceptance testing of this facility progressed slowly because of weakness discovered in existing equipment, and also because of considerable contamination. No work can be done when wind velocities approach or exceed 15 miles per hour. The present target date for beneficial use is November 1, 1955.

In 200-West Area, work at Tank Farms 241-TY and TX has progressed satisfactorily. Structural work at the new 601 Building was continued. Both inside and outside piping work has been started.

Plant forces work at "T" Plant was about 98% complete, and at "B" Plant about 90% complete.

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CG-613, Hanford 4X Program, Metal Conversion Plant

Design completion status was revised downward to 90%; construction progressed 1 $\frac{1}{2}$ % to a total of 4%. The fixed-price contractor for the foundations completed work on September 20, 1955. The subcontractor for structural steel started Phase II field work on September 26, 1955. Minor Construction forces continued architectural work on the 224-U Building.

The current procurement situation indicates probable delays from slow delivery of gas filter unit vessels and process bag filters. The difficulties encountered while obtaining materials for the calciners has caused some relaxation of specifications, as well as some substitutions of material. It is now planned to use some 304-L or 347 stainless steel. The first furnace was ready for the vendor's test, and is being prepared for the witness test in early October 1955. Shipment of the electrical controls, transformers, and other items has been scheduled through October 24, 1955. Six JKR current transformers, thirty 25 KVA, and fifteen 10 KVA transformers have been shipped to HAP0. Six of the 25 KVA and three of the 10 KVA transformers have been shipped to Schenectady, New York, for use in the furnace test.

All materials for the reaction vessel are at the vendor's plant, and work is progressing favorably. Shipment has been promised for October 3, 1955.

B. Other Assignments

CA-548, Reactivated Project Proposal for New VSR Test Tower

The AEC issued a work authority to General Electric Company on September 20, 1955. This authority is being processed for design work only to be released at this time.

CA-555, Graphite Hot Shop and Storage Building

Construction progressed 21% to a total of 47%. The lump sum contractor completed the exterior concrete walls and erected structural steel for the bridge crane. Revision #1 to the project proposal was transmitted to the AEC on September 22, 1955.

CG-572, Particle Problem Animal Exposure Equipment

Construction progressed 20% to a total of 95%. This progress represented the following percentages of completion: architectural and structural alterations to the 141-F Building, 95%; mechanical work, 90%; electrical work, 90%; and installation of laboratory furniture, 95%.

CG-576, General Improvements to Laboratory Area, 300 Area

Design progressed 3% to a total of 98%; construction progressed 3% to a total of 52%. Work by plant forces was continued on alterations to the cell exhaust system in 327 Building, installation of "panic" hardware in the 327 Building, and painting shop equipment in 328 Building.

CG-578, Effluent Water Monitoring Improvements, 100-B, D, F, DR, and H Areas

Construction progressed 2% to a total of 35%. Painting of sample rooms in 105-H was completed during late September. At 105-D, the rotameter rack assemblies were installed,

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and the assemblies for 105-B are being fabricated in the shops. At 105-DR, the outage for Panellit installation was started on September 29, and the gamma monitoring facilities are to be installed during this shutdown.

CG-579, Effluent Water Monitoring Improvements, 100-C Area

Detailed design and design services in the field are being managed by Design Section. The control estimate based upon the completion of detailed design was prepared. Construction work was again suspended because of similar work being performed under Project CG-578.

CA-586, First Capacity Increase, 230-KV System

Design progressed 10% to completion. The apparent low bid on the Duplex board and relays was received and reviewed during the month. The bid assemblies for fixed-price-contract work were issued September 28 for a bid opening on October 26, 1955. Minor Construction started installation of cable trays in the 165-KW-KE tunnel on September 12, 1955. Work has progressed satisfactorily.

CG-587, TBP Waste Scavenging

Construction progressed 1% to a total of 88%. All drawings had been issued and a work order estimate is being prepared by plant forces for the piping and installation of the tank and one jumper. Fabrication of the make-up tank was complete.

CG-589, De-jacketing and Ultrasonic Equipment, 105-C Building

This project is being closed out with exceptions.

CA-590, Fly Ash Collection Equipment, Building 384

With preliminary design completed, the AEC authorized work according to the revised project proposal. A directive was issued on September 12, 1955, and the work authorization is being prepared.

CG-598, Purex Acid Fractionator

Design was completed on September 15; construction progressed 9% to a total of 36%. Major physical work was stopped on September 2, 1955, pending a detailed analysis of the project status. Construction of the cribs by a fixed-price contractor has continued. Requisitions have been completed for engineered items. A revised project proposal requesting an increase in authorized funds and an extension of the completion date is being prepared.

According to present information, the acid fractionator is to be delivered in late April 1956; so the major field work is to be temporarily suspended for about sixty days.

CG-599, Hanford 4X Program, 100 Area

The project proposal was submitted to AEC on September 23, 1955, for review and authorization. The proposal actually outlines the work as performed, and no further project work is proposed.

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CG-600, 100-C Alterations

The revised project proposal, as submitted on August 11, 1955, to the AEC-Washington office, requested provisions for increased water flow, alterations for charging and discharging poison columns during operation, and improvements for calibrating the existing Panellit gauges. A letter was received by Hanford Operations Office on September 20 authorizing replacement of process pumps, modifications to the effluent system, and other work associated with pump facilities. Action on the other work requested was deferred. Construction is to be resumed in November 1955.

CA-601, 300 Area General Improvement Program

The AEC has authorized \$60,000 for this project, and is preparing the work authority.

CG-614, Hanford 4X Program, 300 Area

Scoping and design are being managed by Design Section. Construction was about 6% complete; work orders were issued to plant forces for the remaining items of work in the 313 Building. These include installation of the autoclaves, cylinders, cap sorter, conveyor carriers, and other minor related items. Except for final storage pallets, all of the engineering items have been purchased.

CA-615, Mechanical Maintenance Shop Centralization, 100 Areas

A letter is being prepared to answer the AEC's request for additional justification.

CG-616, Installation of Acid Feed Equipment, 100-B, C, D, DR, F, and H Areas

With design about 75% complete, agreement was reached by General Electric Company to purchase tanks and other long-term delivery items. All other materials are to be purchased by the fixed-price contractor.

CG-617, Additional Air-drying Facilities, Building 234-5

Construction progressed about 40% to a total of 86%. Acceptance tests were completed, and operation of the dryer, chiller, blowers, and related piping was satisfactory. Minor Construction work was accepted with exceptions caused by slow delivery of material.

CG-620, Melt Plant Modifications, 314 Building

Because of the change of scope, the percentage of design completion cannot be stated. A design order was issued to Design Section for assistance in rescoping and for preparation of a revised project proposal.

CG-621, Redox Contamination Control Facilities

Construction remained at about 26% complete. Further work is to be coordinated with shutdowns as permitted by production requirements during 1955 and early 1956. The instrument panels arrived on September 21, and instrumentation work is to be completed during early October 1955. All jumpers are ready to be installed with the ozone connector. Scheduled work on the vessel-vent system is to be done after January 1, 1956.

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CG-624, Redox Railroad Tunnel Ventilation Barrier

Since only one bid was received, the bid date was extended to September 27, 1955. Three bids were received, of which the bid of the F. T. Crowe Company of Seattle was apparently low. The required delivery date has not been extended.

CA-625, Additional Waste Disposal Facilities, 200 Area

Design remained at about 46% complete. All drawings for Phase I have been issued for comment. A design study for reinforcing the tanks is being made, and final approval of all drawings is awaiting slight revisions of tank structural design.

CG-626, Alterations to Redox Inert Gas Vent System

Construction progressed 2% to a total of 5%. Installation of rotameters was continued on the nitrogen bleed piping system. Work on the filter modification and fabrication of dunnage was delayed until October because of other higher priority work.

CA-627, Replacement of 300 Area Fence

Construction progressed 59% to a total of 79%. The contractor is now working on relocation of the exclusion fence east of the 306 Building. About half of the removed fence is to be relocated around the new burial ground north of the 300 Area.

CG-630, Minor Construction Fabrication Shops Modifications

With preliminary design completed, a letter is being prepared to answer the AEC request for additional justification.

CG-631, Crib Replacement Facilities, 241-T Tank Farm

Design work has been suspended to await clarification as to the need for facilities as originally scoped. No construction has been started.

CA-633, Remodeling of Facilities, Kadlec Hospital

Construction items have been approved by AEC. Major engineering services are to be performed by a fixed-price architect-engineer.

CG-634, Replacement of Redox 216-S-1 and 2 Crib

Design work was initiated on September 22, 1955. Because of the urgency of this project, comment drawings and a bid specification have been scheduled for completion by October 9, 1955.

CG-635, Redox Stack Particulate Sampler

Design work was started September 6, 1955. Since design work has been completed, a detailed estimate is to be made. No construction work is to be started until sufficiency of funds has been determined.

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CG-636, Redox Service Facilities Expansion

The project proposal is being revised by Design Section to reduce the scope.

CG-637, TBP Product Tail-end Treatment Facilities

The project proposal is being prepared by Design Section. The scope of work to be performed has been greatly reduced. Limited facilities to recycle out of standard 224-U Area material through Redox will be provided, including crossover piping at 224-U Area and a truck unloading station at the Redox Area.

CA-639, Painting Water Plant Structures, 100-DR Area

The project proposal was transmitted to AEC on September 23, 1955.

IR-191, 321 Building Fire Protection and Staging Study

The design comment drawings were issued during the latter part of September 1955.

IR-196, Redox Stack Spray Piping Modification

Design work was started September 11, 1955. The purchase requisition has been processed for the required pump. The field release was issued to Minor Construction to permit procurement of ladders and special equipment.

* * * * *

The following studies and Engineering Requests, involving preparatory work and scoping of future projects, were active during the month:

ER 1219, 105-KW Laboratory

The project proposal was returned for corrections.

ER 1225, Continuous Charge-discharge Facility at 105-C

The project proposal has been signed and is being distributed. A design progress schedule meeting was held on September 27, 1955.

ER 1227, Provide Additional Storage and Shop Space in the 105-B, D, and F Buildings

The final draft of the project proposal is being routed for comments.

ER 1229, Installation of Raw Water Cross-tie, 105-C

The rough draft of the project proposal is being circulated for comments.

ER 1736, FY-1955 Water Tank Replacements, 100-200 Areas

The project proposal was revised to include only the 100-B Area tank replacement. All replacement work and work within the 184-B Power House is to be performed by a fixed-price contractor. The revised project proposal is being routed for General Electric approvals.

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ER 2764, 2101 Building Conversion

The project proposal is being prepared.

ER 2766, 221-J Section 9 Conversion to Intercycle Concentration

The project proposal has been temporarily delayed to await results of a study of possible methods of connecting the system.

ER 2767, Additional Redox Liquid Cooling Waste Cribs

A revised scope was issued on September 19, 1955, and the project proposal is being prepared by Design Section.

ER 3122, Replacement of Steam Plant Deaerator, 384 Building

The Manufacturing Department, Metal Preparation Section, is conducting tests to determine the operating efficiency of the existing deaerator at various load levels. Data obtained from these tests are to be the bases of decision.

ER 3124, Graphite Machining Facilities, 300 Area

A rough draft of the work scope and justification was submitted to the Separations Technology Section for comments. The project is to be submitted on the basis of performance of work by a fixed-price contractor, with architect-engineer services being performed off site.

ER 3125, Roof Repairs, Central Stores

Because of less favorable weather conditions, this work is to be postponed until the spring 1956.

ER 3126, Replacement, Repair, and/or Removal of Valve Houses, 100-B, D, and F Areas

The Manufacturing Department has requested the addition of one valve house to the list of those to be replaced. The project estimate is being revised according to this change.

ER 3127, Painting of Two High Tanks at 105-C Area

Information for bid assemblies was transmitted to AEC on September 15, and bids were requested by AEC on September 23. The bid opening date was set for October 5, 1955.

ER 3128, Decontamination Facilities, 100-H, 200-W, and 300 Areas

The rough draft of the project proposal is being prepared.

ER 3129, Modifications to Industrial Medical Facilities, Kadlec Hospital

The project proposal is being prepared by Design Section.

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C. Related Functions

All phases of the inspection workload continued to increase during the month. The number of orders requiring inspection increased to a total of 724, of which 639 had been assigned to inspectors. These assignments have been made to inspectors as follows: off-site, 574; on site, 61; and government agency, four. The distribution of off-site inspectors has been widened to accommodate the increased workload with the same number of people. Efforts to find additional vendor inspectors were continued, and five were in process of being added to the payroll.

The workload for the Corrosion Testing Program has increased to the following totals: Huey tests, 217; macro-etch tests, 54; and chemical determinations, 70.

The On-site Inspection Unit completed inspection on 40 orders during the month, identified ten orders, and performed other inspection functions as requested. Space has been made available in the Central Stores Building for one man to work continually. The space assignments at White Bluffs were continued.

The revised Inspection Manual has been issued to all off-site inspectors, and its provisions are to become effective October 1, 1955. This revised manual contains more condensed information, as well as revisions to methods, procedures, and responsibilities to be observed by vendor inspectors.

Following is a resumé of inspection activities during the month:

<u>Items</u>	<u>Number</u>	<u>Value</u>
New orders received during the month	213	
Total orders for items requiring inspection	724	
Cumulative orders assigned to inspectors (distribution noted above)	639	\$11,600,000
Orders assigned to inspectors this month	196	669,000
Orders completed during the month	126	382,000

Reproduction output increased sharply to an average daily rate of 21,914 square feet. This great increase was caused by AEC requests for bid assemblies, and it is apparent that the increased workload will continue for several months. Distribution of prints by Engineering Files increased correspondingly to 211,854 during the month. This total included 5,000 classified items and rehabilitation work required on 58 linen reproductions. The largest single orders were about 3,600 for the Reactor Modification Program and about 2,100 for the Hanford 4X Program, Bismuth Phosphate Plants. The total workload of these two Units was accomplished with a relatively low increase in overtime hours.

The workload for Estimating Unit remained about level at 70 estimates on schedule, of which 31 were completed. The completed estimates included the following: study, 12; project proposals, nine; construction, eight; and fair cost, two.

Field Surveys continued to provide routine field services and assistance, particularly for the Reactor Modification Program and the Metal Conversion Plant. Work was started on the coal pile inventories in 100-B, D, F, and H Areas. The assistance on the resurvey of Richland, Washington, was about 98% complete, however some work is being added.

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Plans were completed to reorganize certain functions within the Project Section, including the renaming of Project Control Unit as the Project Administration Unit. Activities during the month included transmittal of seven project proposals to the Financial Department and six to the AEC. Property evaluation work was continued on recently completed projects, and work was initiated on the data for 100-K Area facility and Part "A" of Purex Facility.

D. Craft Labor

See Summary above.

III. REPORT OF VISITORS

A. To Hanford, September 1955

J. W. Dickinson and Gene Nollmann, Linde Air Products Company, visited R. T. Gardner September 13 to discuss specifications of an automatic pipe welding machine.

Sheldon Dunning of Amercoat Company, Seattle, Washington, visited D. M. Diediker on September 20 in relation to Project CG-603.

L. P. Sharts of the L. H. Butcher Company, Seattle, Washington, and G. Kenta of the Udyllite Corporation, Detroit, Michigan, visited P. J. O'Neil September 26 and 27 to discuss equipment maintenance problems.

B. To Other Installations, September 1955

J. S. McMahon, J. C. Hamilton, and H. H. Hubble visited the De Laval Steam Turbine Company, Trenton, New Jersey, September 7 to 9 to discuss delivery of Project 558 process pumps. September 10 to 13, Mr. Hamilton and Mr. Hubble visited the Everett Steel Foundry, Everett, Massachusetts, for further discussion on the same subject.

P. M. Griffith and W. Seeburger visited the Fruit Packers Supply in Yakims, Washington, on September 16 to check on order HWC-3683.

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ADVANCE ENGINEERING SECTIONMONTHLY REPORTSEPTEMBER 1955

IBM-702 programming of rigorous equations for the computation of reactivity changes and isotope production during long pile exposures are essentially complete. Rapid solutions for any chosen values of pile parameters will be possible.

With the completion of boiling reactor studies, a study has been initiated on the comparative desirability of homogeneous reactors for use as plutonium producers.

W. K. Woods

Manager, Advance Engineering
ENGINEERING DEPARTMENT

WK Woods:pk

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EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

MONTHLY REPORT SUMMARY - SEPTEMBER, 1955

PERSONNEL PRACTICES SECTION

The number of applicants interviewed in September was 1537 as compared with 1677 for August. In addition, 74 new applicants applied by mail. Open, non-exempt, nontechnical requisitions decreased from 208 at the beginning of the month to 201 at month end. One hundred and forty-seven employees were added to the roll and 203 removed during the month. The separation rate for fiscal month of September was 2.27% and for fiscal month of August .92%. These rates when converted to annual rates are 23.68% and 12.00% respectively. During September 86 new requests for transfer to other type work were received by Employment and 37 transfers were effected. Attendance recognition awards were distributed to 153 employees in September, including 21 who qualified for five year awards.

Three employees died during the month of September. One hundred and thirty visits were made to employees confined to Kadlec Hospital, and 18 checks were delivered to employees confined at the hospital or at home. At month end, participation in the Pension Plan was 98.5%, in the Insurance Plan 99.5%, and the Employee Savings and Stock Bonus Plan 53.5%. At month end there were 618 non-veterans registered under Selective Service and 686 military reservists were on the roll. Since August 1, 1950, 422 employees have terminated to enter military service, of which 165 have returned, 48 have not claimed re-employment rights, leaving 209 still in military leave status.

Seventy-five adopted suggestions were approved for awards in September resulting in cash awards totaling \$1,140, with a total net savings of \$6,627.67.

Two hundred and four offers have been extended to BS/MS graduates for the R.T.P. and there have been 69 offers accepted to date and 133 rejections. Acceptances have been received from 57 experienced candidates with 11 yet to report; there are 6 open offers and 14 other candidates are under active consideration. A total of 16 PhD candidates have accepted offers since October 1, 1954, and 129 candidates have accepted invitations to visit HAPD during the current season.

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS SECTION

The Press Relations Unit issued 59 releases during the month, 15 of which were especially planned for national publicity purposes and were sent to the Schenectady Press Relations Section. Seven manuscripts were approved for publication, and four technical papers received all required approvals. Arrangements were made for nine speeches to be delivered before public groups. The Community Newsletter was written and distributed to community leaders in Pasco, Kennewick, and Richland. Six Management NEWS Bulletins were produced and distributed to all exempt personnel during the month.

Diagrams of the dual-purpose reactor Hanford scientists discussed at Geneva were forwarded to SCIENCE AND MECHANICS magazine at the request of the Schenectady Press Relations Office.

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS (Continued)

A photo story on radiation protection at Hanford was sent to TODAY'S HEALTH.

Explanation and promotion of the 32 point "better living" program was prominently published in the Management NEWS Bulletins and GE NEWS issues.

A "live" television show for a regional audience was developed with Hanford's representatives to the Geneva "Atoms for Peace" Conference. This supplemented the press conference held September 13 which was also recorded on tape for local radio broadcast.

A total of 315 photographic assignments were covered for the month of September, and 14,918 prints were produced.

UNION RELATIONS SECTION

Acceptance of the Company's offer, subject to ratification by the membership and our ability to reach agreement on the definitive details of a five year contract, was received during the month from three of the four HAPU bargaining units.

Acceptance of the Company's offer by the Hanford Guards Union was obtained with considerable difficulty because of persistent demands for a higher classification grade or a revised shift schedule.

SALARY AND WAGE ADMINISTRATION SECTION

Further revisions to the Exempt Employee Appraisal Form and Guide were completed for distribution to the Department Managers for their study and comments.

All necessary authorizations were received pertaining to the Company-wide adjustment in salaries of exempt employees.

EDUCATION AND TRAINING SECTION

Following 2 new hires, 3 placements in other departments, the Rotational Program now includes 56 trainees.

The Technician Training Program was inaugurated on September 12 with 15 transfers from other sections and with 15 new hires.

HEALTH AND SAFETY SECTION

Dr. Harry Levinson, Clinical Psychologist, Menninger Foundation of Topeka, discussed mental health in industry with interested groups at HAPU.

One major injury in operations brought the yearly total to 5 and a frequency rate of .39 injuries per million manhours worked. Total injuries were down to 378 for the month.

The average daily adult census at Kadlec increased from 53.0 to 54.5 as compared to 61.0 a year ago. This represents a 50 per cent occupancy.

Dr. E. Warren resigned as part-time public health officer. Dr. Norwood will perform the duties of this office until a replacement can be secured.

AUXILIARY OPERATIONS AND PLANT PROTECTION SECTION

The Stromberg-Carlson Company completed all required corrective work in the 700 Area Plant Telephone exchange on September 23, and the exchange was formally accepted on the same date from the AEC-H00.

Two hundred and nineteen new residential telephones were installed and 61 residential telephones were relocated for subscribers who had moved. One hundred and seventeen new requests for residential telephones were received.

There were six fire alarm responses during the month with the only reportable loss being \$2,000 damage to a truck owned by a sub-contractor.

Security violations increased during the month from none to six in the 700 Area and from fourteen to thirty in the 300 and outer areas.

A comprehensive search of Classified Files was started for missing documents. Six missing documents have been located to date, one of which was credited to du Pont. The number of unaccounted for classified documents chargeable to General Electric is 198, a reduction of five under the previous month.

COMMUNITY SECTION

A consultant, Professor Tyler, formerly with the University of Washington, visited Richland at the request of AEC-H00 to review the operation of the sewage system and make recommendations for the possible elimination of odors emanating from the Sewage Treatment Plant.

The home fire inspection program is now 95 per cent complete.

Effective August 31, the normal force of the Richland Police Department was reduced from 41 employees to 40.

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Employee and Public Relations

PERSONNEL PRACTICES

Employment

	<u>August, 1955</u>	<u>September, 1955</u>
Applicants interviewed	1,677	1,537

304 of the applicants interviewed during September were individuals who applied for employment with the Company for the first time. In addition, 74 applications were received through the mail.

	<u>August, 1955</u>	<u>September, 1955</u>
Open requisitions		
Exempt	2	--
Nonexempt	208	201

Of the 208 open, nonexempt, nontechnical requisitions at the beginning of the month, 166 were covered by interim commitments. Of the 201 open, nonexempt nontechnical requisitions at month end, 138 were covered by interim commitments. During September, 114 new requisitions were received requesting the employment of 149 nonexempt, nontechnical employees.

	<u>August, 1955</u>	<u>September, 1955</u>
Employees added to the rolls	115	147
Employees removed from the rolls	111	203
NET GAIN OR LOSS	4	56

Separation Rate:

<u>Fiscal Month</u>		<u>Fiscal Month</u>	
<u>August, 1955</u>		<u>September, 1955</u>	
Male	Female	Male	Female
.61%	2.36%	1.62%	5.27%

<u>Fiscal Month</u>		<u>Fiscal Month</u>	
<u>August, 1955</u>		<u>September, 1955</u>	

Over-all Separation Rate:

.92%	2.27%
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Employee and Public Relations

PERSONNEL PRACTICES

During September, 15 employees left voluntarily to accept other employment, 2 left for business for self, and 3 left to enter military service.

Transfer Data

Accumulative total of requests for transfer received since 1-1-55	660
Number of requests for transfer received during September	70
Number interviewed in September, including promotional transfers	77
Transfers effected in September, including promotional transfers	53
Transfers effected since 1-1-55, including promotional transfers	375
Transfers effected in September for employees being laid off	1
Number of stenographers transferred out of steno pool in September	8
Transfer requests active at month end	355

ADDITIONS TO THE ROLLS

	<u>Exempt</u>	<u>Nonexempt</u>	<u>Community Firemen</u>	<u>Total</u>
New Hires	10	117	--	127
Re-engaged	--	--	--	--
Reactivates	2	16	--	18
Transfers	<u>2</u>	<u>--</u>	<u>--</u>	<u>2</u>
TOTAL ADDITIONS	14	133	--	147

TERMINATIONS FROM THE ROLLS

	<u>Exempt</u>	<u>Nonexempt</u>	<u>Community Firemen</u>	<u>Total</u>
Actual Terminations	19	126	--	145
Removals from rolls (Deactivates)	6	43	--	49
Transfers	<u>9</u>	<u>--</u>	<u>--</u>	<u>9</u>
TOTAL TERMINATIONS	34	169	--	203

GENERAL

	<u>8-1955</u>	<u>9-1955</u>
Photographs taken	207	217
Fingerprint impressions	132	91

PERSONNEL SECURITY QUESTIONNAIRES PROCESSED

	<u>8-1955</u>	<u>9-1955</u>
General Electric Cases	139	149
Facility Cases	<u>21</u>	<u>26</u>
Total	160	175

Employee and Public Relations

PERSONNEL PRACTICES

Advertisements for stenographers were placed in the Yakima, Spokane, and Portland newspapers for the week-end of September 25, 1955. In addition, our openings for stenographic personnel were included in a radio broadcast by the Washington State Employment Security Department in Seattle.

A representative of the Plant Engineering Group is at present on a trip to interview additional prospective candidates for Instrument Technician openings. Fifteen candidates will be interviewed in the various parts of the country who replied to the ads placed in INSTRUMENTS AND AUTOMATION magazine.

The G. E. Supervisory Selection Program was used for the first time during the month by the Engineering Department. The procedure was used by the Project Section in selecting Vendor Inspectors. To date 13 candidates have been administered the test.

Personnel Records and Investigations

8-1955 9-1955

INVESTIGATION STATISTICS

Cases received during the month	175	137
Cases closed	362	290
Cases found satisfactory for employment	162	128
Cases found unsatisfactory for employment	46	36
Cases closed before investigation completed	30	10
Special investigation conducted	1	4

PERFECT ATTENDANCE RECOGNITION AWARDS

Total one-year awards to date since January 1, 1950	5363
One-year awards made in September for those qualifying in August	31
Total two-year awards to date since January 1, 1950	3058
Two-year awards made in September for those qualifying in August	37
Total three-year awards to date	1792
Three-year awards made in September for those qualifying in August	37
Total four-year awards to date	875
Four-year awards made in September for those qualifying in August	27
Total five-year awards to date	269
Five-year awards made in September for those qualifying in August	21

SERVICE RECOGNITION

Total Service Recognition Pins presented to date	5362
Five-year Service Recognition Pins presented during September to Exempt personnel	20
Five-year Service Recognition Pins presented during September to Nonexempt personnel	26
Twenty-year Service Recognition Pins presented during September to Exempt personnel	1

During September, 10 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	130
Salary checks delivered to employees at Kadlec Hospital	16
Salary checks delivered to employees at home	2

At the end of the month, participation in the Benefit Plans was as follows as compared with last month's participation:

	<u>AUGUST</u>	<u>SEPTEMBER</u>
Pension Plan	98.5%	98.5%
Insurance Plan	99.4%	99.5%
Savings & Stock Bonus Plan	52.9%	53.5%
Good Neighbor Fund	70.3%	70.9%

Three employees expired during the month of September, namely:

James B. Gibson	9/14/55	W4328-6602	Manufacturing
Frank Meehan	9/23/55	W6890-4641	Emp. & Pub. Relations
Paul H. Klute	9/30/55	M1573-6444	Manufacturing

One retired employee expired during the month of September, namely:

Joseph M. Francois	9/2/55	Normal Retirement
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All necessary arrangements have been made to settle all matters of business in connection with the named deceased employees at an early date. A member of this Unit visited the wife of our Mr. Klute on the day of his death.

Ten employees retired during the month of September:

Roy H. Keene	M 12036	Optional	Frank H. Mumm	W 12600	Normal
Elmer H. Pegor	W 8718	"	Leo Fisk	W 4152	"
John Edinger	W 6039	"	Charles J. Barnett	W 4256	"
Charles T. Olinger	W 2609	Normal	A.P. St. Germain	W 8030	"
Rolla V. Cutler	W 2220	"	Richard L. Travis	W 6317	"

All matters pertinent to retirement have been discussed with these employees in order that they will be fully informed of their retirement benefits.

A total of 130 new employees attended Orientation Programs given by members of this group during the month of September. 99% have signed up to participate in the Pension Plan, 99% have signed up to participate in the Insurance Plan, and 94% in the Good Neighbor Fund program.

29 letters were written in regard to matters concerning deceased employees and their families during September regarding payment of monies from the Company, and general information.

Employee and Public Relations

PERSONNEL PRACTICES

Military Reserve and Selective Service

Total number of non-veteran employees subject to military service training through Selective Service System. 618

Number Classified	1A	143
Number Classified	1A0	1
Number Classified	1D	54
Number Classified	2A	111
Number Classified	3A	228
Number Classified	4A	2
Number Classified	4F	79
		<u>618</u>

Number of Technically Trained & Engineering Personnel for whom deferments are currently being requested. 118

Number of Non-Technically Trained & Engineering Personnel for whom deferments are being requested. 11
Total 129

Accumulated total of deferments requested 1549

Accumulated total of deferments granted 1252

Current number of deferment requests pending 20

Current number of deferment requests denied 1

Current number of deferment requests granted 11

During Month of September

Number of deferment requests pending at Local Board Level 13

Number of deferment requests pending at Appeal Board Level 6

Number of deferment requests pending at Presidential Appeal Level 1
Total 20

Number of deferment requests denied by Local Boards 1

Number of deferment requests denied by State Appeal Boards 0

Number of deferment requests denied by Presidential Appeal Board 0
Total 1

Number of deferments granted by Local Boards 8

Number of deferments granted by State Appeal Boards 3

Number of deferments granted by Presidential Appeal Board 0
Total 11

Employee and Public Relations

PERSONNEL PRACTICES

Military Reserve and Selective Services

Number of Technically Trained & Engineering Personnel denied, or requesting no further appeal, now pending induction	12
Number of Technical Graduates with over two years of deferments	79
Number of Selective Service vulnerable Technical Graduates Enlisted	0
Number of Selective Service vulnerable Technical Graduates Drafted	0
Number of Technical Graduates called to active duty under R.O.T.C.	0
Total	0

Reservists Data - Total Number of Reservists on Roll

Number of Active Reservists	162
Number of Inactive Reservists	502
Number of employees in the National Guard	22
	<u>686</u>
Reservists and National Guard members subject to drills, tours of duty, Cruises, Summer Camp and/or Weekly or Monthly meetings	253

Military Service Leaves of Absence - Aug. 1, 1950 thru Sept. 30, 1955

Reservists	129
Selective Service System	285
Female Employees Enlisted	8
	<u>422</u>
Total number returned to roll	165

Reservists	71
Sel.Serv.System	94
	<u>165</u>

Known number not claiming reemployment rights	48
Number of employees still on military leaves	209

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

<u>Suggestion Plan</u>	<u>August</u>	<u>September</u>	<u>Total Since 7-15-47</u>
Suggestions Received	231	201	17745
Acknowledgements to Suggesters	222	215	
Suggestions Pending Acknowledgement	30	16	
Suggestions Referred to Depts. For Investigation	272	267	
Suggestions Pending Referral to Departments	33	24	
Investigations Completed and Suggestions Closed	274	268	
Suggestions Adopted - No Award	0	1	
Adopted Suggestions Approved by Board for Award	97	75	
Total Net Cash Savings	\$18,689.22	\$6,627.67	
Total Cash Awards	\$2,500.00	\$1,140.00	
Total Number Suggestions Outstanding to Departments	551	504	

A proposal has been made to decentralize the suggestion plan operation and a proposed OPG has been drafted, together with a supplementary manual, which is designed to enable departmental administrators on a decentralized basis to appropriately administer the suggestion plan.

Cumulative suggestion statistics for the first nine months of 1955, compared with 1954, are:

	<u>1955</u>	<u>1954</u>	<u>Increase</u>
Received	2,124	1,618	31.2%
Adopted	825	542	52.2%
Awards	\$16,819	\$11,040	52.3%
Savings	\$124,290	\$81,908	51.7%
Award/Savings	13.5%	13.5%	--

Life Insurance

Sixty-two requests for code information were received from insurance companies and investigation agencies and furnished during the month of September, 1955. The code information is supplied in accordance with a prearranged plan whereby employees of this project may be insured on the same basis as those working elsewhere.

Insurance Statistics

Claims reported to
Department of Labor

<u>August, 1955</u>	
<u>Long Forms</u>	<u>Short Forms</u>
68	537
<u>September, 1955</u>	
<u>Long Forms</u>	<u>Short Forms</u>
48	484

Total Since September, 1946 - 29069

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

Insurance Statistics, Continued

Claims reported to
Travelers

August, 1955
6

September, 1955
* 7

Total Since September, 1946 - 1013

Workmen's Compensation

- a. Albert F. Baxter, 8002005 -- Date of Injury: 8-24-54; Employer: General Electric Company; Nature of Injury: Hearing Loss

Mr. Baxter submitted a claim to the Department of Labor and Industries for loss of hearing allegedly resulting from exposure to noise from a new lathe which was being tested. His claim was rejected by the Department and in July he appealed to the Board of Industrial Insurance Appeals. His appeal was granted and a conference was held on September 14, 1955, at which time no agreement could be reached relative to disposition of the case so it was agreed to set the matter for hearing. We have since been advised by Mr. Baxter's attorney that he is going to withdraw his appeal.

- b. R. B. McCord, 8002384 -- Date of Injury: 8-30-55; Employer: General Electric Company; Nature of Injury: Fatality

We are in receipt of an order dated September 27, 1955 granting a widow's pension to Mrs. R. B. McCord as a result of the death of Mr. McCord on August 31, 1955.

Liability Insurance

- a. Doris Hall vs. General Electric Company, B-6835992

Date of occurrence June 9, 1955. A government bus driven by a General Electric employee ran into rear of her car causing her to sustain an alleged "whiplash" injury. A Summons and Complaint was served upon the General Electric Company on August 15, 1955 alleging damages in the sum of \$51,250 plus costs and disbursements. The defense is being handled by The Travelers and has not been assigned to counsel. Mrs. Hall has been examined by a doctor selected by The Travelers and his reported findings indicate possibility of a skull fracture, a torn cartilage in the knee and lumbar back injuries, all due to the accident. It is our understanding that Mrs. Hall's attorney is asking \$7,500 in settlement and that Travelers will probably agree to the figure in the light of the examination report of their doctor.

* Of the claims reported to Travelers Insurance Company during the month of September six were property damage and one was a bodily injury claim.

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

Liability Insurance, Continued

b. M. T. Powell vs. General Electric Company, B-6835907

Mr. Powell filed a Summons and Complaint on June 2, 1955 alleging loss of vision in the right eye from an injury caused by an ashtray thrown by another employee. The Complaint alleged damages in the sum of \$25,000. At the time of the incident Mr. Powell was on the premises but not in the course of his employment according to the allegations. The defense is being handled by The Travelers and has been assigned to Mr. John Gavin. The claimant is a janitor in the Reactor Section of the Manufacturing Department. His deposition is to be taken on October 10, 1955 in Richland and we are informed by Mr. Gavin that the case will be set for the forthcoming term in Federal Court and will probably be heard in November.

c. Milo Riste vs. General Electric Company and Dr. P. A. Fuqua, B-6835809
Curtis Swearingen vs. General Electric Company and Dr. P. A. Fuqua, B-6835841

Milo Riste was given medical examinations by Industrial physicians in 1949 and 1950. When examined by his personal physician in July, 1953 he was informed that tuberculosis was present at the time of the 1949 and 1950 examinations. Mr. Riste had not been advised by General Electric that the condition was present. The Travelers recommended settlement for \$10,000 but the Commission did not approve. Thereafter, a Summons and Complaint was served upon General Electric Company on April 14, 1954 alleging damages in the amount of \$83,590.

Curtis Swearingen was examined in March 1949 and May 1950 by General Electric Company physicians and according to Mr. Swearingen's allegations tuberculosis was present at the times of the examinations as shown in X-ray films, however, Mr. Swearingen was not informed of the condition. Suit was filed against General Electric Company on May 27, 1954 alleging damages in the amount of \$90,000.

It was agreed to consolidate the two cases to conserve time and expense. The defendant's demurrers were argued before Judge Horrigan on February 1, 1955 and were sustained. Notice of Appeal by plaintiffs to the Washington State Supreme Court has been served. The cases have been set for argument in the Supreme Court on October 4, 1955.

d. Homer Snyder vs. General Electric Company, B-6835621

A Satisfaction of Judgement order was filed on September 21, 1955 in the Superior Court of the State of Washington in and for Franklin County which recognizes consideration of full and complete payment in satisfaction of the

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

Liability Insurance, Continued

judgement rendered together with costs and releases and discharges the judgement in the amount of \$43,113.25. This case can be considered closed and is no longer in litigation.

- e. Jack Traum and Virginia Traum vs. General Electric Company, O. F. Hultman and Mrs. O. F. Hultman, B-6835871

On July 30, 1954 a government bus driven by General Electric Company employee, O. F. Hultman, hit the rear of a private sedan in which Mr. Jack Traum was a passenger. A Summons and Complaint was served upon General Electric Company on February 24, 1955 alleging damages in the sum of \$90,175 plus costs. The defense is being handled by The Travelers and has been assigned to Mr. John MacGillivray. On May 31, 1955 depositions were taken from Mr. Hultman and Mr. Traum. The case has been set for trial November 14, 1955.

- f. Warren H. Worthington and Josephine W. Worthington vs. General Electric Company, B-6835908

A Summons and Complaint was served upon the General Electric Company on April 6, 1955 alleging that Mrs. Worthington became ill after being exposed to sewer gas in her home on September 13, 1954. The amount claimed was \$5,608 with costs and disbursements. The defense is being handled by The Travelers and has been assigned to Attorney Charles Powell. It is our understanding that Mr. Powell has filed a demurrer. Mr. Worthington is a Plumber, Steamfitter, Welder Journeyman in the Separations Section.

Technical Recruitment

Status of the recruiting for the Rotational Training Program may be summarized as follows:

<u>Field</u>	<u>Offers Extended</u>	<u>Offers Accepted</u>	<u>Offers Rejected</u>	<u>On the Roll</u>	<u>Estimated Requirements</u>
Engineering:					
Chemical	60	18	42	14	27
Mechanical	44	14	30	13	28
Electrical	31	11	19	11	17
Science:					
Chemistry	28	14	14	12	36
Physics	22	6	16	6	21
Metallurgy	12	3	8	3	15
Other:	<u>7</u>	<u>3</u>	<u>4</u>	<u>3</u>	<u>-</u>
Totals	204	69	133	62	144

Thirty-one offers have been extended to business graduates. To date 17 acceptances and 14 rejections have been received.

