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D.S. Lewis 5/28/92
By D.S. Lewis 6/2/92
P.M. Eck 6-2-92

MONTHLY REPORT

61151

HANFORD ATOMIC PRODUCTS OPERATION

FOR

NOVEMBER 1955

JUL 1 1992

CLASSIFICATION REVIEW FOR DECLASSIFICATION BUT LEFT UNCLASSIFIED
By J.P.D. (D.S.E.)
5-15-23
U.S. Atomic Energy Commission

Compiled By
DEPARTMENT MANAGERS

December 30, 1955

RICHLAND, WASHINGTON

Operated for the Atomic Energy Commission
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[redacted]

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J. T. Lewis

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MONTHLY REPORT
HANFORD ATOMIC PRODUCTS OPERATION

NOVEMBER 1955

GENERAL SUMMARY

PRODUCTION OPERATION

A net production of 393 tons of acceptable slugs, or 100 percent of the official forecast, was produced during the month.

The plutonium input production, although establishing a new record, was 6.2 percent below the official forecast. Lower than forecast average operating levels and lower than forecast time operated efficiency adversely affected production. The overall reactor time operated efficiency was 70 percent. Major causes of down time were scheduled metal discharges, rupture removal, tube replacement, production test, television installation, junction box repair and essential maintenance.

Tube replacement programs were in effect during the month at D and F with a total of 81 and 108 tubes respectively being replaced at each reactor. At D, one outage was required to test process tubes for leaks with three tube leaks being found, and at F two outages were necessary for tube testing with a total of six leaking tubes isolated. The helium detector facility was successfully used at both reactors in locating the leaking tubes.

The total production of low ngs plutonium from the Redox and T Plants was 105 percent of the official forecast. During the month Redox also produced the high ngs product which was 37 percent over the forecast. This high production resulted from exceeding the forecasted operating rate and efficiency.

The Purex facility completed dissolving of depleted uranium satisfactorily. The first two cold runs were completed and a third one is in progress at month end. Results were very satisfactory and the objectives of the cold runs were achieved.

ENGINEERING TECHNOLOGY

Major reactor design development activity during November involved preliminary scope for a small demonstration reactor for use in the application of advanced reactor technology. Other studies in progress included once-through pressurization and pressurization recirculation systems for existing reactor application.

Approximately 100 I and E cooled fuel elements were canned by the lead dip process in the Manufacturing Facility.

Various techniques are being investigated for attaching studs or short ribs to the cylindrical surfaces of slugs for centering the slug in ribless process tubes.

A fair size sample of uranium shot has been procured from Fernald for examination. The shot appears to be clean and round. The various fractions pack to a volume density of 61-63%, and the mixed fractions also pack to approximately the same figure. Employing shot such as this, it may not be possible to achieve densities higher than 63% in a matrix type fuel element.

HAPO MONTHLY REPORT
GENERAL SUMMARY (CONTIN.)

A study was completed of eight types of reactor-fuel element combinations, the reactors all being water cooled and graphite moderated.

GENERAL

A reactor incident led to particulate contamination of about seven square miles around the 100-H site. Although cars and roads were contaminated, there was no significant exposure of personnel.

The schedule of meetings with key employees to review and explain provisions of the proposed prime AEC-GE contract was substantially completed in November, with a few sessions scheduled for December and early January. About 500 employees have attended these meetings to date. General "wind-up" meetings in January will be held for personnel who were unable to attend meetings scheduled for their groups because of vacations, the urgency of their work, or for other reasons. It is planned to hold follow-up meetings with certain groups after the effective date of the new contract.

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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

[redacted]

PERSONNEL DISTRIBUTION
NOVEMBER 30, 1955

Department		100-B & C Area	100-D & DR Area	100-F Area	100-H Area	100-K Area	Other Areas*	200-E Area	200-W Area	300 Area	700-1100 Areas and Plant General	Total
Engineering	- exempt	24	49	-	3	34	-	52	64	258	294	778
	- other	15	28	2	13	17	76	18	32	229	201	631
	Total	39	77	2	16	51	76	70	96	487	495	1 409
Manufacturing	- exempt	62	54	74	84	65	-	92	234	114	123	902
	- other	289	313	324	292	254	-	450	1 208	576	692	4 398
	Total	351	367	398	376	319	-	542	1 442	690	815	5 300
Financial	- exempt	-	-	-	1	-	-	-	5	6	120	132
	- other	-	-	-	5	-	-	-	21	11	330	367
	Total	-	-	-	6	-	-	-	26	17	450	499
Employee & Public Relations	-exempt	22	6	6	7	9	-	7	14	11	210	292
	- other	64	48	44	45	50	54	41	121	108	848	1 423
	Total	86	54	50	52	59	54	48	135	119	1 058	1 715
Radiological Sciences	- exempt	1	-	35	-	-	-	4	19	64	7	130
	- other	6	-	46	1	3	-	17	19	175	21	288
	Total	7	-	81	1	3	-	21	38	239	28	418
General	- exempt	-	-	-	-	-	-	-	-	-	9	9
	- other	-	-	-	-	-	-	-	-	-	3	3
	Total	-	-	-	-	-	-	-	-	-	12	12
Total Exempt		109	109	115	95	108	-	155	336	453	763	2 243
Total Other		374	389	416	356	324	130	526	1 401	1 099	2 095	7 110
GRAND TOTAL		483	498	531	451	432	130	681	1 737	1 552	2 858	9 353

* Includes White Bluffs and B-Y Exchange

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HANFORD ATOMIC PRODUCTS OPERATION
NUMBER OF EMPLOYEES
NOVEMBER 30, 1955

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DEPARTMENT	EXEMPT 11-30-55	EXEMPT 10-31-55	OTHER 11-30-55	OTHER 10-31-55	TOTAL 11-30-55	TOTAL 10-31-55
COUNSEL	3	3	2	2	5	5
OPERATIONS RESEARCH STUDY	6	6	1	1	7	7
EMPLOYEE & PUBLIC RELATIONS DEPARTMENT						
General	9	8	7	8	16	16
Salary & Wage Administration	11	11	10	10	21	21
Personnel Practices	16	14	39	38	55	52
Education & Training	6	5	63	69	69	74
Emp. Comm. & Pub. Rel.	10	11	41	43	51	54
Union Relations	5	5	1	1	6	6
Aux. Oper. & Plant Prot.	115	115	780	785	895	900
Community	76	77	310	317	386	394
Health & Safety	44	46	172	174	216	220
ENGINEERING DEPARTMENT						
Engineering Administration	29	29	84	86	113	115
Advance Engineering	6	6	1	1	7	7
Design	175	170	110	111	285	281
Project	175	179	166	164	341	343
Pile Technology	229	232	172	165	401	397
Separations Technology	164	166	98	98	262	264
MANUFACTURING DEPARTMENT						
General	24	22	8	9	32	31
Reactor	337	330	1 462	1 450	1 799	1 780
Separations	309	300	1 609	1 602	1 918	1 902
Metal Preparation	113	112	579	572	692	684
Transportation	44	44	447	447	491	491
Purchasing & Stores	59	59	218	213	277	272
Electrical Utility	16	16	75	74	91	90
FINANCIAL DEPARTMENT						
General	9	9	3	5	12	14
Budgets & Measurements	7	7	8	8	15	15
Contract Cost	24	24	102	102	126	126
General Accounting	11	11	60	59	71	70
Property Accounting	17	17	53	53	70	70
Auditing	14	14	2	2	16	16
SS Accountability	10	10	35	33	45	43
Personnel Accounting	9	8	55	54	64	62
Procedures & Computing	31	29	49	48	80	77
RADIOLOGICAL SCIENCES DEPARTMENT						
General	5	6	-	-	5	6
Records & Standards	30	30	172	174	202	204
Biophysics	54	55	68	69	122	124
Biology	33	33	42	42	75	75
Engineering	6	5	1	1	7	6
Adm. & Comm.	2	2	5	5	7	7
GRAND TOTAL	2 243	2 226	7 110	7 095	9 353	9 321

MANUFACTURING DEPARTMENT

NOVEMBER, 1955

METAL PREPARATION SECTION

The net production for the month was 393 tons which was 100 percent of the official forecast. Of the total, 14 tons were canned using the cored slug material.

The composite canning yield was 78 percent and represents a two percent increase over the yield of the previous month. The higher yield reflects a decrease in the number of poor bonds, thin caps, marred surfaces and inclusions.

The inventory of canned slugs increased to about a six weeks supply as the result of changes in Reactor forecasts. The bare slug inventory varied throughout the month from seven days to less than a one day supply.

During the month one eight-inch cored slug failed during autoclave testing.

REACTOR SECTION

The plutonium input production, although establishing a new record, was 6.2 percent below the official forecast. Lower than forecast average operating levels and lower than forecast time operated efficiency adversely affected production.

The overall reactor time operated efficiency was 70 percent. Major causes of down time were scheduled metal discharges, rupture removal, tube replacement, production test, television installation, junction box repair and essential maintenance.

The maximum reactor operating levels, excluding burnout, were increased 50 megawatts at DR Reactor, 88 at H Reactor, 49 at KE Reactor, and 189 at KW Reactor. The increases at DR and H Reactors are due to gains from colder river water, and at the K Reactors to the revised tube power limits.

The plutonium megawatt day output production was 32.1 percent over the official forecast. Exceeding the forecast was due to lowering goal concentration for high concentration metal. The tonnage of metal discharged at high and low concentration was 55 and 271 tons respectively.

There were 19 ruptures during the month; 18 slugs of regular material and one production test slug. Outage time for the removal of these slug failures was 252 hours.

A total of 28 reactor scrams occurred; eight of these were manual and nine were caused by normal Panellit system variables. Total outage time resulting from all scrams was 126.3 hours.

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Tube replacement programs were in effect during the month at D and F with a total of 81 and 108 tubes respectively being replaced at each reactor. At D, one outage was required to test process tubes for leaks with three tube leaks being found, and at F two outages were necessary for tube testing with a total of six leaking tubes isolated. The helium detector facility was successfully used at both reactors in locating the leaking tubes.

Partial installation (about 75 percent complete) of the closed circuit television installation for discharge area view at B Reactor was accomplished during a one-week outage. At the same time partial repairs to an effluent water junction box were made.

The third shipment of irradiated Mint pieces was made to an offsite receiver.

SEPARATIONS SECTION

The total production of low ngs plutonium from the Redox and T Plants was 105 percent of the official forecast. During the month Redox also produced the high ngs product which was 37 percent over the forecast. This high production resulted from exceeding the forecasted operating rate and efficiency.

The Redox Plant operated, except for a five day period for flushing, to convert the facility from low to high concentration material, at rates varying from 9 to 11 tons. The total outage time for the month was 121 hours and the efficiency was 83 percent.

T Plant operated normally throughout the month at a reduced rate as specified by Commission requirements.

Iodine emission was essentially within specification at Redox and T Plants because of processing well aged metal. The minimum age of feed at Redox was 96 days and at T Plant, 100 days.

The TBP production was 112 percent of the forecast. Operation of the facility during the month was normal with the first cycle outages confined to 21 hours and the second cycle with no lost time.

The production of the UO_3 Plant exceeded the forecast by ten percent due to the availability of feed material which resulted from the high operating efficiency of the Redox and TBP facilities.

The Purex facility completed dissolving of depleted uranium satisfactorily. The first two cold runs were completed and a third one is in progress at month end. Results were very satisfactory and the objectives of the cold runs were achieved.

The Isolation facility continued to process only low g/t material with production curtailed because of scheduled slowdown of the T Plant. Fabrication met the forecast of fabricated and unfabricated quantities. The first material from Recuplex was introduced into the line and no difficulty was experienced in fabricating the metal.

Rate of removal of waste metal was constant and adequate feed supply for TBP was maintained the entire month.

[redacted]

GENERAL

Personnel

On Roll November 1, 1955	5250
Net Increase	50
On Roll November 30, 1955	5300

W.K. MAC CREADY, MANAGER
MANUFACTURING DEPARTMENT

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HW-40182

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MANUFACTURING DEPARTMENT

PATENT REPORT SUMMARY
FOR
MONTH OF NOVEMBER, 1955

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

INVENTOR	TITLE
NONE	

W.K. MAC CREADY, MANAGER
MANUFACTURING DEPARTMENT

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MONTHLY OPERATING REPORT

NOVEMBER 1955

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December 7, 1955

MANUFACTURING DEPARTMENT
METAL PREPARATION SECTION
November, 1955

I. RESPONSIBILITY

There was no change in responsibility during this period.