Experienced recruiting results for the year may be summarized as follows:

<u>Field</u>	<u>Open Invitations</u>	<u>To Visit</u>	<u>Open Offers</u>	<u>Acceptances not OTR</u>	<u>Offers to be Extended</u>	<u>On the Roll</u>
Engineering:						
Electrical			1	1	1	5
Mechanical			1	3	2	2
Chemical	1			0*	1	3
Industrial		1		1		2
Metallurgical	1					1
Civil				1		1
Geological		2		1		1
Science:						
Mathematics	2	1		1	1	1
Chemistry	3		3	2		9
Physics		1		1		3
Biophysics						1
Physiology						1
Indus. Hygiene						1
Other:	<u>-</u>	<u>-</u>	<u>1*</u>	<u>1</u>	<u>3</u>	<u>15</u>
Totals	7	5	6	11	7	46

* 1 medical reject.

PhD Recruiting

For the 1955-56 season, which began September 1, 29 new cases were considered, 6 visit invitations were extended, 6 candidates visited, 1 employment offer was extended, and no acceptances were received. Two visit acceptances from 1954-55 rejected in September. Two PhD's have been put on the Hanford rolls since 9-1-55, and 6 acceptances are scheduled to report very soon. There are 3 PhD candidates who have accepted interview invitations and there are 5 open offers from whom no reply has yet been received who were carried over from the 1954-55 season.

The 1955-56 recruiting activities to date are summarized in the following table:

	<u>Cases Considered</u>	<u>Invitations</u>			<u>Visited to date</u>	<u>Offers</u>			<u>On the Roll</u>
		<u>Invited</u>	<u>Open</u>	<u>Accepted</u>		<u>Made</u>	<u>Open</u>	<u>Accepted</u>	
New PhD's	51	41	6	34	24	14	5	8	2
Experienced	<u>22</u>	<u>6</u>	<u>2</u>	<u>3</u>	<u>2</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>
Sub-totals	73	47	8	37	26	14	5	8	2
54-55									
Carryovers	<u>44</u>	<u>41</u>	<u>5</u>	<u>34</u>	<u>20</u>	<u>13</u>	<u>5</u>	<u>8</u>	<u>—</u>
55-56 Totals	29	6	3	3	6	1	0	0	2

Terminations

During September there were 40 terminations of technical or major exempt employees: 3 left for another job, 5 to return to school, 5 summer professors and 4 graduate students completed summer assignments. There were also 9 summer juniors who completed their assignments and returned to school. One left to seek other employment, 4 for personal reasons. There were 9 transfers to other CE sites including 6 to APED, San Jose.

Employee & Public Relations Department

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

During the month of September, the Press Relations unit issued 59 releases. The breakdown by category, distribution and content was as follows:

<u>Subject</u>		<u>Distribution</u>	
Pay and Benefits	5	Hanford Area	35
Employment Services	4	West Coast Area	8
Good Will	7	National	15
Technology and Research	23	Other Special	1
Utilities & Public Works	2		
Safety & Fire	1	<u>Content</u>	
Real Estate	1	Information	3
Administration & Legal	5	Pictures	10
Education & Library	3	Short	40
Richland - Hanford Protection	2	Long	5
Health & Medicine	2	Feature	1
Organization Changes	3		
Richland	1		

The following 12 stories were forwarded to J. D. Morton for placement with national media: "Cesium Recovery" - this story describes a new process at Hanford for removing the fission product Cesium 137 from wastes. Since this is a step towards peacetime uses of a Hanford by-product, we feel it has very good possibilities; "Hot Pinball Machine" - this is a story with picture describing a machine used to sort radioactive steel balls from the thousands of such balls that drop through a Hanford reactor when one of the safety systems goes into operation; "Table-Top Atom Plant" - this is a picture with cutlines describing a laboratory version of a Hanford Separations Plant; "Dummy Mask Head" - pix with cutlines showing a dummy head equipped with latex flesh and mechanical lungs to test masks used at Hanford; "Nuclear Spectrometry" - a general story with pictures on "weighing by radiation counting"; Two pictures with cutlines on the "Most-Dressed" Man showing 18 garments worn for protection in highly contaminated zones. This was the finally approved form at Schenectady's version of a release we sent them previously; "Atomic Bug Man" - a picture with cutlines of a GE employee at Hanford using head antennas and throat microphone to report by radio on radiation intensity; Three releases covering burial of radioactive equipment and underwater examination of fissioned fuel elements were sent to the Schenectady Press Relations office. These stories were based on papers presented to the AEC's "Hot Lab" Conference in Washington, D. C. September 30; pictures with cutlines of an uranium slug on a nylon ball conveyor; and a revised feature-length story with pictures on Patricia Hackett, one of GE's higher rated technical women employees at Hanford.

A photo story on radiation protection at Hanford was sent to TODAY'S HEALTH.

Diagrams of the dual-purpose reactor Hanford scientists discussed at Geneva were forwarded to SCIENCE AND MECHANICS magazine at the request of the Schenectady Press Relations office.

At the request of Schenectady Press Relations, additional information was furnished to CHEMICAL ENGINEERING about the absorptometer developed at Hanford.

Employee & Public Relations

EMPLOYEE COMMUNICATIONS & PUBLIC RELATIONS

A release sent to the science-engineering and local lists described lectures given by HAPO employees at the AEC's Fourth Symposium on "Hot Laboratories" on September 30, in Washington, D. C.

At the request of the Seattle TIMES to furnish them with a story of an interesting personality in connection with a "Help the Handicapped Week" edition they plan to run early in October, a story with pictures of Bill Smith, whose arm was lost because of a war injury, was supplied. Smith, formerly a welder, turned to metallurgy after gaining his bachelor of science degree. Today he is head of a metallurgy development section and is valued by GE as a welding consultant.

A release distributed to the daily list gave notice that representatives of the Hanford Atomic Metal Trades Council at Hanford had accepted in principle GE's five-year, 32-feature "Better Living" program. Another release gave notice of agreement with the Building Service Employees International Union.

A story forwarded to the local and business list concerned the appointment of E. T. Maher as attorney for HAPO.

A release distributed to the science and engineering list covered a lecture given by William J. Dowis, GE engineering specialist at Hanford, at the Spokane, Washington Advertising Club. His speech described how America is taking up the challenge of supplying the world's power needs through nuclear energy.

A story forwarded to the local and business list concerned the appointment of D. S. Roberts as Manager of the Education and Training Section of GE's Employee & Public Relations Department. Roberts replaced D. W. McLenegan, who moves to the Engineering Department as an engineering specialist.

Three northwest television stations were furnished three pictures with cutlines of the new underwater facility for examining intensely radioactive uranium at Hanford. A short release accompanying the pictures told of a HAPO employee, John M. Fouts, reporting on this facility at the "Hot Lab" symposium. A similar release went to the complete local list.

A press conference was attended by eleven representatives of newspapers, wire services, radio stations and a TV outlet. The five GE scientists who attended the U. N.'s Atoms for Peace Conference in Geneva provided the media representatives with first-hand impressions from Geneva.

Notice that retired persons and widows of deceased project employees could continue occupancy of Richland homes was given in a local release.

A local release pointed out reasons for the coming tree-removal program in Richland.

Releases distributed locally described lectures to be given at Oak Ridge, Tenn., Minneapolis, Minn., and Augusta, Ga. by HAPO employees.

A local release discussed benefits included in the 32-point "Better Living" program up for approval by HAPO unions.

Employee & Public Relations

EMPLOYEE COMMUNICATIONS & PUBLIC RELATIONS

Pictures with cutlines of the five GE scientists from Hanford who attended the Geneva Atoms for Peace Conference were furnished local TV stations. Cutlines described press conference with scientists and press, radio and TV representatives in Richland.

Appointment of Floyd K. Peck to head the Commonwealth Edison project's Administration section at San Jose was announced in a local release.

A local release gave details regarding a five-semester course in business training being offered by GE to members of the Financial Department at Hanford. The course will later be expanded and offered to qualified persons in other departments.

Two organization changes in Hanford's Manufacturing department were announced in a local release - Kenneth V. Stave's appointment to the position of Superintendent in the Metal Preparations Section, and E. W. O'Rourke's appointment to the position of Specialist in the Production section.

Dr. Bradford C. Scudder's election to the executive committee of the Northwest Association of Occupational Medicine was reported in a local release.

Pictures with cutlines of the arrival of Francis K. McCune and C.W. LaPierre at Hanford were sent to local newspapers and TV stations.

A reporter for the local TRI-CITY HERALD requested and was furnished with information regarding enrollment at the GE School of Nuclear Engineering.

A reporter for the local COLUMBIA BASIN NEWS requested information whether a death at Kadlec hospital in Richland had spoiled the "No Maternal Deaths" record. Kadlec furnished the information that death was not related to pregnancy. Final decision as to affect on record is up to American College of Surgeons.

A local release told of a HAPO employee dying of a heart attack while at work in one of the production areas.

L. L. German's kickoff talk to the Richland Community Chest drive members was described in a local release. German, Manager of GE's Employee and Public Relations department presented a check for \$4600 from GE.

It was reported in a local release that representatives of the Hanford Guards Union had accepted in principle GE's five-year, "Better Living" program.

Announcement that the civil defense sirens would be sounded October 3 was made in a local release.

The local reporter for the TRI-CITY HERALD asked for an interview with H. M. Parker, Director of Radiological Sciences, to further explore points brought out in the press conference held this month at which newsmen met GE representatives to the U. N.'s "Atoms for Peace" conference in Geneva. The interview was arranged, and a Press Relations representative sat in on it.

Employee & Public Relations

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

Mr. J. R. L. Holdsworth of the Schenectady Public Relations office was furnished with color slides and a two-page write-up on the closed-circuit color TV installation at the new Separations Plant. The slides and information are to be included in a talk by Vice-President F. K. McCune at a Board of Directors meeting at Electronics Park.

Arrangements were made with Photography unit to provide photos on mat paper in the future for use by TV stations.

Pictures and a biography of L. L. German were furnished to the Community Chest chairman to be used in publicity for the Chest's annual kick-off dinner.

Seven manuscripts received all required approvals during the month.

Two manuscripts, one by Ezra Hollister, "Handling of Radioactive Materials," which was combined with an article by Carroll and Berry, and the other "Fuel Reprocessing -- One Roadblock to Cheaper Atomic Power," by R. D. Bennett and W. N. Mobley, for inclusion in the November issue of the GENERAL ELECTRIC REVIEW, have received final approval here at Hanford and have been returned to Schenectady.

"Radiation Shielding Windows," by L. T. Federson, has been accepted for possible publication in NUCLEONICS and "Unique Equipment Aids Underwater Examination of 'Hot' Fuel Elements," by H. J. Bellarts, J. L. Spencer and R. S. Petersen, was sent to NUCLEONICS for possible publication.

Items for the January 1956 Engineering and Research Progress edition of the GENERAL ELECTRIC REVIEW were received from three departments, and the unit has edited and shortened the items and is obtaining Legal, Patent and AEC approvals for submission to the REVIEW.

Twelve papers received all required approvals and nine speeches were arranged during the month.

The third in the community relations ad series was placed in the COLUMBIA BASIN NEWS and in the GE NEWS on September 2 and in the TRI-CITY HERALD on September 4.

A full page advertisement for an October 15 special edition of COLUMBIA BASIN NEWS was prepared and recommended for placement.

The AEC-GE float appeared on a noncompetetive basis in both the Prosser States Day parade on September 5 and in the Benton City Mardi Gras parade on September 17.

A statement about why General Electric contributes to Community Chest was prepared in response to a request from the Chest received by W. E. Johnson.

A Community Newsletter was written and distributed to community leaders in Richland, Kennewick and Pasco.

A representative sample of GE educational booklets was sent to Mr. David Hunter for use in a round-table discussion of industry's participation in primary and secondary education to be held in Spokane later this year.

Employee & Public Relations

EMPLOYEE COMMUNICATIONS & PUBLIC RELATIONS

The possibility of holding a Communications Workshop at Hanford were explored at the request of the Department Manager. It was recommended that the workshop that has been presented in the East be brought here with the original cast and presented to top management. This should be followed up with a local product for all exempt that would condense the philosophy behind communications and techniques required and services available at Hanford.

Five weekly reports of significant Hanford development were sent to J. R. L. Holdsworth at Schenectady for transmittal to F. K. McCune and C. W. LaPierre.

Explanation and promotion of the 32-point "Better Living" program was made through lead stories, plus major features and full-page messages, in four GE NEWS issues, and through items in four Management NEWS Bulletins. A primary objective of these communications was to help HAMTC members to appreciate fully the program and hence ratify its acceptance, and to encourage the BSEIU and Hanford Guards Union to accept the program. In addition, slide-projection service was given at seven 2-hour meetings for supervisors conducted by Employee Services Unit to explain the new Pension and Insurance Plans. Further explanation of the new Pension and Insurance Plans was given through a special six-page attachment to the September 8 Management NEWS Bulletin.

The Priority Message procedure was utilized to announce the location of temporary headquarters of the Commonwealth Edison Project at San Jose, and to announce acceptance by the Hanford Guards and the BSEIU of the 32-point "Better Living" program.

Summary of round table and information meetings held during the second quarter of 1955 was completed in report form and distributed with a letter signed by the Manager-Employee & Public Relations.

Publicity concerning Radiological Sciences' Personnel Meters Poster Contest was concluded during the month. Publicity included GE NEWS stories, photographs, editorial cartoons, items in the Management NEWS Bulletin, and posters.

Sound-slide film, "Unconsciousness," was selected to supplement the September health topic; and was shown 30 times to a total of 704 employees.

10,000 window sticker emblems, showing membership in the Nucleonics Employees Good Neighbor Fund, were produced at the request of Employee Services.

Classified recruitment advertisement for Stenographers was prepared and placed in the Yakima, Spokane and Portland newspapers at the request of Employment Unit.

Letter to supervisors of employees not participating in the Employee Savings and Stock Bonus Plan, and the fact sheet directed to the non-participants concerning the Plan, were placed in production at the request of Employee Services.

September safety topic, "Check Your TQ," and September health bulletin, "Loused Weekend" were distributed.

Booklet concerning radiation protection for visitors at Hanford, "About Radiation," was placed in production at the request of Radiological Sciences.

Employee & Public Relations

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

Final production copy of instruction sheet to supervisors concerning proper completion of weekly time cards was submitted to Financial Department for final approval.

Plant Mail was instructed to proceed with preparation of addressograph plates for the new nonexempt distribution system. Letter was prepared, for the signature of the Acting Manager-Employee Communications and Public Relations, to those persons responsible for distribution of material through the nonexempt distribution system.

1956 logbooks (2400) and 350 fiscal calendars ordered earlier this year, were received and are being stored in the 744 Building pending distribution in December. Follow-up on receipt of diaries and standard wall calendars was initiated.

Thirty movie projection engagements were met, with showings to 724 employees.

Question and answer sheet concerning Civil Defense evacuation was placed in production at Central Printing, at the request of Civil Defense.

Five GE NEWS issues were produced and distributed during September. One of these was a ten-page issue and the balance eight pages. Major portions of the last four issues of the month were devoted to explaining and promoting the "Better Living" program.

Appointments announced during the month included D. S. Roberts, Manager - Education and Training; E. T. Maher, HAPO Attorney; and K. V. Stave, Superintendent, Metal Preparations-Process Sub-Section.

Art services provided to the GE NEWS by the Employee Communications commercial artist during the month included: two full-page GE NEWS photo layouts, photo re-touching, layout and final artwork for two GE NEWS messages on the revised Pension Plan and Insurance Plan, revised syndicated editorial cartoon, and two editorial cartoons in support of the Personnel Meters Poster Contest.

Final artwork for #4 in a series of Community Relations advertisements was developed at the request of Public Communications. Layout and final artwork were provided for the September and October health bulletins and for the October safety topic of the month.

Final artwork and type layouts were prepared for the booklet, "About Radiation...", a six-page pamphlet including cover and seven illustrations.

Miscellaneous artwork produced during the month included: layout for Civil Defense Question and Answer pamphlet, billboard layout for fire prevention month, preliminary and final layouts for brochure of instructions concerning completion of weekly time cards, and type layout for a Bioassay re-survey card.

Eight radio programs were produced and recorded by Audio-Visual Communications, with four broadcasts of INSIDE HANFORD made over an Eastern Washington radio network, and four regional broadcasts of G.E.'s HANFORD SCIENCE FORUM.

The feature length, 16 mm. motion picture, BUILDING A CHEMICAL SEPARATIONS FACILITY,

Employee & Public Relations

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

covering all construction phases of Purex facilities, produced by Audio-Visual Communications, was delivered to the Atomic Energy Commission this month.

G.E. at Hanford was featured on the CBS Sunday network television program INDUSTRY ON PARADE September 18, with scenes of the outer Areas taken from film footage produced by Audio-Visual Communications.

A "still picture story" on the G.E. School of Nuclear Engineering was produced for regional television showing, with the assistance of Public Communications unit. The reaction of the public and the television station executives was extremely favorable, with a solicitation for more of similar shows.

A "live" television show for a regional audience was developed with Hanford's representatives to the Geneva "Atoms for Peace" Conference. This supplemented the press conference held September 13 which was also recorded on tape for local radio broadcast.

A semi-official television film policy was established for HAPO by the Information Director of AEC's Hanford Operations Office. Both motion pictures and television film programs of an educational nature will be recommended for reimbursement. No approval can be given, however, to such programs that may be developed as a publicity or advertising venture for General Electric. This in essence is the opinion of AEC at Washington, D. C. They will agree to project development of promotional features for G.E. so long as Company funds are advanced.

Complete public address and recording facilities were (with the cooperation of Radio Maintenance Unit) installed and operated in two sites. In Carmichael cafeteria, facilities were provided for the Community Chest's Kick-Off dinner. The Department Manager's keynote address was recorded and later played back for News Bureau representatives as a help in their preparation of news releases. It is contemplated that selected portions of the Department Manager's recorded address can be incorporated in one or more radio programs or spot announcements to be developed for the Community Chest publicity.

The second sound installation was provided for the American Chemical Society in connection with the appearance of Hanford's representatives to the "Atoms for Peace" Conference. Portions of this recording will be selected, bridged with narrator's commentary, cleared and released to KHQ as the fifteenth edition of the INSIDE HANFORD series (export version), as well as to other radio outlets in the Northwest.

At the request of the News Bureau, a portion of the recording of the Geneva Conference representatives' press conference was reduced to typescript. The Director of Radiological Sciences desired to ascertain the accuracy (or inaccuracy) of a press quotation. This is another example of the advisability of recording important proceedings.

Audio-Visual Communications has planned and arranged tape recordings and installation of public address systems in five outer areas and the bus terminal in conjunction with Fire Prevention Week displays. Considerable work is involved in special voice and music recordings desired.

Employee & Public Relations

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

Public address system facilities were provided the AEC for a special outdoor auction being held in the outer areas. Specially modified mobile-equipped amplification was arranged.

Distribution of Graphics September Assignments

	<u>Percent</u>	
General Administrative (Including Operations Research)	--	
Employee and Public Relations	17	
Engineering	35	
Manufacturing	16	
Financial	17	
Radiological Sciences	9	
Atomic Energy Commission	6	
	<u>August</u>	<u>September</u>
Total assignments completed	42	42
Total assignments backlog	49	44

A total of forty-two visual aids were prepared for HAPO representatives to use in their "business review" presentation to visiting G. E. officials. The Graphics unit experienced considerable difficulty in meeting deadline requirements as the review date was moved up one week earlier than originally scheduled. Many last minute changes in statistical data also effected productivity efficiency.

During the period work was in progress for the above review, the unit was required to furnish two graphic illustrators to the 100-F Area for "on the spot" sketching. Their assignment was to rush out a series of drawings showing step by step use of equipment in removing and replacing process tubes.

At the request of the E. & P. R. Department Manager, graphic services were made available to an outside concern conducting a salary and promotion appraisal study. Assistance in the preparation of department and section organization chart work sheets was furnished.

Seventeen large visual aids were prepared on a rush basis for the Project Section to use in their presentation review of "Project Construction Business."

Fourteen visual aids were revised and four new drawings were prepared for the Manufacturing department manager to use in various meetings.

Eighteen charts and twenty-one photo copy plates were prepared for a report titled, "Histopathology of Sheep Thyroid in Chronic Administration of I¹³¹". The report will be published in the AMERICAN JOURNAL OF PATHOLOGY.

Four schematic diagrams were prepared for a report titled "Unique Equipment Aids for Underwater Examination of Hot Fuel Elements." The report is to be published in the NUCLEONICS magazine.

Ten charts and five photo copy plates were prepared for document HW-36788 titled "A Gamma Absorptometer for the In-Line Determination of Plutonium or Uranium."

Seven illustrations and four photo copy plates were completed for a report titled "Electrical System for Nuclear Reactors."

Employee & Public Relations

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

Fifteen plates originally used in a report titled "Thermal Annealing Kinetics of Interlayer Spacing Damage in Irradiated Graphite" were redesigned for slide use at a meeting of the American Chemical Society at Minneapolis.

Five plates were prepared for slides on the new "702" IBM and to be used in a lecture in New York.

Graphics Statistical Summary

	<u>Charts or Graphs</u>	<u>Illustrations</u>	<u>Other</u>
Report Material (Includes Technical Publications)	25	5	-
Mechanical Art (Flow charts, schematics, maps, etc. - not for publication)	24	-	-
Technical or Scientific Illustrations	-	7	-
Lecture Material (Includes plates for slides)	27	5	-
Posters	27	15	-
General (Posting of current data, assembly, revisions, etc.)	76	-	-

Total plates completed - 211

A total of 315 photographic assignments were covered for the month of September, 14,918 prints were produced of which 2,961 were "A" and 3,104 were "B" photographs; 8,853 were area and news. 1,189 negatives were exposed.

See attached statistical report for Photography Unit.

52

PHOTOGRAPHY UNIT
MONTHLY REPORT
SEPTEMBER, 1955

2"	2"	4"	5"	8"	11"	16"	N	35mm	35mm	3 1/4" X 4"	3 1/4" X 4" 16mm
X	X	X	X	X	X	X	E	Color	B&W	Color	B&W
2"	4"	5"	7"	10"	14"	20"	G.	Slides	Slides	Slides	Film

EMPLOYEE & PUBLIC
RELATIONS

SALARY & WAGE
ADMIN.

Employee Services 3
Suggestion System 1
& Workman's Comp.

37 51

EDUCATION & TRAIN.
Train. & Develop

14 3 4 2

EMP. COMM. &

PUBL. RELATIONS

Public Comm.

Audio-Visual

Empl. Comm.

Photography

Graphics

41 6 59 1 4
74 20 47 433 12 2 62 24 243 5 8
58 15 30 151 4
700 Ft.

AUXILIARY OPER. &

PLANT PROTECT.

Fire Protection

Telephone

Patrol

Plant Protect.

Services

Security Prac.

& Procedures

COMMUNITY

Fire

Police

Library

Grounds Maint.

129 8 93 93 26 16
15 18 42 3 8

PHOTOGRAPHY UNIT
MONTHLY REPORT (CONT)
SEPTEMBER, 1955

- 2 -

	2"	2"	2"	4"	5"	8"	8 1/2"	11"	11"	16"	N	35mm	35mm	3 1/4"	3 1/4"	3 1/4"	16mm
	X	X	X	X	X	X	X	X	X	X	E	Color	Color	Color	Color	B&W	M.P.
	2"	4"	7"	5"	10"	11"	11"	14"	20"	G.	Slides	Slides	Slides	Slides	Slides	Film	Film

HEALTH & SAFETY

Safety & Fire Prevention	2										7						
Public Health	3										10						
Industrial Med.	1										6	1					
Hospital Admin.	1																135

ENGINEERING

ADVANCE ENGR.

Pile Fuels	2										3					2	
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DESIGN

Process Engr.	1										20						
Design Engr.	4										11					1	6
	5																

PROJECT

Project Engr.	4										69						
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PILE TECH.

Physics Res.	3										11						
Metal. Res.	19										49					5	
Pile Materials	7										9					16	
Pile Engr.	1										1						
Special Irradiations	2										30						
Fuel Tech.	23										143					14	

SEPARATIONS

TECHNOLOGY

Tech. Shop	2										8						
Buildings and Grounds	2										5					3	
Chem. Devel.	2										4						
Plant Processes	2										4						
Chem. Research	7										42					10	

PHOTOGRAPHY UNIT
MONTHLY REPORT (Cont.)
SEPTEMBER, 1955

	2"	2"	4"	5"	8"	8 1/2"	11"	11"	16"	N	35mm	3 1/4"	3 1/4"	3 1/4"	16mm
	X	X	X	X	X	X	X	X	X	E	Color	Color	Color	Color	M.P.
	2"	2"	4"	5"	7"	10"	11"	14"	20"	G.	Slides	Slides	Slides	Slides	Slides

MANUFACTURING	2	44													
PLANT ENGR.	1		40												
REACTOR	6					67				23					
Process	5					18				19					300
Power	2									14					
Maintenance	2														200
SEPARATIONS	2	34								2					
Rail. Mon.	1					2				3					
Manufac. Engr.	3					20				16					
METAL PREP.	1					4				3					
Planning and	3		10							10					
Scheduling															
Process Control	5		6							13					
Operations	1									3					
Plant Services	1					4									
Z Plant	3	14	22			51				16					17
TRANSPORTATION															
Bus and Rail Oper.	1					16				12					
PURCHASING AND															
STORES															
Rec. & Oper.	1					22				11					
Shipping															
ELECTRICAL															
UTILITY															
Line Maint.	1					16									
FINANCIAL	7	84													7
RADIOLOGICAL															
SCIENCES															
RADIOLOGICAL	2	17													
RECORDS & STANDARDS															

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PHOTOGRAPHY UNIT
MONTHLY REPORT(Cont)
SEPTEMBER, 1955

BIOPHYSICS	9	25	30	87	9	11"	16"	N	35mm	35mm	3 1/4" X 4"	3 1/4" X 4"	3 1/4" X 4"	16mm
BIOLOGY	9	8	44	84	77	4	11"	E	Color	B&W	Slides	Slides	Slides	M.P.
RADIOLOGICAL ADMINISTRATION & COMMUNICATIONS	4	20		8	2		14"	G.	Slides					File
A.E.C. SAFETY	9	24	174	24										
A.E.C. SECURITY	1	1												

TOTAL 315 6281 270 794 374 1307 5890 0 2 1189 52 1 90 82 1635

	JULY	AUGUST	SEPTEMBER
TOTAL ASSIGNMENTS	296	322	315
NEGATIVES	1,186	1,024	1,189
TOTAL PRINTS	12,107	11,498	14,918

Employee and Public Relations

UNION RELATIONS

Union Relations - Operations Personnel

Acceptance of the Company's offer, subject to ratification by the membership and our ability to reach agreement on the definitive details of a 5-year contract, was received from three of the four HAPU bargaining units. The status of negotiations with each unit is summarized as follows:

Hanford Atomic Metal Trades Council: Agreement on the details of the contract language was reached on September 23. A settlement agreement incorporating these understandings has been drafted and copies will be distributed by the Council to their affiliated local unions during the first week in October. Meetings of the local unions to ratify the agreement will take most of the month. Formal execution of the agreement will not take place until ratification is complete. It is estimated that this will occur on October 27 or 28.

Hanford Guards Union: Negotiations with this group have been very difficult and acceptance of our offer was obtained only after considerable pressure was exerted by every means available to us. The Guards feel they should have a higher classification grade or a revised shift schedule which would result in more overtime and also more take-home pay. Agreement was reached only when we offered to formally open the agreement on October 1, 1958 to discuss classification grades and gave assurances that we would consider a revised shift schedule at any time a more satisfactory one could be devised that was economically feasible. The timetable for execution of a settlement agreement with the Hanford Guards Union is also estimated to be near the end of October.

Building Service Employees Int'l. Union: A settlement agreement with this Union is being drafted which will serve as the basis of discussions with International representatives of the Union who will be in Richland during the first week in October. No particular difficulty is anticipated in completing negotiations with this group in a timely manner.

Community Firemen: No discussions have been held with this Union to date. They are represented by the Hanford Atomic Metal Trades Council and it is expected that negotiations will get under way early in October. We are currently studying the application of the 5-year package to this group.

Grievance Statistics:

A total of twenty-four (24) grievances were received and no Step II grievance meetings were held during the month. A breakdown of the grievances received and processed follows:

ALL DEPARTMENTS

	<u>HAMTC</u>	<u>HGU</u>	<u>BSEIU</u>	<u>Total Unit</u>	<u>Total Nonunit</u>	<u>Total</u>
Received this month	22	1	0	23	1	24
Received this year	357	4	1	362	16	378

Employee and Public Relations

UNION RELATIONS

	ALL DEPARTMENTS (Cont'd.)			Total Unit	Total Nonunit	Total
	HAMTC	HGU	BSEIU			
Step I.						
Pending August 31	1	0	0	1	0	
Settled this month*	25	1	0	26	1	27
Settled this year	248	3	0	251	6	257
Pending September 30	0	0	0	0	0	
Step II						
Pending August 31	41	0	0	41	0	
Settled this month**	0	0	0	0	0	0
Settled this year	108	2	0	110	10	120
Pending September 30	42	0	0	42	0	
Arbitration						
Pending August 31	0	0	0	0		
Settled this month	0	0	0	0		
Settled this year	0	1	0	1		1
Pending September 30	0	0	0	0		
Total settled this month	25	1	0	26	1	27
Total settled this year	356	6	0	362	16	378

BY DEPARTMENTS

	Received		Settled Step I*		Settled Step II**	
	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year
Manufacturing						
Reactor - Unit	10	160	8	104	0	48
Separations - Unit	6	94	11	86	0	19
- Nonunit	1	9	1	4	0	9
Metal Preparation - Unit	6	44	4	25	0	12
- Nonunit	0	1	0	0	0	1
Transportation - Unit	0	18	0	10	0	9
Electrical Utilities - Unit	0	4	0	2	0	2
Stores - Unit	0	5	1	4	0	4
Employee & Public Relations						
Community - Unit	0	7	1	2	0	3
Aux. Ops. & Pl. Pro. - Unit	1	19	1	11	0	10
Radiological Sciences - Unit	0	11	0	7	0	0
- Nonunit	0	1	0	1	0	0
Engineering - Nonunit	0	3	0	0	0	2
Financial - Nonunit	0	2	0	1	0	1
Total	24	378	27	257	0	120

*Grievances brought to Step II prior to July 1, 1955 but never processed by the union are, for the purpose of this report, considered settled at Step I.

**Grievances which the union formally indicated their intention to submit to arbitration but have taken no further action since July 1, 1955 are, for the purpose of this report, considered settled at Step II.

Employee and Public Relations

UNION RELATIONS

BY SUBJECTS

Unit	<u>Manufacturing</u>		<u>Emp. & 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>
Recognition	0	1	0	0	0	0				
Discrimination	0	3	0	0	0	0				
Jurisdiction	5	125	0	11	0	1				
Health-Safety-Sanitation	0	11	0	3	0	2				
Hours of Work	0	16	0	3	0	0				
Overtime Rates	10	54	0	3	0	4				
Vacations	0	1	0	0	0	0				
Seniority	5	29	1	1	0	2				
Wage Rates	1	22	0	1	0	0				
Miscellaneous	1	61	0	2	0	2				
Sick Leave	0	2	0	0	0	0				
Grievance Procedure	0	2	0	0	0	0				
<u>Nonunit</u>										
Continuity of Service	0	1	0	0	0	0	0	0	0	0
Overtime Rates	0	0	0	0	0	0	0	0	0	1
Wage Rates	0	6	0	0	0	0	0	1	0	0
Miscellaneous	0	0	0	0	0	1	0	1	0	0
Health-Safety-Sanitation	1	1	0	0	0	0	0	0	0	0
Working Conditions	0	1	0	0	0	0	0	0	0	0
Work Assignment	0	0	0	0	0	0	0	1	0	1
Holidays	0	1	0	0	0	0	0	0	0	0
Total	23	337	1	24	0	12	0	3	0	2

Employee and Public Relations

SALARY AND WAGE ADMINISTRATION

In addition to the normal flow of routine work in Salary and Wage Administration, the following work was conducted during September:

1. During the month 21 selected positions in the Radiological Sciences Department were audited. A report on the audit of property accounting positions in Financial was issued.
2. A section representative began a three-week trip to other Company components for the purpose of reconciling additional HAPO representative positions. During the trip an outside concern will be contacted to check on our evaluation of certain positions in the Procedures & Computing function.
3. Upon request, information on the HAPO salary plan was supplied to the Company's A.P.E. Department.
4. The section participated in non-exempt wage surveys conducted by North American Aviation and National Lead Company of Ohio. An inquiry was received from the Ramo-Wooldridge Corporation regarding exempt positions.
5. Further revisions to the Exempt Employee Appraisal Form and Guide were completed and the revised material was delivered to Forms Control and Printing for sample copies. Department managers will be sent copies of the new material for study and comment and their suggestions will be incorporated into the Form and Guide, where appropriate, before the revised Form is released for use.
6. All necessary authorizations were received pertaining to the Company-wide adjustment in salaries of exempt employees. During the month the salary records of these employees were adjusted in accordance with the authorizations. A method of producing IBM listings which incorporate all data required by Salary Administration and by Personnel Accounting was developed.
7. The following reimbursement authorizations were received during the month:
 - a. No. 247 covering the adjustment of the exempt salary structure by approximately 3%.
 - b. No. 248 covering a 3% adjustment in the rates of technical and business graduates on the payroll, and a similar increase in starting rates for these groups.
 - c. No. 249 covering a 3% adjustment in certain exempt positions currently paid on a fixed rate basis.
8. Extensive data were prepared for use by Union Relations personnel in their negotiations with Union representatives. These data covered several aspects of non-exempt wage administration such as the automatic progression schedule, job classifications and detailing procedures.
9. The Wage Rate Study continued and some progress was made on job groupings in the three major classifications of non-exempt jobs. The lists are in various stages of completion but firm listings are not yet available for all groups.

10. A status report on the study of HAPO stenographic and secretarial positions was issued early in the month.
11. Section personnel participated in training programs for new supervisors.
12. Organization changes were effected during the month in the following components.

Engineering

Project Section, Project Engineering Sub-Section and Project Auxiliaries Sub-Section.

Engineering Administration Section, Technical Information Unit.

Employee & Public Relations

Community Section, Public Works & Recreation Unit and Water & Sewerage Utilities Unit.

Financial

Property Accounting Section.

Manufacturing

Reactor Section, Redox Sub-Section, Plant Services Unit.

Radiological Sciences

Radiological Records & Standards Section, Radiological Field Unit.

Biophysics Section, Regional Radiation Measurement Unit.

Employee and Public Relations
EDUCATION AND TRAINING

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>		
Pile Technology	14	13
Separations Technology	5	7
Design	3	5
Project	7	7
<u>Manufacturing</u>		
Metal Preparation	4	3
Separations	8	8
Reactor	9	9
<u>Radiological Sciences</u>		
Biology	0	0
Records & Standards	1	1
Bio-Physics	4	2
<u>Financial</u>		
Procedures & Computing	<u>2</u>	<u>1</u>
TOTAL	57	56

Permanent Placements

There were three placements off the program as follows:

Metal Preparation	1
Reactor	2

It appears that there will only be one permanent placement during the month of October. This is not due to any slackening of demand, but reflects the desire of most of the trainees to have two to three rotations before accepting permanent assignments.

Additions

There were two new trainees reporting on the Rotational Training Program during the month. About five others are scheduled to report before the end of the year.

Selective Service

There were no losses of young technically-trained men to Selective Service during September.

Employee and Public Relations
EDUCATION AND TRAINING

TECHNICIAN TRAINING PROGRAM

The Technician Training Program was inaugurated on September 12th with 15 transfers from other sections and with 15 new hires. Some of the latter are without security clearances and have been placed in temporary assignments until clearances allow for assignments in restricted information areas. The educational classes also began on schedule and are progressing satisfactorily.

SCHOOL OF NUCLEAR ENGINEERING

Fall Semester

Announcement of Fall Term classes was made in two successive issues of the GE News with an application blank provided for easy registration. In addition graduate catalogs were mailed out to all recent science and engineering graduates who have joined the company during the past five years and former students. To support this mailing the school sent sufficient copies of two bulletins, one containing all courses offered and the other listing just the college-level and vocational courses to be given this term, to each Education and Training Section correspondent for distribution within his organization. The fall enrollment shows that this was a successful distribution pattern.

Registrations for this fall are shown below compared with 1954:

<u>Graduate</u>	<u>1954</u>	<u>1955</u>
Differential Equations	25	24
Advanced Calculus	11	
Math Statistics I	11	19
Numerical Analysis and Digital Computers		14
Vector Analysis		9
Modern Physics I	18	29
Nuclear Physics I	7	
Theoretical Physics I	6	9
Quantum Mechanics I		7
Physical Chemistry I	9	11
Radiochemistry	13	20
Fluid Mechanics	9	16
Chemical Engineering Thermodynamics		6
Diffusional Processes I	9	7
Electric Transmission Problems I	8	
Process Instrumentation and Control		7
Mechanical Vibrations	5	
Reactor Design		23
Engineering Metallurgy	9	11
Advanced Physical Metallurgy	5	
Structure of Solids		8
	<u>145</u>	<u>220</u>

Employee and Public Relations Department
EDUCATION AND TRAINING

<u>College-level and Vocational</u>	<u>1954</u>	<u>1955</u>
Intermediate Algebra	21	63*
College Algebra	18	42**
Differential and Integral Calculus	24	30
General Physics I		41***
Elements of Measurement		37
Automatic Control	18	
Instrument Electronics	26	
Television Maintenance		43
Elementary Accounting I	35	24
Cost Accounting	10	
Business Law I	20	26
Mechanical Design		12
Electrical Fundamentals		22
Water Treatment		11
	<u>172</u>	<u>350</u>
Total Registrations	317	570

Only five courses were cancelled this year due to insufficient registration. Because of the large registration in some classes, four have been divided into two sections. The totals shown above for the two fall terms represent better than a 70% increase in overall enrollment while the graduate courses have increased nearly 50% and the college-level and vocational subjects have doubled in size.

The school is now concentrating on collecting all course tuitions and helping all students who want college credit so that their credentials can be reviewed by the universities prior to the Richland visits of the faculty members.

Graduate Affiliations

Students in graduate courses have indicated their school affiliation as follows:

	<u>1954</u>		<u>1955</u>	
	<u>Old</u>	<u>New</u>	<u>Old</u>	<u>New</u>
Washington State College	3	7	8	5
University of Washington	8	6	9	6
Oregon State College	10	5	10	14
University of Idaho	37	25	50	26

An additional 22 students are undecided about their affiliation for college credit. Every effort will be made to hasten their decision before the Richland visits.

- *includes 7 Technician Training Program students
- **includes 23 Technician Training Program students
- ***includes 30 Technician Training Program students

Employee and Public Relations Department
EDUCATION AND TRAINING SECTION

Course and Instructor Approvals

All material on new courses and new instructors has been submitted to each of the four schools for their consideration. Approvals can be expected during October.

Typical MS Programs

Greater use has been made of the typical graduate study programs which were compiled during the summer. These have proved of great value to new graduate students who do not know what general requirements must be satisfied in working toward a master's degree.

PERSONAL DEVELOPMENT

Interest in attendance at training programs is continuing at the high level which was reached during the summer months. Reactor Section, for example, has scheduled four of our standard programs (in the area) through the end of the year and other sections are requesting more and more programs. Explanation of the new benefit plans will take considerable presentation time and all indications point to high training activity for the next three months.

The Non-Exempt Rating Program was presented September 2 at Central Stores Unit with an attendance of 10 supervisors; on September 6 for Technical Information Unit personnel with 8 supervisors attending; again at White Bluffs on September 13 with an attendance of 15 supervisors; on September 27 in 200-W Area with 13 attending, and on September 27 in 100-H Area with 13 supervisory personnel in attendance. This program was presented at the request of supervision and is intended to bring about more uniformity of rating within groups. Comments received to date indicate that this program has been very successful.

Effective Human Relations - The third conference, of the series of three, was held on September 1 with 19 supervisors completing the course. This program employs the case study method and also the "island presentation" method of breaking the group into small discussion groups. This program is intended for supervisors of considerable experience, and reviews the principles applied in the Job Relations Development program.

Job Relations Development (JRD) was conducted four times during the month with a total attendance of 49 supervisors as follows:

September 7 - Transportation Section - 10
September 14 - Transportation Section - 13
September 21 - Transportation Section - 9
September 21 - Separations Section - 17 (200-W area)

Although this program is intended for new or inexperienced supervisors, it is also an excellent refresher for more experienced personnel. The program sets forth the foundations for good relations and provides a problem-solving pattern.

Employee and Public Relations Department
EDUCATION AND TRAINING SECTION

Conference Leading was conducted on September 22 in W-10 with a participation of 17 exempt personnel. This was our regularly scheduled program. Interest in this program remains high, and for many months it has been necessary for us to restrict the number of people who may attend any one session.

The Secretarial-Stenographic Program was presented on the mornings of September 21 and 28 in the Transportation Section. The program was conducted by Mrs. Knapp, who is in charge of our Stenographic pool. Twelve secretarial and stenographic personnel of the Transportation Section attended this program. It was presented at the request of Transportation supervision.

New Exempt and Supervisory Orientation was conducted on Monday, Tuesday, and Wednesday, September 26, 27, 28. There were 26 new supervisory and exempt personnel present. A luncheon is a feature of this program and Mr. D. S. Roberts, Manager of Education and Training Section, was the guest.

New Benefit Plans - A member of the training group conducted an information meeting at the 200-W Area on September 27 with an attendance of 37 exempt personnel. The training group is available to assist in the explanation of the new program throughout the project. Several sessions have been held with the Employee Services people in order to arrive at uniform answers to the many questions that will arise relative to the plans.

Three representatives of the Radiation Monitoring Unit in Reactor Section met with members of the training group on September 26 in order to obtain counsel on setting up an extensive training program in the areas. There is great need for instruction for employees, supervisors, and operating supervisors on the methods of procedure and hazards encountered on this project. Although recommendations and advice will be given to the Radiation Monitoring people, the training group will play no direct part in the presentation of these information programs.

During the month there were 57 training program attendance transcripts requested by supervision.

The total number of "Let's Talk It Over" interview sheets mailed out this month was 692.

UNIVERSITY RELATIONS

All of the summer program personnel on the three programs; namely, college juniors, graduate students, and college professors, have now returned to their respective college campuses.

A survey was made of the reactions of the professors to their assignments and in every instance the comments were highly favorable. A survey of the sections utilizing the services of these men also showed wide acceptance for this program of employing college professors.

Employee and Public Relations Department
EDUCATION AND TRAINING SECTION

The other programs for the college juniors and graduate students were also well received by the sections where these people were employed.

Based on these results it is planned to increase the numbers employed on these three programs for the summer of 1956.

Letters have been written to engineering deans of the colleges and universities represented on the professor program expressing the wide approval and high regard for the work performance turned in by the respective professors of these schools during the past summer months. Letters will also be written to each of the professors and it is planned to maintain contact with them at periodic intervals during the coming school year.

EMPLOYEE & PUBLIC RELATIONS DEPARTMENT
HEALTH & SAFETY SECTION
SEPTEMBER 1955

General

Personnel Changes

Eight additions and ten deletions resulted in a decrease to 216.

Employee Relations

Employee attendance at 49 meetings was 321.

Visits

Mr. Bakko attended meetings as follows: Southeast Council of Washington State Hospital Association, Board of Trustees of Washington State Hospital Association and the American Hospital Association meeting in Atlantic City. Dr. Scudder, Dr. Norwood and Mr. Quigley attended the Northwest Industrial Health Conference in Portland. Dr. Norwood and Dr. Scudder assisted in the organization of the Northwest Association of Occupational Medicine and Dr. Scudder was elected to the Executive Committee. Dr. Mankowski attended the Washington State Heart Association Seminar on heart disease. Harry Levinson, Ph.D. of the Menninger Foundation, Topeka, Kansas, spoke to department managers and section managers of the Employee and Public Relations Department on the subject of mental health in industry.

Industrial Medicine

Dispensary visits decreased from 5952 to 5752 while medical examinations increased from 925 to 1125.

Sickness absenteeism was 1.45% versus 1.38% for August while total absenteeism was 2.22% versus 2.26% for August. Year to date total absenteeism of 2.29% compares with 2.34% for 1954.

Safety and Fire Prevention

	<u>Operations</u>		<u>Community</u>	
	<u>September</u>	<u>Year to Date</u>	<u>September</u>	<u>Year to Date</u>
Major Injuries	1	5	0	0
Sub-Major Injuries	3	21	0	0
Near Serious Incidents	2	43	0	2
Total Injuries	378	3816	18	231
Frequency		0.39		0
Severity		486		0

The community sections will become eligible for the Central Safety Council award on October 3, 1955 as a result of operating 504 days without a disabling injury.

A long range comprehensive system of identification of job hazards by systematic job hazard analysis has been proposed to prevent serious injuries arising out of failure to recognize hazards.

An estimated \$8,000 fire loss occurred as a result of a small confined fire from plutonium chips. The expense arises largely from extensive decontamination procedures necessary.

HEALTH & SAFETY SECTION

SEPTEMBER 1955

General (Continued)

Kadlec Hospital

The average daily adult census increased from 53 to 54.5 as compared to 61.0 a year ago. This represents an occupancy percentage of 50. Nursing hours per patient per day were under four for all services.

The Catholic Sisters of Providence, Seattle, who visited the hospital recently, have officially advised that they do not wish to be considered a candidate to operate Kadlec Hospital.

Public Health

Communicable disease cases reported dropped to the lowest level of the year with only 25 cases reported. On September 24, unit personnel participated in a Bi-County school health workshop for teachers, parents, public health personnel, doctors and dentists.

A weekly series of television broadcasts was inaugurated during the month. Purpose of these broadcasts is to sell public health to the community.

Family counseling service was curtailed by the lack of replacements to date for two counselors who resigned.

Dr. E. Warren, part-time public health officer, resigned September 30 due to pressure of private practice. Dr. Norwood will temporarily handle the professional requirements of the position as health officer, while Mr. Branchini will give administrative direction.

Costs-August

	<u>July</u>	<u>August</u>	<u>Aug. Budget</u>
Industrial Medicine	\$45,782	\$48,389	\$48,583
Public Health (Oper.)	7,919	6,841	9,283
Kadlec Hospital (Net)	19,174	15,288	22,612
Hospital Expense Credits	1,784	1,744	1,566
Safety & Fire Prevention	<u>12,044</u>	<u>11,790</u>	<u>14,416</u>
Total-Health & Safety	\$86,703	\$84,052	\$96,460

The net cost of operating the Health and Safety Section for August before charges were assessed to various departments was \$84,052, approximately \$2,700 less than for July and \$12,400 below the budget for August.

Net costs of Kadlec Hospital were much lower than anticipated in spite of the patient census being exactly as budgeted. Revenue was higher by about \$3,400 than anticipated and expenses were \$5,000 lower due to reduced personnel.

Public Health expenses were reduced due to a reduction in personnel and some failure in replacement of employees who have resigned.

Increased industrial medical expense was due to expense incurred in procurement and moving of industrial physicians.

HEALTH & SAFETY SECTION

SEPTEMBER 1955

Industrial Medical Services

The total number of dispensary visits decreased from 5,952 to 5,752. The total for September, 1954, was 4,720. For the year to date the total is 50,975 which represents an increase over 1954 of 9,492. There were 28 nurses and one nurse aid on the non-exempt roll.

The total number of physical examinations increased from 925 to 1125. There was one major injury and three sub-major injuries among General Electric employees while contractor employees sustained one sub-major injury.

Dr. David B. Rowlett joined the industrial physician staff on September 6th.

One industrial staff meeting of general information was held with all industrial physicians in attendance.

The photostating of industrial medical records for medical-legal purposes was begun September 27th and will bring the unphotostated records up to date.

Dr. Mankowski attended the Washington State Heart Association Seminar in Seattle on heart disease.

Doctors Norwood and Scudder and Mr. E. J. Quigley attended the Second Annual Northwest Industrial Health Conference in Portland, September 12th and 13th. During the conference Doctors Norwood and Scudder were instrumental in the formation of the Northwest Association of Occupational Medicine and Dr. Scudder was elected a member of the executive committee for the ensuing year.

Harry Levinson, Ph.D. in charge of research in industrial psychiatry at the Menninger Foundation, Topeka, Kansas, was a plant visitor on September 16th. He spoke to department managers staff of the Employee Relations Department and conferred with industrial physicians.

The health topic of the month dealt with the subject of "Unconsciousness" and information on this subject was prepared for distribution to all employees.

Project proposals for decontamination facilities and for the expansion of examination room facilities are in progress and near completion for submission for approval

Sickness absenteeism for September was 1.45% bringing the year to date total to 1.53%. The comparative figures for 1954 were 1.31% and 1.58% respectively.

Net costs for the month of August increased approximately \$2,400 over the July level in spite of a decrease of \$1,100 in salary expense. From the following schedule it may be noted that Supplies and Other costs increase nearly \$4,000 from the previous month. This was due mainly to (1) travel and living expenses and transportation costs incurred in procuring industrial physicians, \$3,000 and (2) increased supply costs after a low month in July, \$1,000.

HEALTH & SAFETY SECTION

SEPTEMBER 1955

Industrial Medical Services (Continued)

<u>Costs-Operations</u>	<u>August</u>	<u>July</u>	<u>Increase (Decrease)</u>
Salaries	\$34,711	\$35,850	\$(1,139)
Continuity of Service	2,777	2,884	(107)
Laundry	175	148	27
Utilities, Transportation, Maintenance	3,800	3,862	(62)
Supplies and Other	<u>7,862</u>	<u>3,929</u>	<u>3,933</u>
Total Gross Costs	49,325	46,673	2,652
Less: Revenue	936	891	(45)
Expense Credits	<u>11,889</u>	<u>11,677</u>	<u>(212)</u>
Net Cost of Operation	\$36,500	\$34,105	\$2,395

While net costs for August were \$4,000 below the budgeted levels, it should be noted that Gross Costs were only \$250 below the budget. This is due to additional non-cash revenue received that was not anticipated at the time of budget preparation. The annual bogey after two months of operation is only \$1,000 greater than actual costs.

HEALTH & SAFETY SECTION

SEPTEMBER 1955

<u>Industrial Medical Services (Continued)</u>	<u>August</u>	<u>September</u>	<u>Year to Date</u>
<u>Physical Examinations</u>			
<u>Operations</u>			
Pre-employment	124	116	1146
Rehire	10	12	139
Annual	243	348	1963
Interim	9	25	365
A.E.C.	30	28	236
Re-examination and recheck	133	152	1318
Termination	106	192	881
Sub-total	655	873	6048
<u>Contractors</u>			
Annual	1	3	90
Pre-employment	105	116	1378
Recheck	33	34	410
Re-examinations	0	0	1
Termination and Transfer	86	62	487
Interim	45	37	299
Sub-total	270	252	2665
Total Physical Examinations	925	1125	8713
<u>Laboratory Examinations-Clinical</u>			
<u>Operations</u>			
Government	87	126	911
Pre-employment, Termination, Transfer	1436	1760	20968
Annual	1384	1892	10806
Recheck (Area)	81	136	1979
First Aid	24	17	140
Sub-total	3012	3931	34804
<u>Contractors</u>			
Pre-employment, Termination, Transfer	1293	1162	3936
Total Clinical Laboratory Examinations	4305	5093	38740
<u>X-Ray</u>			
<u>Operations</u>			
Government	5	9	111
Pre-employment, Termination, Transfer	200	177	2967
Annual	296	421	2655
First Aid	87	85	758
Sub-total	588	692	6491
<u>Contractors</u>			
Pre-employment, Termination, Transfer	167	153	524
First Aid	8	10	29
Sub-total	175	163	553
Total X-Ray	763	855	7044
Electrocardiographs	140	121	1029
Physical Therapy Cases Referred	227	194	2089

HEALTH & SAFETY SECTION

SEPTEMBER 1955

<u>Industrial Medical Services (Continued)</u>	<u>August</u>	<u>September</u>	<u>Year to Date</u>
<u>First Aid Treatments</u>			
<u>Operations</u>			
New Occupational Cases	604	554	4833
Occupational Case Retreatments	2183	2116	16717
Non-occupational Treatments	3036	3001	25896
Sub-total	5823	5671	47446
<u>Construction</u>			
New Occupational Cases	25	21	653
Occupational Case Retreatments	79	47	2072
Non-occupational Treatments	25	13	804
Sub-total	129	81	3529
Total First Aid Treatments	5952	5752	50975
<u>Major Injuries</u>			
General Electric	1	1	5
Contractors	0	0	3
Total	1	1	8
<u>Sub-Major Injuries</u>			
General Electric	6	3	21
Contractors	0	1	3
Total	6	4	24
<u>Nurses Visits</u>			
Calls made	1	1	17
Employee Personal Illness	1	1	14
No. absent due to illness in family	0	0	1
No. not at home when call was made	0	0	2

HEALTH & SAFETY SECTION

SEPTEMBER 1955

Kadlec Hospital

The average daily adult census increased from 53.0 to 54.5 as compared to 61.0 a year ago. This represents an occupancy percentage of 50.0 broken down as follows: Mixed Service (Medical, Surgical and Pediatrics) 48.2; Obstetrical Service 57.6. A further breakdown of the Mixed Service shows an occupancy percentage of 46.5 on Medical, 54.7 on Surgical and 40.5 for Pediatrics.

The minimum and maximum daily census ranged as follows:

	<u>Minimum</u>	<u>Maximum</u>
Mixed Service	25	51
Obstetrical Service	7	20
Total Adult	36	71

The average daily newborn census increased from 8.8 to 10.3 as compared to 12.1 a year ago.

Nursing hours per patient per day:

Medical, Surgical, Pediatrics	3.90
Obstetrical	3.57
Newborn	3.49

The ratio of inpatient hospital employees to patients (excluding newborn) for the month of August was 2.31. When newborn infants are included, the ratio is 1.98.

The net expense for the operation of Kadlec Hospital for August was \$15,288 as compared with \$19,174 for July. Summary is as follows:

Kadlec Hospital net expense	\$15,288
This is a decrease of \$3,886 from the month of July which resulted from an increase in the patient load. Although expenses increased over \$1,600 revenue increased over \$5,500.	

Mr. O. E. Bakko represented the hospital at a meeting of the Southeast Council of the Washington State Hospital Association in Dayton, Washington, and also participated in a meeting of the Board of Trustees of the Washington State Hospital Association in Seattle. From September 18 to 22 he attended the American Hospital Association annual meeting in Atlantic City.

Following is a summary of employee relations meetings held in the Health and Safety Section during the month of August.

	<u>Meetings</u>	<u>Attendance</u>
Hospital	38	254
Industrial Medicine	3	14
Public Health	5	31
Safety & Fire Prevention	1	11
General	2	11
Total	49	321

HEALTH & SAFETY SECTION

SEPTEMBER 1955

Hospital Unit (Continued)	August	September	Year to Date
<u>Kadlec Hospital</u>			
Average Daily Adult Census	53.0	54.5	58.4
Medical	13.0	17.2	15.9
Surgical	21.7	17.5	21.7
Pediatrics	10.2	7.7	10.1
Mixed	44.8	42.4	47.7
Obstetrical	8.1	12.1	10.7
Average Daily Newborn Census	8.8	10.3	10.7
Maximum Daily Census:			
Mixed Services	59	51	83
Obstetrical	13	20	20
Total Adult Census	72	71	95
Minimum Daily Census:			
Mixed Services	34	25	20
Obstetrical Service	4	7	3
Total Adult Census	38	36	29
Admissions: Adult	426	420	4106
Discharges: Adult	415	416	4099
Medical	104	101	959
Surgical	184	183	1776
Pediatrics	69	54	663
Mixed	357	338	3398
Obstetrical	58	78	701
Newborn	56	75	651
Patient Days: Adult	1642	1633	15958
Medical	403	516	4340
Surgical	672	524	5936
Pediatrics	315	230	2751
Mixed	1390	1270	13027
Obstetrical	252	363	2931
Newborn	272	309	2934
Average Length of Stay: Adults	4.0	3.9	3.9
Medical	3.9	5.1	4.5
Surgical	3.7	2.8	3.3
Pediatrics	4.6	4.2	4.1
Mixed	3.9	3.8	3.8
Obstetrical	4.3	4.7	4.2
Newborn	4.9	4.1	4.5
Occupancy Percentage: Adults	48.6	50.0	53.6
Medical	35.1	46.5	43.0
Surgical	67.8	54.7	67.8
Pediatrics	53.7	40.5	53.2
Mixed	50.9	48.2	54.2
Obstetrical	38.6	57.6	60.0
Newborn	33.8	39.6	41.2

(Occupancy Percentage based on 109 adult beds and
26 bassinets.)

HEALTH & SAFETY SECTION

SEPTEMBER 1955

<u>Hospital Unit (Continued)</u>	<u>August</u>	<u>September</u>	<u>Year to Date</u>
<u>Kadlec Hospital (Continued)</u>			
Avg. Nursing Hours per Patient Day:			
Medical, Surgical, Pediatrics	3.78	3.90	
Obstetrics	6.55	3.57	
Newborn	4.10	3.49	
Avg. No. Employees per Patient (excluding newborn)	2.31		
Operations: Major	66	47	574
Minor	63	64	631
E.E.N.T.	49	46	497
Dental	1	1	7
Births: Live	60	78	648
Still	1	0	11
Deaths	5	8	38
Hospital Net Death Rate	.21%	.61%	.32%
Net Autopsy Rate	60.0	37.5	36.8
Discharged Against Advice	0	0	5
One Day Cases	128	140	1286
Admission Sources:			
Richland	83.3	83.6	82.1
North Richland	.9	.5	4.2
Other	15.7	15.9	13.7
Admissions by Employment:			
General Electric	79.8	80.5	75.9
Government	1.9	3.3	2.9
Facility	6.6	3.1	5.8
Contractors	4.0	1.7	6.2
Schools	0.7	0.7	1.1
Others	7.0	10.7	8.1
Hospital Outpatients:			
First Aid	525	527	4393
Clinical Laboratory	121	107	1278
Bacteriological Laboratory	51	51	434
X-Ray	148	156	1447
Physical Therapy	232	178	2519
<u>Physical Therapy Treatments</u>			
Outpatient Treatments	219	178	2643
Hospital	40	62	674
Total	259	240	3317
<u>Pharmacy</u>			
No. of Prescriptions Filled	2401	2399	21990
No. of Store Orders Filled	529	466	4413

HEALTH & SAFETY SECTION

SEPTEMBER 1955

Hospital Unit (Continued)	August	September	Year to Date
<u>Kadlec Hospital (Continued)</u>			
<u>Clinical Laboratory Examinations</u>			
Outpatient Examinations	430	316	3458
Hospital	3182	3377	30647
Public Health	0	0	1
Total	3612	3693	34106
<u>X-Ray Examinations</u>			
Outpatient Examinations	162	162	1486
Hospital	220	201	1843
Public Health	0	3	73
Total	382	366	3402
<u>Electrocardiographs</u>			
Outpatient Examinations	1	1	15
Hospital	27	19	218
Total	28	20	233
<u>Bacteriological Laboratory</u>			
Treated Water Samples	253	175	1839
Milk Samples (Inc.Cream & Ice Cream)	55	40	342
Other Bacteriological Tests	446	387	4019
Total	754	602	6200
<u>Patient Meals</u>			
Regulars	2511	2541	24567
Children under 8	486	483	5715
Specials	548	978	6416
Softs	608	379	4960
Tonsil and Adenoid	70	85	735
Liquids	167	153	1256
Surgical Liquids	116	61	745
Total	4506	4680	44394
<u>Cafeteria Meals</u>			
Noon	1337	1270	13402
Night	294	253	2510
Total	1631	1523	15912

HEALTH & SAFETY SECTION

SEPTEMBER 1955

Public Health Unit

Communicable disease cases reported dropped off to an unexpectedly low level of 25 for the month. This is a drop of about 32% from the 37 cases recorded in August. Six cases of ringworm were reported. Two poliomyelitis brought the year's total to four.

Field nursing visits remained about the same - 202 as compared with 207 for August.

Orientation sessions were held at the unit for teachers new to the Richland school system. About 25 teachers attended.

A School Health Workshop was held for Benton and Franklin County teachers, parents, public health personnel, doctors and dentists. Unit personnel were active in planning for the workshop. The public health nurse supervisor was a member of one of the panels. Six staff members attended the Saturday, September 24th meeting.

A series of television broadcasts was inaugurated during the month over Channel 2 of the RTVC closed circuit. It is hoped to develop interest in the activities of the unit and improve understanding and support through these programs.

Assistance was given to the Junior Women's Club in organizing classes for baby sitters at the junior high schools. Staff personnel will provide instructions.

Of the 108 contacts made by the social service counselor this month, 62 were directly concerned with family relationships, 29 related to marital conflict and 33 to difficulties between parents and their children.

Personality and behavior problems were the focus of 31 interviews. There were 12 direct contacts with children, 1 with an adolescent and 18 with adults.

Twelve contacts were made to plan for substitute care of children.

In addition, two contacts were made in regard to problems stemming from mental retardation and one regarding medical financial problems.

Sanitary surveys were made in school cafeterias. All were found to be in excellent condition with the exception of adequate cleaning of dishwashing machines. Arrangements have been worked out to have a maintenance man service all dishwashing machines on a regular basis.

Flies were found to be prevalent in many of the restaurants inspected. Importance of adequate control methods was stressed.

Five nuisance abatement notices were issued. Violations consisted in inadequate cleaning of dog pens. Several residents have requested insect identification and information about control methods.

HEALTH & SAFETY SECTION

SEPTEMBER 1955

Public Health Unit (Continued)

Bacteriological results of 22 pasteurized milk samples were found to be satisfactory. Improvement was noted over preceding months.

Water samples were satisfactory with the exception of one from a private well. Investigation revealed the well to be subject to surface contamination.

No. 2 sewage disposal plant has been shut down for two weeks for complete cleaning and overhaul. This should improve the quality of the effluent when the plant is put back into service. All sewage is presently being handled by No. 1 plant.

The mosquito control program was terminated during the month.

HEALTH & SAFETY SECTION

SEPTEMBER 1955

Public Health (Continued)	August	September	Year to Date
<u>Education</u>			
Pamphlets distributed	8,991	9,990	102,951
News Releases	6	8	81
Staff Meetings	1	1	8
Classes	1	6	86
Attendance	9	23	1,125
Lectures & Talks	3	11	67
Attendance	250	220	2,997
Films Shown	1	2	125
Attendance	80	65	4,664
Community Conferences & Meetings	13	21	130
Radio Broadcasts	9	8	67
<u>Immunizations</u>			
Diphtheria	0	0	235
Diphtheria Booster	0	0	915
Diptussis	0	0	15
Tetanus	0	0	1
Tetanus Booster	0	0	276
Pertussis	0	0	1
Pertussis Booster	0	0	272
Schick Test	0	0	1
Smallpox	0	2	1,647
Tuberculin Test	6	7	52
Typhoid	1	0	1
Typhoid Booster	0	1	1
Immune Globulin	0	0	93
Other	0	0	1
First Polio Series	0	0	795
Second Polio Series	0	0	476
<u>Social Service</u>			
Cases carried over	48	34	712
Cases admitted	11	6	114
Cases closed	25	9	192
Remaining case load	34	31	634
Activities:			
Home Visits	4	12	24
Office Interviews	190	96	2,331
Conferences	28	34	417
Meetings	3	6	98
<u>Sanitation</u>			
Inspections made	81	87	951
Conferences held	24	25	228

HEALTH & SAFETY SECTION

SEPTEMBER 1955

<u>Public Health (Continued)</u>	<u>August</u>	<u>September</u>	<u>Year to Date</u>
<u>Communicable Diseases</u>			
Chickenpox	7	0	224
Erysipelas	0	0	1
German Measles	6	3	71
Impetigo	0	2	8
Influenza (U.R.I.)	0	0	4
Infectious Mononucleosis	0	2	11
Infectious Hepatitis	0	0	17
Measles	2	4	31
Meningitis	0	0	2
Mumps	7	1	431
Pinkeye	0	2	9
Pneumonia	0	0	1
Polio-myelitis	1	2	4
Rheumatic Fever	0	0	1
Ringworm	0	6	18
Roseola	1	2	21
Salmonellosis	1	0	1
Scarlet Fever	0	0	119
Strep. Infection (Throat)	12	1	42
Tuberculosis	0	0	6
Whooping Cough	0	0	16
Total	37	25	1,038
 Total No. Nursing Field Visits	 207	 202	 3,375
Total No. Nursing Office Visits	34	42	374

COMMUNITY SECTION

SEPTEMBER, 1955

ORGANIZATION AND PERSONNEL:

	<u>BEGINNING OF MONTH</u>		<u>END OF MONTH</u>	
	<u>Exempt</u>	<u>Nonexempt</u>	<u>Exempt</u>	<u>Nonexempt</u>
Community Administration	1	1	1	1
Maintenance & Renovation Unit	9	146	9	144
Police Unit	15	25	15	25
Commercial & Residential Property Unit	7	25	7	24
Fire Unit	50	0	50	0
Transfer Study	1	0	1	0
Community Operations Administration	1	1	1	1
Electrical Unit	5	16	4	16
Engineering Unit	7	4	6	4
Water & Sewerage Utilities Unit	5	22	6	24
Library Unit	4	9*	4	9*
Public Works & Recreation Unit	<u>7</u>	<u>49</u>	<u>6</u>	<u>32</u>
	112	298	110	280

	<u>Exempt</u>	<u>Nonexempt</u>
Additions to Payroll	0	3
Transfers In	0	2
Removals from Payroll	1	14
Transfers Out	1	9
New decrease	<u>20</u>	

*Includes two half-time employees.

MAINTENANCE AND RENOVATION UNIT

September, 1955

	<u>Exempt</u>	<u>Nonexempt</u>
Employees - Beginning of month	9	146
Transfers in	0	2
Transfers out	0	1
Retirements	0	3
Employees - End of month	9	144

INTERIOR PAINT REPORT - FY 1956

September, 1955

FOREMEN: B. C. BAIN, R. A. CHAMBLISS, D. W. LUKINS, M. E. TAPPAN

TYPE UNIT	NO. UNITS SCHEDULED	COMPLETED THIS MONTH	COMPLETED TO DATE	BALANCE TO BE PAINTED
A	402	11	17	385
B	345	8	12	333
C	160	2	2	158
D	2	0	0	2
E	23	0	1	22
F	64	0	0	64
G	4	0	0	4
H	67	0	0	67
K	57	1	1	56
L	37	0	0	37
M	7	0	0	7
Q	28	0	1	27
R	21	0	0	21
S	5	0	0	5
T	0			
U	77	0	0	77
V	182	2	2	180
Y	15	4	4	11
Z	2	0	0	2
1BP	5	1	2	3
2BP	23	6	11	12
3BP	6	1	1	5
Tract	19	0	1	18
1BR Apt.	26	0	0	26
2BR Apt.	69	3	3	66
W-13 Apt.	0			
Dormitories	5	0	0	5
<hr/>				
TOTAL	1651	39	58	1593

10 Units added

Est. MH B. F.	926	Actual MH B. F.	1051½
Est. MH This Month	<u>1896</u>	Actual MH This Month	<u>1890</u>
Total Est. MH	2822	Total Actual MH	2941½

EXTERIOR PAINT REPORT - FY 1956

September, 1955

FOREMEN: R. A. CHAMBLISS, D. W. LUKINS, M. E. TAPPAN

TYPE UNIT	NO. UNITS SCHEDULED	COMPLETED THIS MONTH	COMPLETED TO DATE	BALANCE TO BE PAINTED
A	109	22	106	3
B	170	19	170	0
C	85	0	0	85
D	1	0	1	0
E	13	6	11	2
F	76	20	76	0
H	56	18	52	4
K	60	0	0	60
L	2	0	2	0
1BP	97	34	38	59
2BP	599	182	197	402
3BP	494	137	141	353
Tract	7	4	7	0
2BR Apt.	9	0	0	9
W-13 Apt.	1	0	0	1
Dormitories	19	0	0	19
TOTAL	1798	442	801	997

Est. MH B. F.	17,635	Actual MH B. F.	14,170
Est. MH This Month	<u>8,686</u>	Actual MH This Month	<u>7,526</u>
Total Est. MH	26,321	Total Actual MH	21,696

Spray time to date: 587 MH

PLUMBING SHOP

September, 1955

FOREMAN: F. L. ELSENSOHN

Electric water heaters replaced	16
Laundry trays replaced	16
Miscellaneous plumbing work orders completed	30
Cleared major sewer stoppages caused by tree roots	54
Cleared major sewer stoppages in main sewers for Public Works	5
Plumbing for floor and sink linoleum	103
Repaired or replaced blacktop walks	14
Replaced street steps	12
Steam work orders completed	6
Radiators completely overhauled in dormitories	27
Worked on plumbing service orders	33 hrs.
Furnished six men to work at 100-F Area (Overtime hours)	101.7 hrs.

Made routine steam inspection once each week in Government owned commercial facilities, dormitories, and apartments.

Excavated with backhoe machine and handwork for the cleaning out of roots in sewer lines, and to repair all leaking and broken underground piping, and backfilled.

Landscaped where sewers and other lines were dug out and trees were removed, and seeded excavated portions.

SERVICE ORDER CREW

FOREMAN: L. F. CARPENTER

A. Service orders on hand at beginning of month	871
B. Received during the month	2477
C. Completed during the month	2110
D. On hand at end of month	1238

E. A total of 185.4 manhours were spent on work orders.

F. Backlog of incomplete service orders by craft:

Plumbing	451
Electrical	637
Carpentry	<u>150</u>
Total	1238

RENOVATION AND LABOR CREW

September, 1955

FOREMAN: B. C. BAIN

Houses renovated	51
Minor carpenter repairs to renovated houses	41
Trash pickups	37
Minor carpenter repairs to dormitories	6
Renovation minor paint jobs	30
Renovation complete paint jobs	2
Redecorated following a fire	0
Houses sprayed for insect control	9
Dormitories sprayed for insect control (M-4)	1

Provided weekly service of delivering linens and janitorial supplies to occupied dormitories.

Provided weekly pickup and delivery of laundry from various General Electric Company units to Richland Laundry and Dry Cleaners.

MECHANICAL SHOP

FOREMAN: Z. H. MAYBERRY

A. Millwright Crew:

Furnace service orders	249
Routine furnace inspections	130
Refrigerators repaired	7
Oil tanks replaced	1

B. Sheetmetal Crew:

Replaced gutters	5
Installed shower stalls	3
Installed coal hatch flashings	9
Replaced smoke pipes	20
Installed lockers -- 200-E Area	40
Installed storage bins -- 200-E Area	8

C. Service Crew:

Tree removal orders completed	31
Tree stump removal orders for Electrical	26
Trash removals	4
Sidewalks repaired	5

LINOLEUM AND CARPENTER SHOP

September, 1955

FOREMAN: R. M. MARTIN

Replaced bath floor linoleum	13
Replaced kitchen floor linoleum	56
Repaired kitchen floor linoleum	3
Repaired living room floor linoleum	2
Replaced hall linoleum	1
Replaced steps linoleum	32
Replaced sink top linoleum	86
Repaired sink top linoleum	1
Replaced cupboard linoleum	1
Replaced work bench linoleum	3
Replaced sinks	5
Chempoints	122
Paint touch ups	130
Repaired porches	80
Jack and shim	3
Doors repaired - exterior	1
Interior house repair	61
Weepholes	30
Repaired roofs	33
Ranch window screens	29
Ranch ladders	61
Replaced screen doors	147
Prefab window screens	392
Repaired walls	3
Replaced floor boards	8
Sidewalk forms	3
Repaired sidewalks	2
Replaced window sills	9

COMMUNITY SECTION
RICHLAND POLICE DEPARTMENT
MONTHLY REPORT
SEPTEMBER 1955

ORGANIZATION

	EXEMPT	NON-EXEMPT
EMPLOYEES - BEGINNING OF MONTH	15	25
TRANSFERS IN	0	0
TRANSFERS OUT	0	0
NEW HIRES	0	0
TERMINATIONS	0	0
TOTAL - END OF MONTH	15	25

GENERAL

EFFECTIVE AUGUST 31, THE NORMAL FORCE OF THE RICHLAND POLICE DEPARTMENT WAS REDUCED FROM 41 EMPLOYEES TO 40.

DURING THE MONTH, 350 PLACARDS READING "SCHOOL'S OPEN, DRIVE CAREFULLY", WERE DISTRIBUTED.

THE FIFTH ANNUAL POLICE ATHLETIC LEAGUE BANQUET HONORING THE PAL'S LITTLE LEAGUE BASEBALL TEAM WAS HELD AT THE DESERT INN ON SEPTEMBER 19. MASTER OF CEREMONIES WAS TED R. STOUT. GUEST SPEAKERS INCLUDED J. E. TRAVIS, A. E. C. MANAGER OF THE HANFORD OPERATIONS OFFICE; REV. W. G. GREENFIELD; E. G. CORCORAN, COMMISSIONER OF RICHLAND LITTLE LEAGUE BASEBALL; A. C. MILLER, PRESIDENT OF THE COLUMBIA LITTLE LEAGUE; H. W. STROCK, CHIEF OF POLICE; T. J. MCGUIRE, PRESIDENT OF THE POLICE ATHLETIC LEAGUE; AND LT. A. F. NOVOTNY, ATHLETIC MANAGER OF THE POLICE ATHLETIC LEAGUE.