II. ACHIEVEMENT

A. Operating Experience

1. Statistics

	November	October	Year to date
Total Acceptable Slugs Canned (Tons)	393	423	4396
Composite Canning Yield (%)	78	77	76
Efficiency (%)(Canning Throughput)	95	94	94
Forecast Achievement (Current Commitment)	100	101	102
Net Acceptable Solid Slugs (Tons)	379	406	4021
Slugs Returned from Reactor (Tons)	1.78	0	43.17
Canning Yield (%)	79	76	76
Net Acceptable Cored Slugs (Tons)	14	17	375
Slugs Returned from Reactor (Tons)	0	0	1.57
Canning Yield (%)	72	81	73
Autoclave Failure - Solid (No./M)	.00	.00	.001
Autoclave Failure - Cored (No./M)	.001	.00	.001
Acceptable C-4 Slugs Canned (Pieces)	1,262	0	7160
Acceptable Pb-Cd Slugs Canned (Pieces)	1,355	0	10218
Acceptable 10-66 Slugs Canned (Pieces)	0	0	3366
Average Steam Generated (M lbs/hr)	69.9	40.5	
Maximum Steam Generated (M lbs/hr)	105.0	63.0	
Total Steam Generated (M lbs)	50,310	30,192	
Coal Consumed (Tons)	3,294	2,000	
Sanitary Water from 3000 Area ($\bar{M}$ Gals.)	75.7	76.5	
Average Rate (GPM)	1,753	1,714	

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2. Activities

A net production of 393 tons of acceptable finished slugs, achieved in 20 working days, was essentially 100% of forecast. Of the 393 tons total, 14 tons were cored slugs. To offset the lost production effort due to one additional holiday, seven canning-line shifts per day were operated from November 16 through November 23. Six canning-line shifts per day were operated the remainder of the month.

A composite yield of 78% was experienced in November. This is an increase of 2% over last month's yield. The higher yield in November reflected a decrease in the number of poor bonds, thin caps, marred surfaces and inclusions. The inclusion rate decreased to 1.8% from the previous month's 2.5%. The poor bond rejection rate decreased to 3.0% from the previous month's 3.8%. Marred surfaces, frost test, bad welds and inclusions continued to be the major causes for rejection.

The combined canned slug inventory of the Metal Preparation and Reactor Sections increased to about a six-weeks' supply at month-end. Since forecasted Reactor consumption of canned slugs is comparatively low, a high inventory of canned slugs will probably exist for several months. The bare slug inventory in Metal Preparation, excluding slugs in process, fluctuated during the month from 7 days to less than a one-day supply.

On November 28 one eight-inch cored slug failed during autoclave testing, due to a defect in the can wall.

9443 Nine thousand four hundred forty-three pounds of turnings and oxides were shipped to National Lead Company, Fernald, Ohio during the month.

Under the Plant Defense program for the Area, installation of electric power for the motor pre-heaters in the evacuation buses was accomplished before the cold weather began. Driving training has been completed and the drivers for the evacuation buses were taken over the evacuation route on November 3, 1955 to acquaint them with the route and the location of the staging area.

Aluminum vendor activity continues to progress. Approval of stock material for cap fabrication has been granted to Reynolds Metals which will permit fabrication of 4,000 caps. Testing of cans from the Harvey Machine Company is continuing prior to approval for completion of the order.

3. Special Operations

42 Forty-two four-inch enriched uranium slugs and fifty regular eight-inch slugs were lead-dip canned using special 1% nickel-aluminum jackets. These slugs were canned to study the application of lead dip canning to the 1% nickel-aluminum alloy components and to provide selected slugs for in-pile evaluation.

831 Eight hundred thirty-one small diameter uranium enriched aluminum alloy "C" slugs were canned by the hot press process during the month. Two thousand four hundred thirty "C" slugs were bond tested

3. Special Operations - continued

with a yield of 77%. These slugs were tested according to the new Process Standard which stipulates that only those slugs indicating no count when tested on the bond machine shall be classified as acceptably bonded. Approximately 1300 canned "C" slugs remain to be bond tested. One thousand two hundred sixty-two canned "C" slugs were transferred to storage after final inspection.

1400 One thousand four hundred lead-cadmium slugs were canned by the "C" process with a relatively high yield of 97%. This high yield was primarily due to a reduction in the number of bad welds. A revision in the canning process permitted these slugs to be welded without first being cold-sized. At month-end, sixteen thousand bare lead-cadmium slugs were received for canning.

6239 Six thousand two hundred thirty-nine uranium "dingot" slugs were outgassed in the salt bath heat treating facilities during the month.

4. Schedule Variance

Acceptable canned slug production was 100% of forecast, based on the November commitment of 393 tons.

B. Equipment Experience

1. Operating Continuity

The canning line efficiency was 95%, an improvement of 1% over last month.

2. Inspection, Maintenance and Replacements

The new canning line and component parts conveyors were placed in service during the month. Use of the conveyors was discontinued after approximately one week's operation due to falling baskets. Modifications are being made to the safety retaining screens; the conveyor tightener on the cap and can line is being remounted; and several bind points along the conveyor guides are being removed. It is anticipated that the conveyor system will be placed back in service in early December.

The transformation tester provided by Project CA-514 for cored slugs was in service for about a week during the month. The new tester was replaced with the old tester at month-end. The electrical switch controlling the flow of slugs down the conveyor failed to operate correctly and the alarm circuit was not sensitive enough to detect slight transformation changes on the surface of the slugs. The testers are now being repaired.

Two hundred gallons of methanol were lost when a mild steel methanol supply line to the cap and can machines failed. This was the result of a corroded pipeline adjacent to the nitric acid pump and supply line in the 303-F building. The pipe was replaced with a stainless steel section.

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2. Inspection, Maintenance and Replacements - continued

The pump housings on both caustic supply pumps cracked during the month. Investigation of the failures revealed that the pumps were originally installed without check valves on the downstream side as recommended by the vendor. The housings were welded and a metal safety guard was installed on each pump in case of failure. New check valves and housings are on order.

The No. 3 Acme-Gridley lathe was shut down for a general overhaul and repairs to the sound barrier. As a precautionary measure against fire hazards, wire netting was installed to hold the Fiber-glass insulation material in place instead of the highly inflammable glue previously used.

C. Improvement Experience

1. Production Tests

PT-313-47MT "Cored Slugs from Extruded Blanks and Rolled Rods" HW-33189
The preparation of eight-inch alpha rolled drilled cored slugs with aluminum end plugs was continued. A total of 14 tons of finished slugs was produced with a 72% yield.