TRAFFIC

RICHLAND	1955		1954		1955	1954
	AUG.	SEPT.	AUG.	SEPT.	TOTAL TO DATE	TOTAL SAME PERIOD
REPORTABLE ACCIDENTS	17	20	23	20	166	177
PROPERTY DAMAGE ACCIDENTS	15	17	19	18	143	153
INJURY ACCIDENTS	2	3	4	2	23	24
TOTAL PERSONS INJURED	2	3	4	2	27	24
FATAL ACCIDENTS	0	0	0	0	0	0
ACCIDENTS-DAYLIGHT HOURS	15	18	16	15	127	126
DARKNESS "	2	2	7	5	39	51
ACCIDENTS-BUSINESS DISTRICT	8	8	2	9	52	49
RESIDENTIAL "	6	11	14	8	85	99
OTHER "	3	1	7	3	29	29
ACCIDENTS INVESTIGATED	12	15	17	16	114	113
CRIMINAL COMPLAINTS FILED	9	10	14	13	64	85
VIOLATIONS CONTRIBUTING						
ACCIDENTS:						
NEGLIGENT DRIVING	3	4	4	5	24	33
FAIL. TO YIELD RIGHT OF WAY	5	7	8	6	51	55
FOLLOWING TOO CLOSELY	2	1	1	4	25	30
DRUNK DRIVING	1	0	0	0	3	2
PEDESTRIAN VIOLATION	1	0	2	1	5	6
INATTENTION TO DRIVING	2	2	1	1	6	2
RECKLESS DRIVING	0	0	2	0	1	5
SPEEDING	0	0	0	0	1	1
UNSAFE SPEED	0	0	1	0	18	21
IMPROPER BACKING	0	0	1	0	6	8
DISREGARDING STOP SIGN	0	0	1	1	4	2
HIT AND RUN	0	0	0	0	0	0
IMPROPER PASSING	1	1	1	0	6	2
IMPROPER TURN	0	2	0	0	5	1
FAILURE TO SIGNAL	0	1	0	0	2	1
WIDE RIGHT TURN	1	0	0	0	1	1
BICYCLE VIOLATION	1	2	1	0	6	3
DEFECTIVE EQUIPMENT	0	0	0	1	2	1
WRONG SIDE OF ROAD	0	0	0	0	1	0
ANIMAL IN ROAD	0	0	0	0	2	0
PASSENGER JUMPED FROM CAR	0	1	0	0	1	0

RICHLAND	1955		AVE. PER ACCIDENT 1955		AVE. PER ACCIDENT 1954	
	AUG.	SEPT.	AUG.	SEPT.	AUG.	SEPT.
ACCIDENT PROPERTY DAMAGE	\$2420.91	\$5,747.50	\$130.63	\$287.38	\$191.94	\$259.45

TRAINING

ADVANCE TRAINING FOR RICHLAND POLICE MEMBERS AT THE SMALL ARMS RANGE FOR THE PERIOD IN FIELD INSTRUCTION WAS AS FOLLOWS:

.38 CALIBER REVOLVER	1/2 HOUR
TOTAL NUMBER OF MEN REPORTING AT THE RANGE	19
NUMBER OF MEN FIRED OVER THE ARMY-L COURSE	19

QUALIFICATIONS ON THE ARMY-L COURSE AS FOLLOWS:

EXPERT	6	33%	SHARPSHOOTER	4	22%
MARKSMAN	5	28%	UNQUALIFIED	3	17%

ACTIVITIES	AUGUST	SEPTEMBER
BICYCLES IMPOUNDED	0	0
BICYCLE VIOLATIONS, OTHER	0	0
BICYCLES REGISTERED	35	82
CHILDREN LOST OR FOUND	12	28
COMPLAINTS INVESTIGATED	116	89
DEATHS REPORTED	0	0
DOG, CAT, LOOSE STOCK COMPLAINTS	15	14
DOGS, CATS, OTHER ANIMALS REPORTED LOST OR FOUND	8	5
DOORS, WINDOWS, FOUND OPEN IN FACILITIES	76	55
EMERGENCY MESSAGES DELIVERED	10	9
FIRES INVESTIGATED	6	12
GUNS REGISTERED	15	11
LAW ENFORCEMENT AGENCIES ASSISTED	4	3
LETTERS OF INQUIRY	158	151
MISCELLANEOUS ESCORTS AND DETAILS	6	5
PERSONS INJURED BY DOGS	4	1
PLANT DEPARTMENTS ASSISTED	7	23
PRISONERS PROCESSED THROUGH JAIL	7	7
PRIVATE INDIVIDUALS ASSISTED	51	44
PROPERTY LOST OR FOUND	12	19
RECORDS INQUIRIES	38	31
REPORTS PROCESSED THROUGH RECORDS	195	173
STREET LIGHTS OUT REPORTED TO ELECTRICAL	66	114
TRAFFIC SAFETY MEETINGS (SEPT. ATTENDANCE 122)	3	3
TOTALS	845	879

MONTHLY REPORT
 RICHLAND POLICE DEPARTMENT
 SEPTEMBER 1955

OFFENSES	KNOWN	UNFOUNDED	CLEARED OTHER*	CLEARED ARREST
PART I				
1. Criminal Homicide				
a. Murder & Non. Neg. Mans.				
b. Man. by Negligence				
2. Rape				
3. Robbery				
4. Aggravated Assault				
5. Burg.-Break. & Entry	2	-	-	-
6. Larceny Over \$50.00	-	-	-	-
Under \$50.00	12	-	2	1
7. Auto Theft	2	-	2	-
TOTAL PART I CASES	16	-	4	1
PART II				
8. Other Assaults	2	-	-	2
9. Forgery & Counterfeit	3	-	-	1
10. Embezzlement & Fraud	1	-	-	1
11. Stolen Prop:Buy:Receive	-	-	-	-
12. Weapons:Carry:Possessing	-	-	-	-
13. Prostitution	-	-	-	-
14. Sex Offenses	-	-	-	-
15. Offenses Ag. Fam. & Child	-	-	-	-
16. Narcotics	-	-	-	-
17. Liquor Laws	-	-	-	-
18. Drunkenness	3	-	-	3
19. Disorderly Conduct	-	-	-	-
20. Vagrancy	-	-	-	-
21. Gambling	-	-	-	-
22. Drunk Driving	2	-	-	2
23. Viol. Road & Driving Laws:				
Speeding	27	-	13	14
Stop Sign	17	-	5	12
Right of Way	6	-	1	5
Negligent Driving	15	-	2	13

<u>OFFENSES</u>		<u>KNOWN</u>	<u>UNFOUNDED</u>	<u>CLEARED OTHER*</u>	<u>CLEARED ARREST</u>
	Defective Equipment	14	-	7	7
	Illegal Passing	1	-	-	1
24.	Parking	10	-	4	6
25.	All Other Traffic Violations	8	-	5	3
26.	All Other Offenses:				
	Vandalism	4	-	2	-
	Malicious Mischief	2	-	1	-
	Arson	1	-	-	1
	Public Nuisance	2	-	-	2
	Indecent Exposure	1	-	-	-
	Trespassing	1	-	-	1
	Violation of Parole	1	-	-	1
	Molesting	1	-	1	-
	Prowler	1	-	-	1
27.	Suspicion	-	-	-	-
TOTAL PART II CASES		123	-	41	76
PART III					
28.	Missing Persons	2	-	2	-
	Lost Persons	22	-	22	-
	Lost Animals	3	-	1	-
	Lost Property	9	-	13	-
29.	Found Persons	-	-	-	-
	Found Property	24	-	21	-
	Found Animals	2	-	1	-
TOTAL PART III CASES		62	-	60	-

<u>OFFENSES</u>		<u>KNOWN</u>	<u>UNFOUNDED</u>	<u>CLEARED OTHER*</u>	<u>CLEARED ARREST</u>
PART IV					
30. Fat. M.V. Traff. Accid.		-	-	-	-
31. Pers. Inj. M.V. Traff. Accid.		3	-	-	-
32. Prop. Dam. M.V. Accid.		17	-	-	-
33. Other Traffic Accidents		-	-	-	-
34. Public Accidents	)				
35. Home Accidents	)				
36. Occupational Accidents	)				
37. Firearms Accidents		No Accurate Statistics Kept			
38. Dog Bites		-	-	-	-
39. Suicides		1	-	-	-
40. Suicide Attempts		-	-	-	-
41. Sud. Death & Bod. Found		-	-	-	-
42. Sick Cared For		-	-	-	-
43. Mental Cases		-	-	-	-
TOTAL PART IV CASES		21	-	-	-
<u>COMPOSITE TOTALS</u>					
PART I, II, III, IV CASES		222	-	105	77

Cases listed under "Cleared Other" are those cleared by various means other than arrest, such as: orders from prosecutor, juvenile probation officer or other situations in which a mutual agreement is obtained. They are definitely "cleared" cases and differ from the arrest column only in that there was no arrest.

Property reported stolen	Richland	\$1,748.63
Property recovered	Richland	\$1,845.50

MONTHLY REPORT		RICHLAND POLICE DEPARTMENT					JUVENILES INVOLVED					SEPTEMBER 1955	
OFFENSES	NO. CASES	JUVENILES	SEX	12	13	14	15	16	17				
Third Degree Assault	1	2	M	-	-	-	1	-	1				
Missing Persons	1	2	F	-	-	-	1	-	1				
Violation of Parole	1	1	M	-	-	-	-	-	-				
Forgery	1	1	M	1	-	-	-	-	-				
Larceny	2	3	M	-	1	1	1	-	-				
Prowler	1	3	M	-	-	-	-	3	-				
Molesting	1	1	M	-	-	-	-	-	1				
TOTALS	8	13		1	1	1	3	3	4				

RICHLAND POLICE DEPARTMENT
RICHLAND JUSTICE COURT CASES
SEPTEMBER, 1955

VIOLATIONS	NO. OF CASES		NO. OF CONV.	NO. OF FORF.	CASES CONT.		CASES DISM.		SENT. JAIL		SENT. SUSP.		LIC. REV.		BAIL FORF.		FINES		SUSP.	
DEFECTIVE EQUIPMENT	9	7	2																	
IMPROPER REGISTRATION	1	1																		
NO DRIVER'S LICENSE	5	4																		
NEGLIGENT DRIVING	14	13																		
NEG. DRVG, LIQ. INV.	2	1																		
RECKLESS DRIVING																				
DRUNK DRIVING	3	1																		
SPEEDING	17	10																		
ILLEGAL PASSING	1	1																		
ILLEGAL PARKING	5	1																		
STOP SIGN	13	9																		
FAIL. TO YIELD RIGHT OF WAY	3	2																		
FOLLOWING TOO CLOSE	1	1																		
PUBLIC NUISANCE	2	1																		
VIOL. OF DOG ORDINANCE	1	1																		
PUBLIC INTOXICATION	3	1																		
2ND DEGREE ARSON	1	1																		
LARCENY BY CHECK	1	1																		
TRESPASSING	1	1																		
TOTALS	83	55	18	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

1 NEG DRVG - FINED \$35, \$10 SUSP, 8 DYS CNTY JAIL IN LIEU OF \$25.

1 NEG DRVG - NOT GUILTY.

1 NEG DRVG - FINED \$35, \$15 SUSP, LIC HELD BY CRT FOR 60 DAYS.

1 NEG DRVG, LIQ. INV. - DATE TO BE DECIDED BY COURT.

1 SPEEDING - HELD ON FILE.

1 SPEEDING - FINED \$7.50, LIC SUSP 60 DAYS.

1 RECKLESS DRVG - DATE TO BE DECIDED BY COURT.

1 DRUNK DRVG - CHANGE OF VENUE, POSTED \$250 BAIL.

1 DRUNK DRVG - F&C \$125, LIC SUSP 30 DAYS, 5 DAYS CNTY JAIL SUSPENDED.

1 DRUNK DRVG - CONTINUED, POSTED \$250.

1 PUBLIC NUISANCE - CONTINUED, POSTED \$50.

1 2ND DEGREE ARSON - BOUND OVER TO SUPERIOR COURT.

TOTALS \$194.50 \$914.00 \$157.00(11)

x

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT
COMMUNITY SECTION
September, 1955

PERSONNEL - COMMERCIAL AND RESIDENTIAL PROPERTY UNIT:

	<u>Exempt</u>	<u>Non-Exempt</u>
Employees - beginning of month	7	25
Transfers In	0	0
Transfers Out	0	0
New Hires	0	0
Terminations	0	0
Leave of Absence	0	1
Employees - end of month	<u>7</u>	<u>24</u>

PERSONNEL - COMMERCIAL AND NONCOMMERCIAL FACILITIES:

	<u>Commercial</u>	<u>Noncommercial</u>	<u>Total</u>
August	1,625	110	1,735
September	<u>1,629</u>	<u>110</u>	<u>1,739</u>
Net Change	+ 4	0	+ 4

SUMMARY OF ROUTINE ITEMS PROCESSED:

	<u>Commercial</u>	<u>Noncommercial</u>	<u>Total</u>
Work Orders	43	3	46
Back Charges	4	0	4
FY Work Orders	97	7	104
FY Back Charges	7	0	7

CONTRACTS AND NEGOTIATIONS:

A. Commercial:

1. Supplemental Agreements:

- a. Diettrich's Market - to provide for new rent, separate payment for utilities and services, and incorporation of additional required articles in accordance with lease renegotiation.
- b. G. N. Felton - to provide for new rent, separate payment for utilities and services, and incorporation of additional required articles in accordance with lease renegotiation.

2. Business Development:

- a. The plot of land on Wellsian Way in the Heavy Industrial Area was awarded to J. R. Parcell for construction and operation of a fuel oil distributorship, bulk plant, and warehouse.
- b. The plot of land on George Washington Way between Knight Street and Lee Boulevard was awarded to True's Oil Company for the construction and operation of an automotive service station.

GENERAL:

A. Commercial:

1. The Elite Shop terminated its lease in the Government-owned building located at 711 The Parkway and re-opened for business in the Davis Furniture Building in the Uptown Business District.
- * 2. Mrs. Ann Raeder assumed the operation of the Recreation Hall Cafe.
3. Mr. George C. Butler opened a law office in the Richland Development Co. Building.
4. Mr. R. A. Hutchinson opened a general insurance office in the Richland Development Co. Building.
5. E. R. Thompson and H. J. Davis opened a Service Center for the repair of household appliances in the Automatic Laundry Co. Building.
6. Lil-Dale's Sewing Center terminated its sublease in the Bailey Building No. 1.
7. Carter's Toyland opened for business in the Bailey Building No. 1.
8. H. R. Moore started construction of an automotive service station at the intersection of Van Giesen Street and Wright Avenue.
9. Bud and Gene's Super Conoco Service opened for business at the intersection of Knight Street and Stevens Drive.
10. The Government-owned building formerly occupied by the Columbia Service Company has been declared excess.

B. Noncommercial:

1. Authorization was granted by the A.E.C. to permit construction of a parsonage by the Free Methodist Church on their leased site.
2. Fifty-three site permits for private boat moorage were executed and distributed.
3. One pasture permit was assigned.

4. Tract House J-700, formerly leased to the Sacajawea Rifle and Pistol Club, has been declared excess.

COMMERCIAL PROSPECTS:

Inquiries were received during the month concerning the establishment of the following types of enterprises in Richland:

Farmer's Market	Used Car Lot
Warehouse Facility	Dog Kennels
Preschool Nursery	

SUMMARY OF OCCUPANCY AND EXPANSION STATUS:

A. Commercial:	<u>AUGUST</u>	<u>SEPTEMBER</u>
1. Number of Government-Owned Buildings	42	41
a. Number of Businesses operated by Prime Lessees	38	37
(1) Number opened	2	0
(2) Number closed	2	1
b. Number of Businesses operated by Sublessees	18	19
(1) Number opened	1	1
(2) Number closed	1	0
c. Total Businesses in Government-Owned Buildings	<u>56</u>	<u>56</u>
2. Doctors and Dentists in Private Practice	33	33
3. Number of Privately Owned Buildings	80	81
a. Number of Businesses operated by Prime Lessees	49	49
(1) Number opened	2	0
(2) Number closed	1	0
b. Number of Businesses operated by Sublessees	115	120
(1) Number opened	4	6
(2) Number closed	2	1
c. Total Businesses in Privately Owned Buildings	<u>164</u>	<u>169</u>
4. Privately Owned Buildings under Construction	10	11
5. Total Number of Businesses in Operation	220	225
a. Total openings	9	7
b. Total closings	6	2
B. Noncommercial:		
1. Government-Owned Buildings		
a. Churches	1	1
b. Clubs and Organizations	5	5
c. Government Agencies	2	2
Total	<u>8</u>	<u>8</u>

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT - COMMUNITY SECTION

September, 1955

	<u>AUGUST</u>	<u>SEPTEMBER</u>
2. Privately Owned Buildings		
a. Completed and in Use	11	11
b. Under Construction	5	5
3. Church Plots and Buildings in Private Ownership	6	6
4. Pasture Land Permits	99	99
5. Private Boat Moorage Permits	0	53

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT

TENANT RELATIONS

PROGRESS REPORT

	Orders incomplete as of August 31, 1955	Orders issued 8-31 to 9-30	Total orders incomplete as of September 30, 1955
Service orders	1161	2731	1475
Work orders	982	581	1061
Service charges		231	

Principal work order loads

	Incomplete as of August 31, 1955	Incomplete as of September 30, 1955
Laundry trays	20	30
Kitchen cabinet linoleum	129	79
Kitchen floor linoleum	87	83
Bathroom tileboard	13	12
Shower stalls	2	8

284 alteration permits were issued as compared to 256 issued in August.

Install air conditioner	4	Install automatic washer	31
Install automatic dryer	53	Install additional wiring	11
Install TV antenna	33	Install fence	17
Install patio	7	Install oil burner	40
Install electrical heat	48	Basement excavation	7
Install tile on floor	1	Remove laundry trays	5
Install water softener	2	Install sink	3
Install tool shed	1	Install porch	3
Glass in porch	1	Install shelves	1
Install driveway	1	Install tile	3
Reverse range and refer	1	Install garbage disposal	2
Install stoker	1	Install partitions	2
Install toilet	1	Install back door	1
Install concrete slab	3	Install clothes poles	1

1086 inspections were made, as compared to 864 in August.

Alteration permits	134	Basement	2
Bathroom	6	Doors	15
Floors	12	Laundry trays	18
Linoleum	43	Lot lines	49
Paint	138	Porch	7
Range and refer recalls	8	Steps and walks	21
Sink	9	Shower stall	5
Toilet seat	9	Trees	23
Walls	6	Windows	8
Yard	13	Renovation rechecks	49
Dormitories	161	Miscellaneous	25
Cancellations	92	Renovations	126
Shows (new tenants)	108		

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT

TENANT RELATIONS

TENANT STORES

<u>Merchandise Issued</u>	<u>Total Amount</u>
Shades	1014
Reflectors	19
Drip trays	22
Ice cube trays	32
Door stops	9
Hydrator glass	3
Meat tender	5
Range parts	6
Refer parts	2
Cooker pot and lid	2
Furnace parts	1
Caulking compound	3
Grass seed	2
Furniture delivery	34
Furniture recall	10
Space heater delivery	5
Space heater recall	17

RECALL AND DELIVERY OF RANGES AND REFRIGERATORS -- MONTH OF SEPTEMBER

	RECALLED		DELIVERY	
	RANGES	REFERS	RANGES	REFERS
A	5 SC	8 TA	2 SC	4 TA
B	5 SC	6 TA	6 SC	1 TA
C		1 GM		
E		1 TA		1 TA
F	2 SC	1 TA	1 SC	3 TA
H	2 SC	1 TA	1 SC	2 TA
L			1 GE	
R	1 GE		1 GE	
T			1 GE	
U				1 TA
V				1 TA 1 GM
Y	2 GE			2 GM
2Br.	2 SC	3 TA	2 SC	3 TA
3Br.	1 SC	1 TA	1 SC	1 TA
Tract 1 hotspot,	1 SC	2 TA		
2Br. Apt.		1 SO-82		
Total	22	25	16	20

IN WAREHOUSE:

GM 4 burner Apt.	---1
SC ranges	---53
GE ranges	---4
TA refer 7'	---8
GM refer 6'	---2
GM refer 7'	---2 (SO - 82)

COMMERCIAL & RESIDENTIAL PROPERTY UNIT
RESIDENTIAL LEASES

SEPTEMBER 1955

DORMITORY REPORT

Dormitories:

	<u>Beds Available</u>	<u>Vacant Beds</u>	<u>Occupied Beds</u>
Men	477	115	362
Women	381*	118**	263*
Total	858*	233**	625*

*This includes 2 beds used for Dormitory offices.

**This includes 7 beds vacant in Dormitory M 13.

Waiting Lists

	Single Rooms	Double Rooms
Men	0	0
Women	0	0

The following Dormitories are in stand-by condition:

W 16 50 beds	M-15 50 beds	M-7 39 beds
Total beds 139		

Released for temporary office use: W-21 50 beds W-17 50 beds
Total beds 100

RESIDENTIAL LEASING

<u>CANCELLATIONS</u>		<u>ALLOCATIONS</u>	
Voluntary terminations	27	Houses allocated to new tenants	62
R.O.F.	1	Exchanged houses	8
Discharge	0	Moves (within Richland)	41
Transfers	16	Turnovers (divorce, death, schools)	8
Retirement	1	Wherry house move to GE Houses	1
Move off project	28	Total leases signed	120
Divorce	0	Total cancellations	135
Death	2	Houses assigned "As Is"	51
Move to W.H.	1	Houses sent to "Renovation"	61
Military Service	1	Applications pending	640
Not Eligible	1		
	<u>78</u>		

RICHLAND HOUSING

HOUSING UTILIZATION AS OF MONTH ENDING SEPTEMBER 30, 1955
HOUSES OCCUPIED BY FAMILY GROUPS

	Conven.	A&J	T	Pre Cut	Ranch	Pre Fab	Dorm Apt.	A&J Apt.	2BR Apt.	4th Hsg.	Tract	Total
G. E. Employees	2212	266	10	397	875	1115	7	55	59	208	34	5238
Comm. Fac.	102	18	0	26	53	48	0	5	4	8	4	268
AEC	65	28	0	17	37	23	3	3	4	9	2	191
Other Gov't.	11	2	0	0	4	3	0	0	0	0	0	20
Post Office	8	0	0	0	2	8	0	0	0	0	2	20
Schools	65	0	0	6	11	41	0	0	1	1	0	125
Comm. Activities	9	0	0	1	6	5	0	0	0	0	0	21
Med. Facilities	4	16	0	0	1	3	0	0	0	3	0	27
Kaiser Eng.	0	0	0	0	0	0	0	0	0	0	0	0
J. A. Jones	3	3	0	0	3	0	0	0	0	0	0	9
Blaw-Knox	0	0	0	0	0	0	0	0	0	0	0	0
Minor Const.	0	0	0	0	0	1	0	0	0	0	0	1
Not Certified	2	0	0	1	3	2	0	0	0	0	0	8
Total	2481	333	10	448	995	1249	10	65	68	229	42	5928
Ready to Rent	3	0	0	0	1	9	0	1	0	1	0	15
In Renovation	16	0	0	2	4	18	0	0	2	0	1	43
Boarded Up	0	0	0	0	0	0	0	0	0	0	0	0
Total	2500	333	10	450	1000	1276	10	64	70	230	43	5986

	Begin Month	Moved In	Moved Out	End of Month	Difference
Conventional Type	2478	+35	-32	2481	+3
A&J Type	333	+1	-1	333	0
"T" Type	10	+1	-1	10	0
Pre-cut Type	449	+6	-7	448	-1
Ranch Type	996	+15	-16	995	-1
Prefab Type	1250	+42	-52	1249	-10
Dorm Apts.	10	+0	-0	10	0
A&J Apts.	64	+1	-2	63	-1
2BR Apts.	68	+3	-3	68	0
Fourth Housing	229	+2	-2	229	0
Tracts	43	+0	-1	42	-1
Total	5939	+106	-117	5928	-11

COMMUNITY SECTION
RICHLAND FIRE DEPARTMENT
MONTHLY REPORT

September, 1955

Organization and Personnel

	<u>Exempt</u>	<u>Non-Exempt</u>
Employees - Beginning of Month	50	0
Transfers In	0	0
Transfers Out	0	0
Terminations	0	0
New Hires	0	0
End of Month	50	0

Fire Protection

Fire Loss (Estimated): Government	\$ 225.00
Personal	.00
September Total	225.00
Year's Total	\$6,875.50

Response to Alarms	27
Investigation of Minor Fires and Incidents	4
Ambulance Response	15
Inside Schools and Drills	7
Outside Drills	9
Safety Meetings	7
Security Meetings	4
Fire Alarm Boxes tested	210

In early September, a specially constructed PBX board was installed in the Central Fire Station alarm room as a part of the new alarm and communication facilities, which modernized the means of handling both emergency and routine calls. Aside from relocation of some electrical equipment and probable installation of a voice recorder, the installation is complete.

A total of 5,800 feet of fire hose was given its annual pressure test during September.

Captain R. W. Hatfield demonstrated the latest artificial respiration method to 9 Project Engineering employees and Fireman John Ward gave a similar demonstration for 30 employees of the Weekly Payroll Unit.

On September 1, eight Boy Scouts and their Scoutmaster visited No. 2 Fire Station. Seven Cub Scouts and three mothers made a similar visit to the Central Fire Station on September 20.

RICHLAND FIRE DEPARTMENT

Ladder Truck was utilized September to re-install flagpole rope at Jefferson Grade School.

There was a total of 1,385 housing inspections completed during the month of September, raising the completion percentage to 95-per cent.

FIRE MARSHAL'S MONTHLY ACTIVITIES

A total of 220 buildings were inspected, resulting in 19 hazard reports being submitted. A total of 66 fire extinguishers were inspected, 12 recharged and 2 removed.

Fire Marshal's staff arranged with the Chamber of Commerce to sponsor our Fire Prevention Week project. Attended eleven meetings with various organizations to promote and assist in developing projects. Some new projects include "Voice of Experience" news releases by firemen; "Operation Telephone" by Richland Women's Club; "Baby-Sitters Clinic" by the Junior Women's Club; and many other projects conducted by the schools, churches, Army, General Electric, etc.

Lectured on Fire Prevention Week at Chamber of Commerce Meeting and before three GE Safety Meetings.

Made arrangements with local tire recapping plant to relocate a drum of Naphtha outside the building and install proper grounds to eliminate static charges.

Provided House of Hazard's sponsor with a list of 100 hazards and material needed.

Arranged for use of the GE Float in Fire Prevention Week Parade and for the Plant Safety Unit to remodel and sponsor the float.

Designed billboard poster and arranged with Richland Safety Council to have it made and posted for fire prevention week.

Conducted acceptance test of the Central United Protestant Church School fire alarm and sprinkler systems with contractor and church officials.

Tabulated record of home inspections made during September and listed types of hazards encountered.

COMMUNITY OPERATIONS SUB-SECTION
RICHLAND ELECTRICAL UNIT
MONTHLY REPORT
SEPTEMBER 1955

ORGANIZATION AND PERSONNEL

	<u>Exempt</u>	<u>Non-Exempt</u>
Employees Beginning of Month	<u>5</u>	<u>16</u>
Transfers In	<u> </u>	<u> </u>
Transfers Out	<u> </u>	<u> </u>
Terminations	<u>1</u>	<u> </u>
Total End of Month	<u>4</u>	<u>16</u>

SYSTEM MAINTENANCE AND OPERATION

Outside Lines	
Poles set	<u>3</u>
Poles transferred	<u>8</u>
Anchors installed	<u>2</u>
Guys installed	<u>5</u>
Street lights installed	<u>0</u>
Mast arms installed	<u>0</u>
Street lights relamped - 1100 Area	<u>115</u>
Street lights relamped - 700 Area	<u>1</u>
Flood lights relamped - 1100 Area	<u>17</u>
Flood lights relamped - 700 Area	<u>1</u>
Stack lights relamped - 700 Area	<u>0</u>
Traffic signals relamped	<u>2</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>85</u>
New services installed	<u>2</u>
Services removed	<u>2</u>
Scheduled outages	<u>2</u>
Unscheduled outages	<u>1</u>
Trees trimmed	<u>43</u>
Stand by and Escort	<u>2</u>

TRAFFIC SIGNALS

Operational failures	<u>3</u>
Installations	<u>0</u>
Removals	<u>0</u>
Routine check R. R. signal at Van Giesen	<u>5</u>
Total signals in operation - automatic	<u>19</u>
Total signals in operation - manual auxiliary	<u>5</u>
Total signals in operation - flasher	<u>3</u>

RICHLAND ELECTRICAL UNIT

PUBLIC WORKS ELECTRICAL MAINTENANCE

Electrical motors checked and serviced - irrigation	<u>15</u>
Electrical motors checked and serviced - water	<u>95</u>
Electrical motors checked and serviced - sewage	<u>64</u>

FIRE DEPARTMENT TEST AND MAINTENANCE

Inside circuit and equipment checks	<u>4</u>
Outside circuit checks	<u>6</u>
Inside faults repaired	<u>0</u>
New circuits placed in operation	<u>0</u>
Outside faults repaired	<u>2</u>
New boxes placed in operation	<u>0</u>

SUBSTATIONS

Main feeder and tie breaker checks - BBLS1	<u>5</u>
Main feeder and tie breaker checks - BBLS2	<u>5</u>
Secondary and pad located stations - checked jumpers, cutouts, grounds and general condition	<u>26</u>

METERING - OPERATION, MAINTENANCE, CONSUMPTION AND REVENUE

Voltage and load checks	<u>1</u>
Meters tested - customer's requests	<u>2</u>
New meters shop tested	<u>30</u>
Faulty meters replaced or repaired	<u>3</u>
Damaged meters and covers	<u>0</u>
Residential read-ins	<u>228</u>
Residential read-outs	<u>222</u>
Residential disconnects	<u>13</u>
Residential reconnects	<u>13</u>
Radio interference checks	<u>0</u>
Overloaded meters changed out	<u>27</u>
Routine meter tests	<u>19</u>

Consumption and Revenue:

	<u>No. of Meters</u>	<u>KWH</u>	<u>Revenue</u>
Residential - Schedule 1	6,980	3,995,681	\$45,335.90
Commercial - Schedule 2	<u>416</u>	<u>3,926,453</u>	<u>28,449.95</u>
Total	7,396	7,922,134	\$73,785.85

RICHLAND ELECTRICAL UNIT

COMMENTS

STREET LIGHTING:

Replaced defective photo cell to Yakima Bridge lights. The usual routine relamping, tree trimming from circuit, and station maintenance was performed during the month.

TRAFFIC SIGNAL SYSTEM:

Installed replacement detector pad and wiring to traffic controller damaged by contractor at George Washington Way and Van Giesen.

Replaced lenses and reflectors to traffic signal at Riding Academy and relamped the signal.

Readjusted timers to traffic signals on Goethals, Swift to Lee.

Performed weekly checks to all traffic signals and controllers.

FIRE PROTECTION SYSTEM:

Installed conduit and wiring for PBX board wiring for battery service at Central Fire Station.

Cleaned batteries to Repeater circuit #10 to remove leakage path to ground, which was indicating a tendency to circuit failure. This was an unusual maintenance item other than routine. Performed bi-monthly cleanup and performance checks to all battery banks to fire alarm circuits.

Repaired defective phone jack switch in fire alarm box #821 on #4 circuit.

Tested auxiliary fire alarm circuit at Jason Lee School.

Performed routine auxiliary circuit tests to Dental Bldg, Health Center, Desert Inn and Dormitories.

WATER SYSTEM:

Repaired controller to irrigation pump motor to Pump No. 3.

Performed weekly inspection and servicing to electrical installations to domestic and irrigation wells.

SEWAGE TREATMENT AND DISPOSAL SYSTEM:

Checked and repaired motor control defects to 60 hp motors at Sewage Treatment Plant.

Relamped pilot lamps for annunciator and control boards at Sewage Disposal Plant. Made operational checks to all Sewage Plant motors.

Extended service to rest room facilities at Riverside Park, and re-arranged services to sewage lift and chlorinator bldgs., and removed and eliminated one meter.

Completed routine checks to electrical equipment to main plants and lift stations.

GENERAL COMMUNITY ELECTRICAL MAINTENANCE:

Replaced defective lighting control switches in game room at Community House.

Repaired bank of flood lights to parking lot in rear of Community House.

RICHLAND ELECTRICAL UNIT

GENERAL COMMUNITY ELECTRICAL MAINTENANCE (Continued)

Connected service to Paint Busses at Snow between Longfitt and McClellan and on Kuhn between Sanford and Willard.
Assisted Community Maintenance in topping and removing dangerous trees at two locations where danger to electric circuits was associated with removal.

MAINTENANCE AND OVERHAUL - OUTSIDE LINES AND STATIONS:

11 customers were disconnected and reconnected during the month for non-payment of either use of electricity or meter deposit or both. All customers were reconnected as of September 19th.
Performed routine transformer overhaul to 8 transformers during the month as customary when transformers are removed or installed.
Performed routine station checks and overhaul to all school transformer stations, mostly located in vaults. Weekly to 7200 volt switches and controls in main 115 KV stations, feeding outside lines.
Performed monthly check on all ground stations in fenced locations in Richland.
Repaired broken service insulator at 1603 Davison.
Assisted tenants in making heating installations in Ranch House Area by disconnecting and reconnecting services as requested at 6 locations.
Installed permanent services to commercial building at Van Giesen and Wright, Fleiss-Davis at 615 Goethals.
Installed temporary service to Western Union building on Parkway, contractor at Wright and Van Giesen, All Saints Church at Symons and Kimball.
Removed service from Tract House J700-901 George Washington Way Bldg 69X.
Repaired switch blade on 23X64 that was closed in a defective manner and dropped open causing unscheduled outage to some customers on that line from 6:30 to 8:20 AM, 9-1-55.
Replaced two 15 KVA transformers with two 25 KVA transformers to station at Anderson Store to meet increased 3 phase power demands along Parkway. Planned outage of 2 hours was necessary.
Replaced three 75 KVA transformers at south end of Uptown Alley to meet increased power demands in that area, with three 100 KVA transformers. No outage was necessary.
Two planned outages were necessary on Rebuild #2 south of Fries and west of Thayer to transfer 7200 volt circuits to new poles.
On Rebuild #3, 85 KVA of transformer capacity was removed from the system due to more economical placement of transformers.

CALLCUTS:

Four weekly men and three monthly men were called out during the month.

COMMUNITY OPERATIONS SUB-SECTION
ENGINEERING UNIT
MONTHLY REPORT
SEPTEMBER 1955

<u>PERSONNEL:</u>	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>
Employees Beginning of Month	7	4	11
Transfers Out	1	0	1
Transfers In	0	0	0
Terminations	0	0	0
Total End of Month	6	4	10

BUILDING PERMITS ISSUED IN SEPTEMBER

1. Spencer R. Greer - Wood Frame Shed - 1032 Birch Ave.
2. L. J. Chockie - Workshop & Greenhouse - 1116 Cottonwood Drive
3. J. E. Bradley - Frame Garage - 1107 Sanford
4. E. H. Blick - Frame Garage - 2009 Humphries
5. 2 Sign Permits

NEW MUNICIPAL CONSTRUCTION STARTED IN SEPTEMBER

Replacement of Thin Wall Steel Mains

NEW PRIVATE CONSTRUCTION STARTED IN SEPTEMBER

Spencer R. Greer - Wood Frame Shed - 1032 Birch Ave.
L. J. Chockie - Workshop & Greenhouse - 1116 Cottonwood Drive
J. E. Bradley - Frame Garage - 1107 Sanford
E. H. Blick - Frame Garage - 2009 Humphries

PRIVATE CONSTRUCTION COMPLETED IN SEPTEMBER, OR ON WHICH FINAL INSPECTION MADE

NONE

ENGINEERING JOBS COMPLETED IN SEPTEMBER

C-0578 - Water and Sewer Line to Property on Gillespie
C-81591 - Engineering Work in Connection with Installation of Blacktop on
Project Work in 300 Area
C-98001 - Extending Sewer to Vacant Lot "Rose Garden"
C-98096 - Water, Steam and Electricity Study - Elite Shop

ENGINEERING JOBS COMPLETED (Cont.)

- G-01009 - Knight Street Improvement
- G-01010 - Extension Torbett West of Perkins Avenue
- G-01012 - Boise Street Extension
- G-02176 - Comfort Station, Sewage Lift Station - Chlorination Station, Riverside Park
- G-03628 - Van Giesen Street Improvements (Geo. Wash. Way to Hunt Ave.)

STATUS OF ENGINEERING UNIT PROJECTS

- G-01015 - Water Service to Commercial Users (7 locations) - 99% complete. Final inspection to be made.
- G-01018 - Relocation of 20" Meter at 300-F Well - Contract award 6-28-55. Materials on order. No construction started.
- G-01019 - Water Meter & Check Valve, No. Richland - Project cancelled. Physical completion notice prepared.
- G-02171 - Automatic Bar Screens Sewage Lift Station - Contractor started work September 19, 1955. 5% complete.
- G-02193 - Development Riverside Park - North of Lee Boulevard - 85% complete. Driveway oiling is completed.
- G-02197 - Water Meter Installation for 300 Area Supply Lines - Material on order. No construction started.
- G-03629 - Replacement of Thin Wall Steel Water Lines (FY 1955) - Contractor started work 9-16-55. 20% complete.

STATUS OF ACTIVE ENGINEERING WORK ORDERS

- C-0572 - Study of Drainage Ditch from Swift Blvd. to Origin on Wellsian Way - 80% complete. Design delayed for pressing construction work.
- C-0579 - Harris Avenue, Gaillard Place & Hains Avenue Extensions - Started preliminary design 9-21-55.
- C-111460 - Plat and Legal Description Christian Science Society - 90% complete.
- C-111461 - Revise Legal Description of 11 Churches - 80% complete.
- C-81020 - "As Builts" - Phase III - 78% complete. (Decrease from last month based on increase of work scope). Work scheduled completed Oct. 15, 1955.
- C-81384 - Plot Lot Lines on Utility Drawings from Plats of Richland - 85% complete. Work scheduled complete Oct. 15, 1955.
- C-81578 - Basin Located West of No. Richland Recharge Basin - Design 90% complete. It was forwarded to AEC for review on 8-26-55.
- C-95450 - Replace Lot Line Corner Stakes - an open active file.

STATUS OF ACTIVE ENGINEERING WORK ORDERS (Cont.)

C-98020 - Plat and Legal Description - Vacant Lot So. of Morgan's Warehouse - 90% complete.

C-98054 - Legal Description "Rose Garden" - 90% complete.

I-90914 - Utility Lines, Legal Descriptions and Diagrams for Churches - 90% complete.

I-91014 - Retirement of Separate Irrigation System - Design 90% complete.

I-91024 - Retirement of Irrigation Canal - Design 75% complete. Delayed for other work.

C-5108 - Plat & Legal Description 1125 Warehouse - 30% complete.

BUILDINGS UNDER CONSTRUCTION

Assembly of God Church - 99% complete. Final inspection to be made.

Plans, Specs., Inspections, All Saints Episcopal Church Addition - 25% complete. Work progressing according to schedule.

First Baptist Church (Richmond and Raleigh Sts.) - 92% complete. No progress this month.

Television Antennae - an open active file. No permits being issued.

Plans, Specs., Inspections, Christ of King Parish (Catholic) - Construction materially complete and buildings occupied.

Plans, Specs., Inspections, L. G. Cook Building - 80% complete. Work progressing slowly.

Plans, Specs., Inspections, Johnny's Drive-In Farmers Market - 75% complete. Work progressing slowly.

Plans, Specs., Inspections, Shell Oil Company Service Station - Final inspection to be made.

Plans, Specs., Inspections, Style-Rite Painting and Decorating - Final inspection to be made.

Plans, Specs., Inspections, Parker Hanson Building - Construction 25% complete.

Plans, Specs., Inspections, Alterations to Davis Furniture Co. - 85% complete.

Plans, Specs., Inspections, Davis Furniture Co. Addition - 25% complete.

Plans, Specs., Inspections, Moore's Service Station - Wright & Van Giesen - Construction 50% complete.

COMMUNITY OPERATIONS SUB-SECTION
PUBLIC WORKS AND RECREATION UNIT
MONTHLY REPORT
SEPTEMBER 1955

<u>ORGANIZATION AND PERSONNEL</u>	<u>Exempt</u>	<u>Non-Exempt</u>
Employees Beginning of Month	7	49
Transfers Out	1	12
Transfers In	0	1
New Employees	0	0
Terminations	0	6
Total End of Month	6	32

ROADS AND STREETS

The radius on McMurray Road and Thayer Drive was widened to 100 feet and guard posts installed along the inside of the turn.

The north shoulder of the highway past the Riding Academy was reshaped and the Jones Road entrance was improved during the month. Blacktopping at the approach to the Richland Animal Hospital was completed on a back charge basis in connection with the above work.

Shoulders on the 300 block on Sanford were regraded and surfaced with 3/4" minus rock to improve drainage.

Loose sand was removed from the intersection of Sprout Road and Burlin Road and the intersection repaired with base and leveling course.

Weed removal on shoulders and parking areas was started. Cleaning of catch basins and storm sewers is in progress preparatory to the Fall and Winter rainy season.

Street maintenance and patching with blacktop was continued.

Total materials used during the month were 86 tons of blacktop, 217 yards 3/4" minus rock, and 60 yards 2" base course.

The Elgin street cleaner has been broken down since August 15 - awaiting parts for repair. Scoopmobile was taken in for motor repair August 27. Balance of street equipment in usable condition.

During the month, one operator and one driver were used for vacation relief on the Sanitation crew.

PUBLIC WORKS AND RECREATION UNIT

SANITATION

Total weight of garbage and trash collected and disposed of during the month was: Residential, 840 tons; Commercial, 207 tons; Trash Wagons, 99 tons, for a total of 1146 tons.

One trash wagon was excessed to the Transportation Section for their needs. A replacement of the D-7 Crawler Tractor at the Disposal Pit was requested.

Arrangements were also made during the month to have all brush and stumps removed by other Commercial Operations units hauled to the burning ground north of the A.E.C. Airport, thereby reducing operation hazards at the Disposal Pit.

PARKS AND PUBLIC GROUNDS

The extension of Riverside Park north of Lee Boulevard is now approximately 90% complete. Remaining work consists of completing the irrigation system and planting trees. Work completed during the month included oiling of the park drive and planting the lawn areas.

The new Comfort Station at the park was completed 9-13-55 and placed in routine service. The old chlorinator building and piping was removed and the site restored.

Night watering was discontinued during the month and temporary employees were removed from the roll 9-16-55. Irrigation systems at Frankfort and Columbia were shut down and winterized. Pickup of hose and sprinklers was started. Wading pool at Riverside Park was shut down.

Shelterbelt irrigation was completed for this season and cleanup of weed and pollen areas started.

MOSQUITO CONTROL

Mosquito control work was completed for the 1955 season September 11. A complete report on the 1955 season's operation was prepared by the Assistant Engineer, Mr. Roberts, and placed on file for reference in future operations. Insecticides remaining from this year's operation were stored at the A.E.C. Airport and barrels labeled and tagged. Equipment used in the program was turned back to the Transportation Section.

PUBLIC WORKS AND RECREATION UNIT

PAINTING OF FLAGPOLE

Painting of the flagpole in the Village Plaza was completed September 26. Pole was given two coats of paint and two new ropes were installed.

RECREATION

General

The summer recreation program was completed during the month and the new fall and winter program was prepared for the months October 1955 to April 1956. Facilities and equipment used in the summer recreation program were stored and lights turned off at Columbia Playfield for the season.

The International Folk Dance Festival was held in the Community House September 24.

The Knights of Columbus sponsored the televising of the World Series for the Community Chest during the month in the Social Hall.

Riverside Waterfront Usage Policy was initiated during the month and applications for space along the waterfront by clubs and organizations are being received.

A temporary office for the F.H.A. Appraisal Group was set up in the East Social Room at the Community House.

Attendance Statistics - September 1955

	<u>No. of Sessions</u>	<u>Youth</u>	<u>Adults</u>	<u>Sub Total</u>
<u>A. Community House</u>				
American Red Cross	1		160	160
Bowling Leagues	2		18	18
Boy Scouts	3	14	8	22
Campfire Girls	1		35	35
City Council	2		48	48
Columbia Little League	1		14	14
Columbia Sports Officials	1		7	7
Cub Scouts - Pack 38	1	5	11	16
F.H.A. Appraisal Group	8		12	12
Games Room	23	1 107	197	1 304
Hi-Spot	8	2 754	32	2 786

PUBLIC WORKS AND RECREATION UNIT

Attendance Statistics - September 1955 (Contd.)

	<u>No. of Sessions</u>	<u>Youth</u>	<u>Adults</u>	<u>Sub Total</u>
<u>A. Community House (Contd.)</u>				
International Folk Dancers	7	429	662	1 091
Jewish Congregation	3	65	250	315
Junior Sportsmen	1	10	1	11
Laundry Workers Union	1		45	45
League of Women Voters	1		21	21
Orthopedic Guild	1		75	75
Pony League	4	17	68	85
Radiological Dept.	1	75	75	150
Rec-A-Teers	4		370	370
Richland Rod & Gun Club	1	75	119	194
Richland Volley Ball Assoc.	1		8	8
Richland Women's Bowling Assoc.	1		43	43
Richland Youth Council	1		9	9
Social Security	2		64	64
Stamp Clubs	2	1	17	18
Y.W.C.A. (Membership Tea)	1	7	65	72
Y.W.C.A. Bridge Club	1		12	12
Total Community House	84	4 559	2 446	7 005
<u>B. Parks and Playgrounds</u>				
Columbia Hardball Field	2		45	45
Wellsian Lake	30	1 800	250	2 050
All Playgrounds	360	10 800	500	11 300
Memorial Softball Field	3	15	60	75
Scheduled Picnics	20	400	600	1 000
Riverside Park	30	2 000	1 500	3 500
Columbia(Tennis Court Lights)	20	380	160	540
Columbia P.E. Classes	17	2 550		2 550
Total Parks and Playgrounds	482	17 945	3 115	21 060
<u>C. Summary</u>				
Community House and Parks and Playgrounds total for September 1955	<u>566</u>	<u>22 504</u>	<u>5 561</u>	<u>28 065</u>
Calendar Year to Date				<u>295 448</u>

COMMUNITY OPERATIONS SUB-SECTION
WATER AND SEWERAGE UTILITIES UNIT
MONTHLY REPORT
SEPTEMBER 1955

ORGANIZATION AND PERSONNEL

	<u>Exempt</u>	<u>Non-Exempt</u>
Employees Beginning of Month	5	22
Transfers Out	0	2
Transfers In	1	5
New Employees	0	0
Terminations	0	1
Total End of Month	6	24

DOMESTIC WATER

Normal operations and routine minor maintenance were continued throughout the month. On September 8th a leak developed in the discharge column of 3000 H Well pump. This unit was taken out of service and is scheduled for overhaul. On September 12th the 3000 D Well was taken out of service because of pump bearing trouble. This unit is scheduled to be pulled for repairs.

A sixty foot section of 8" steel dipped and wrapped water main at the corner of Richmond and Elm Streets was replaced with new pipe. Several leaks had occurred in this section of pipe which were apparently due to a local electrolytic condition. The insulated covering on the new pipe was carefully protected in an effort to retard further electrolytic action.

A six inch sectionalizing valve was installed at the south side of Swift Blvd. on the six inch water loop line supplying water to 760, 761 and 762 Buildings.

Water meters were installed during the month at the following locations:

Tri-City Herald	624 Biddle
Lucky Five Tavern	626 Biddle
Hannas Malt Shop	703 The Park Way
Moore's Service Station	Van Giesen & Wright Streets
Diettrichs Market	415 Wright Street
Christ the King Catholic Church	1200 Stevens
Amusement Enterprises	1305 Mansfield

WATER AND SEWERAGE UTILITIES UNIT

DOMESTIC WATER DATA

	<u>Well Production</u>	<u>Av. Da. Prod.</u>	<u>Total Consumpt.</u>	<u>Av. Da. Cons.</u>
Richland	136,580,000	4,552,600	419,795,500	13,993,000
North Richland	330,260,000	11,008,600	43,802,000	1,460,000
Columbia Field	77,346,000	2,578,200		
300 Area			78,486,000	2,616,200
Total	<u>544,186,000</u>	<u>18,139,400</u>	<u>542,083,500</u>	<u>18,069,200</u>

Maximum daily production 27,363,400 gallons on September 1, 1955

Maximum daily consumption 27,363,400 gallons on September 1, 1955

SEWERAGE SYSTEM

Normal operations and routine maintenance of the sewerage system were continued throughout the month. Approximately 90,000 gallons of sludge were pumped to the drying beds during the month.

On September 29th, the No. 2 Treatment Plant was shut down for periodic inspection and overhaul of all units of equipment.

SEWAGE DATA

Plant No. 1 Total Flow	40,980,000	Average Daily Flow	1,366,000
Plant No. 2 Total Flow	91,123,000	Average Daily Flow	3,037,400
Total Flow	<u>132,103,000</u>		<u>4,403,400</u>

IRRIGATION SYSTEM

Normal operation and routine maintenance were continued throughout the month.

The steel gate in the west side of Weedles Spill on the irrigation canal collapsed and it was necessary to shut the canal down for one day to replace this gate.

COMMUNITY OPERATIONS SUB-SECTION
RICHLAND PUBLIC LIBRARY
MONTHLY REPORT
SEPTEMBER 1955

<u>ORGANIZATION AND PERSONNEL</u>	<u>EXEMPT</u>	<u>NON-EXEMPT</u>
Employees beginning of month	4	8
Transfers in	0	0
Transfers out	0	0
New hires	0	3
Terminations	0	3
End of month	4	8

GENERAL

Circulation

Books	16,015
Magazines	392
Pamphlets	87
Records	1,353
Inter-library loans	26

Grand Total 17,873

Current Book Stock

Books added this month	382
Books withdrawn this month	14

Grand Total 35,920

Phonograph records added	4
Phonograph records withdrawn	4

Registration

Adult	160
Juvenile	57

Grand Total 217

Total registered borrowers 20,133

Meetings in North Hall 4

Children's Story Hour attendance 356 (Pre-school - 300;
(4 - Pre-school; 2 Elementary) Elementary - 56)

The children's story hour program was resumed September 19 with pre-school story hours being held on Tuesday and Wednesday mornings at 10:30 A.M. and elementary school-age story hours on Monday afternoons at 3:45 P.M.

Community Operations
Library Unit

The "Freedom Agenda" Discussion Group jointly sponsored by the Richland Public Library and the Richland League of Women Voters held their first session, Thursday, September 29. There were fifty registrations for participation in the group and an attendance of thirty at the first meeting. The leaders for this year's "Freedom Agenda" discussion group are Mr. C. G. Stevenson, Head, G. E. Technical Information Unit and member of the Washington State Library Commission, and Mr. D. E. Davenport, G. E. Physics Research Section.

At the invitation of Miss Dorothy Heagy, Curriculum Consultant, Richland Public Schools, Miss Marie Golubski, Children's Librarian, toured the schools to meet the school principals and librarians, on September 8. On September 20, Miss Golubski attended the elementary school librarian's meeting to coordinate plans for the Richland Public Library's contest for school children during annual Book Week, November 13 - 19.

The exterior of the library building was painted this month.

AUXILIARY OPERATIONS AND PLANT PROTECTION SECTION

MONTHLY REPORT - SEPTEMBER 1955

ORGANIZATION AND PERSONNEL

Number of employees on payroll:

	<u>Beginning of Month</u>	<u>End of Month</u>	<u>Increase</u>	<u>Decrease</u>
Staff	2	2		
Administration Area Maintenance	103	104	1 (a)	
Security and Patrol	472	468		4 (b)
Fire Protection	133	132		1 (c)
Office Auxiliaries	122	117		5 (d)
Telephone	84	85	1 (e)	
	<hr/>	<hr/>	<hr/>	<hr/>
TOTALS	916	908	2	10

NET DECREASE: 8

(a) - Administration Area Maintenance

- 3 - New Hires
- 1 - Transferred in
- 1 - Deactivated
- 1 - Transferred out
- 1 - Termination

(b) - Security and Patrol

- 4 - Terminations

(c) - Fire Protection

- 1 - Transferred out

(d) - Office Auxiliaries

- 12 -New Hires
- 2 -Reactivated
- 14 -Transferred out
- 4 -Deactivated
- 2 -Terminations
- 1 -Transferred in

(e) - Telephone

- 2 - New Hires
- 1 - Transferred in
- 1 - Transferred out
- 1 - Termination

FIRE PROTECTION UNIT

Fire Responses

HAPO	4	Loss	0
Private	1	Loss	\$ 2,000.00 (Estimated)
Outer Area	1	Loss	0
<hr/>		<hr/>	
TOTALS	6		\$ 2,000.00

Description of Fires

L. W. Vail Construction Company

Outer Area - Time 11:21 AM - 9/2/55 - Fire was in 1952 Ford dump truck at Route 2, South, Mile Post 7. Fire Chief and Captain controlled the fire with dry chemical extinguishers from the Chief's car until a water tank truck arrived. Employees had retarded the fire by covering the truck with sand and gravel. Sand was removed and fire extinguished with hose lines from Fire Department tank truck. Approximately \$2,000.00 damage to truck.

Outer Area - Time 5:08 PM - 9/11/55 - Small grass fire west of Midway. No loss.

Engineering - Minor Construction Sub-Section - Transportation & Equipment

200-West Area - Time 10:50 AM - 9/16/55 - Automotive fire at Main Gate. Battery cable shorting out against frame of DC-1C-14901-C. Removed cable from frame. No loss.

Radiological Sciences - Radiological Records & Standards - Radiation Monitoring

100-H Area - Time 5:53 PM - 9/16/55

Road asphalt ignited in burning pit. Extinguished with water from Fire Department tanker. No loss.

Rekindled 9/17/55 at 6:00 P.M. Extinguished with water from Fire Department tanker. No loss.

Manufacturing - Separations - 234-5 Operations

200-West Area - Time 3:00 PM - 9/24/55 - Ballast in fluorescent light burned out. No loss.

Manufacturing - Transportation - Bus & Rail Operations

Outer Area - Time 7:11 AM - 9/25/55 - Responded to bus fire at Richland Barricade. Found electric switch operating heating system was shorting out. Switch was turned off and batteries disconnected. No loss.

Drills Held During September

Outside drills held	105
Inside drills held	30

26,300 feet of fire hose and 1,358 feet of ladders were used for drill purposes during September.

Thirteen Round Table meetings were held by the Fire Protection Unit with eight members attending each meeting, non-exempt.

One Chemox mask demonstration and two fire extinguisher demonstrations were held by Fire Protection officers with 50 people of various departments attending.

FIRE PROTECTION UNIT (Contin)

Fire Extinguishers

Inspected	1,855
Installed	22
Delivered to New Locations	17
Seals Broken	33
Serviced	216
Weighed	446

Gas Masks

Inspected	44
Serviced	12

<u>Hose Boxes</u> inspected	30
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<u>Hand Lines</u> inspected	91
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OFFICE AUXILIARIES SUB-SECTION

Plant Mail Unit

Interoffice mail increased slightly during the past period. U. S. Postal incoming remained normal but outgoing postal increased both in volume and postage used. Teletype activity also increased sharply.

Special assignments included distribution of residential telephone directories to GE supervision, the preparation and distribution of a booklet and letter entitled "Mental Health", the preparation and distribution of the Stores Directory, and fifty-two separate distributions of the routine G.E. Review, Monogram, Organization and Policy Guides, Health Bulletins, Safety Flashes, News Letters, Management News Bulletins, etc. Addressograph increased slightly in volume during the past period and one new file was added for bulk distribution of material for non-exempt employees. The electrical billing file is being reviewed and new plates inserted to replace dull and illegible impressions.

<u>Types and Pieces of Mail Handled</u>	<u>August</u>	<u>September</u>
Internal	4,641,194	4,925,097
Postal	78,252	77,383
Special	2,046	2,058
Registered	9,532	9,218
	<hr/>	<hr/>
	4,731,024	5,013,756
Total postage used	\$2,767.54	\$3,306.08
Total teletypes handled	3,051	3,528
Total store orders handled	488	493

Plant Mail Unit (Contin)

<u>Addressograph</u>	<u>August</u>		<u>September</u>	
	<u>Number of Runs</u>	<u>Total Copies</u>	<u>Number of Runs</u>	<u>Total Copies</u>
Plate name list	120	161,030	128	170,414
Housing list	14	48,693	14	49,836
Payroll list	5	18,600	6	18,930
Total new plates	3,969		3,385	
Total corrected plates	2,186		4,136	
	6,155		7,521	

Printing Unit

Interior painting and renovating interfered with production for a period of three weeks during September.

The imposing table and type storage cabinet unit was received and installed in the Print Shop during this month. This unit will provide maximum efficiency in type setting and working arrangement in the limited floor space available to the letter press operation in the Print Shop.

<u>Work Completed</u>	<u>August</u>	<u>September</u>
Orders received	355	398
Orders completed	349	381
Average orders on hand	58.4	78.2
Copies printed	903,110	859,435
Vacuum frame plates masked	736	521
Negatives processed	730	708
Photo copy prepared	469	216
Litho Plates processed	811	587

Stenographic Unit

Six Stenographer-Typists and three Stenographers were assigned to the Stenographic Unit during September. Twelve permanent transfers and twenty-nine temporary loan assignments were made to other plant units.

The work load was light the first part of the month, becoming quite heavy the latter two weeks. Larger assignments included work for Employee Services on Good Neighbor Fund ballots and Community Chest material distribution, large numbers of non-exempt rating sheets for a number of organization components, preparation of Stores Catalogs, and collating and enveloping of Organization and Policy Guides for the Finance Department.

At the request of the Manager, Education and Training Section, the Stenographic-Secretarial Training Program developed by that section was presented to secretaries, stenographic and clerical personnel in the Transportation Section by the Supervisor, Stenographic Unit. Other sections have requested this program and additional meetings are being scheduled.

Stenographic Unit (Contin)

Revision of "This Way, Please" to bring it up-to-date was started during the month and it is planned to reissue this book in the next few months. Responsibility for issuing this booklet was transferred from the Procedures and Computing Section of Finance Department by mutual agreement.

	<u>August</u>	<u>September</u>
Total production hours	2,249	2,591.5
Training hours	744	617
Unassigned hours	79	94
Holiday hours	----	88
Meeting hours	4.5	7
	<hr/>	<hr/>
	3,076.5	3,397.5

Duplicating Unit

Tests made on new pre-sewn Repelex form and ductor roller covers used on 1250 offset presses indicate that considerable labor savings can be realized through their use. Previously, old-style covers had to be sewn on by hand. A supply of these covers has been requisitioned.

A new type Haloid developer which eliminates the necessity for using plate cleaner in connection with the Xerox process is being stocked in Stores for use by duplicating offices. Elimination of the cleaner will result in an annual saving of approximately \$673.00 (cost of cleaner purchased last year) to the plant; considerable labor savings should also be realized. In addition, plate life, which was shortened by abrasive action of the cleaner, will be lengthened.

Priority jobs handled included an order for 2,425 copies of the new General Electric contract with the A.E.C. The job was run by duplicating personnel assigned to the 760 Building, and required less than three hours running time. A total of 64 orders for Organization and Policy Guides (approximately 97,000 copies) were completed by Central Duplicating during the month. No Organization and Policy Guide orders were on hand at month's end.

	<u>August</u>	<u>September</u>
Orders received	3,497	3,417
Orders completed	3,347	3,375
Orders on hand	201	190
Offset plates	16,637	14,907
Offset copies	1,010,564	1,177,072
Verifax masters	2,959	3,383
Verifax copies	8,963	10,939
Ditto masters	554	514
Ditto copies	9,778	12,580
Zerox plates	1,897	1,584
Ozalid masters	10	66
Ozalid copies	55	515
Embosograph orders	2	3
Embosograph copies	13	10
Number of copies duplicated	1,029,373	1,201,116

Office Equipment Unit

Office Furniture

The expendable office furniture inventory account 93 was valued at \$10,404.00 on August 31, 1955 or an average of 2.1 months supply on hand. Withdrawals for the month were \$1,567 and receipts in the amount of \$3,067.

The following is a detailed list of pieces of furniture handled during the month:

<u>Item</u>	<u>Issued</u>	<u>Received</u>	<u>Salvage</u>
Bookcase	8	0	3
Blackboard	9	0	0
Cabinets	43	19	66
Card File	1	1	3
Costumer	11	5	5
Chair	125	50	81
Desk	27	19	11
Daveno	2	0	0
Table	51	19	23
Miscellaneous	221	37	6
	—	—	—
	498	150	198

The volume of furniture handled remains about steady in comparison with two previous months activity.

A total of 77 service orders and 10 work orders were issued to cover cost of minor repairs of office furniture and repair of file cabinet locks during the month.

There were a total of 384 debit and credit store orders processed during the month. This is an average of 18 orders per working day.

Two special type settee couches were ordered and received. Before placing an order to replace approximately 65 household type davenos now being used in ladies rest rooms, several styles and models of divans are being checked for comfort, quality and price.

Office Machines

The total number of machines in service and stock as of the 20th of September was 4,314 or a net increase of 17 machines over previous month.

An inventory of portable refrigerant type air conditioners is in process to establish a record of proper specifications, acquisition cost and custodian of equipment. Plant Accounts, unit of the Finance Department, will be given a report on these.

There is a total reduction of 54 machines in service by General Electric during the past year even though two additional operational areas have gone into service with an increase in total number of personnel. AEC Operations has a reduction of 108 machines which has resulted from reduction of personnel in their operations.

Office Machines (Contin)

A total of 403 machines were transferred from construction forces to operations. These machines are being issued to upgrade machines now assigned to operational units. The older machines will be excessed as surplus to operations requirements.

The reconciliation of office machine inventory has reduced the number of machines missing from IBM inventory listing to 16. Further investigation will be made before removing from records. Plant accounts has completed their reconciliation and have reported 83 machines unaccounted. A listing of these machines was furnished to Office Equipment Unit and it appears that many of these machines can be located or records corrected from factual information found where records were being erroneously posted.

Office Machine Repair Unit

Two days special instruction was given on Monroe Calculators by a representative of the Monroe Calculator Company.

A special study was made to determine how many machines remained that require maintenance inspection. This is in line with goal for the year, to have inspected all machines this year that did not receive an inspection last year, 1954. At the start of the year, approximately 1,700 needed such attention; to date approximately 900 have been inspected.

During the month, cleaning equipment was delivered to the 100-H Area satellite shop. This is another step in equipping this shop to take care of all types of cleaning and repair in the 100 areas.

Steps were taken during the month to procure space in the 2705Z Building. Space will be used to establish a one man office machine repair shop to service the 200 East and 200 West areas.

During the month, four time attendance recorders were installed in the White Bluffs area. These are to be used by the personnel of the Minor Construction Section.

A special radiation detection instrument was assigned to the instrument group by Security Patrol Unit. This equipment was completely overhauled and put into service. This machine will be maintained on a routine work order issued by Security and Patrol Sub-Section.

Repair tickets processed:	<u>August</u>	<u>September</u>
	671	432

ADMINISTRATION AREA MAINTENANCE SUB-SECTION

Following request from the Commission for assignment of approximately 7,250 square feet of additional office space in 703 Building in return for space they propose to vacate in 760 Building, studies were inaugurated to determine feasibility of such a move.

Three small installations of Hauserman partition were made in 700 Area in September.

Administration Area Maintenance Sub-Section

Effort is being made to justify with AEC acceptance of second low bid on new supply of movable partitioning, inasmuch as low bidder's product is not interchangeable with product now in use and there is no justification for stocking two non-matching types. Existing stock is very low.

Thirteen office moves were made in September.

Another informal inquiry from Commission personnel regarding vault space that would be required in a new structure to replace 760 Building vault space indicates that AEC is still working on the proposed new building.

Liaison work was done in connection with installation of water line along south side of area adjacent to Knight Street.

Arrangements have been made to assign millwrights to shifts to provide necessary routine maintenance attention to Transportation heating system and perform other general maintenance work.

Union Relations has advised the HAMTC Council of our intention to assign 5 to 7 craftsmen to swing shift, starting October 10 and continuing for 8 to 10 weeks, to install asphalt floor tile and paint 700 Area offices which are occupied during day shift.

Building and Equipment Maintenance

Four 10,000 cfm "Comfort" evaporative coolers were installed at Buildings 761 and 762. Four 10,000 cfm and four 7,500 cfm coolers are yet to be installed at this same location to complete necessary improvements to the air cooling system.

All 700 Area roof drainage down-spouts have been inspected and repaired or replaced as necessary.

Steam was turned into all 700 Area buildings and lines were checked for leakage.

Miscellaneous installations completed included two drinking fountains and one steam radiator in 760, two steam radiators in 703, one radiator in 761, and four unit heaters and two evaporative coolers at 716.

Biennial overhaul of No. 4 boiler at 784 was completed and overhaul of No. 2 boiler is 25% complete. Annual overhaul of steam boilers at 1171, Central Stores and Central Fire Station were also completed.

Major repairs and alterations have been completed on the Ross hot air furnaces at Building 1171. This work was recommended by, and performed under the direction of the J. O. Ross Engineering Company, and it is anticipated that many of the operating problems experienced last year will have been eliminated through these improvements.

Monthly inspection of fire alarm systems and electric lift trucks was completed according to schedule.

Building and Equipment Maintenance (Contin)

Electrical installations completed during the month included 80 light fixtures, 16 receptacles, nine buzzer systems, three motors and one exhaust fan.

Interior cycle painting was completed in 717 Building and two women's restrooms in 761. Other paint work performed included 20 miles of center-striping on area roads, 30 "School Zone" markings on streets and 51 street marker signs.

A total of 28 lineal feet of Hauserman partitions were installed and 16 lineal feet relocated in 703, and a 16 foot frame partition was removed from Room 2129 in this same building.

Routine maintenance was continued on buildings and equipment in the 600 and 700 Areas, Central Stores, Consolidated Transportation Shops, Kadlec Hospital and Public Health; and locksmith and glazier service was supplied to all areas.

Responsibility for performance of maintenance work at Kadlec Hospital and Public Health will be transferred to Community Section as of October 1, 1955.

Building Services

Protective floor seal was applied on all fir floors in Buildings 770, 770-A, 770-B and W-10; rooms 200 through 209 and the south half of hutment in Building 705; and four offices in 703.

Color seal was applied on all concrete floors in Building 707; and three restrooms in 761.

Special vacuum cleaning service is being supplied to the IBM section of Building 713 in an attempt to minimize equipment down-time caused by dust particles.

Routine janitorial service was continued according to schedule.

Steam Operation

No. 1 boiler was in service at the beginning of the month, with No. 2 awaiting biennial major overhaul, No. 3 in reserve and No. 4 approaching completion of major overhaul.

Increasing heating load necessitated placing No. 3 boiler in service on September 22.

At the close of the month, Nos. 1 and 3 boilers were in service, No. 4 in reserve, and No. 2 undergoing major overhaul.

All main and branch lines of the steam distribution system which had been turned off during the summer months were re-energized during the month, and heating steam was supplied to many of the connected buildings.

The quantity of steam generated at 784 Plant was 0.7% greater than for the same period of the previous year.

On September 16, representative of the Travelers' Indemnity Company inspected Nos. 2, 3, and 4 boilers at the 784 Plant and the boiler at Central Stores Heating Plant.

Steam Operation (Contin)

At Central Stores Heating Plant, the 12,000 gallon fuel oil supply tank and the pump suction, discharge, and relief lines were cleaned. Following this the tank was filled with oil and the boiler fired up for a test run.

Coal Consumed: 610.55 net tons.

Steam generated: 8,840.7 M. Lbs.

Steam leaving plant: 7,531.5 M. Lbs.

Steam delivered: 5,371.5 M. Lbs.

Total water softened: 1,400,900 Gallons

Total soft water sent to Kadlec Hospital: 86,280 Gallons

Total soft water sent to 784 Heating Plant: 1,314,620 Gallons

TELEPHONE SUB-SECTION

The Stromberg-Carlson Company completed all required corrective work in the 700 area Plant Telephone Exchange on September 23 and the Exchange was formally accepted by General Electric from the Hanford Operations Office, Atomic Energy Commission.

Publicity in the MANAGEMENT NEWS BULLETIN and the GE NEWS on the use of plant telephones for non-official calls resulted in a decrease of approximately 6% as measured by a four-day study immediately following the publicity.

In the four weeks from August 20 through September 18, 219 new residential telephones were installed and 61 residential telephones were relocated for subscribers who had moved to new locations. During the same period 117 new requests for residential telephones were received. At September 30, the back-log of requests for new telephones had been reduced to 50, and 23 outside moves were yet to be completed. The request for new telephones are still being received at the rate of approximately 25 a week.

Prepared and submitted appropriation request AR-56-EX-3 for \$6000 to cover cost of telephone instruments and other items of subscribers station equipment for the remainder of the first half of FY 1956.

Plant Telephone Operations

At the request of the Electrical Utility Section, two temporary control circuits were provided between the 100K and 100B areas for use in connection with fault-tests made on the 230 KV system on September 29.

Completed removal of cable half-taps which were installed for the purpose of placing the 700 Area exchange in service.

Located and cleared an insulation fault in the 200W area distribution cable system.

Located and cleared a moisture fault in the Gable Mountain-BY exchange aerial cable.

Service wire installations were removed from the 69X building and the several hutments along the South side of the 700 area.

Removed the PBX switchboard and associated equipment from the Central Stores Building. The PBX system was replaced in August with direct lines from the 700 area Plant Exchange.

Plant Telephone Operations (Contin)

Assisted the Stromberg-Carlson Company in correcting wiring and equipment deficiencies in the new 700 Area exchange and completed the follow-up testing of all equipment on September 23.

Repaired an intercommunication system cable in the 100BC area.

At the request of the Z Plant Sub-Section, Plant Telephone Unit personnel repaired and tested the 234-5 Building PAX system.

Prepared job specification P-56-7 for installing additional cable in the vicinity of the 3707-D Building in the 300 Area. This addition is required in order to provide additional services to the 306 Building.

Prepared job specification P-56-8 to cover the addition of approximately 400 feet of 26 pair cable and two terminals in the vicinity of the 3746 Building, 300 Area.

At the request of the Plant Accounting Unit, started unitizing the equipment in the new 700 area exchange.

Preparation of information for the December edition of Plant Telephone Directory was continued through the month.

Commercial Telephone Operations

The Atomic Energy Commission owned section of the Richland-Kennewick trunk cable was put under gas pressure and similar work was started on the Richland-Pasco trunk cable.

Installed a PBX switchboard in the Richland Central Fire Station. This switchboard was designed and assembled by Telephone Sub-Section personnel.

Installed a 1A key system at the No. 2 fire station.

Replaced eight cable terminals in the vicinity of Winslow and Fries streets and rearranged drop wires as required by relocation and replacement of power poles by the Richland Electrical Unit.

Replaced a 16-pair cable terminal behind the W-10 building with a 26-pair size terminal.

Prepared five engineering jobs relating to minor outside plant expansion and improvement.

Radio System Operations

Modified radio remote control and intercommunication equipment at the Richland Central Fire Station and installed the equipment in a new cabinet.

Operated public address equipment on the General Electric float in Prosser parade on September 5.

Relocated one intercom remote station in the Public Health Building.

Radio System Operations

Installed one additional intercom remote station in the Kadlec Hospital conference room and two additional stations in the 713 Building.

Installed and operated public address and sound recording equipment in the Columbia High School cafeteria for conference held by Dr. H. W. Parker on September 29.

Installed public address and sound recording equipment in the Carmichael school cafeteria on September 29.

Recorded Science Forum programs on September 14, 21 and 28.

Installed public address and sound recording equipment in the Desert Inn Hotel on September 13 in connection with interview of Hanford scientists on the Geneva Conference.

Station KKE 624 # 4 at White Bluffs Fire Station was out of service on September 6 from 7:00 P.M. to 8:41 P.M. due to tube failure.

Station KKE 624 # 6 at the 200W Patrol Headquarters was out of service on September 9 from twelve midnight to 9:09 A.M. due to tube failure.

Station KKE 624 # 9 at the 100F Patrol Headquarters was out of service on September 9 from 11:23 PM to 9:44 AM due to tube failure and was again out of service on September 15 from 8:00 AM to 9:23 AM due to defective fuse.

Station KKE 624 # 13 at Army Post 210 was out of service on September 24 from 10:15 AM to 7:45 PM due to a burned out transformer in the receiver power supply.

Stations KGB 886 # 1 and 2 were out of service on September 27 from 7:00 AM to 10:45 AM due to telephone cable trouble between BY tandem office and Gable Mountain.

Statistical Data

	<u>At 20th of September</u>	<u>Change from Previous Month</u>	<u>Change from Year Ago</u>
Residential Subscribers	5930	/171	-116
Business Subscribers	464	/ 3	- 26
Paystation Telephones	46	no change	- 22
Official Subscribers:			
Richland Exchange	247	/ 3	-722
700 Area Exchange	873	/ 3	/873
Process Areas Exchanges	1642	/ 8	-161
		<hr/>	<hr/>
		/188	-174

New Service Requests Received During the Month:

For Residential Service	121
For Business Service	8

TOTAL	129
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Statistical Data - Telephone Sub-Section (Contin)

Backlog of Service Requests:

For New Residential Telephones	62
For New Business Telephones	0
For Residential Outside Moves	30
For Business Outside Moves	0

TOTAL	92
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Service Orders Processed:

In Connection with Business and Residential Service	593
In Connection with Plant Service	200

TOTAL	793
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Telephone Facilities - Installed, In Service and Available

	<u>Exchange Lines</u>			<u>Party Lines</u>
	<u>Installed</u>	<u>In Service</u>	<u>Available</u>	<u>Available</u>
Richland Community	4006	3554	452	763
700-1100 Areas	1230	854	376	
Process Areas	1950	1633	317	
	7186	6041	1145	763

Radio Stations - In Service

	<u>At 20th of</u>	<u>Change From</u>	<u>Change From</u>
	<u>September</u>	<u>Previous Month</u>	<u>Year Ago</u>
Fixed Stations	34	0	-1
Mobile Stations	154	0	44
	188	0	43

SECURITY AND PATROL SUB-SECTION

Document Report

Number of classified documents and prints unaccounted for as of September 1, 1955: 307
(104 of the above 307 documents are chargeable to the du Pont Company)

Number of classified documents and prints reported as unaccounted for during September: 0

Document Report (Contin)

Number of classified documents and prints either recovered or downgraded in classification during September:

8

(Three of the eight documents are chargeable to the du Pont Company)

(Six of the documents were located and two were declassified)

Number of classified documents and prints remaining unaccounted for as of October 1, 1955:

299

(101 of the above 299 documents are chargeable to the du Pont Company)

The Non-Technical Document Review Board held two meetings during September and reviewed a total of 119 documents. Of this number -

16 had their classification retained,
1 was downgraded to "confidential",
3 were downgraded to "Official Use Only",
98 were declassified, and
1 was not within the scope of the Board.

Security Education

Four items concerning security appeared in the GE NEWS during the month.

There were 364 security meetings held and attended by 4,846 members of HAPO personnel. A representative of the Plant Protection Services Unit showed one of the security films at some of these meetings as indicated below:

<u>Film</u>	<u>Number of Meetings</u>	<u>Average Attendance per Meeting</u>	<u>Total</u>
Handle With Care	24	25	600
Badge of Honor	4	19	76

GE Security Bulletin No. 96 entitled "Who Knows?" was issued September 19, 1955.

An item of security interest appeared in three issues of the Management News Bulletin as follows:

September 12 issue: "Authors of Technical Reports concerning their issuance as "Unclassified" or "Confidential" whenever possible.

September 16 issue: "For Better Property Control" regarding the removal of government property at the perimeter barricades without an authorized Material Pass or Release.

September 29 issue: "New Edition of the Declassification Guide" for General Application is now available to plant personnel.

Two Organization and Policy Guide revisions were issued during September revising the present procedures, as follows:

"Movement of Classified and/or Radioactive Material"

"Authorization and Control of Visits and Visitors"

Security Education (Contin)

A memorandum was issued September 6 to employees located in the 703 Building, 700 Area, concerning the disposal of classified scrap for that Building. This was a revision of the present procedure.

A memorandum was issued by the Technical Information Unit listing the directory for information needs from Classified Files, in order to expedite the issuance, handling, and procurement of documents from Classified Files.

During the month of August, the Manufacturing Department conducted a security survey among its exempt personnel and determined the following:

- 99% of those polled agreed that their groups were sincerely security minded;
- 82% indicated that they reviewed security rules regularly within their groups;
- 76% indicated that security was not sacrificed for job needs;
- 97% indicated security morale was good;
- 98% concurred that security was an important part of their job; and
- 91% felt that security was not over-emphasized.

One hundred and nine employees of the General Electric Company received a "Q" security orientation talk from either a representative of the Plant Protection Services Unit or a Patrol Supervisor, and 24 employees received the "L" security orientation.

Statistical Report of Patrol Activities

	<u>100-B</u>	<u>100-D</u>	<u>100-F</u>	<u>100-H</u>	<u>100-K</u>	<u>200-E</u>	<u>200-W</u>	<u>300</u>
Pat Searches	90	90	90	90	0	0	0	1
Escorts	14	24	5	60	41	1	1	26
Ambulance runs	0	4	3	1	1	0	1	8
Passes issued:								
One day temporary	32	5	8	13	10	23	34	58
Travel	0	0	0	0	0	0	0	130
Red Tag	103	61	89	29	37	56	331	145
Telephonic	0	0	0	0	0	0	0	3
Supervisor's Post Contacts	463	191	177	157	384	310	394	172

Other Patrol Activities (computed by hours):

								300 & 700
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File Check	178	238	172	428	340	276	276	2,220
Building Check	320	67	284.6	1016	340	276	276	720

Arrest Report

<u>Violations</u>	<u>Number of Violations</u>	<u>Cont. Cases from August</u>	<u>Cases Cleared</u>	<u>Pending</u>	<u>Fined</u>	<u>Jailed</u>
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Driving while under the
influence of or affected
by use of intoxicating

liquors	1	0	1	0	1	1
Illegal Parking	0	2	0	2	0	0
No Driver's License	0	1	0	1	0	0
Speeding	0	1	0	1	0	0

TOTALS	1	4	1	4	1	1
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Arrest Report (Contin)

Citation Tickets issued:	1
Warning Tickets issued:	23
Verbal Warnings	0

Patrol Training Activities

Patrolmen attending classroom instruction during the reporting period:	304
Patrolmen attending firearms training during the same period:	177

Patrol Post Changes

On September 29, 1955, a temporary post was established at the 105-DR Badge House, 100-D Area. It will be operated on the No. 2 shift seven days per week and on the night shift as needed.

General

A survey was made of all positions within the Hanford Atomic Products Operation to determine those which fall within the Atomic Energy Commission's amended criteria for sensitive positions. This survey was completed on September 15, and forwarded to the Commission.

For the past two years, the Security Office and Classified Files have been working toward the closing out of classified records created by and issued to the National Carbon Company under its several contracts with Hanford Atomic Products Operation. After numerous audits, searches, and conferences with the Hanford Operations Office Security Branch, the final audit was approved on September 21, 1955, which accounted for all classified documents involved under the several contracts.

The Security Audit and Investigation Unit is concentrating on a comprehensive search of Classified Files in the 300 Area for unaccounted for documents. This endeavor was started September 19, 1955. At the close of the month, approximately 50% of the Files had been searched, and six previously unaccounted for classified documents were located. One of these six documents was an unaccounted for du Pont document.

Agreement was reached with the Atomic Energy Commission on permitting private vehicles to enter plant "limited" areas at times when company transportation from the badge house to the various buildings is not available. Department Managers were advised, and the effective date for this procedure has tentatively been set for October 7, 1955.

In the interest of property control, procedure has been established for notification to supervision when their employees are involved in the removal of government property through the perimeter barricades without a Material Pass in their possession.

Security Administration

Daily Badge Log Entries	2,708
"Q" Clearances	109
"L" Clearances	24
Formal "P" clearances issued	52
"P" Approval clearances issued	52
Category access granted	33
Category access withdrawn	98
Category access revised	60
Number of photos for "A" badges	44 (707 from January 1 to date)
Number of photos for "B" badges	220 (3,299 from January 1 to date)
Number of persons rephotographed	20

Total of 419 photo identification passes were laminated and issued.

Total of 989 "A" badges were assembled and distributed to the areas.

Total of 801 "A" badges were received from the areas.

Total of 39 "A" badges were received from the areas for repair.