Minor process difficulty was experienced during the later part of the month as a result of a high copper alloy being mixed with the 2S alloy from which a vendor supplied aluminum plugs. The plugs containing an excessive amount of copper resisted deformation in the crimping press because of abnormal hardness and were immediately detected. Sorting has indicated 1.5-2% of the plugs were fabricated from the high copper alloy. Plugs received from another vendor are being used until this problem is fully investigated and appropriate action taken.

PT-313-56MT "Canning of Four Tons of Dingot Uranium for Pile Irradiation" HW-37695
Preparation of dingot uranium slugs for in-pile evaluation as authorized by Supplement "A" to this production test is being continued. Sixteen tons of finished slugs were prepared for low goal exposure. Three tubes of slugs are being selected from each month's production for irradiation to high goal exposure.

The preparation of dingot slugs will be extended to about 33 tons per month beginning in January, 1956. To date it has been necessary to outgas all slugs in a salt bath prior to canning to reduce hydrogen content as necessary to prevent excessive bond porosity.

PT-105-615-A-63MT "Evaluation of I & E Slugs Canned by the Lead Dip Process" HW-39886-A
A production test was issued for the preparation of eight tubes of internally and externally cooled slugs by the lead dip process for irradiation in C Pile. During this period a preliminary test run was made on 100 slugs to evaluate process techniques, slug quality, and equipment performance.

1. Production Tests - continued

Only minor difficulty was encountered in the canning operation. Bond and penetration tests indicated good quality except for minor hairline cracks observed in the internal braze layer. Apparently this condition resulted from the aluminum tube pulling away from the uranium core during quenching. Major equipment problems involve the development of suitable probes for the bond and penetration testers and devising a method for radiographing the internal tube weld. All of these items are being given priority for early solution.

It is anticipated that sufficient progress will have been made to begin processing I & E slugs for pile testing during the week beginning December 12. Approximately 500 slugs will be processed.

2. Process Tests and Revisions

The bond tester head and penetration tester head were combined on one conveyor, thus allowing slugs to be checked for both bond and penetration quality in one operation and eliminating the need for one man. This feature will be incorporated in all bond and penetration testers when the electronic and tank components are received.

With a change in the Process Standard to increase cap thickness tolerance from 0.340" ±.010" to 0.340" ±.020", fewer thin caps are being cut on the Acme-Gridley lathes. The thin cap rejection rate for November was 0.6% compared to 1.1% for October.

3. Inventions and Discoveries

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

D. Events Influencing Costs

1. Labor Variance

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

2. Material Variance

Unit cost of direct material is expected to remain the same as the previous month.

3. Other Costs

I.M.E. unit cost for November is expected to increase over October by approximately .025 per unit. This results from pay for two holidays and retroactive pay adjustments for overtime work.

E. Plant Expansion

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1. Project Status

CA-514 "Expansion of 300 Area Production Facilities" - Closeout dates for all work orders and cross orders have been established. The

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1. Project Status - continued

majority of the work order completion dates are prior to January, 1956 but some work has had to be rescheduled for completion by March 1, 1956. Fabrication of four slug brushes for the welding conveyor is complete.

Stainless steel mesh was installed in the ducts leading to the fume scrubbers and from the fume scrubbers to the roof to entrain acid mist from the spray tanks of the pickle machines. The exhaust fans were slowed down as much as possible to reduce the velocity of the fume exhaust. Preliminary tests show that the fume discharge to the roof has been cut approximately one-half.

Construction was begun on the installation of the caustic waste station in slug recovery. It is scheduled for completion in December.

CA-590 "Fly Ash Collection Equipment - 384 Building" - The design criteria for inclusion in the bid assembly are being routed for comments. The design and installation contract is expected to be let in January.

CA-601 "General Grounds Improvement-300 Area" - The rough draft of the design criteria is being routed for comments. The layout print for the lighting and grounds improvement is being reviewed. The construction contract is expected to be let by March 1, 1956.

CG-614 "Hanford 4X Program-300 Area" - Modifications to the 3707-D Change House have been held up pending a review of future manpower requirements.

The autoclaves were received and set in place. Piping to the autoclaves has commenced. Modifications were completed on the autoclave tag board. The booths for the welding machines were erected and the installation of the welding machines is in progress. Take-offs for all material in the finishing area were completed at month-end.

Installation of the induction blower exhaust for the canning area was completed at month-end. Fabrication of the ventilation system for the Ajax furnaces is to be initiated at an early date.

CG-646 "Modifications to Pickle Machines-313 Building" - This project proposal is expected to be submitted and approved by December 5. Delivery dates for the two pickle machines are mid-March, 1956 with an estimated beneficial use date of April 15 for one and June 15 for the second.

Funds for this work will be obtained from the budget item "General Plant Projects-FY 1956" since the work is in addition to that specified on Project CA-514.

IR-194 "Centralized Quality Reporting System" - Most of the material to be procured has been received. The cable has been installed and the panel boards are 60% complete. The pushbuttons are being equipped with micro-switches and will then be ready for installation.

1. Project Status - continued

A project proposal is being prepared to correct heating and ventilation problems in 3760 Building.

2. Plant Engineering

A modified canned slug stamping machine was tested during the month. Although operation has not been continuous for a long period of time, improved operation of the modified stamper was very noticeable. Re-design of the stamp advance mechanism has resulted in continued smooth operation. A vacuum system is being tested to remove dirt, water, and Alsi from the stamp head. All of the autostamp machines are now being modified accordingly.

F. Significant Reports Issued

1. Routine

Number	Title	Author	Date
HW-39831	Monthly Report-Operation Sub-Section, MPS, October, 1955	W Windsheimer	11-4-55
HW-39857RD	Production Report - Metal Preparation Section, Operation Sub-Section - October, 1955	HE Berg	11-8-55
HW-39778	Monthly Report, Process Sub-Section, Metal Preparation Section, October, 1955	KV Stave	11-1-55
HW-39779	Monthly Report, New Fuel Element Production Program, October 1955	WA Blanton	11-1-55
HW-39876	Fabrication History of Uranium Slug Cores; C, K, and M Lots, Part III	RE Olson	11-10-55
HW-40108	Report of Uranium Accountability Activities Performed for the Metal Preparation Processes for the Quarter Ending 9-30-55	WG Tews	11-25-55

2. Non-Routine

HW-39960	Performance-Metal Preparation Section FY 1953 through FY 1955	HE Berg	11-23-55
HW-39909	Meeting Minutes-Aluminum Can Evaluation-Harvey Machine Co.	TD Naylor	11-14-55
HW-39934	Ultrasonic Transformation Test	SM Gill	11-15-55
HW-40107	Proposed Lot Numbering System	RE Olson	11-21-55

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III. PERSONNEL

A. Organization

No change.

B. Force Summary

	Start of Month		End of Month		Net Change	
	Ex.	N-Ex.	Ex.	N-Ex.	Ex.	N-Ex.
Section General	1	1	1	1	0	0
Operations	22	178	22	176	0	-2
Power & Maintenance	36	320	37	329	+1	+9
Process	40	66	40	66	0	0
Projects & Personnel	15	5	15	5	0	0
Section Total	114	570(684)	115(692)	577	+1	+7

C. Safety Experience

There were no major injuries during the month. One sub-major injury occurred when a pinch bar, being used to raise a piece of equipment, slipped and hit the employee's finger against the concrete floor fracturing a bone in one finger.

D. Radiation Experience

No exposures in excess of 200 mrads/week and only eight exposures above 100 mrads/week were reported for the Section during this period.

E. Personnel Activities

1. Visits and Visitors

D. W. Haught attended the Fifth Annual Symposium on Statistical Methods sponsored by General Electric Company in New York City.

As part of the Company's technical recruitment program, F. E. Jochen visited Oklahoma University, Oklahoma A&M and the University of Nebraska and K. V. Stave visited the University of Washington in Seattle.

M. L. Nash, AEC, Washington D.C. Security Office, visited the 300 Area to discuss security aspects of the proposed tour of the Area facilities by the press.

J. C. Finley, Aluminum Company of America, visited HAPO to discuss the quality of aluminum cans and caps.

2. Meetings

The Metal Preparation Section Business Review was presented during November.

Thirty round-table, 39 information and 16 staff meetings were held for members of the Section. Eighty-eight safety and security meetings were held.

Richland, Washington
December 7, 1955

MANUFACTURING DEPARTMENT
REACTOR SECTION
MONTHLY REPORT
NOVEMBER, 1955

I. RESPONSIBILITY

Assigned responsibilities of the Reactor Section remained unchanged during November.

II. ACHIEVEMENT

A. Operating Experience

Reactor time operated efficiency was 70.0 per cent which is an increase of slightly more than two per cent over October. Major causes of down time were for metal discharge, rupture removal, tube replacement, production tests, television installation, junction box repair, and essential maintenance. Almost eight per cent of total operating time available was consumed for tube replacement at D and F Reactors. There were nine scheduled and 48 unscheduled outages.

Reactor input production was 6.2 per cent below forecast due to lower than forecast average operating levels and lower than forecast time operated efficiency. These effects were partially offset by postponement of a twelve-day Panellit outage at B Reactor.

Output production for November was 32.1 per cent above forecast due to lowering the goal concentration for high concentration

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A. Operating Experience (Continued)

metal by 100 megawatt days per ton.

The established maximum reactor operating levels, excluding burnout, were increased 50 megawatts at DR Reactor, 88 at H Reactor, 49 at KE Reactor, and 189 at KW Reactor. The increases at DR and H Reactors are due to gains from colder river water, and at the K Reactors to the relaxation of tube power limits.

There were 19 slug failures during November, one less than October, as follows:

	B	C	D	DR	F	H	KE	KW	Total
Eight-inch regular		4	4		1	8			17
Eight-inch cored regular	1								1
Production Test		1*							1
	1	5	4	—	1	8	—	—	19

* PT-105-593-A, "Irradiation of Cored Slugs With Aluminum End Plugs."

Reactor outage time for the removal of these slug failures was 252.0 hours.

1. Statistics

Operating statistics are summarized in the table shown on Page 3.

2. Activities

As a result of changing A.E.C. requirements, the low concentration program was discontinued at H and KW Reactors but remains in effect at C Reactor.

Partial installation (about 75 per cent complete) of the closed circuit television installation for discharge area view at the B Reactor was accomplished during a one-week outage. Partial repairs to the No. 19 effluent water junction box were also effected.

The KE Reactor was shut down for Production Test 105-600-A, "Periodic Measurement of Graphite Coefficient of Reactivity of the KE Reactor."

The D and F Reactors were shut down alternately for the tube replacement program. At the end of the month, the D Reactor was again shut down for a continuation of tube replacement,

1. Statistics

	B	C	D	DR	F	H	KE	KW	Total or Ave.
Reactor Time Operated Efficiency (%)	63.8	57.6	48.3	94.5	47.4	85.1	85.9	77.7	70.0
Reactor Outage Time (Hrs)									
Plutonium Production	260.7	305.2	372.0	37.4	377.8	38.6	64.0	160.4	1619.7
Special Irradiations and Tests				2.0	1.0	64.8	37.8		105.6
Total Outage Time	260.7	305.2	372.0	39.4	378.8	107.0	101.8	160.4	1725.3
Reactor Unscheduled Outage Time (Hrs)	90.5	233.5	133.2	2.4	69.5	107.0	29.1	56.0	721.2
Metal Discharged (Tons)	13.9	83.0	21.0	15.7	14.6	4.0	6.1	167.4	325.5
Water Quality (ppm Turbidity)									
Raw Water - Average	6	5	6	6	6	4	4	4	
Raw Water - Maximum	12	13	15	14	14	8	16	12	
Process Water - Average	0.009	0.005	0.006	0.007	0.004	0.005	0.002	0.004	
Process Water - Maximum	0.019	0.009	0.017	0.010	0.007	0.009	0.010	0.018	
Water Pumped (MM Gals)									
Bldg. 190 to Reactor	1542	2536	1663	2108	1249	2190	5193	4882	21,362
Bldg. 182 to 200 Areas	63.3					411.3			475
Bldg. 181	4838		4508		1509	2996	5517	5106	24,474
Steam Generated (MM Lbs)	146		230		105	129	21	22	653
Coal Consumed (Tons)	9501		14241		7300	7500			38,542
Oil Consumed (M Gals)							231	234	465

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A. Operating Experience

2. Activities (Continued)

and for installation of gamma monitoring and replacement of discharge area chute liners.

The following table indicates activities during November associated with special irradiations:

	Tubes Charged	Tubes Discharged	Casks Shipped
Production Tests	44	10	2
"B" Material	0	5	0
Mint Flattening	45	5	0
Thorium Flattening	0	24	0
Totals	89	44	2

The third shipment of Mint pieces from DR Reactor to Savannah Works was made November 11. A total of five casks containing 4,557 pieces was shipped.