Top Secret Clearances

Top Secret clearances cancelled during September	43
Number of clearances requested	37
Number of clearances granted	34

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HANFORD ATOMIC PRODUCTS OPERATION
General Electric Company
Richland, Washington

REPORT OF VISITORS FOR PERIOD ENDING SEPTEMBER 30, 1955

<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>
<u>ENGINEERING DEPARTMENT - ADVANCE ENGINEERING SECTION</u>					
I. Visits to other Installations					
W. K. Woods to: Commonwealth Edison Project General Electric Company San Jose, California	Discuss power reactors	J. E. Maider, Jr.	9-19-55	9-23-55	X
<u>ENGINEERING DEPARTMENT - DESIGN SECTION</u>					
I. Visitors to this Works					
H. B. Avery General Electric Company Schenectady, New York	Vibrating testing of process water pumping unit in 190-C Building	C. F. Quackenbush	9-26-55	10-8-55	X 100-B XXX 100-D XXX 300- XXX; 700
A. J. McCrocklin, Jr. Commonwealth Edison Project General Electric Company San Jose, California	Staged fault tests on 230 KV System	I. M. A. Garcia	9-19-55	9-20-55	X 100-B XXX 100-D XXX 100-K 105-KE, 105-KW 700
E. P. Peabody Commonwealth Edison Project General Electric Company San Jose, California	Staged fault tests on 230 KV System	I. M. A. Garcia	9-28-55	9-29-55	X 100-B XXX 100-D XXX 100-K 105-KE, 105-KW 700
R. Plunkett General Engineering Laboratory of Schenectady, New York	Vibration survey and of process water pumping unit in 190-C Building	C. F. Quackenbush	9-25-55	10-8-55	X 100-B XXX 100-D XXX 300 XXX; 700

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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>
II. Visits to other Installations							
R. T. Jaske to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Consultation on separations and reactor designs and process operations	F. E. Kruesi L. C. Peery A. A. Johnson	9-20-55	9-23-55		X	
C. E. Kent to: Knolls Atomic Power Lab. Schenectady, New York	Consultation on project and budget planning methods and equipment design costs	F. P. Seymour W. W. Smith	9-29-55	9-30-55		X	
E. B. Lavelle to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Attend AEC Welding Committee Meeting on collateral welding problems	H. Nowak, AEC F. W. Davis	9-7-55	9-8-55		X	
G. L. Locke to: Arco, Idaho	Discuss problems on in-pile boiling, fuel handling, and pressurized loops and remote maintenance	J. D. Bassett, Jr. R. W. Coyle F. McMillan	9-19-55	9-21-55		X	
W. J. Love to: Arco, Idaho	Discuss problems on in-pile boiling, fuel handling, and pressurized loops and remote maintenance	J. D. Bassett, Jr. R. W. Coyle F. McMillan	9-19-55	9-21-55		X	
J. O. Ludlow to: Oak Ridge National Lab. Oak Ridge, Tennessee	Consultation on separations plant process equipment design and operations	A. C. Jealous	9-20-55	9-21-55		X	
J. O. Ludlow to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Consultation on separations plant process equipment design and operations	L. C. Peery	9-22-55	9-23-55		X	

ENGINEERING DEPARTMENT - ENGINEERING ADMINISTRATION SECTION

I. Visitors to this Works

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass. Areas
Helen Redman Los Alamos Scientific Lab. Los Alamos, New Mexico	Observe IBM accountability systems in Files	C. G. Stevenson	9-12-55	9-13-55	X	300-XXX 700
L. M. Redman Los Alamos Scientific Lab. Los Alamos, New Mexico	Observe IBM accountability systems in Files	C. G. Stevenson	9-12-55	9-13-55	X	300-XXX 700
II. Visits to other Installations						
C. G. Stevenson to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Attend meeting of Technical Information Panel	J. W. Morris	9-19-55	9-21-55	X	
C. G. Stevenson to: Bettis Plant Westinghouse Atomic Power Pittsburgh, Pennsylvania	Attend meeting of exchange of technical information	D. M. Wroughton	9-22-55	9-23-55	X	
ENGINEERING DEPARTMENT - DESIGN SECTION (cont'd)						
I. Visitors to this Works						
B. Dodge Yale University New Haven, Connecticut	Interview for possible chemical engineering consultant agreement between himself and HAPO	R. H. Beaton	9-21-55	9-21-55	X	100-K 105-KE, 105-KW 202-ACR 200-W 221-T, 221-U, Redox 300 303; 700
ENGINEERING DEPARTMENT - PILE TECHNOLOGY AND SEPARATIONS TECHNOLOGY SECTIONS						
I. Visitors to this Works						
J. O. Blomeke Oak Ridge National Laboratory Oak Ridge, Tennessee	Discuss neutron cross sections on transuranics elements.	B. R. Leonard F. J. Leitz	9-28-55	9-28-55	X	100-D 105-D 300 XXX
J. T. Robbitt Argonne National Laboratory Lemont, Illinois	Discuss Pu fabrication for ZPR-III	J. J. Cadwell	9-20-55	9-23-55	X	100-K 105-KE, KW 100-H XXX 200-W 234, 235 300 XXX; 700

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass. Areas
R. H. Fillnow Westinghouse Atomic Power Pittsburgh, Pennsylvania	Consult on future WAPD- PWR irradiation programs	J. A. Berberet	9-14-55	9-15-55	X	100-B 105-C 100-D 105 100-H 105 100-K 105-KE, KW 300-XXX
J. P. Frankel Northwestern University Evanston, Illinois	Consultation in conjunction with consultant agreement	W. P. Wallace	9-12-55	9-16-55	X	300-303
G. A. Garrett Union Carbide Nuclear Company Oak Ridge, Tennessee	Examine equipment and combined operations involving Hanford and K-25 equipment	J. B. Work L. W. Lang	9-20-55	9-23-55	X	100-D XXX 100-K 105-KE 202-ACR 200-W Redox 300-303
J. Halperin Oak Ridge National Laboratory Oak Ridge, Tennessee	Discuss neutron cross sections on transuranics elements	B. R. Leonard F. J. Leitz	9-28-55	9-28-55	X	100-D 105-D 300 XXX
P. E. Merrill National Lead Company Fernald, Ohio	Discuss sonotest instrument design	D. C. Worlton	9-12-55	9-12-55	X	300 303
L. R. Kelman Argonne National Laboratory Lemont, Illinois	Discuss Pu fabrication for ZPR-III	J. J. Cadwell	9-20-55	9-23-55	X	100-K 105-KE, KW 100-H XXX 200-W 234, 235 300 XXX; 700
D. Okrent Argonne National Laboratory Lemont, Illinois	Discuss Pu fabrication for ZPR-III	J. J. Cadwell	9-20-55	9-23-55	X	100-K 105-KE, KW 100-H XXX 200-W 234, 235 300 XXX; 700
W. H. Pennington Westinghouse Atomic Power Pittsburgh, Pennsylvania	Consult on future WAPD- PWR irradiation programs	J. A. Berberet	9-14-55	9-15-55	X	100-B 105-C 100-D 105 100-H 105 100-K 105-KE, KW 300 XXX

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Name	Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
						Class.	Unclass. Areas
W. J. Ramsey	Radiation Laboratory University of California Berkeley, California	Discuss Pu fabrication schedules on Hanford assistance to Whitney Project	W. J. Ozeroff J. J. Cadwell O. J. Wick	9-28-55	9-30-55	X	100-K 105-KE 200-W 234, 235 300 XXX
F. Ropitzky	Knolls Atomic Power Lab. Schenectady, New York	Act as courier for KAPL- 120-fuel element program	J. A. Berberet G. E. Wade	9-18-55	9-21-55	X	100-H 105 100-K 105-KE 300 XXX; 700
M. J. Ryan	Radiation Laboratory University of California Berkeley, California	Consultation on Pu fabrication schedules Hanford assistance to Whitney Project	J. J. Cadwell O. J. Wick	9-28-55	9-30-55	X	100-K 105-KE 200-W 234, 235 300 XXX
J. Shacter	Union Carbide Nuclear Company Oak Ridge, Tennessee	Examine equipment and combined operations involving Hanford and K-25 equipment	J. B. Work L. W. Lang	9-20-55	9-23-55	X	100-D XXX 100-K 105-KE 202-ACR 200-W Redox 300 303
B. Weidenbaum	Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Discuss plutonium fabrication	R. B. Richards O. F. Hill O. J. Wick	9-19-55	9-23-55	X	200-W 234, 235 300 XXX 700
G. C. Westfall	Knolls Atomic Power Lab. Schenectady, New York	Discussion on KAPL-120 in-pile loop	G. E. Wade	9-8-55	9-9-55	X	100-K XXX 100-H 105 300 XXX
D. M. Wilsey	All States Employee Schenectady, New York	Instrumentation work on KAPL-in-pile water loop modification	G. E. Wade	5-1-55	10-1-55	X	100-B 105-B, 105-C 100-D XXX 100-H 105 100-F XXX 100-K 105-KW 300 XXX
E. R. Wittry	Radiation Laboratory University of California Berkeley, California	Discuss Pu fabrication schedules on Hanford assistance to Whitney Project	W. J. Ozeroff O. J. Wick J. J. Cadwell	9-28-55	9-30-55	X	100-K 105-KE 200-W 234, 235 300 XXX

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass. Areas
C. W. Zabel Los Alamos Scientific Lab. Los Alamos, New Mexico	Discuss reactor physics experiments	J. E. Faulkner	9-29-55	9-30-55	X	100-D 105-DR 300 XXX
J. E. Carothers Radiation Laboratory University of California Berkeley, California	Discuss fabrication on 234-5 as it applies to Redwing Project	W. J. Ozeroff J. J. Cadwell O. J. Wick	9-28-55	9-30-55	X	100-K 105-KE 200-W 234, 235 300 303
L. S. Germain Radiation Laboratory University of California Berkeley, California	Discuss Pu fabrication on fabrication schedules concerning Hanford assistance to Whitney Project	W. J. Ozeroff J. J. Cadwell O. J. Wick	9-28-55	9-30-55	X	100-K 105-KE 200-W 234, 235 300 303
II. Visits to other Installations						
J. M. Atwood to: Phillips Petroleum Co. Idaho Falls, Idaho	Discuss results of Borax experiments, review ANP facilities, discuss pressurized water loops on MTR and decontamination on GEH-9 experiments	J. D. Bassett R. W. Coyle W. B. Lewis	9-19-55	9-21-55	X	
J. M. Atwood to: Knolls Atomic Power Lab. Schenectady, New York	Discuss high temperature water technology	R. H. Simon	9-29-55	9-30-55	X	
J. A. Ayres to: Iowa State College Ames Laboratory Ames, Iowa	Consult on problems concerning coatings and corrosion	P. Chiotti	9-26-55	9-26-55	X	
J. A. Ayres to: Argonne National Lab. Lemont, Illinois	Consult on problems concerning coatings and corrosion	J. E. Draley	9-27-55	9-27-55	X	
J. A. Ayres to: Knolls Atomic Power Lab. Schenectady, New York	Consult on problems concerning coatings and corrosion	L. P. Niedrach	9-28-55	9-30-55	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. A. Ayres to: Research Laboratory Schenectady, New York	Consult on problems concerning coatings and corrosion	D. W. Lillie	9-29-55	9-29-55		X	
T. K. Bierlein to: U. S. Atomic Energy Comm. Washington, D. C.	Attend Hot Laboratory symposium	E. Brunenkant	9-29-55	9-30-55		X	
L. P. Bupp to: Phillips Petroleum Co. Idaho Falls, Idaho	Discuss results of Borax experiments, review ANP facilities, discuss pressurized water loops on MTR and decontami- nation on GEH-9 experiments	J. D. Bassett R. W. Coyle W. B. Lewis	9-19-55	9-21-55		X	
L. P. Bupp to: Argonne National Lab. Lemont, Illinois	Chapter Editor's meeting S. McLain on Reactor Handbook		9-22-55	9-23-55		X	
R. E. Connally to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss analytical instrumentation	C. J. Borkowski	9-12-55	9-16-55		X	
R. E. Field to: U. S. Atomic Energy Comm. Washington, D. C.	Attend Hot Laboratory symposium	E. Brunenkant	9-29-55	9-30-55		X	
K. D. Hayden to: Babcock and Wilcox Alliance, Ohio	Inspect and discuss high J. J. Owens temperature, high pressure water technology		9-14-55	9-15-55		X	
K. D. Hayden to: Argonne National Lab. Lemont, Illinois	Inspect and discuss high C. R. Breden temperature, high pressure water technology		9-16-55	9-16-55		X	
O. F. Hill to: Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Discuss measurements methods	E. J. Walko	9-16-55	9-16-55		X	

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Name - Organization	Purpose of Visit	Person Contacted	Restricted Data		
			Arrival	Departure	Class, Unclass, Areas
R. E. Isaacson to: Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Attend meeting on development and application of Magnege techniques and inspection procedures	I. B. Venable E. J. Walko D. Brown L. Fasulo	9-6-55	9-9-55	X
R. E. Isaacson to: Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Attend meeting on development and application of Magnege techniques and inspection procedures	I. B. Venable E. J. Walko D. Brown L. Fasulo	9-27-55	9-30-55	X
R. E. Isaacson to: Los Alamos Scientific Lab. Los Alamos, New Mexico	Discuss neutron counting constants	W. W. Carter G. H. Tenney	9-29-55	9-30-55	X
W. T. Kattner to: Mallinckrodt Chem. Works St. Louis, Missouri	Discussions regarding uranium technology	W. M. Leaders A. E. Ruehle	9-6-55	9-9-55	X
W. T. Kattner to: National Lead Company Fernald, Ohio	Discussions regarding uranium technology	C. E. Polson	9-12-55	9-16-55	X
D. C. Kaulitz to: Knolls Atomic Power Lab. Schenectady, New York	Discuss fuel element fabrication	D. W. White	9-26-55	9-27-55	X
L. E. McEwen to: Phillips Petroleum Co. Idaho Falls, Idaho	Discuss results of Borax J. D. Bassett experiments, review ANP facilities, discuss pressurized water loops on MTR, decontamination on GEH-9 experiments, and CPP operation problems	R. W. Coyle W. B. Lewis C. E. Stevenson	9-19-55	9-21-55	X
L. G. Merker, Jr. to: Argonne National Lab. Lemont, Illinois	Discuss hood construction for plutonium laboratories	F. Foote	9-15-55	9-16-55	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>
R. E. Nightingale to: Argonne National Lab. Lemont, Illinois	Discuss radiation damage to graphite	W. Primak	9-12-55	9-12-55		X	
A. M. Platt to: Argonne National Lab. Lemont, Illinois	Consultation on Separations Technology Matters	S. Lawroski	9-12-55	9-12-55		X	
A. M. Platt to: U. S. Atomic Energy Comm. Washington, D. C.	Conference on chemical processing of power reactor fuel elements	K. Davis	9-13-55	9-14-55		X	
R. H. Purcell to: Knolls Atomic Power Lab. Schenectady, New York	Discuss high tempera- ture water technology	R. H. Simon	9-29-55	9-29-55		X	
F. B. Quinlan to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Installation and opera- tion of uranium shooting machine and techniques	J. A. Fellow	9-19-55	9-30-55		X	
O. W. Rathbun to: National Lead Company Fernald, Ohio	Observe special process- ing of uranium	C. E. Polson	9-26-55	10-5-55		X	
P. H. Reinker to: Phillips Petroleum Co. Idaho Falls, Idaho	Discuss results of Borax experiments, review ANP facilities, discuss pressurized water loops on MTR, decontamination on GEH-9 experiments, and CPP operation problems	J. D. Bassett R. W. Coyle W. B. Lewis C. E. Stevenson	9-19-55	9-21-55		X	
J. W. Riches to: National Lead Company Fernald, Ohio	Attend meeting of Work- ing Committee for Uranium Quality and Fabrication	C. E. Polson	9-12-55	9-16-55		X	
W. E. Roake to: The Norton Company Worcester, Massachusetts	Discuss fuel element fabrication	F. B. Huke	9-22-55	9-23-55		X	

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass.
W. E. Roake to: Knolls Atomic Power Lab. Schenectady, New York	Discuss fuel element fabrication	D. W. White	9-26-55	9-27-55		X
W. E. Roake to: Bettis Field Westinghouse Atomic Power Pittsburgh, Pennsylvania	Discuss fabrication and irradiation of oxide fuel elements	R. H. Fillnow	9-28-55	9-28-55		X
W. E. Roake to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Discuss oxide development	W. M. Leaders	9-29-55	9-30-55		X
M. J. Sanderson to: The Norton Company Worcester, Massachusetts	Discuss fuel element fabrication	F. B. Huke	9-22-55	9-23-55		X
M. J. Sanderson to: Knolls Atomic Power Lab. Schenectady, New York	Discuss fuel element fabrication	D. W. White	9-26-55	9-27-55		X
M. J. Sanderson to: Bettis Field Westinghouse Atomic Power Pittsburgh, Pennsylvania	Discuss fabrication and irradiation of oxide fuel elements	R. H. Fillnow	9-28-55	9-28-55		X
M. J. Sanderson to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Discuss oxide development	W. M. Leaders	9-29-55	9-30-55		X
J. M. Skarpelos to: Knolls Atomic Power Lab. Schenectady, New York	Attend Carbon Steel Committee Meeting	R. Koenig	9-15-55	9-16-55		X
L. D. Turner to: U. S. Atomic Energy Comm. Washington, D. C.	Attend Hot Laboratory symposium	E. Brunenkant	9-28-55	9-30-55		X
R. E. Wilson to: Ballou, B. And Wilcox Alliance, C. C.	Consult on reactions at high temperatures and pressures.	R. Blaser	9-13-55	9-15-55		X

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass. Areas
R. E. Wilson to: Argonne National Lab. Lemont, Illinois	Consult on reactions at high temperatures and pressures	C. R. Beeden	9-15-55	9-16-55	X	
I. Visitors to this Works (cont'd)						
E. Block U. S. Atomic Energy Comm. Washington, D. C.	Calcination and Purex process	F. W. Woodfield	9-8-55	9-8-55	X	300 XXX
A. J. Hill, Jr. E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Inspect Hot semiworks and discuss remote handling of equipment. Inspect underwater high level activity facilities	G. C. Oberg C. L. Pleasance J. M. Fouts	9-13-55	9-15-55	X	200-W XXX 100-B 105-C
R. Plunkett General Electric Company Gen. Engineering Laboratory Schenectady, New York	Consultant on instrument development	G. S. Cochrane	9-30-55	9-30-55	X	300 XXX
FINANCIAL DEPARTMENT - S.S. ACCOUNTABILITY SECTION						
I. Visits to other Installations						
C. B. McKee to: Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Exchange SS Account- ability data on measurements	L. R. Drake	9-29-55	9-30-55	X	
MANAGEMENT - OPERATIONS RESEARCH STUDY SECTION						
I. Visitors to this Works						
M. W. Hulse U. S. Atomic Energy Commission Washington, D. C.	Discuss statistical matters pertaining to SS materials accountability	C. A. Bennett	9-19-55	9-21-55	X	700

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class. Unclass.	Areas
L. W. Smith, Jr. to: Aircraft Nuclear Propulsion Project Operations Cincinnati, Ohio	Discuss organization of Project Operations Research	R. J. Grosch J. W. Darley	9-27-55	9-30-55	X	
MANUFACTURING DEPARTMENT -						
I. Visitors to this Works						
D. G. Ebenlack E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Observe analytical methods, procedures and standards	L. M. Knights D. F. Shepart	9-26-55	9-30-55	X	200-W 234, 235 Redox, 231 200-E 202-ACR 300 XXX; 700
F. B. Huke Norton Company Worcester, Massachusetts	Discuss special refractory problems	W. N. Mobley E. G. Pierick W. E. Roake	9-19-55	9-19-55	X	700
D. E. Webster Norton Company Worcester, Massachusetts	Discuss special refractory problems	W. N. Mobley E. G. Pierick W. E. Roake	9-19-55	9-19-55	X	700
A. J. Hill, Jr. E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Study laboratory techniques for examining hot equipment such as caves	C. A. Priode L. D. Turner J. E. Fouts	9-14-55	9-15-55	X	200-E 201-C 100-B 105-C 200-W 221-T, 221-U, Redox 300 XXX; 700
II. Visits to other Installations						
S. M. Gill to: National Lead Company Fermeld, Ohio	Attend Metal Quality Working Committee and discuss uranium quality control	C. E. Polson J. C. Mead	9-12-55	9-16-55	X	
L. M. Knights to: U. S. Atomic Energy Comm. Washington, D. C.	Accountability Meeting on accountability procedures and policies	C. Nelson	9-22-55	9-22-55	X	

RADIOLOGICAL SCIENCES DEPARTMENT

I. Visitors to this Works

OFFICIALS ONLY

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data	
					Class.	Unclass. Areas
J. T. Bobbit Argonne National Laboratory Lemont, Illinois	Discuss hood gloves, glove boxes, and Pu handling	C. M. Unruh	9-22-55	9-22-55	X	300 XXX
M. E. Ensminger State College of Washington Pullman, Washington	Consult with animal farm personnel	L. K. Bustad	9-8-55	9-8-55	X	100-F 108-F
L. R. Kelman Argonne National Laboratory Lemont, Illinois	Discuss hood gloves, glove boxes, and Pu handling	C. M. Unruh	9-22-55	9-22-55	X	300 XXX
I. H. Platz U. S. Atomic Energy Comm. New York, New York	Discuss "K" source, and inspect instruments	W. C. Roesch H. V. Larson	9-14-55	9-14-55	X	300 XXX
II. Visits to other Installations						
W. A. McAdams to: Knolls Atomic Power Lab. Schenectady, New York	Confer on radiation problems	L. J. Cherubin	9-27-55	9-30-55	X	
M. L. Mickelson to: Knolls Atomic Power Lab. Schenectady, New York	Confer on radiation problems	L. J. Cherubin	9-27-55	9-30-55	X	
H. M. Parker to: Argonne National Lab. Lemont, Illinois	Consultation on matters relating to radiological sciences	A. M. Brues J. E. Rose L. D. Marinelli	9-19-55	9-24-55	X	
C. M. Unruh to: U. S. Atomic Energy Comm. Washington, D. C.	Standardization of Hot Laboratory equipment at the various AEC installations	E. Brunenkant	9-28-55	9-30-55	X	

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RADIOLOGICAL SCIENCES DEPARTMENTSEPTEMBER 1955SUMMARY

Thirty-four informal, fourteen Class I and three Class II radiation incidents were recorded. One of the Class II incidents referred to a hand and partial body exposure of about 13 r. The other two involved spots of contamination on the neck, with doses between 5 and 10 rads.

Emission of I^{131} averaged 20 curies per week. Although this emission caused no excessive deposition on vegetation, it could have done so under less favorable atmospheric dilution conditions.

Further calculations on possible future contamination conditions in the Columbia River were made. Consideration of a system of lakes and canals for reactor effluent disposal was reopened.

Minor changes in sheep fed as little as 1.5 μ c I^{131} per day were noted. This makes the existing practical limit of 0.5 μ c per day seem justifiable without the criticism that it contains too large a safety factor.

A department general meeting was held on the topic of the International Conference on the Peaceful Uses of Atomic Energy.

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RADIOLOGICAL SCIENCES DEPARTMENT

SEPTEMBER 1955

The month-end force of 419 included 36 supervisors, 94 engineers and scientists, 24 clerical and 265 other personnel.

Number of Employees on Payroll

Beginning of Month	422
End of Month	419
Net Loss	3

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

Name

Title of Invention

J. S. Reddie

Continuous Alpha Air Monitoring System

L. D. Test

A Simple Low-Torque Anemometer

There were 51 radiation incidents, including 14 Class I incidents and 3 Class II incidents. The Class II incidents included one hand and partial body exposure of 13 r to an operator during recovery of ball third safety system material. The other two involved small spots of contamination on the neck with localized doses between 5 and 10 rads.

In 1955 to date there have been 421 radiation incidents of all kinds, compared with 276 for the same period in 1954. That part of the increase ascribable to informal incidents is not highly significant, but there has been an increase in definable Class I incidents from 55 to 117. This suggests the need for a general tightening of controls in all areas of radiation work.

An interesting survey was made of 150 foreign bodies removed from the eyes of employees this year. None of these particles was radioactive.

For several years, the department has studied designs of lightweight film badges, which would be more acceptable than the present type. None has been found that did not sacrifice some technical advantages that are judged to be essential. Recently, a new design was developed here which may or may not be satisfactory. It is proposed to test the point by seeking the cooperation of selected groups of employees in wearing the new badges along with the old for comparison tests.

Radiological Sciences Department

The emission of I^{131} averaged 20 curies per week with peak emissions of about 8 curies on two days. Favorable atmospheric dilution assured that the deposition on vegetation at off-reservation locations was not excessive. However, similar releases with typical winter conditions would have been excessive.

Ground water in wells in the Purex areas is contaminated with ruthenium isotopes and nitrate ion. This implies that the contamination did not come from the old 241-B-361 reverse well which was drilled too close to the water table. Rather, it came from the 241-B second cycle crib site about a mile away. This comparatively rapid travel must have been promoted by the ground water gradient established by the 200 West Area water mound. It is an indication for the need for acceleration of hydrological studies in order that all relevant factors may be known in advance.

The proposal to improve percolation rate in cribs and swamps by addition of gypsum has been tested on the laboratory scale. Initial success was not maintained indefinitely; tests at other concentrations may be more encouraging.

Plans to improve knowledge on the details of Columbia River contamination moved ahead as rapidly as possible. The foreseeable problems in the event of power increases, with single pass operation of the coolant system, were again studied. Total radioactivity of drinking water, accumulation of P^{32} in fish, and chromium toxicity could all be raised to intolerable levels; the effects of temperature increases would be borderline to critical.

In view of these technological findings, and perhaps even more on account of anticipated national and international ramifications of waste disposal policy, developments leading ultimately to recirculation are indicated. As an interim step, feeding of reactor coolant to a series of lakes and canals with return to the river below Hanford is receiving detailed study. Such a system would provide a hold-up time of 40 to 80 hours, which would favorably reduce total activity and water temperature. Chromium ion reduction might be reducible by a cheap enough chemical process. Collateral advantages would be erection of a ground water dam by percolation from the lakes, and the creation of a valuable aquatic biology research tool.

Although P^{32} has long been recognized as a major component of the river contamination problem, there has been surprisingly little direct study of the radiotoxicity of this nuclide. The deficiency is accentuated by the fact that P^{32} is frequently used as the reference beta emitter for studies of relative biological effectiveness. Studies have just been initiated of the sub-acute radiation syndrome for fish fed P^{32} previously incorporated in minnows.

Numerous laboratories are working on the RBE of alpha radiation compared with beta or gamma radiation. Los Alamos, for example, has developed many examples in which the RBE is found to be about 1, as contrasted with the value of either 10 or 20 used in protection calculations. This laboratory has obtained a value of 1 for Po^{210} alpha particles versus P^{32} beta particles for effects on haploid yeast. The crux of this problem is that elementary theory predicts RBE values considerably less than one for "single hit" biological mechanisms and values considerably higher

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Radiological Sciences Department

than 1 for "multiple hit" mechanisms. Before the data can be applied to the practical case of plutonium poisoning of man, the nature of the relevant determining biological effect must be known. In all cases of chronic radiation injury, this is still largely a matter of speculation.

The early work on I^{131} effects on sheep at this location indicated that the permissible uptake of this nuclide was far greater than that obtained by conventional physics calculations. However, in the last two years, marginal effects have appeared at lower levels. Most recently, some signs of injury were observed in sheep fed 1.5 μ c I^{131} per day for two years. This probably means that the working limit of 0.5 μ c per day, chosen two years with a nominal safety factor of 10, is a sound realistic limit, with no appreciable safety factor.

A department meeting, open to spouses and teen-age children, was held on the topic of the International Conference on the Peaceful Uses of Atomic Energy. The two department representatives at that meeting were also impressed into service at various general meetings on the same topic.

Director,
RADIOLOGICAL SCIENCES DEPARTMENT

HM Parker:kss

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Radiological Sciences DepartmentAPPENDIX1. Condensed Exposure Records

Type	Number of Readings	Potential High Results	Confirmed High Results
Pocket chambers - gamma	275,562	32	0
Pocket chambers - slow neutron	1,926	0	0
Film badges - beta-gamma	49,304	49	0
Film badges - neutron	724	0	0
Pu bioassay	1,215	44	0
F. P. bioassay	1,408	3	0
U bioassay	394	21	0
Alpha hand counts	39,176	0	0
Beta hand counts	46,110	2	0
Thyroid counts	139	0	0

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Radiological Sciences Department2. Regional Monitoring Records

<u>Sample Type and Location</u>	<u>Activity Type</u>	<u>Average Activity Density</u> <u>/uc/ml</u>	<u>Trend*</u> <u>Factor</u>
<u>Drinking Water and Related Materials</u>			
Benton City Water Company Well	alpha	1.3×10^{-8}	--
Richland, N. Richland, Benton City Wells	alpha	$(\leq 0.5 \text{ to } 1.3) \times 10^{-8}$	--
100 Areas	beta	$(0.5 \text{ to } 6.3) \times 10^{-7}$	--
200 Areas	beta	$\leq 5 \times 10^{-8}$	--
Pasco, Kennewick, McNary Dam	beta	$(0.6 \text{ to } 3.8) \times 10^{-7}$	--
Backwash Solids - Pasco Filter Plant	beta	$8.7 \times 10^{-3} \text{ /uc/gm}$	+3
Backwash Liquids - Pasco Filter Plant	beta	8.5×10^{-7}	--
Sand Filter - Pasco Filter Plant	beta	$6.4 \times 10^{-5} \text{ /uc/gm}$	--
Anthracite Filter - Pasco Filter Plant	beta	$1.1 \times 10^{-4} \text{ /uc/gm}$	--
<u>Other Waters and Related Materials</u>			
300 Area Wells #1, and 2	alpha	$(0.8 \text{ to } 15) \times 10^{-8}$	--
300 Area Well #4	alpha	9.4×10^{-8}	--
Well #4 measured as Uranium U	U	8.9×10^{-8}	--
Other Wells on the Reservation	beta	$(\leq 0.05 \text{ to } 43) \times 10^{-6}$	+3
Columbia River - Hanford Ferry	beta	1.4×10^{-5}	--
Columbia River - Below Reactors	beta	1.2×10^{-5}	+2
Columbia River - Paterson to McNary	beta	2.0×10^{-7}	--
Columbia River - Shore Mud	beta	$(0.3 \text{ to } 1.1) \times 10^{-4} \text{ /uc/gm}$	--
Raw Water - Operating Areas	beta	$(\leq 0.05 \text{ to } 2.2) \times 10^{-6}$	+2
Reactor Effluent Retention Basins to River	beta	$6,000 \text{ to } 25,000 \text{ /uc/sec/reactor}$ $(0.7 \text{ to } 8.4) \times 10^{-3}$	--
Reactor Effluent Retention Basins to River	alpha	$\leq 0.04 \text{ /uc/sec/reactor}$ $\leq 5 \times 10^{-9}$	--
I-131 in Farm Wastes to River	I-131	22 /uc/day 4.5×10^{-7}	--
I-131 in Columbia River - Hanford	I-131	$\leq 7 \times 10^{-8}$	--
300 Area Pond Inlet	alpha	1.4×10^{-6}	--

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Sample Type and Location	Activity Type	Average Activity Density /uc/ml	Trend* Factor
<u>Atmospheric Pollution</u>			
Gross Alpha Emitters	alpha	$(\leq 4.0 \text{ to } 5.0) \times 10^{-15}$	--
Gross Dose Rate - Separations Areas	beta - gamma	$(0.52 \text{ to } 2.1) \text{ mrad/day}$	--
Gross Dose Rate - Residential Areas	beta - gamma	$(0.38 \text{ to } 0.74) \text{ mrad/day}$	--
Active Particles - Separations Areas	beta	$(1.9 \text{ to } 5.3) \times 10^{-13}$	--
I-131 Separations Areas	I-131	$(1.6 \text{ to } 12) \times 10^{-13}$	+2
I-131 Separations Stacks	I-131	2.8 curies/day	+2
Ruthenium - Separations Stacks	Ru ¹⁰³⁻¹⁰⁶	$\leq 0.01 \text{ curie/day}$	--
Active Particles - Wash., Idaho, Ore., Mont.	--	$\leq 0.0005 \text{ to } 0.003 \text{ ptle/m}^3$	-2
Active Particles - HAPO	--	$0.008 \text{ to } 0.29 \text{ ptle/m}^3$	-2
Tritium (as oxides) - Reactor Stacks**	T	0.74 curie/day	--

Vegetation

Environs of Separations Areas	I-131	$(\leq 3 \text{ to } 8) \times 10^{-6} \text{ /uc/gm}$	--
Residential Areas	I-131	$\leq 3.0 \times 10^{-6} \text{ /uc/gm}$	--
Eastern Washington and Oregon	I-131	$\leq 3.0 \times 10^{-6} \text{ /uc/gm}$	--
Non-Volatile Beta Emitters - Wash. and Oregon	beta	$(1.6 \text{ to } 3.2) \times 10^{-5} \text{ /uc/gm}$	--
Alpha Emitters - Separations Areas	alpha	$(\leq 0.5 \text{ to } 6.6) \times 10^{-7} \text{ /uc/gm}$	--
Alpha Emitters - 300 Area	alpha	$9 \times 10^{-8} \text{ /uc/gm}$	--

* The trend factor shows the n-fold increase (+) or decrease (-) from last month, where values of n less than 2 will not be noted.

** The value recorded in the August report should be 0.52 instead of 0.09 curie/day.

FINANCIAL DEPARTMENT MONTHLY REPORT
SEPTEMBER, 1955

Information meetings for the purpose of discussing provisions of the proposed new prime contract with key personnel and others who are concerned got under way this month. This program will be accelerated in the coming weeks and subsequent meetings are to be scheduled as time will permit.

Upon direction of the Commission, arrangements have been completed with respect to the issuance of eviction notices to tenants of Government-owned housing units whose rental payments are 30 days delinquent as of October 1, 1955. On advice of the Accounts Receivable Unit, the Community Section will issue such notices by the 9th day (including week-ends) of the month following the first delinquent month. Eviction notices, the form of which was prepared by the Commission, provide for a four-day period (excluding week-ends) in which delinquent rent can be paid. If payment is not made within this four-day period, eviction proceedings will begin, with no recourse by the tenant even though payment is tendered by him, unless other arrangements satisfactory to the Commission are made.

A credit under the Washington Unemployment Compensation Act in the amount of \$254,683.78 has been allocated to Hanford Atomic Products Operation. This credit is based upon wages subject to contribution which were reported for the year 1954. As a result of the credit, no payment will be made for the third and fourth quarters of 1955 to the Washington Employment Security Department. The credit will also offset a portion of the payment for the first quarter of 1956.

The Financial Plan for FY 1956 was officially transmitted to General Electric by the Commission and was reconciled in detail.

Final results of a physical inventory of general supplies in the custody of the Community Section, taken in August, revealed an overage of \$6,923, while the reconciliation of the physical inventory figures for special materials in the custody of the Engineering, Manufacturing and Radiological Sciences Departments with book amounts showed an overage of \$555, attributed principally to the receipt of 514.1 grams of unrecorded palladium from the P-10 facilities. Reconciliation of inventory and book figures for general supplies in the custody of the Stores Sub-Section, the physical inventory of which was taken September 29 and 30, will be completed in October.

The Plant Accounting Unit is being discontinued as of October 1, its functions being assumed by two new components, the Property Accountability Unit and the Capitalization and Depreciation Unit.

Reconciliation of a physical inventory of major equipment is 50 percent complete. Reconciliations of the White Bluffs inventory, covering electricity, telephone, steam, water and sewage systems was completed and the information forwarded to AEC Finance Division with a request for billing for those items to be retained and utilized by the General Electric Company.

RESTRICTED USE ONLY

Redistribution of indirect costs of uninstalled items acquired on Project 512-R&W (100-K Area Facilities) was completed, however, recent transmittals from Washington indicate that it may be necessary to eliminate the allocation of all indirect costs to uninstalled equipment. Memoranda from Washington and local AEC further indicate that a reunition of the 100-K Facilities may be required to arrive at more realistic values prior to the booking of these items in plant accounts.

Through meetings with interested General Electric groups and with HOO-AEC representatives, it has been agreed that simplified procedures should be established for the authorization of the advance engineering necessary to prepare improved budget data. A tentative procedure has been developed in which a simplified project proposal will be used to initiate major items of advance engineering work. At the beginning of each fiscal year a letter request will be submitted by General Electric requesting authorization of a lump sum to cover the other foreseeable engineering studies to be devoted directly to preparation of the Plant and Equipment Budget.

Seven project proposals and one informal request, representing an aggregate of \$1,150,000, were reviewed, approved, and processed to the Commission during the month. After receipt and analysis of AEC directives and work authorities, eleven project authorizations were issued for a total of \$2,459,175. Twenty-three appropriation requests, totaling \$292,782, were investigated and processed during the month.

On September 19, 1955 a reallocation of Process Technology Funds was made. Reductions of \$50,000 each, in Pile Technology and Separations Technology Budgets were offset by an allocation to Design Section of \$100,000. Revised Section totals are given below:

Pile Technology Section	\$1 077 000
Separations Technology Section	1 256 000
Design Section	<u>100 000</u>
Total Engineering Department	<u>\$2 433 000</u>

The \$100,000 allocated to Design Section will be expended to perform work directly in support of maintaining continued plant operation.

The review of product billing prices, brought about by the switch from high to low NGS material production at Redox, showed a wide variation in price between BiPO_4 and Redox materials. This variation results from (1) lower uranium credit for BiPO_4 due to additional processing cost of TBP and (2) additional processing cost of 231 Building. It was proposed that the average cost of BiPO_4 and Redox material be used for billing purposes. However, the AEC has directed that actual cost for each plant be used to determine billing prices. This will result in a higher price for nitrate shipments than for buttons and shapes.

During the month a separate suspense code was established to record the cost incurred in receiving, original servicing and freight expense for construction equipment being received from other Atomic Energy Commission installations for the upgrading program of Minor Construction Major Equipment. This suspense code will also include the expense incurred to move replaced equipment from

the equipment yard to the sales yard, as well as returns received from sale of replaced equipment. The net result of this suspense code will be added to or deducted from the net book value of replacement equipment. At the end of September billing had been received covering 40 pieces of equipment with an acquisition value of \$197,794 and a reserve of \$152,538, resulting in a net book value of \$45,256. To date 13 pieces of replaced equipment have been physically moved to the sales yard; however, no transfer forms have been processed.