B. Equipment Experience

Twenty-eight scrams occurred, nine of which were caused by normal Panellit system variables. Eight manual scrams were necessitated as shown below.

Reactor	Reason
H	No. 11 horizontal rod water hose became caught and split causing loss of sufficient cooling water flow.
DR	As required by PT-105-606-A, "The Effect of Moderator Temperature on Control Rod Strength."
KW	For temperature control and to charge additional poison columns.
C	Erroneous high tube temperature was indicated due to a potentiometer test box left attached to a thermocouple lead.
KW	Temperature control during severe heat cycling.
KW	Insufficient reactivity following a scram recovery from the KE Reactor inter-tie trip. It was later determined that VSR No. 23 was partially or wholly inserted into the reactor.

[redacted]

B. Equipment Experience (Continued)

Reactor	Reason
D	Temperature control.
KW	To discharge a tube which was indicating abnormal temperature and pressure.

In addition, the following scrams occurred due to miscellaneous causes:

Reactor	Reason
D	Reactor scrammed when a riser impulse line to the Building 190-D pump controllers froze causing the pumps to drop pressure. The impulse lines were exposed due to excavation for Project CG-558 (Reactor Modification for Increased Production).
KW	No. 2 Beckman trip point exceeded when range change was not coordinated.
KE	Reactor scrammed by the inter-tie circuit from KW Reactor.
KE	Beckman was unbypassed after a range change without resetting the trip controllers.
KW	Inter-tie circuit due to the above trip at KE Reactor.
KE	Surge on No. 1 and No. 2 Beckman power circuits.
KW	Inter-tie circuit due to the above trip at KE Reactor.
KE	Beckman power failure.
KE	High level Beckman trip when a switch in the instrument tunnel was inadvertently operated.
KW	Inter-tie circuit due to the above trip at KE Reactor.
C	Water pressure surge resulting from a power surge on the BPA system.

Total down time due to all the above outages was 126.3 hours.

Tube replacement programs were conducted at D and F Reactors. At D Reactor, 77 tubes were removed and these channels plus four previously emptied channels were retubed. A tube replacement rate of 2.9 hours was required as compared with a 1.8 hour average previously attained, primarily due to difficulty of inserting new tubes. At

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B. Equipment Experience (Continued)

F Reactor, 108 tubes were replaced at an average rate of 1.8 hours per tube.

Leak testing programs were necessary at the D and F Reactors. At D Reactor, increasing water collection rates prompted leak testing the entire reactor following a rupture outage. Three leaks were confirmed and isolated. Two complete leak tests were required at F Reactor and a total of six tubes were found leaking and were replaced. During the month, almost 1900 gallons of water have been removed from F Reactor and trends indicate additional leaks are present. The helium detector facility was successfully used at both reactors in locating leaks.

Functional checks of the Ball 3X system included the following:

a. At B Reactor, three hoppers of balls were test dropped, inspected, and found to be in good condition.

b. At C Reactor, the following occurred:

   1) The balls dropped freely from 12 hoppers when manually tripped.
   2) The balls failed to drop from seven hoppers when manually tripped. The balls were dislodged, recovered, and successfully dropped a second time.
   3) The balls were dropped from 20 hoppers, and refilled with a 70-30 boron steel mixture.

c. A functional check of the Ball 3X Meletron switches at D Reactor revealed seven switches which were not functioning at the desired pressure. All switches were repaired and reset.

d. At DR Reactor, a test was run on all hopper gates and representative samples of balls inspected. Some rust was noted which was insufficient to affect the proper functioning of the system.

At KW Reactor, a malfunctioning seismoscope selector switch tripped the Ball 3X system. An examination of the switch revealed that it had been improperly assembled in manufacture. This switch and the corresponding switch at KE Reactor were correctly reassembled and returned to service.

The reliability of the VSR mechanism continues to be a problem at the K Reactors. The latch on VSR No. 32 at KE Reactor failed to function on three separate occasions and caused one drop of the associated ball hopper. Difficulties were also experienced with three other latch assemblies.

[redacted]

B. Equipment Experience (Continued)

The temperature monitors remain on bypass at the K Reactors. The installation of the interim bulbs was completed at KE Reactor on October 31. Thirteen have since been replaced due to low resistance to ground. Four scrams would have occurred from the KE Reactor temperature monitor if it had not been on bypass.

Inspection of 30-inch backwash valves at Buildings 183-KW and KE revealed breakage of internal parts in 11 valves. The breakage is the result of over travel of the valve stems. Stops are being installed in valve operating power pistons to prevent over travel.

Drive gears for actuating limit switches controlling motor operated waste and influent valves were replaced during the month. Teeth of the small gears were damaged by operation in lubricant stiffened by low temperatures. Manual control of the valves during filter washes was necessary during the repair period. Lubrication specifications for the assemblies have been revised.

At Building 190-C, the 1-B process water discharge header screen was altered to prevent leakage of water past the bottom of the screen as a follow-up on the theory that plugging of tube inlet cone screens may be the result of water bypassing the Building 190 discharge screens. It is planned to make these screens interchangeable at Building 190-C.

C. Improvement Experience

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

PT-105-537-E (Effects of J-Q Pairs on Radiation Damage to Pile Graphite)
In continuation of this test, 12 tubes at F Reactor remained charged with 36 pieces of J-Q material.

PT-105-548-E (C Pile Graphite Burnout Experiment)
Nine tubes remained charged with J-Q material at C Reactor to gain additional information on graphite chemical stability and radiation damage prior to reaching the higher graphite temperatures following completion of Project CG-558.

PT-105-345-E (KAPL-120 Recirculation Loop)
At H Reactor, start-up was accomplished with the loop operating on process water while a thermocouple well leak was repaired. After about five hours operation, power level was reduced to 50 megawatts and the facility switched to recirculation. This was the second switch over during operation and results in a significant savings of down time.

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C. Improvement Experience (Continued)

One new and five revised Process Standards - Reactor were approved and issued and one Standard was eliminated by incorporating the requirements in a different Standard. The new Standard provides specifications governing the charging and discharging of poison columns during reactor operation. The five revisions covered restriction of outlet tube tempe atures at the K Reactors, requirements pertaining to the flux monitor interlocks at dual areas, re-statement of temperature map requirements during start-ups for all reactors, relaxation of initial power raises during hot start-ups at reactors having octant monitoring, and establishment of minimum frequency for graphite distortion measurement at the K Reactors.