A letter of explanation and report on the obligational status of all active budget items at 6-30-55 was published on September 22, 1955. This report will be brought up-to-date at September 30, 1955 and will be published monthly thereafter.

The Engineering Department's Spare Parts Inventory, Caption 92 - Special Mechanical Development Parts will be transferred to General Supplies with some items in the \$75,000 inventory scheduled for excess prior to the change. The target date to complete the transfer is November 1, 1955.

The Work Order Authorization list for HAPO was revised during September and will be issued early in October. The new listing has been prepared so that individual pages may be revised and issued when necessary.

Employees participating in the Technician Training program will apply against the personnel ceiling of the section and department to which they are temporarily assigned. In this respect they will differ from personnel on the Rotational Trainee program who apply against the personnel ceiling for the Education and Training Section and the Employee and Public Relations Department.

For the first time since the 702 data processing machine has been used to prepare payrolls, checks and earnings statements for the week ending September 18 were finished by 8:00 a.m. the following Tuesday. This bettered the previous performance by six to eight hours.

The use of five IBM electric accounting machines, annual rental charges on which amount to \$32,833, was discontinued in September by the Computing and Procedures Section. These included the 412 tabulator, a component of the card programmed calculator.

Two representatives of the Computing and Procedures Section, H. Tellier and S. B. Badgett, presented papers and participated in panel discussions at the annual national AEC contractors' records management conference held in Denver on September 19 - 21.

The SS Accountability Section reports that a further liquidation of the Metal Preparation Section holdings of enriched uranium aluminum turnings was accomplished by shipment to Oak Ridge. As a result, the current status of inactive material held by Metal Preparation Area is now at the lowest level achieved to-date.

As of October 1, 1955, Fission Loss will be calculated on discharged material. So as to bring Engineering Department inventories to a comparable basis, the Reactor Area and Metal Preparation Area - SS Accountability Units have adjusted inventories to the depleted levels. Prior to October 1, 1955 Fission Loss adjustments have been delayed to the point of final process movements.

Pursuant to the SS Accountability Section's plan for 1955, a system of double entry SS material accounts was furnished for use at the Purex facility. Installation assistance through one accounting cycle will be provided at the time operations commence at the facility.

Detailed reports for the Financial Department appear on succeeding pages, as follows:

Summary of Cash Disbursements, Receipts and Advances	I - 5
Auditing Section	I - 6
Budgets and Measurements Section	I - 7
Contract Cost Section	I - 8 through I - 11
General Accounting Section	I - 12 through I - 18
Personnel Accounting Section	I - 19 through I - 21
Procedures and Computing Section	I - 22 through I - 24
Property Accounting Section	I - 25 through I - 31
SS Accountability Section	I - 32 through I - 34
Personnel and Organization Statistics	I - 35 through I - 36

SUMMARY OF CASH DISBURSEMENTS,
RECEIPTS AND ADVANCES

A summary of cash disbursements and receipts (excluding advances of \$6,800,000 and \$6,000,000, respectively, by the Atomic Energy Commission) for the months of September and August, 1955, is shown below:

<u>Disbursements</u>	<u>September</u>	<u>August</u>
Payrolls (net)	\$3 651 060	\$3 057 348
Materials and Freight	1 659 707	1 708 211
Payroll Taxes	671 632	820 920
Payments to Subcontractors	635 970	480 452
Group Insurance Premium	146 893	147 055
United States Savings Bonds	143 232	217 874
Travel Advances to Employees	91 390	72 447
Pension Plan - Employees' Portion	88 246	114 468
All Other	215 290	119 905
 Total	 7 303 420	 6 738 680
 <u>Receipts</u>		
Rent	105 069	119 004
Electricity	54 697	60 348
Telephone	51 570	52 894
Hospital	46 791	41 812
Sales to AEC Cost-type Contractors	21 379	20 095
Sundry Accounts Receivable	18 098	23 978
Refund of Travel Advances to Employees	11 121	7 786
Bus Fares	8 816	9 503
Refunds from Vendors	4 547	130
Washington State Pension Award Adjustment	-0-	53 336
Other	26 353	6 043
 Total	 348 441	 394 929
 Net Disbursements	 \$6 954 979	 \$6 343 751

Outstanding advances as of September 30, and August 31, 1955 were as follows:

	<u>September</u>	<u>August</u>
Cash in Bank - Contract Accounts	\$1 904 819	\$2 059 799
Cash in Bank - Salary Accounts	20 000	20 000
 Total	 \$1 924 819	 \$2 079 799

AUDITING SECTION
MONTHLY REPORT - SEPTEMBER, 1955

A report was issued for the completed audit listed below:

Material and Package Passes

At month-end, reports were being prepared of audits of:

Plant Libraries
Shipping Activities
Taxes
Employee Awards and Recognition Pins

Field work was continued on the following audits:

SS Accountability
Administrative Services - Office Auxiliaries Sub-Section

The following audits were started during the month:

Cost Accounting - Manufacturing Cost
Overtime Administration

Follow-ups were made to determine the extent of compliance with recommendations in reports of the following audits:

Motor Pool Operations
Records Operation and Forms Control
Traffic Activities
Graduate School of Nuclear Engineering
Tools, Protective Clothing and Equipment

As of September 1, 1955, R. E. Thomas transferred from Auditing Section to Contract Cost Section. As of September 19, 1955, J. E. McDonald transferred to Auditing Section from the Contract Cost Section.

Five employee information meetings of exempt employees were held during the month. Safety was discussed in one of these meetings, which was also attended by non-exempt employees.

BUDGETS AND MEASUREMENTS SECTION
MONTHLY REPORT - SEPTEMBER, 1955

General

As of the end of September, thirteen Business Graduates from the 1955 graduating class had reported. Of these, nine had completed rotational training, received "Q" clearances and had been permanently assigned. Four remained on rotation. One offer is outstanding to a prospect who graduates in February, 1956. All who have reported to date appear to be outstanding with comments by various supervisors universally on the high side.

On September 22, K. F. Priest of the Manufacturing Department took eight "Q" cleared Business Graduates on a one day plant tour. A second tour is planned for the other five in the near future.

One Suggestion Award in the amount of \$100.00 was approved by the Suggestion Board in September for a Financial Department employee. The employee is assigned to 300 Area S.S. Accountability.

Budgets

A meeting was held in September with HOO-AEC Budget Office to determine content and due dates for the Midyear Budget Review. Preliminary instructions were issued to the Contract Cost Section.

The Financial Plan for FY 1956 was officially transmitted to us by the Commission and was reconciled in detail. No major difficulties are expected with the possible exception of funds for equipment which were reduced and in the Weapons Program which now indicates a slight overrun.

Considerable assistance was provided in connection with the HAPU Business Review.

Contributions are also being made on the annual measurements report to be issued in December.

One employee (Bob McCutcheon) was added to fill a vacancy created several months ago through transfer of Ivan Burnett.

Measurements

Almost the entire effort of the group was directed toward development of a "Measurement Philosophy" for HAPU. This was reviewed with the Manager - Finance and is generally agreed to have some value. Work will continue for the first two weeks of October at which time it is expected that a draft will be suitable for presentation to the General Manager. The remaining time in October and all of November will be devoted to the annual report of measurements accomplishments which will be due early in December to the General Manager.

The Measurements group, namely S. G. Smolan, was assigned responsibility for preparing the Quarterly Savings Report formerly prepared by the Manufacturing Department. We are also responsible for accumulating all officially issued forecasts of objectives and reporting quarterly on achievements.

CONTRACT COST SECTION
MONTHLY REPORT - SEPTEMBER 1955

General

The Metal Preparation Section Financial Representative prepared and issued the Cost Analysis report for the Section. In the past this report was issued by the Projects and Personnel Development Sub-Section with the supporting data coming from the Financial Representative. In the future the Cost Analysis Report and the Quarterly Savings Report for the Section will be prepared and issued by the Financial Representative.

September 1955 cost reporting of Operating Costs, Process Technology Costs and Research and Development Costs for the Pile Technology Section and the Separations Technology Section will reflect graphic presentations of major cost components and end functions. These reports are completed in pencil and duplicated by utilizing the ozalid process. Advantages of this new method are presenting more useful information to management, earlier issuance of reports and reduction in report preparation cost.

The latest information with respect to the Plant and Equipment Projects Budget through FY 1957 has been prepared and distributed. This schedule reflects all active budget items included in the latest FY 1956 Financial Plan. Each item is detailed as to the status of all known items financed from, or to be financed from, the amounts authorized in the Financial Plan. In addition, the latest information with respect to treatment of the FY 1957 budget items by Washington - AEC is also included. This information supersedes letter transmitted on September 22, 1955 which reflected known action by Washington - AEC at that time.

Effective immediately the allocation of funds made available for General Plant Projects will become the responsibility of the Engineering Cost Unit. This allocation was previously made by the Appropriations Unit of Property Accounting.

Arrangements were completed to provide for the accrual to be made in September for the retroactive salary adjustment for weekly paid employees. A 2.61% accrual is being made for regular salaries, and where applicable, will be distributed to the work order detail. In addition, 3% for isolation pay and 6.3% shift differential will also be accrued.

The August Equipment Work In Progress report was revised after receipt of the current financial plan for equipment funds. The revised report gives the total funds now available by department with the unencumbered budget balance as of August 31, 1955.

A monthly report entitled "RDX Equipment Purchased" will be issued commencing Oct. 1, 1955. Included in this report will be the current month's purchases of retirement units of property financed from expense funds detailed by item with a brief description, estimated cost, organization making the purchase, the individual to whom the delivery is to be made and the program in which the equipment is to be used.

A major effort during the month was aimed at the reduction of the number of maintenance expense codes currently being used by Separations Section. The Redox expense codes were reviewed and the number was decreased from about 50 to 12 without any loss in accuracy of coding costs. The TBP, T Plant and Z Plant codes are currently under review and it is hoped that an overall 50% reduction in the number of expense codes will be possible.

Two new Unit Cost statements for the Employee and Public Relations Department were issued for the first time this month. One covers the cost per square foot serviced by janitors in 700 Area buildings, and the other covers Employment Unit activities showing the costs of hires, terminations, and transfers. These two new statements will henceforth be included in the Unit Cost Books.

Employee and Public Relations Cost Unit

A draft of a procedure designed to place the Industrial Medical Program in the status of customer to Kadlec Hospital for certain services such as X-ray, Physical Therapy, Clinical Laboratory, etc. was prepared and is currently being reviewed. This procedure calls for charging plant activities for these services at rates calculated to return a reasonable profit to the hospital. Preliminary estimates indicated an increase of approximately \$35,000 annually in non-cash revenues for the hospital with no increase in costs. An attempt is currently being made to obtain information as to amounts other industries are paying for this type service.

A detailed procedure covering liquidation practices employed by Plant Activities Cost was brought up to date and distributed to cost supervisors.

Performance bogeys recently submitted to the Budgets and Measurements Section were reviewed at their request. Due to the imminence of disposal, it was felt that these bogeys should recognize the probability of attrition and at least continue at the FY 1955 level or show some reduction. Following a discussion with the section manager involved, no change was made in the figures submitted on the assumption that no substantial attrition is anticipated in the activities represented by the bogeys.

A study of the effects of the patient load on the average per patient day revenue is being made. While still not complete, it appears that during periods of low census, revenue obtained from certain services does not decrease in proportion, thus creating a higher per patient day revenue. Reasons for this phenomenon are being sought.

The Accountant - Employee and Public Relations Cost has been requested to coordinate the Business Review for the Employee and Public Relations Department. A series of meetings has been held with the department and section managers during which the basic content and outline of the review were discussed. Assistance was also furnished department management in assembling and coordinating data used during the Business Review with Messrs. LaPierre and McCune.

Engineering Cost Unit

The FY 1956 Financial Plan, which was received from HOC-AEC on September 20, 1955, indicated that Engineering Department's request for Research and Development funds for FY 1956 were provided in full. Under the 2000 - Special Nuclear Materials Program, Process Development funds for the Engineering Department, including general overhead, amount to \$8,917,000 and under the 3000 - Weapons Program, Nuclear Research and Development funds, including general overhead, amount to \$198,000.

Instructions have been received from HOC-AEC regarding preparation of the Midyear Budget Review for Plant and Equipment Projects. Letters of instruction are presently being prepared and will be transmitted this week. The due date for this budget to HOC-AEC is November 15, 1955.

Meetings with Project Section representatives resulted in a distribution of \$25,000 overliquidation of CPFF Service Contract Fee and \$50,000 overliquidation of Minor Construction Indirect Expense. It was also decided that effective October 1, 1955 liquidation rates for CPFF Service Contract Fee would be reduced from 5% to 2% of applied labor and Minor Construction Indirect Expense reduced from 17% to 14% of applied labor. However, all future Project Proposal Estimates will contain an estimate of 15% for Minor Construction Indirect Expense.

A meeting was held with Manager, Minor Construction Sub-Section to develop a system of establishing accountability for small tools and scheduling annual inventory. Physical inventory of non-expendable small tools is to be conducted during October 1955. Priced physical inventory will be used as basis for segregating financial records into Expendable and Non-expendable classification. Also, from this inventory Property Control Records will be prepared and custodian records set up. Job superintendents will be responsible and accountable for all tools in their respective areas. By December 31, 1955 Minor Construction will develop a listing of expendable small tools which are considered sensitive, due either to value, scarcity or other reasons. A custodian will be established for each of these sensitive tools who will regulate purchase and issue as well as maintain accountability records. Engineering Cost will maintain financial records which will readily furnish information as to quantity and value of these sensitive tools. By March 31, 1956 a physical inventory will be completed of all expendable small tools and from this inventory expendable tools will be classified into control groups such as Welding Tools, Protective Clothing, Safety Devices, etc. Financial records will be segregated to show total value of each of these control groups, however, no quantity records will be maintained except for tools considered sensitive. Procedures are now being developed to place in effect the above planning.

The Civilian Application Program, sponsored by the Atomic Energy Commission, calls for extra copies of all formal research and development reports distributed via the Standard Distribution List (M-3679) including topical reports and progress reports covering research and development projects. Weapons data and production reports are excluded. Certain other formal research and development reports may be withheld from CAP distribution at the request of the issuing site, but these instances will be few. The purpose of CAP is to make available, as considerations of security permit, those portions of AEC technology which will be of use to American industry. Costs associated with the reports required by the CAP will not be charged to the organizations originating the reports but will be charged to the Technical Information Unit - Technical Publications who will then liquidate these costs to General and Administrative.

General and Consolidations Cost Unit

Cost units will begin checking pre-coded payroll masters on a routine basis in October. Use of the Payroll Master Card change listing will reduce the present time lag encountered in this operation, and should facilitate the establishment of an employees cost code at the time he is entered on the plant payroll.

A tentative cost closing schedule for the second quarter FY 1956 has been issued. The scheduled dates are somewhat later than in prior months and normal scheduling will not be resumed until late November due to various delays arising in the Computing Unit.

All cost units were instructed on proper methods of reporting AEC upgrade equipment. In the future all upgrade equipment will be segregated from cash expenditures on equipment in order to conform with AEC method of reporting.

A detailed study is being made of the Allocation of General Administrative and Protection of Plant and Personnel to the Research and Development Programs. It is proposed to use this allocation for the forthcoming Midyear Budget Review after review and approval by Financial Department management.

Manufacturing Cost Unit

With engineering assistance from the Power and Maintenance Sub-Section, Metal Preparations Section Cost Standards were established for the production of steam, water, and other products of the Power Operations Unit. A six months production and cost forecast was prepared and submitted to the Superintendent of the Power and Maintenance Sub-Section for comments. This report was favorably received by the Section Manager and the Power and Maintenance Superintendent and it was requested that this report be issued monthly as it would provide them with a valuable tool for measuring and evaluating the performance of the Power Operations.

A report on overtime hours worked by Sub-Sections was prepared for the Reactor Section Manager. Henceforth, this report will be issued on a weekly basis in order to more effectively control the overtime within the Section.

Preparation was completed for the first of a series of information meetings with Reactor Operations Sub-Section Superintendents. The first meeting scheduled for October 3 will cover preparation of the budget for Equipment Not Included in Construction Projects.

Arrangements were completed between the Reactor Maintenance Sub-Section and the Manufacturing Cost Unit to charge overtime premium to individual work orders. This will result in an equitable distribution of overtime premium to customers and may lead to the eventual reduction of IME rates for some of the maintenance units.

At the request of the Process Unit of T Plant the Separations Section Financial Representative participated in the initial scoping for a new Separations facility. The cost data for operations for this proposed new facility will be incorporated in the scope.

Arrangements were made during September to train a Manufacturing Cost Unit employee to do a pre-audit of all stores tickets at Central Stores. Stores tickets will be key punched at Central Stores when the conversion to the 702 machine is made and it was felt that some of the advantages of pre-audit of cost codes should be preserved. Previously this was done by each cost unit prior to key punching by Procedures and Computing.

Meetings were held with Plant Accounting personnel to discuss Plant and Equipment accountability and control. A meeting was also held regarding replacement and installation of utility poles. It was agreed that all replacements and installations would be done on individual work orders in order to assist Plant Accounting in making proper unitization of these charges.

A needle card system has been adopted for Equipment Work In Progress in order to improve control and speed up the sorting of cards by classification of equipment and section.

Three employees assisted with the annual physical inventory of General Supplies on September 29 and 30.

A considerable amount of time has been spent in cost analysis work to provide the Section Managers with needed data for their "Business Reviews".

GENERAL ACCOUNTING SECTION
MONTHLY REPORT--SEPTEMBER, 1955

ACCOUNTS PAYABLE UNIT

Volume of work in Accounts Payable in September was about normal; 4,372 vouchers booked, amounting to \$3,629,400. Unpaid bills at the month-end amounted to \$827,000.

Work started on the revision of the Accounts Payable Procedures Manual. This is scheduled for completion by December 1, 1955.

Cash discount earned in September, through payment of vendor invoices within stipulated discount periods, amounted to \$7,560.

Contract payments amounted to \$635,000 and open contract commitments amount to \$1,895,000.

Over-all volume of work is currently at a somewhat higher level than a year ago, as indicated by statistics shown below:

	<u>First Quarter</u>	
	<u>FY-1955</u>	<u>FY-1956</u>
Vouchers Booked	12 419	12 890
Freight Bills Paid	4 075	4 374
Purchase Orders Received	6 482	7 075
No. of Checks Issued	7 784	9 306
Cash Discount Earned	\$14 800	\$23 446

A significant point in connection with the foregoing is that the average number of personnel during the first quarter of FY-1955 was 32 as compared with 23 during the first quarter of FY-1956.

Accounts Payable:

	<u>September</u>	<u>August</u>
Balance at beginning of month	\$ 702 309	\$ 776 299
Vouchers entered	3 629 380	3 389 332
Cash receipts	4 547	131
	<u>4 336 236</u>	<u>4 165 762</u>
Less: Vouchers Paid	<u>3 509 128</u>	<u>3 463 453</u>
Balance at end of month	<u>\$ 827 108</u>	<u>\$ 702 309</u>
Number of vouchers recorded	4 372	4 740
Number of checks issued	3 123	3 203
Number of freight bills paid	1 404	1 718
Amount of freight bills paid	\$286 886	\$304 820
Number of purchase orders received	2 272	2 613
Amount of purchase orders received	\$2 283 650	\$1 926 701
Amount of cash discount earned	\$7 560	\$7 367

ACCOUNTS RECEIVABLE UNIT

The gross accounts receivable balance at September 30, 1955 amounted to \$316,451, an increase of \$46,218 from the balance at August 31, 1955. This increase represents increases of \$25,000, Sundry Accounts; \$10,000 AEC Cost-Type Contractors; \$10,000, Rent. The increase in Sundry Accounts results primarily from billings to Schenectady for non-reimbursable Association Island costs and expenses of employees transferred to the Commission at Washington, D.C. Invoices issued during the latter part of the month to AEC Cost-Type Contractors for services rendered by HAPO account for the increase in receivables from AEC Cost-Type Contractors. The increase in rents receivable is due to the fact that a number of payments by facility operators, usually received around the end of each month, were not received until after the month-end.

During the month, routines and procedures were established for issuance of eviction notices as requested by the Atomic Energy Commission by letter dated July 26, 1955. In accordance with this request, all tenants who have not paid their monthly rental by the ninth day of the following month will be notified that if such rent is not paid within a four day period (excluding weekends) they will be required to vacate the premises. Accounts receivable will notify Community Section of all tenants who are delinquent, and, based on this information, they will forward the required delinquent notice. It is anticipated that the first notices of this type will be issued on October 6, 1955, and tenants will have until October 12, 1955, to pay delinquent rentals.

Disconnect notices were mailed to 162 telephone subscribers, and the service of 12 subscribers was suspended due to non-payment of bills. During the month, 516 delinquent notices and 101 final notices were mailed to electricity customers. The service of 10 electricity customers was suspended due to non-payment of bills.

Statistics pertaining to accounts receivable are summarized below:

<u>Account</u>	<u>Balance</u> <u>8-31-55</u>	<u>Net</u> <u>Charges</u>	<u>Collec-</u> <u>tions</u>	<u>Balance</u> <u>9-30-55</u>	<u>Active</u> <u>Accounts</u>
Kadlec Hospital:					
Active	\$ 92 822	\$ 52 522	\$ 52 189	\$ 93 155	1 487
Collection Agencies					
(78 accounts)	7 085	873	272-b)	7 686	
Electricity	25 819	56 712	56 837	25 694	3 955
Telephone	31 083	54 147	52 832	32 398	7 576
Sundry:					
Active	28 696	42 380	17 815	53 261	373
Collection Agencies					
(134 Accounts-a)	7 692	211	570-b)	7 333	
AEC Cost-type Contractors	21 515	31 556	21 378	31 693	23
Rents	32 963	384 446	374 428	42 981	6 920
Equipment Sales to					
Facilities (1 Account)	20 591	-0-	-0-	20 591	
Safety Shoes	1 628	2 758	3 059	1 327	307
Loans to Employees					
(2 Accounts)	339		7	332	
Sub-Total	270 233	\$625 605	\$579 387	316 451	20 641

ACCOUNTS RECEIVABLE UNIT (Continued)

<u>Account</u>	<u>Balance</u> <u>8-31-55</u>	<u>Net</u> <u>Charges</u>	<u>Collec-</u> <u>tions</u>	<u>Balance</u> <u>9-30-55</u>	<u>Active</u> <u>Accounts</u>
Sub-Total (Repeated)	270 233	<u>\$625 605</u>	<u>\$579 387</u>	316 451	<u>20 641</u>
Reserve for Bad Debts	<u>34 763</u> cr.			<u>35 469</u> cr.	
General Ledger Balance	<u>\$235 470</u>			<u>\$280 982</u>	

- (a- Includes all utility and rental accounts.
(b- Includes commission retained by agencies.

ADMINISTRATIVE PLANNING

A total of 33 new or revised Organization and Policy Guides were distributed during September. Of these, seven were Instruction or Policy guides, twenty-five were Organization guides and one was the Numerical Index. In addition, thirty-one OPGs were in the process of duplication or distribution at the end of the month.

The seven Instruction-type guides issued during September are:

04.1.2	"Management of Work by Plant Force Laborers and Mechanics"
08.1	"Long Distance Telephone Service"
13.16	"Travel Accident or Special Accident Insurance"
13.17	"Progress Report - Non-Exempt Employees"
15.10	"Authorization and Control of Visits and Visitors"
16.8	"Motor Vehicle Operator's Permits"
24.1	"Radiation Protection Standards"

The present OPG numbering system is currently being reviewed to determine if a more logical and usable method of numbering and organizing the OPGs can be worked out.

A proposed Organization and Policy Guide on Organization Announcements has been prepared and is being circulated for comments.

220 extra copies of Organization and Policy Guides were distributed to OPG holders.

A report was made summarizing AEC transmittals received within HAPO during August, 1955 and forwarded to Department Managers.

CONTRACT REIMBURSEMENTS

To fully acquaint section managers of the Financial Department with the provisions of the present draft of the proposed revised prime contract, the Manager - General Accounting held two meetings to review this document in detail, with a third and final meeting scheduled for October. Dates have been

CONTRACT REIMBURSEMENTS (Continued)

set for meetings with employees of the Auditing Section of the Financial Department and with key personnel of the Purchasing Sub-Section, Manufacturing Department, for the first week in October, which will be the first of an extended program of information sessions to be held by the Section Manager and Reimbursement Auditors with interested groups throughout the plant.

The Contract Reimbursements group was assigned the task of revising Appendix A to OPG 04.1.1 ("Performance of Project Work"), which is an interpretation of the responsibilities of G.E. and the A.E.C. for functions performed in connection with construction projects at HAPO. Revised drafts have been reviewed with organizational components affected and it is anticipated that the revision will be ready for top management's review in October.

Charges against the Overhead Allowance in September were \$25,087, consisting of: Association Island expense, \$16,008; contribution to Richland Community Chest, \$4,600; expenses in connection with transfer of employee transferred to Washington, D.C., for an assignment with the Commission, \$2,728; conference expense (entertainment), \$676; non-reimbursable transfer expense, \$600; travel and living expense variation, \$353; expenses in connection with Company-owned cars, \$113; insurance on household goods, non-reimbursable transfer, \$9.

The August "Summary of Disbursements," transmitted to the Commission through the Chief of its Finance Division, covered disbursements of \$6,343,751, summarized as follows:

Payrolls and Payroll Deductions Disbursed	\$4 262 759
Materials (including payments on requirements contracts) and Freight	2 129 514
Subcontracts and Agreements	59 149
Advances for Traveling and Living Expenses	72 447
Miscellaneous	<u>214 811</u>
Gross Disbursements	\$6 738 680
Less: Revenue	<u>394 929</u>
Net Disbursements	<u>\$6 343 751</u>

In preparing this report, a review was made of each of 265 items which comprised "Miscellaneous" to establish their propriety, while all other expenditures were analyzed, classified and summarized to disclose the nature of all disbursements made at HAPO during the month.

Eight letter approvals, obtained in accordance with OPG 05.4 ("Work or Expenditures Which Require AEC Reimbursement Authorization or Letter Approval") were received from the Commission in September. The subjects were as follows:

- Establishment of Rental Rates for Foreign Exchange Service Provided by Community Telephone System
- Institution of G.E. Business Training Program at Hanford
- Travel and Living Expenses for G.E. Employment Supervisor for Trip in Connection with Training for Manpower Development Program.

CONTRACT REIMBURSEMENTS (Continued)

Reimbursement of Traveling and Living Costs for Employee of Research Laboratory in Connection with Consultation Services at HAPO (Assistance to Hanford Program)
Reimbursement of Cost of Vibration Analysis of Process Pumping Units (Bldg 190-C) at HAPO by General Engineering Laboratory (Assistance to Hanford Program)
Increased Distribution of "G.E. Review"--November Issue
Attendance of HAPO Employee (Social Worker) at University of Washington Workshop on Community Councils
Participation of HAPO in Civic Celebration in Benton City by Entry of Float in Parade

The Contract Reimbursements group handled 17 inquiries on reimbursement problems during the month, 12 of which originated outside the department.

One assignment performed during September included the compilation of an organization directory for the Financial Department, listing all exempt employees as of September 1.

GENERAL BOOKS UNIT

General Ledger Account 0707, Cost of Operations - Other Expenses, was established effective September 1, 1955 in compliance with a memorandum from W. E. Campbell, Washington - AEC to A. M. Waggoner, HOO. This account will be restricted to the write-off of certain SS Material due to product inventory decay. Manufacturing Cost Unit will be responsible for all entries to the account based on information furnished them by SS Accountability Section. At year end the balance of the account will be transferred to the Commission in conjunction with other year-end closing entries.

During September a total of 366 travel, living and conference expense reports were processed, representing an expenditure of \$80,679, summarized as follows:

Travel and Living Expenses - HAPO business	\$68 823
Travel Expenses billed to other Company Components	8 008
Expenses of two employees transferred to AEC-Washington	2 738
Conference Expense	657
Employee traveling for the Commission	340
Cost of Company-owned Cars	113
	<u>\$80 679</u>

Final disposition of 1954 Association Island costs was made in September, resulting in a net charge to Non-Reimbursable Expenditures Account of \$15,896, consisting of attendance costs for 69 employees at \$259 each, less a per diem allowance of \$27.00 per man and a credit variation from living expenses en route of \$112.

As of September 30, the end of the First Quarter FY-1956, total charges against the travel and living expense variation account were \$1,455 or 17% of the aggregate budgets allocated to departments.

GENERAL BOOKS UNIT (Continued)

Considerable time was spent this month in connection with changes scheduled to take place in October in distributing stores withdrawals to cost. The change in procedure provides for stores personnel to key punch IBM cards from stores tickets and forward the cards to IBM for processing, rather than for IBM to key punch cards as is currently the practice. Pre-audit of tickets will be done at Central Stores by a Manufacturing Cost Unit employee prior to their being key-punched.

Work was started on a revision of the procedure for control of, recording and billing of Special Requests and Backcharges. It is expected that the revised procedure will be published next month.

Work was continued on the procedure manual for General Ledger accounts and revision of the Cash Control Procedures manual.

	<u>September</u>	<u>August</u>
Advances from AEC		
Balance at beginning of month	\$2 079 800	\$2 423 551
Advances received from AEC	6 800 000	6 000 000
Other cash receipts	348 440	394 929
	<u>9 228 240</u>	<u>8 818 480</u>
Less disbursements	<u>7 303 420</u>	<u>6 738 680</u>
Balance at end of month	<u>\$1 924 820</u>	<u>\$2 079 800</u>
Advances requested for subsequent month	<u>\$6 800 000</u>	<u>\$6 800 000</u>
Travel and Living Expenses		
Travel Advances to employees		
Balance at beginning of month	\$ 68 345	\$ 54 075
Advanced to employees	<u>104 763</u>	<u>72 447</u>
	<u>173 108</u>	<u>126 522</u>
Less:		
Travel, living, and conference expenses reported by employees	80 679	50 391
Cash refunded by employees	<u>11 121</u>	<u>7 786</u>
	<u>91 800</u>	<u>58 177</u>
Balance at end of month	<u>\$ 81 308</u>	<u>\$ 68 345</u>
Outstanding Travel Advances to Employees		
Current	\$ 67 602	\$ 53 168
Outstanding over 30 days	<u>13 706</u>	<u>15 177</u>
Total	<u>\$ 81 308</u>	<u>\$ 68 345</u>
Number of expense reports submitted by employees	366	228

GENERAL BOOKS UNIT (Continued)

Works Cashier's Office

Number of Receipts Issued	<u>11 148</u>	<u>11 478</u>
Bus System Operations		
Cash collections: Village	\$ 545	\$ 431
Area	\$ 8 271	\$ 8 472
Tickets: Value of tickets sold	\$ 400	\$ 600
Number of tickets sold	8 000	12 000
Number of tickets collected	9 432	10 343
Cash Overages and (Shortages)		
Number	5	7
Amount	\$ (.06)	\$.94

PERSONNEL ACCOUNTING SECTION
MONTHLY REPORT
SEPTEMBER, 1955

Eight annuity certificates were delivered to former duPont employees who transferred to General Electric Company at Hanford on September 1, 1946. To date, 137 annuity certificates have been purchased from the Connecticut General Life Insurance Company.

A credit under the Washington Employment Compensation Act in the amount of \$254,683.78 has been allocated to Hanford Atomic Products Operation. This credit is based upon wages subject to contribution which were reported for the year 1954. As a result of the credit, no payment will be made for the third and fourth quarters of 1955 to the Washington Employment Security Department. The credit will also offset a portion of the payment for the first quarter of 1956.

Weekly salary rate charts were prepared to reflect the recently announced general salary increase. These rate charts were verified with rates prepared by Wage Rates Unit and will be used as a media for changing salary rates on the payroll.

Increased salary rates, shift differential rates, and isolation pay rates were furnished to the Procedures & Computing Section to enable them to prepare programs to calculate retroactive payroll amounts. Details of reports to be prepared have been agreed upon.

Non-exempt ratings were discussed with employees, rating sheets were prepared, "Let's Talk It Over" interviews completed, and rating forms forwarded to Employee and Public Relations Department for Personnel Accounting Section non-exempt employees.

A report of participation in Employee Benefit Plans showing percentage participation in each plan by organizational unit was prepared. This report was developed at the request of the Measurements group and the Employee and Public Relations Cost Unit.

With the cooperation of Procedures & Computing Section, the weekly salary checks were delivered to the outer areas during Labor Day week in time for normal distribution to weekly paid employees. No overtime was necessary in spite of the short work week.

Drafts of the contracts with the local labor unions were reviewed prior to and during negotiations with the unions. This enabled Personnel Accounting Section to be informed as to the additional requirements of the new agreements, and to prepare for payments governed by the new agreements.

Evidence of the importance of the Pension Plan to HAPO employees is illustrated by the retirements effective October 1, 1955. Nine employees retired -- three optional and 6 normal. The average length of their service is 8 years and 8 months. These employees contributed an average of \$1,077 to the Pension Trust. They will receive an average of \$431 annually in retirement income. In comparison, those employees (51) who retired in 1954 contributed an average of \$787 to the Pension Trust, and are receiving an average of \$314 annually in retirement income.

Round Table meetings with non-exempt employees were conducted by the supervisors of all units of the section during the month.

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	9 317	2 263	7 054
Additions and transfers in	148	15	133
Removals and transfers out	(201)	(33)	(168)
Transfers from weekly to monthly payroll	-	14	(14)
Transfers from monthly to weekly payroll	-	(1)	1
Employees on payroll at end of month	<u>9 264</u>	<u>2 258</u>	<u>7 006</u>

	<u>September</u>			<u>August</u>		
<u>Overtime Payments During Month</u>	<u>Number</u>	<u>Amount</u>		<u>Number</u>	<u>Amount</u>	
Weekly Paid Employees	8 277	\$161 720	-a)	6 520	\$127 932	-b)
Monthly Paid Employees	422	29 672		411	33 762	
Total	<u>8 699</u>	<u>\$191 392</u>		<u>6 931</u>	<u>\$161 694</u>	

	<u>September</u>			<u>August</u>	
<u>Gross Payroll Paid During Month</u>					
Engineering	\$ 836 992			\$ 769 223	
Manufacturing	2 957 324			2 476 382	
Other	1 333 401			1 137 378	
Total	<u>\$5 127 717</u>	<u>-a)</u>		<u>\$4 382 983</u>	<u>-b)</u>

(a- Payments to weekly paid employees are for five week periods.

(b- Payments to weekly paid employees are for four week periods.

<u>Employee Benefit Plans</u>	<u>Number Participating</u>		<u>Percent Participation</u>	
<u>Participation in Benefit Plans at Month End</u>	<u>September</u>	<u>August</u>	<u>September</u>	<u>August</u>
Pension Plan	8 125	8 134	98.5%	98.5%
Insurance Plan				
Personal coverage	9 215	9 262	99.5	99.4
Dependent coverage	6 566	6 560	-	-
U. S. Savings Bonds				
Stock Bonus Plan	4 958	4 926	53.5	52.9
Savings Plan	1 051	1 059	11.3	11.3
Both Plans	5 441	5 423	58.7	58.2

<u>Pension Plan</u>	<u>September</u>	<u>August</u>
Number retired	9	6
Number who became eligible for participation	80	87
Number who applied for participation	74	81
Number who elected not to participate	6	6
Replies not received	-	-
 <u>Insurance Plan - Number of Claim Payments</u>		
Employee Life Insurance	3	2
Employee accident and health insurance	454	431
Dependent accident and health insurance	<u>488</u>	<u>520</u>
Total	<u>945</u>	<u>953</u>
 <u>Good Neighbor Fund</u>		
Number participating	6 570	6 546
Percent of participation	70.9%	70.3%
 <u>Suggestion Awards</u>		
Number of awards	100	181
Total amount of awards	\$1 305	\$3 955
 <u>Preferential Rates</u>		
Number (eliminated) or added	(2)	(2)
Number currently in effect	535	537
 <u>Number of Military Allowance Payments</u>	3	2

PROCEDURES AND COMPUTING SECTION
MONTHLY REPORT - SEPTEMBER 1955

GENERAL

For the first time in the preparation of the payroll on the 702, checks and earning statements for week ending 9-18 were calculated and printed by 8:00 a.m. Tuesday, September 20. This performance exceeds previous performances by 6 to 8 hours. Unfortunately, machine difficulty delayed the issue of post-payroll reports until the normal deadline. Special measures by IBM service personnel and Section employees are being taken to reduce the frequency of tape reading errors thus eliminating a serious problem.

The processing of July month end reports marked the last complete EAM punched-card data processing activity of the Section. It is notable that this processing was completed in record time, all reports being completed $4\frac{1}{2}$ days after month end cut-off. Five EAM machines were taken off rental in September, including the 412 tabulator, a component of the card-programmed-calculator.

A calculation of some magnitude was completed for Chemical Development Sub-Section. The calculations were carried out in an effort to improve certain design features of the separation process. Approximately 6 hours of 702 time were required to prepare the required tabulations.

A high speed sorting routine has been completed and is now in successful operation. Section personnel who attended the annual convention of the Association for Computing Machinery report that this routine appears superior, both in generality and speed, to any other sorting routine in existence.

PROCEDURAL ANALYSIS

Forms control reviewed 367 orders during September covering 864,760 forms; 16 orders, amounting to 25,610 forms, were rejected; 103 new forms designed; 47 forms were obsoleted.

As a result of the new agreements negotiated between the company and the various bargaining units, the "Better Living" program provisions affecting weekly payroll are being worked out in detail to permit retroactive payments, and make necessary calculations and revisions to existing procedures applicable under the new plan. Logic work on weekly roll retroactive pay increases is 50% complete. Detailed programming has begun to produce control totals and to process the retroactive payments.

A 702 procedure was developed for calculating taxes on safety awards given to plant employees in August.

The main programs for processing weekly payroll on the 702 are being checked and reassembled to incorporate latest programming techniques and refinements to expedite processing.

Programming of work order control for EDPM processing is making good progress with passes 1, 2 and 3 ready for assembly and debugging at the month's end.

PROCEDURAL ANALYSIS (continued)

PROCEDURES & COMPUTING SECTION

The conversion of office machine procedures from EAM to EDPM was begun in September, with programming completed for Pass 1. Assembling and testing of pass 1, as well as programming of passes 2, 3 and 4 remain to be done.

Work was continued on conversion of APV and store order punched card procedure to EDPM. During the month the logic and programming for pass 1 was completed and debugging was started.

Vehicle conversion is approximately 85% complete as of the end of September. Testing and correction of detailed programming remains to be completed.

A work request was prepared to calculate retroactive pension adjustments for the exempt roll.

Further work is being done in securing agreement between plant accounting and property management on the new form of custodian record designed for use after plant accounting records are converted to EDPM.