One revised Process Standard - Reactor Cooling Water was approved and issued specifying restrictions on the operation of the flow balance valves at the K Water Plants.

A new type dummy was approved for reactor use. The new dummy is fabricated from flat stock and is expected to cost considerably less than those now in use.

Around the clock performance of field spot checks, to assure compliance with Process Standards, was started during November by assigning three Process Control Engineers to a shift schedule.

The radiation survey form used at all reactors to record the results of monitoring activities has been revised and adapted to the McBee Keport card system. The system has been utilized at H Reactor during the last two months with good results. Data review is expedited by this category method and plans are being made to adopt this system at all reactors on February 1, 1956.

The new Quinn PC amplifier and new type aluminum PC tube have been installed in B and D Reactors. The new amplifier has been installed in 105-H and aluminum tubes will be installed when they are received from the 300 Area fabrication shop. This will complete the amplifier and tube installation in B, C, D, DR, F, and H Reactors.

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

D. Events Influencing Costs

Reactor Section manufacturing cost increased $23,000 in November above the previous month. This rise is attributed primarily to an increase in fuel costs as reflected by a 9.2 per cent increase in amount of steam generated. Part of the increase in

D. Events Influencing Costs (Continued)

fuel costs is due to a higher coal cost as a result of renegotiation of purchase contracts. The unit cost for November is expected to be about seven per cent lower than October since the increased cost is more than compensated by a nine per cent increase in production. Other factors adversely affecting cost such as the tube replacement program, rupture removal, and leak testing of process tubes remained essentially the same as for October.

Unit cost for December is expected to be about the same as for the past month.

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 November 11, 1955.

CA-431 100-C Area

Cost estimated to replace five horizontal control rods, as an alternate to replacement of 15, have been obtained from Engineering Department. These are now being reviewed by Process and Operations prior to forwarding a request to Project Section for starting rod replacement at C Reactor.

The 107-C effluent basin repairs have been temporarily suspended since C Reactor is unable to divert all of its effluent water to the 107-C west basin. Design Section is considering the possibility of performing the repairs under CG-600 (100-C Area Modifications).

CA-512 100-K Plant

The Hoffman Construction Company was awarded the contract for work in all cells of the KER recirculation system on a low bid of $329,000. The contractor began work in November.

All interim rear face resistance bulbs have been installed. Additional operating experience is required before firm statements can be made as to the adequacy and corrosion resistance of these bulbs.

Shipment of the remaining 35,000 pounds of boron steel balls will be delayed until mid-December

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E. Plant Development and Expansion

1. Project Status

CA-512 100-K Plant (Continued)
because of the need for replacement of unsatisfactory alloy delivered to the ball fabricator.

An interim Fireye system will be installed at the steam generators in Buildings 165-KE and KW as soon as possible and in the most simple form consistent with safety. It will be recommended that the work be completed as part of the project which will provide steam driven auxiliaries for the Buildings 165-KE and KW steam generators.

CG-558 Reactor Plant Modification for Increased Production
Replacement of Panellit gages at 105-D Reactor was completed on November 9. Operating experience with the new type gages has not been up to expectations due to mechanical imperfections. Accordingly, the replacement of the pressure monitoring gages at F and B Reactors has been postponed for further evaluation of the gages already installed.

It is Engineering Department's intention to modify and mock-up one machine for the poison column control facility before attempting any further installation. The front and rear face nozzle ball valves on the DR Reactor have been subject to operational difficulties.

2. Plant Engineering

A number of engineering and development studies were active in the Section during November. The studies are, in general, aimed at decreasing costs and/or increasing production. Details are given in Document HW-40272. Several items of interest are reported below.

Two methods of de-filming of process tubes prior to tube removal using super-cel and chromic acid were tested at F Reactor during the month. Further tests are planned at D Reactor to determine whether de-filming of process tubes prior to removal should be accomplished on a routine basis.

Vendor bids have been reviewed for the 112 tube operational charge-discharge facility at C Reactor. Drawings and specifications are being revised to include applicable vendors' suggestions.

[redacted]

2. Plant Engineering (Continued)

Considerable assistance is being given by the Reactor Section Process Engineers to the tube removal program. These efforts and activities comprise two phases, mainly, (1) providing engineering assistance to the maintenance forces engaged in this work, and (2) development of improved tools and methods of tube replacement.

F. Significant Reports

1. Routine

Monthly operating reports issued for October were:

HW-39751-A	Reactor Section	R. S. Bell	11/7/55
HW-39813	Operations Sub-Section	A. R. Maguire	11/1/55
HW-39694	Process Sub-Section	O. C. Schroeder	11/1/55
HW-39690	Projects and Personnel Development	F.A.R. Stainken	11/1/55
HW-39793	Radiation Monitoring Sub-Section	P. C. Jerman	11/2/55
-	Maintenance Sub-Section	E. E. Weyerts	11/7/55
HW-39824	Power Sub-Section	J. C. McLaughlin	11/3/55

Other routine reports issued during November included:

HW-40110	"Monthly Progress Report, Reactor Section Expansion, November, 1955"	J. P. Langan	11/23/55
-	"Status of Reactor Section Projects, Informal Requests, and Budget Items"	F.A.R. Stainken	11/21/55
HW-39749	"Reactivity Balance and Associated Data - October, 1955"	A. P. Vinther	11/1/55

2. Non-Routine

HW-39180	"Octant Monitor Trip System - Status Report"	R. E. Dunn	9/20/55
HW-39549	"Tube Replacement Task Force Interim Report"	C. W. Botsford	10/29/55
HW-39684	"Three-Way Tube Closure Flexibility of Improved Ball Valves"	C. W. Botsford	11/4/55
HW-39693	"Reactor Engineering Problems"	G. O. Amy	11/3/55
HW-39820	"105 Valve Pit 24-Inch Header Screens"	C. W. Botsford A. K. Hardin	11/4/55
HW-39953	"Moisture in Ball 3X Hoppers	R. H. Gay	11/17/55
HW-40120	"In-Pile Defilming of Process Tubes"	A. K. Hardin	11/28/55
-	"Summary of Radiation Exposure Experience of Maintenance and Radiation Monitoring During Tube Replacement"	H. E. Book	11/15/55
-	"Summary of Exposure Records of Mechanical Maintenance During Routine Work"	H. E. Book	11/16/55
HW-38941	"Project Proposal for Charge-Discharge While Operating - 105-C"	J. W. Ballowe	11/21/55

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III. PERSONNEL

A. Organization

There were no appointments in the Reactor Section during November.