A work request was prepared to calculate new exempt rates and retroactive rate increase payments; in the course of this work monthly payroll and salary administration files were coordinated so that both files can be adjusted simultaneously.

An additional procedure was developed for Salary Administration for a quarterly report by level and zone of a selected group of employees with "functional titles".

A 702 program is being prepared for the production of a proof listing of machine tools records which have been processed via punched paper tape machines. This is in conjunction with the cut-over of property records to the 702.

Detailed programming of the principal operating pass for the classified files procedure is 95% complete. The inventory pass and two listing passes remain to be programmed.

Several meetings were held with classified files supervision to develop a system for reconciliation of all files documents, particularly the present accounting for copies held by the yellow file in Schenectady. An operating change was made to process yellow file charges as though they are local routings to an account number.

RECORDS OPERATIONS

Quantity of records received, processed and stored:

Employee and Public Relations Department	17	Standard Storage Cartons
Engineering Department	14	" " "
Financial Department	111	" " "
Manufacturing Department	62	" " "
Radiological Sciences Department	4	" " "
	<hr/>	
	208	

RECORDS OPERATIONS (continued)PROCEDURES & COMPUTING SECTION

Records Retention and Disposal Schedule Number 218, "Reactor Operations Records", consisting of fifty-three individual records was developed and submitted for internal approval. Records Retention and Disposal Schedule Number 217, "Power Operations Records" consisting of twenty-eight (28) individual records was submitted to the Atomic Energy Commission for approval.

Seventy-five reels of microfilm consisting of 308,688 images were completed during the month. A total of 120 reels of microfilm consisting of 508,827 images have been completed by Recordak Corporation to date.

At the AEC Contractor Records Management Conference held at Denver, S. B. Badgett and H. Tellier participated in panel discussions and presented papers on certain aspects of records management.

NUMERICAL ANALYSIS

Report is included in Secret Document HW-39260-W.

COMPUTING OPERATIONS

During the month of September the following non-routine assignments were completed for customers:

Employee and Public Relations	6
Engineering	10
Financial	22
Manufacturing	5
Operations Research	<u>2</u>
	<u>45</u>

Service charges for the month amounted to \$68 700.86. Services, by customer, were as follows:

Atomic Energy Commission	\$ 1 470.86	02%
Employee and Public Relations	1 401.30	02
Engineering	12 440.85	18
Financial	42 477.56	62
Manufacturing	2 464.45	04
Operations Research	7 085.36	10
Radiological Sciences	<u>1 360.48</u>	<u>02</u>
	\$68 700.86	100

PROPERTY ACCOUNTING SECTION
MONTHLY REPORT - SEPTEMBER 1955

PLANT ACCOUNTING UNIT

A physical inventory of 200 Areas, started in August 1955, was completed during September. The inventory included a recheck of all buildings to insure complete coverage for the items being inventoried. Custodial control cards were prepared and forwarded to applicable property custodians for equipment found by inventories which previously were not charged to them. Included were operational spare instruments and research and development experimental type items.

Reports of inventory findings, discrepancies and reconciliations covering photographic equipment, survey instruments and office machines were issued during the month. A summary of adjustments affecting plant accounts follows:

	<u>Additions</u>	<u>Deletions</u>	<u>Net Adjustment</u>
Photographic Equipment	\$ 5 144	\$ 2 985	\$ 2 159
Survey Instruments	15 861	8 234	7 627
Office Machines	<u>9 952</u>	<u>25 656</u>	<u>(15 704)</u>
Total	<u>\$30 957</u>	<u>\$36 875</u>	<u>\$(5 918)</u>

Photographic equipment and survey instrument accounts were adjusted for all known discrepancies, including elimination from records of those items on record not located by physical inventory. The office machine account was adjusted for all discrepancies except for items on record not located by physical inventory. After completion of further investigation and processing of official documents for office machines, additional action will be taken to relieve our records of items not located by physical inventory.

Reconciliation of a physical inventory of major equipment is 50 percent complete. Reconciliations of the White Bluffs inventory, covering electricity, telephone, steam, water and sewage systems, was completed and the information forwarded to AEC Finance Division with a request for billing for those items to be retained and utilized by the General Electric Company.

Summarized below are facilities affected:

	<u>Items to be Removed</u>	<u>Items to be Retained</u>	<u>Total Items Inventoried</u>
Electrical Distribution System	\$135 131	\$198 287	\$333 418
Water System	147 578	287 136	434 714
Sewerage System	0	152 776	152 776
Telephone System	<u>3 995</u>	<u>30 350</u>	<u>34 345</u>
	<u>\$286 704</u>	<u>\$668 549</u>	<u>\$955 253</u>

PLANT ACCOUNTING UNIT (Continued)

Those items to be transferred to the General Electric Company include dollars applicable to the above column, "Items to be Retained". Items to be removed, which are recorded on the AEC books, will be retained and disposed of by them.

Monthly activities of Plant Accountability Sub-Unit include the processing of approximately 1100 new cards which were prepared and issued to custodians, effecting 100 cost code changes as a result of transfers; processing of 122 Property Disposal Requests, including pricing and effecting retirements; and the classification and costing of 170 declarations of excess.

The listing of ranges and refrigerators applicable to Community houses by house address is approximately 75 percent complete.

Commodity Code Classification and standardization of nomenclature activities is progressing at a reduced pace as a result of a termination and assistance in 200 Area physical inventories. However, work continues on classification of laboratory equipment, health instruments, and shop equipment.

Redistribution of indirect costs of uninstalled items acquired on Project 512-R&W (100-K Area Facilities) was completed, however, recent transmittals from Washington indicate that it may be necessary to eliminate the allocation of all indirect costs to uninstalled equipment. Memoranda from Washington and local AEC further indicate that a reunification of the 100-K Facilities may be required to arrive at more realistic values prior to the booking of these items in plant accounts.

Unitization reports completed and distributed in September include the following:

AEC-118	Utilities to Private Housing Development in Fifth Housing Program	\$409 305
AEC-124	Automatic Fire Detector and Alarm Signaling System for White Bluffs Shops and Warehouses	66 814
AEC-125	Utilities to Private Housing Development in Sixth Housing Program	381 724
Other		13 752

Unitization personnel and personnel of Property Evaluation Unit, Engineering Department, completed an inventory of the 313 Building in connection with the unitization of Project CA-514, Expansion of 300 Area Production Facilities.

In connection with the intended business review at HAPO, considerable time was spent preparing statistical information for the Engineering and Financial Departments.

The Annual Statement of Plant and Equipment for fiscal year 1955, covering the balances in accounts as applicable to processes, utilities, systems and equipment, was issued during the month.

Effective October 1, 1955, Plant Accounting Unit functions will be assigned to two new Units and the Unit itself discontinued. The new Units being formed are Property Accountability Unit and Capitalization and Depreciation Unit.

INVENTORY ACCOUNTING UNIT

The third annual physical inventory of general supplies was conducted on September 23, 29 and 30, 1955. Material inventoried included all general supplies, excluding automotive parts in the custody of the Purchasing and Stores Section. Materials inventoried were physically located in the Central Stores warehouse, Kadlec Hospital, 700 Area and 200 West Area. The inventory tags disclosing the results of the physical inventory have been forwarded to the Procedures and Computing Section for punching and tabulation.

Final results of the physical inventory of general supplies in the custody of the Community Section taken on August 30 and 31, 1955 disclosed an overage of \$6923. The principal causes of the overage were due to (1) an increase in stock levels and new inventory items charged to cost rather than to the inventory account and (2) material left over or recovered from completed work orders returned to stock without proper documentation.

Final results of the physical inventory of special materials in the custody of the Manufacturing, Radiological Sciences and Engineering Departments disclosed a net overage of \$555. This net overage, representing 0.154 percent of the reconciled book value, was caused principally by including 514.1 grams of palladium in the inventory as unrecorded material.

The remaining inventories to be completed within the calendar year 1955 include the following: telephone and administrative area service trucks, Transportation's automotive and railway parts, Purchasing and Stores' automotive and heavy equipment parts, Transportation's and Community's railroad materials, and graphite and spare parts in the custody of Purchasing and Stores.

Arrangements are being made for the physical inventory of automotive and railway equipment parts in the custody of the Transportation Section. Tentative dates for the physical count of material have been established as October 24, 25 and 26, 1955.

Several pre-inventory meetings were held with Stores personnel in regard to the forthcoming physical inventory of spare parts, spare equipment and standby material concerning cut-off dates, procedures, work loads, and manpower requirements. The physical count of material is scheduled for November 28, 29 and 30, 1955 and will require the counting of material in 700, 1100, 200-W, 200-E and 100-H Areas.

PROPERTY MANAGEMENT UNIT

Progress continued on the evaluation of property management practices throughout the plant. Field inspections have been essentially completed and reporting started.

There are certain problems in connection with procurement, control and shipment of cask containers, including compliance with ICC Regulations, which have been under review with interested activities. More adequate records are being established. The possibility of centralized control under one activity is also being considered.

PROPERTY MANAGEMENT UNIT (Continued)

The disposition of the equipment and materials being removed in connection with Project 558 has been the subject of conferences with field management in order to establish orderly procedures for the control of this property. The magnitude of this problem can be visualized when it is noted that one item alone consists of some 10,000 odd panellit gauges.

The status of the Mint facility was reviewed with field personnel and a decision reached as to availability or non-availability of certain equipment and materials for issue to other activities having use for same.

A total of 128 requests for disposal of property were initiated during the month. Unusual requests included a total of four tract houses which are to be removed to clear the light industrial area along Lee Blvd. Assistance was also given in cleaning up approximately 90 tons of scrap metals developed in the 200 Areas and for establishing a more orderly and routine method of disposal so as to prevent large accumulations from developing which might become contaminated before disposal was effected.

Twenty-three appropriation requests totaling \$292,782 were investigated and processed during the month.

APPROPRIATIONS UNIT

Through meetings with interested General Electric groups and with HOO - AEC representatives, it has been agreed that simplified procedures should be established for the authorization of the advance engineering necessary to prepare improved budget data. The general procedure which has been tentatively agreed to will operate as follows:

Design Proposals

Simplified project proposals will be used to authorize the initiation of engineering studies and design effort necessary to advance the engineering data and planning beyond the research and development stage and up to a state of definition and firmness which will satisfy the Congressional requirements for improved budget data. The simplified design proposals will cover the same topics prescribed for project proposals in Section III, B-1-b of OPG 05.1. However, the treatment accorded these topics will be very brief and estimates of total project cost will not be detailed but will instead be presented as rough engineering estimates. Present procedures for processing project proposals for approvals will be followed.

Authorization of an Annual Lump Sum for Budget Preparation

Near the beginning of each fiscal year General Electric will prepare a design proposal requesting authorization of a lump sum to cover the foreseeable engineering studies and design work to be devoted directly to preparation of the Plant and Equipment Budget. General Electric will control the funds authorized for individual studies within the over-all program. Two copies of each design authorization issued by the General

APPROPRIATIONS UNIT (Continued)

Electric Engineering Department will be forwarded to the Director, Engineering Division, HOO, for information. If the estimated cost of any study exceeds \$5000, prior approval of the Director, Engineering Division will be requested in writing. Copies of such requests will be furnished to the Appropriations Unit, General Electric Financial Department for financial review and record. A signed copy of each request approved by the Director, Engineering Division will be supplied to the Appropriations Unit for record purposes. Except for the above administrative procedures which are to apply to individual studies, administration of the over-all design project will be in accord with the procedures presently established for the project proposal-directive system.

During the month one project planning meeting was held with representatives of the Engineering Department and two were held with Manufacturing Department representatives. Projects reviewed for scope, justification, and cost included: Silica Gel Tail-End Treatment Facilities - Purex; Back-Up Radiiodine Removal Facilities - Purex; Modifications to Industrial Medical Facilities - Kadlec Hospital; and Modification to Pickling Machines - 313 Building.

Seven project proposals and one informal request representing an aggregate of \$1,150,000 were reviewed, approved, and processed to the Commission during the month.

After receipt and analysis of AEC directives and work authorities, eleven project authorizations were issued for a total of \$2,459,175.

The Post Completion Report for Project CA-431, Parts A and B, New Reactor - 100-C Plant, was reviewed and an audit report prepared.

APPROPRIATIONS UNIT

The following Plant and Equipment projects were processed through the Appropriations Unit during September. GE and AEC approval action was as indicated below.

Project Number	Title	Amount of This Request	Total*	Date To AEC	Disposition
JA-512 PRP 4	1952 Hanford Expansion - 100-K Area Facilities	\$ 2,000,000	\$28,210,000**	8-23-55	Work Authority dated 9-12-55 auth. GE \$28,210,000
CA-539 Rev. 7	Additional Waste Storage Facilities For Redox	275,000	3,897,000	9- 6-55	AEC-38, Mod. 7, dated 9-13-55 auth. AEC \$3,897,000. Work Authority dated 9-14-55 auth. GE \$778,500
JA-555 Rev. 3	Graphite Hot Shop and Storage Facility, Bldg. 3730	-	-	9-22-55	Approved by AEC Review Board 9-29-55
CA-548 Rev. 1	New VSR Tower	125,000	125,000	7-25-55	AEC-63, dated 9-9-55 auth. AEC \$125,000 Work Authority dated 9-20-55 auth. GE \$16,500
JA-590 Rev. 2	Fly Ash Collection Equipment - 384 Building	40,000	40,000	8-23-55	AEC-65 dated 9-12-55 auth. AEC \$40,000 Work Authority dated 9-23-55 auth. GE \$6,000
CG-599	Hanford 4X Program - 100 Areas	Decreased to 76,000		9-23-55	Approved by AEC Board 9-29-55
CG-600 Rev. 1	100-C Alterations	275,000	1,000,000	8- 5-55	Partial approval by AEC-Washington received 9-20-55
CA-601 Rev. 1	General Grounds Improvements - 300 Area	96,000	96,000	2- 7-55	AEC-61 dated 8-15-55 auth. AEC \$60,000
CG-614 Rev. 2	Hanford 4X Program - 300 Area	-	-	8-23-55	HW-348, Mod. 3, dated 9-14-55 auth. requested change in method of performing work
CA-615	Mechanical Maintenance Shop Centralization - 100 Areas	92,000	92,000	7-18-55	AEC-Washington withheld approval; AEC-Hanford letter dated 9-8-55 requested further justification
CG-630	Alterations to Minor Construction Shops - White Bluffs	93,000	93,000	7-25-55	AEC-Washington withheld approval; AEC-Hanford letter dated 9-23-55 forwarded AEC-Washington further justification requested

<u>Project Number</u>	<u>Title</u>	<u>Amount of This Request</u>	<u>Total*</u>	<u>Date To AEC</u>	<u>Disposition</u>
CG-633	Kadlec Hospital Alterations	\$ 29,400	\$ 29,400	7- 7-55	AEC-63 dated 9-23-55 auth. AEC \$26,200 Work Authority dated 9-30-55 auth. GE \$1,475
CG-634	Replacement of Redox 216-S-1 and 2 Crib	95,000	95,000	7- 6-55	HM-360, Mod. 1, dated 9-15-55 auth. GE \$95,000
CG-638	Alum-Activated Silica Water Treatment Facilities	275,000	275,000	9-27-55	AEC Agenda 10-6-55
CA-639	Painting the 100-DR Water Plant Structures	75,000	75,000	9-23-55	AEC Agenda 10-6-55
CA-641	Street Extensions - Hains, Gailard, Harris	25,000	25,000	9-27-55	Approval pending
CG-643	Redox Capacity Increase, Phase III	500,000	500,000	9-30-55	AEC Agenda 10-6-55
IR-194	Procure and Install A Centralized Quality Reporting System - 313 Building	-	-	9-22-55	Extension of completion date approved 9-30-55

* Total previous authorizations plus this request

** GE funds only

SS ACCOUNTABILITY SECTION
MONTHLY REPORT - SEPTEMBER, 1955

Metal Preparation Area

For the past several months, the material control problems in the Metal Preparation Area have reflected the impact of numerous process revisions. During September, the process shakedown period was completed. As a direct result, non-routine process discards have been eliminated. Of further assistance to the SS Accountability program has been the standardization of the Slug Recovery and Slug Pickle Operations. In both cases, there is an SS material transfer to the process solutions. It will now be possible for us to determine the solution pickup as a function of throughput and this investigation is now in progress.

Biweekly shipments of irradiated enriched uranium aluminum alloy slugs was completed on September 15, 1955. This program started on March 7, 1955. No further liquidation of inventories is contemplated for at least three months at which time a new shipping schedule will be formulated. The delay is caused by two factors: (1) Technical; and, (2) Primarily of cost. The technical factor involves decay to levels acceptable for shipment and is fundamentally a radiation control problem. The second factor is that it has developed that A.E.C. contracts for transportation via truck and A.E.C. courier escort, are cheaper when scheduled on a biweekly basis for a period of at least one month. These factors are currently receiving prior consideration and account for the delay.

All shipments for the last five months have been free of any unusual incidents. The Receiver has verified our piece count and on the basis of limited measurements confirmed our shipping quantities. Actual numerical values have shown non-significant overages which may be due to the analytical procedures employed. No final comparisons are available at this time due to lack of Receiver's measurements.

Further liquidation of the Metal Preparation Section holdings of enriched uranium aluminum turnings was accomplished by shipment to Oak Ridge. As a result, the current status of inactive material held by Metal Preparation Area is now at the lowest level achieved to-date.

We are continuing our efforts to gain approval for shipment and recovery or sale of approximately two million pounds of Al-Si which is slightly contaminated with normal uranium. Radiation problems are the principal factor and are currently under review.

Reactor Areas

As of October 1, 1955, Fission Loss is calculated on discharged material. So as to bring Engineering Department inventories on a comparable basis, the Reactor Area and Metal Preparation Area-SS Accountability Units have adjusted inventories to the depleted levels. Prior to October 1, 1955 Fission Loss adjustments were delayed to the point of final process movements.

The reason for the revised procedure is to bring the accounts into the closest relationship with the factual process operation.

Further assumption of responsibilities by the SS Reactor Area Unit involved the control accounts for Normal Uranium in the 100 Area storage locations. Additional responsibilities are scheduled.

An unusual adjustment developed in the 100-B Basin as the result of the recovery of seven irradiated slugs at the time of basin chute liner replacement. This has been a consistent operating difficulty due to the infrequent replacement of such liners and to the fact that slugs have become lodged between the liner and basin floor in inaccessible locations. This situation currently exists in 100-F scheduled for chute liner repair in December. Following recovery all future cases will be recorded under suitable control accounts.

MONTHLY REPORT-SS ACCOUNTABILITY SECTION
SEPTEMBER, 1955

Reactor Areas - continued

D. L. Haynie represented the SS Accountability Section on the Reactor Area 702 EDM Committee. This action is directed towards the determination of the problem of data processing by 702 EDM for the Reactor Areas and includes Engineering interests as well as production control of pile operation. The first meeting was directed to definition of the potential coverage with future paring down to be controlled by relative cost and usefulness.

Separations Area

The Redox Plant is operating routinely on low MWD material. Production rates have been substantial. In conjunction therewith the Metal Fabrication-RMA Line has also been on low material handling T Plant product as well. The only process function operating on high MWD material has been Recuplex which has been processing Metal Fabrication backlog material. The product must be temporarily stored. In addition to low material being processed in Bldg. 234-5, the 231 Isolation Building continues on the low MWD program and is scheduled to stay on the low program indefinitely.

Production scheduling on the RMA line calls for alternate processing of low and high MWD material. This will result in a substantial increase in inventories which must be segregated record-wise as well as physically. A substantial increase in the work load is anticipated.

Preparations have been completed for Purex startup. Present indications are that D-38 material use will not be initiated until early November and may be delayed to a later date.

A records review indicates that the cycle characteristic of Depleted Uranium Material Underaccounted For has again reversed and is now comparable to the early part of 1954 at which time losses were recorded. In late 1954 and early 1955 the trend was reversed. Measurement evaluation studies are currently attempting to determine the contributing factors.

SS Accounting Unit

In accordance with the Plan for 1955 a system of double entry SS material accounts was provided for use at the "T" Plant. Installation of the system will relieve the SS Measurements Unit of an accounting function and will remove, as completed, a long standing HOO-AEC recommendation.

A summary of the 231 Building Review (audit) findings and recommendations was prepared and forwarded to the Supervisor, Separations Area-SS Accountability Unit with a request for a discussion meeting date.

A report of the participation of the SS Accounting Unit in Part III of HOO-AEC Survey 12, concerned with verification of Plutonium inventories, was completed. Copies of the report were furnished to the Manufacturing and Engineering Departments for corrective action on certain items.

A report of Section performance in meeting the established schedule for issuing the HOO-AEC Material Balance Report was furnished under date of September 16.

Pursuant to the Plan for 1955 a system of double entry SS material accounts was furnished for use at the Purex facility. Installation assistance through one accounting cycle will be provided at the time operations commence at the facility.

With the completion of the 231 Building Review, work was started during September on a Review of the SS material accounts and procedures at the 234-5 Building.

During the latter part of the month a procedures study to reorganize the SS material accounts at the 234-5 Building was initiated. In addition to simplification of the

MONTHLY REPORT-SS ACCOUNTABILITY SECTION
SEPTEMBER, 1955

SS Accounting Unit-continued

accounting system the study has as its objective the consolidation of the separate sets of accounts for Task I, the 234-5 Bldg., and Recuplex into one system of accounting records.

SS Measurements Unit

In response to requests from the SS Measurements Unit, the Metal Recovery Sub-Section has reviewed potential error sources in weight factor manometers taking appropriate action where necessary. They have also initiated the revised heel calibration for the 004-WR tank.

A procedure for correcting depleted uranium waste statements for analytical bias was initiated in August material balances. Metal Recovery's credit was increased by 1097 pounds and Redox's by 353 pounds.

A factor for Recuplex scrubber waste losses was calculated and submitted, resulting in the elimination of the analysis and a savings of \$5 per dissolver batch.

The Am-Cm correction factor for 260 MWD/T dissolver solution, calculated by the SS Measurements Unit, has been adopted. The savings are approximately \$1 per ton of uranium processed.

A meeting was held on plutonium factors for 234-5 metals. It was decided that: (1) The current shape factor is still valid; and (2) An additional ten button samples will be taken to permit re-evaluation of this factor also.

Investigations into August M.U.F.'s developed complete explanations for T-Plant and 231 Building discrepancies. They were due to analytical bias. An inventory error was found which explained the TBP plant loss. Partial explanations were developed for Redox plutonium and Task I discrepancies as the result of analytical bias. Inventory errors are the apparent cause of most of the remaining discrepancies in Redox, Task I and Recuplex. A recommendation was made for better cleanup of residual material in Z-Plant processes.

A trip was made to Rocky Flats for the purpose of discussing Shipper-Receiver Variances and of exchanging information on mutual problems. Programs were developed for reducing variances on both nitrate and buttons. A report will be issued shortly.

The Bismuth Phosphate inventory procedures have been revised to meet their operating conditions and process scheduling. Some of the previous procedures recommended by operations would have resulted in late reports at month-end.

Inventory procedures for Recuplex and Task I have been completed and are in the process of being duplicated for the 234-5 Bldg. Manual.

A twelve month custodian verification schedule has been completed for Redox, TBP and the UO₃ Plant.

Redox was requested to closely watch their inventory dissolver heel estimates. According to our estimates they were overstated by 6 to 8 thousand pounds Uranium for the month of August. Quantity of this magnitude should show up for an underage for the month of September.

FINANCIAL DEPARTMENT PERSONNEL AND ORGANIZATION

SEPTEMBER, 1955

	<u>Current Month</u>	<u>Prior Month</u>
<u>Personnel Changes During Month</u>		
Employees at beginning of month	498	488
Additions and transfers in	13	26
Removals and transfers out	(24)	(16)
Employees at end of month	<u>487</u>	<u>498</u>
<u>Personnel by Components at Month-End</u>		
General	<u>10</u>	<u>10</u>
Auditing Section	<u>16</u>	<u>16</u>
Budgets and Measurements Section	<u>13</u>	<u>12</u>
<u>Contract Cost Section</u>		
General and Consolidations Cost Unit	11	12
Engineering Cost Unit		
General	3	4
Design Cost	9	7
Project Cost	20	20
Technology Cost	11	11
Employee and Public Relations Cost Unit		
General	2	2
Plant Activities Cost	10	10
Community Cost	5	5
Medical Cost	3	3
Manufacturing Cost Unit		
General	2	2
Financial Representatives	12	11
Budgets and Control	18	17
Reports and Records	15	16
Product Costs	<u>4</u>	<u>4</u>
	<u>125</u>	<u>124</u>
<u>General Accounting Section</u>		
Accounts Payable Unit	23	23
Accounts Receivable Unit	21	21
General Books Unit	17	17
Administrative Planning	3	3
Contract Reimbursements	<u>5</u>	<u>6</u>
	<u>69</u>	<u>70</u>

	<u>Current Month</u>	<u>Prior Month</u>
<u>Personnel Accounting Section</u>		
Payroll Planning and Analysis Unit	7	7
Weekly Payroll Unit	17	17
Monthly Payroll Unit	11	12
Benefit Plans Accounting Unit	12	12
Payroll Reports Unit	7	7
Weekly Payroll Records Unit	7	8
	<u>61</u>	<u>63</u>
<u>Procedures and Computing Section</u>		
Computing Operations Unit	22	27
Numerical Analysis Unit	9	10
Procedural Analysis Unit	15	16
Scheduling Unit	22	20
Records Operations Unit	8	8
	<u>76</u>	<u>81</u>
<u>Property Accounting Section</u>		
Appropriations Unit	5	5
Inventory Accounting Unit	12	11
Plant Accounting Unit	46	48
Property Management Unit	4	4
	<u>67</u>	<u>68</u>
<u>SS Accountability Section</u>		
Reactor Area - SS Accountability Unit	4	5
Separations Area - SS Accountability Unit	17	16
Metal Preparation Area - SS Accountability Unit	7	8
SS Accounting Unit	6	6
SS Measurements Unit	10	11
	<u>44</u>	<u>46</u>
<u>Rotational Trainees</u>	<u>6</u>	<u>8</u>
	<u>487</u>	<u>498</u>

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HW-39260-W

PROCEDURES AND COMPUTING SECTION
MONTHLY REPORT - SEPTEMBER 1955

GENERAL

For the first time in the preparation of the payroll on the 702, checks and earning statements for week ending 9-18 were calculated and printed by 8:00 a.m. Tuesday, September 20. This performance exceeds previous performances by 6 to 8 hours. Unfortunately, machine difficulty delayed the issue of post-payroll reports until the normal deadline. Special measures by IBM service personnel and Section employees are being taken to reduce the frequency of tape reading errors thus eliminating a serious problem.

The processing of July month end reports marked the last complete EAM punched-card data processing activity of the Section. It is notable that this processing was completed in record time, all reports being completed $4\frac{1}{2}$ days after month end cut-off. Five EAM machines were taken off rental in September, including the 412 tabulator, a component of the card-programmed-calculator.

A calculation of some magnitude was completed for Chemical Development Sub-Section. The calculations were carried out in an effort to improve certain design features of the separation process. Approximately 6 hours of 702 time were required to prepare the required tabulations.

A high speed sorting routine has been completed and is now in successful operation. Section personnel who attended the annual convention of the Association for Computing Machinery report that this routine appears superior, both in generality and speed, to any other sorting routine in existence.

PROCEDURAL ANALYSIS

Forms control reviewed 367 orders during September covering 864,760 forms; 16 orders, amounting to 25,610 forms, were rejected; 103 new forms designed; 47 forms were obsoleted.

As a result of the new agreements negotiated between the company and the various bargaining units, the "Better Living" program provisions affecting weekly payroll are being worked out in detail to permit retroactive payments, and make necessary calculations and revisions to existing procedures applicable under the new plan. Logic work on weekly roll retroactive pay increases is 50% complete. Detailed programming has begun to produce control totals and to process the retroactive payments.

A 702 procedure was developed for calculating taxes on safety awards given to plant employees in August.

The main programs for processing weekly payroll on the 702 are being checked and reassembled to incorporate latest programming techniques and refinements to expedite processing.

Programming of work order control for EDPM processing is making good progress with passes 1, 2 and 3 ready for assembly and debugging at the month's end.

PROCEDURAL ANALYSIS (continued)

The conversion of office machine procedures from EAM to EDPM was begun in September, with programming completed for Pass 1. Assembling and testing of Pass 1, as well as programming of Passes 2, 3 and 4 remain to be done.

Work was continued on conversion of APV and store order punched card procedure to EDPM. During the month the logic and programming for pass 1 was completed and debugging was started.

Vehicle conversion is approximately 85% complete as of the end of September. Testing and correction of detailed programming remains to be completed.

A work request was prepared to calculate retroactive pension adjustments for the exempt roll.

Further work is being done in securing agreement between plant accounting and property management on the new form of custodian record designed for use after plant accounting records are converted to EDPM.

A work request was prepared to calculate new exempt rates and retroactive rate increase payments; in the course of this work monthly payroll and salary administration files were coordinated so that both files can be adjusted simultaneously.

An additional procedure was developed for Salary Administration for a quarterly report by level and zone of a selected group of employees with "functional titles".

A 702 program is being prepared for the production of a proof listing of machine tools records which have been processed via punched paper tape machines. This is in conjunction with the cut-over of property records to the 702.

Detailed programming of the principal operating pass for the classified files procedure is 95% complete. The inventory pass and two listing passes remain to be programmed.

Several meetings were held with classified files supervision to develop a system for reconciliation of all files documents, particularly the present accounting for copies held by the yellow file in Schenectady. An operating change was made to process yellow file charges as though they are local routings to an account number.

RECORDS OPERATIONS

Quantity of records received, processed and stored:

Employee and Public Relations Department	17	Standard Storage Cartons
Engineering Department	14	" " "
Financial Department	111	" " "
Manufacturing Department	62	" " "
Radiological Sciences Department	4	" " "
	<u>208</u>	

DECLASSIFIEDRECORDS OPERATIONS (continued)

Records Retention and Disposal Schedule Number 218, "Reactor Operations Records", consisting of fifty-three individual records was developed and submitted for internal approval. Records Retention and Disposal Schedule Number 217, "Power Operations Records" consisting of twenty-eight (28) individual records was submitted to the Atomic Energy Commission for approval.

Seventy-five reels of microfilm consisting of 308,688 images were completed during the month. A total of 120 reels of microfilm consisting of 508,827 images have been completed by Recordak Corporation to date.

At the AEC Contractor Records Management Conference held at Denver, S. B. Badgett and H. Tellier participated in panel discussions and presented papers on certain aspects of records management.

NUMERICAL ANALYSIS

The first meeting of the committee on the integration of reactor data processing was held on September 29, 1955. Representatives of the Reactor Section - Manufacturing Department, Pile Technology Section - Engineering Department, S. S. Accountability Section - Financial Department, Statistics Unit, and Advanced Engineering Section were present. A representative of the IBM Corporation described data transmitting equipment presently available and equipment which is under consideration. It was generally agreed that the methods of transmitting data from the reactors to the 702 and back would have to be determined by the kinds of data involved, and the frequency with which these data are required. To this end, lists of required data were submitted by representatives of the Pile Technology Section and Reactor Section, representing the needs of the Area engineers and physicists. Similar lists reflecting the needs of Production Planning and Scheduling, and of S. S. Accountability have been promised. These lists will be summarized, and copies sent to the originators to ensure that all facets of the integrated system have been covered. This will be followed by a detailed study of the economics of the integrated system, and some recommendations on the type and quantity of data transmitting equipment necessary to implement the system.

A total of 67 temperature maps from KE Reactor have been received and processed in connection with the KE experiment.

Programming of the trip-before-instability limits calculation on the 702 has been completed. Analytic curves were fit to instability temperature data from KE, KW and C reactors. Arrangements have been made for sharing the expense of processing panellit data from all reactors under this program. In addition, arrangements have been made to supply the Production Planning and Scheduling Unit with flow data as computed under the TBI program.

Programming of reactivity accounting calculations on the 702 has been completed and debugging is underway. These calculations will be made routinely for the area physicists, to assist them in pile operation. If the approach is successful, this problem will be incorporated into an integrated reactor data processing system.

Work is continuing on the conversion of the meteorological studies from punched-card equipment to the 702. One isolated portion of the study has been programmed and debugged. A routine for assembling raw data on magnetic tape has been written and is presently being tested. Three large phases of the problem remain to be programmed.

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NUMERICAL ANALYSIS (continued)

A system of order 115×213 has been run on the 702 in connection with the Operation Research Study of production scheduling. Results were even more satisfactory than the previously run system, both from the standpoint of accuracy and computing time. A major modification of the code was made in order to use the dimensions of the system as a parameter in assigning working areas in high speed memory. The result of this modification should be a marked reduction in computing time. Work is presently underway on the first of four solutions to a 139×274 system.

Several sets of variables have been processed in connection with the estimation of lattice parameters from observed buckling in the exponential pile. It was learned that, due to the uniformity of elements appearing in a matrix, considerable significance was being lost in inverting this matrix, thus leading to apparently anomalous results. Nonetheless, the results attained to date are sufficiently precise to be of some value to the problem originator. Changes in the problem formulation are being considered to overcome this difficulty.

Additional calculations have been requested of corrections to neutron flux measurement in an exponential pile. Because of the asymmetrical arrangement of sources and detector in the present cases, it was decided to generalize the program written earlier. The generalized program has been written and is presently being tested. Four new cases are to be run.

Work has been started on the solution of a three-dimensional pile control problem. The problem consists essentially of determining the buckling of a certain region in the pile which will make the pile critical, given the bucklings of the remaining regions. A variational technique (as outlined in HW-38205, "Variational Control Calculations", J. H. Brown) will be used to determine the minimal buckling. Any three-dimensional array of rectangular regions will be accommodated by the code, thus allowing for asymmetry of control rod configurations, enrichment, etc. Because of the three-dimensional aspect of the problem, it is necessary to generate in one phase of the problem a total of N^3 factors, where N upper limit of harmonics retained. These factors must then be used repeatedly in iterating to the minimal buckling. Thus, the scope of the problem may be limited by the time required to refer to these factors. The solution of this problem will find immediate application to the associated control problem, as well as shedding light on the behavior of asymmetrical heterogeneous reactors.

A request has been received to determine the response of neutron flux in a reactor to a step change in reactor reactivity. The analysis has been carried out using Laplace transform methods, and requires finding the roots of a seventh degree algebraic equation. This problem is essentially the same as that treated earlier, except that provision is now made for determining the effect of delayed neutrons from Plutonium on the neutron flux, as well as from uranium. Some 55 cases are to be considered.

Two new problems dealing with the corrosion of pile tubes have been received. In one instance, an effort will be made to correlate corrosion rates with bulk outlet temperatures. This will be done using the temperature data from the Power & Exposure Studies. In the second instance, corrosion rates and other variables of sampled slugs are to be computed.

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NUMERICAL ANALYSIS (continued)**DECLASSIFIED**

Numerical results were obtained from a formulation of the backmixing phenomenon in a two-phase separation column. Three different formulations were considered, each representing a different set of boundary conditions. For each set, several parameters were varied in order to determine their relative importance. It is anticipated that a fourth formulation will be run in the near future.

Work on a number of general purpose EDPM program developments has been completed. These include a routine for the inverting of matrices, a routine for computing the "Maxwellian Average" of a series of tabular values (frequently encountered in neutron diffusion studies), and a routine for tracing references to certain addresses in actual 702 programs. The latter development should prove highly useful in debugging new programs, in particular, in answering the question, "How did the machine get here". Work is continuing on additions to the floating decimal subroutine library. These include the Bessel functions Y_0 , Y_1 , K_0 and K_1 , which are frequently encountered in diffusion problems with cylindrical geometry.

A Numerical Analyst was added to the Section, effective September 1. Two non-exempt summer employees assigned to the Numerical Analysis Unit terminated during the month to return to graduate school.

COMPUTING OPERATIONS

During the month of September the following non-routine assignments were completed for customers:

Employee and Public Relations	6
Engineering	10
Financial	22
Manufacturing	5
Operations Research	2
	<u>45</u>

Service charges for the month amounted to \$68 700.86. Services, by customer, were as follows:

Atomic Energy Commission	\$ 1 470.86	02%
Employee & Public Relations	1 401.30	02
Engineering	12 440.85	18
Financial	42 477.56	62
Manufacturing	2 464.45	04
Operations Research	7 085.36	10
Radiological Sciences	1 360.48	02
	<u>\$68 700.86</u>	<u>100</u>

OPERATIONS RESEARCH STUDY

MONTHLY REPORT SEPTEMBER 1955

The following is the month end summary of personnel:

	<u>As of 8-31-55</u>			<u>As of 9-30-55</u>			<u>Net Change</u>		
	<u>Ex</u>	<u>Non-Ex</u>	<u>Total</u>	<u>Ex</u>	<u>Non-Ex</u>	<u>Total</u>	<u>Ex</u>	<u>Non-Ex</u>	<u>Total</u>
General	1	1	2	1	1	2	0	0	0
Operations Research Analysts	5	0	5	5	0	5	0	0	0
TOTAL	6	1	7	6	1	7	0	0	0

Mr. B. F. Butler and Mr. C. A. Bennett visited the Senior Consultant - Operations Research & Synthesis of the Management Consultation Services Division during the month for consultation regarding Operations Research.

Mr. R. C. Burke visited with the Senior Consultant and members of the Operations Research & Synthesis Department on the 28th of September and attended the meeting of the Society for the Advancement of Management held in New York City on the 29th and 30th of the month.

During the month, Mr. L. W. Smith, Jr., visited the Aircraft Nuclear Propulsion Department relative to discussions on Operations Research and the Aircraft Gas Turbine Development Department regarding a possible transfer to that Department.

Production Planning

With the concurrence of the Manufacturing Department, using current planning assumptions, the production planning operations research mathematical model is being used on the new Hanford electronic data processing machine to simulate plant operations. Under investigation in these simulation studies are the effects of the timing of Redox Phase III modifications, the related effects on assumptions relative to shut-down of T plant, the effect of certain restrictions on reactor output, and the relative importance of plutonium holdup penalty in determining the acceptability of production plans.

The current plant simulation studies will have the advantage of improved mathematical and data processing linear programming algorithms.

Planning and Scheduling of Capital Improvements

Study of the planning and scheduling of capital improvements has consisted primarily of obtaining the necessary background concerning the timing, status, extent, and

objectives of present project proposals. Particular emphasis is being placed on determining the nature of the quantitative information available on each pertinent project.

Data Processing

The survey of data processing requirements is nearing completion. It is hoped that a preliminary analysis of the desired data processing output can be completed by the end of October.

END

**DATE
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9/21/92