B. Force Summary

	Beginning Of Month	End of Month	Net Change
Section General	2	2	0
Operations	382	388	+ 6
Maintenance	694	703	+ 9
Projects and Personnel	51	52	+ 1
Power	488	488	0
Process	77	83	+ 6
Radiation Monitoring	96	99	+ 3
Section Total	1790	1815	+ 25

Changes during November included 42 transfers into the Section, 19 transfers out of the Section, seven new hires, four terminations, one reactivation, and two deactivations.

C. Safety Experience

There was one Major Injury, no Sub-Major Injuries, and one Near-Serious Accident during the month.

Major Injury No. 113 (fatality) occurred on November 25, at Building 184-H coal handling station. A Coal Handler was trapped in a coal slide while attempting to break up a void over the conveyor intake grating when he was trapped in a slide. The slide covered him completely, resulting in death by suffocation.

Near-Serious Accident No. 55-45 occurred at Building 184-H on November 11, when a Plumber-Steamfitter received first and second degree burns while opening a flange on a feed-water line which was thought to have been drained.

D. Radiation Experience

There were two Class I and no Class II Radiation Incidents during the month of November.

Class I, No. 536-C, Radiation Incident occurred at the H Reactor on November 1, and involved the spread of pariculate contamination to a five square mile ground area south of the stack. The

[redacted]

D. Radiation Experience (Continued)

ignition of a ruptured fuel element, located in the zirconium tube of the water recirculation loop, was the source of the subsequent ground vehicle and personal shoe contamination. Readings from 1000 to 10,000 c/m were observed generally in the affected area with a maximum of 700 mrads per hour, uncorrected for source size, observed on a particle. Travel of personnel and vehicles was adequately controlled within and without the area to confine the zone of contamination. This incident is reported in HW-40115.

Class I, No. 539-C, Radiation Incident occurred at the C Reactor and involved an Operations Supervisor who received external facial, and internal oral and nasal contamination during Ball 3X recovery operations.

The magnitude of contamination did not appear sufficient to cause significant internal deposition of radioisotopes. This incident is reported separately in Document HW-40220.

Class I, No. 534-C, Radiation Incident occurred at the H Reactor in October but was not included in the October report. This incident involved a Pile Operator who was potentially overexposed when the left hip pocket of his coveralls became contaminated during Ball 3X recovery operations. Contamination of 200 mrads per hour was detected which was promptly removed. This incident is reported separately in Document HW-40234.

E. Personnel Activities

At month end, 25 employees are receiving on-the-job training for engineering or supervisory assignments in the Section. Ten of these are on assignment under the rotational training program.

A special meeting was held in 100-F Area at which time Maintenance Supervision assigned to the tube replacement program discussed the problems associated with this work.

Work is progressing on the classroom training program for Radiation Monitor Trainees. Training aids are being made by the Graphics Unit and will be utilized at all class sessions. The lecture series is expected to begin in January.

In the Operations Sub-Section, the first of eight sets of training questions were given to Pile Operators. Evaluation of the results in order to formulate training needs is in progress.

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E. Personnel Activities (Continued)

A film entitled, "Flow Detection Through The Use Of Dye Penetrants" was shown to 26 supervisors by a representative of Turco Products of Seattle.

On November 15, G. L. King and W. W. Kiester of the Contract Reimbursement Unit presented a two-hour review of pertinent points in the proposed GE-AEC contract to approximately 30 Reactor Section superintendents and unit heads.

A series of ten meetings for discussion of the revised union contract was conducted by C. J. Sheeran for first-line supervisors, primarily. Approximately 241 people attended.

Richland, Washington
December 7, 1955

MANUFACTURING DEPARTMENT
SEPARATIONS SECTION
NOVEMBER, 1955

I. RESPONSIBILITY

On November 1 the Manufacturing Department assumed responsibility for operation and maintenance of the 272-E Area Mock-up Shop. Responsibility was also assumed for operation of the waste scavenging equipment in the CR Tank Farm.

II. ACHIEVEMENT

A. Operating Experience

1. Statistics

a. Bismuth Phosphate Operations

	November		October	
	Normal	Acid Wash	Normal	Acid Wash
Charges started in Canyon Bldgs.	40	0	70	2
Charges completed in Conc. Bldgs.	40	2	75	2
Special charges - Conc. Bldgs.	11		17	
Charges completed-Isolation Bldg.	95	0	88	2
Average Waste Losses, %	2.5		3.0	
Special charges-Isolation Bldg.	15		13	
Material balance, %	101.4		102.5	
Yield through Process, %	98.9		99.5	
Average cooling time (days)	115		103	
Minimum cooling time (days)	100		92	

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b. Redox Operations

	November	October
Equivalent charges started	401.3	198.6
Charges completed	373.7	178.1
Tons Uranium delivered to storage	236.9	283.1
Average Production Rate per Operating day, Tons	9.3	10.6
Average Daily Operating Rate for the month, Tons	7.9	9.1
Average yield, %		
Uranium	98.5	99.0
Plutonium	101.1	97.3
Total Waste Loss, %		
Uranium	0.63	0.43
Plutonium	0.92	0.88
Average cooling time, days	157	100
Minimum cooling time, days	96	87
Percent down time	16.8	14.2

c. 231

	November	October
Batches started	111	97
Batches completed	110	100
Batches awaiting processing	5	5

d. 234-5 Operations

	November	October
Batches completed through Task I	210	159
Batches completed through Task II	212	215
Runs completed through Task III	96	85
Waste Disposal (Units)	15.86	20.72

e. UO_3 Operations

	November	October	To Date
Uranium drummed, Tons	341.94	422.79	11,800.72
Uranium shipped, Tons	324.54	394.38	11,749.10
Average cooling time, days	163	106	
Minimum cooling time, days	102	93	
Waste Loss, %	0.02 est.	0.02	

[redacted]

f. TBP Operations

	November	October	To Date
Tons received from Metal Removal	160.88	111.19	6,212.57
Tons shipped to UO_3 Plant	157.71	102.23	6,000.12 adj.
Average Production Rate per Operating day, Tons	5.26	4.41	
Average Daily Operating Rate for the Month, Tons	5.26	3.30	
Average yield, %	98.97	92.78	
Total Waste Loss, %	2.19	3.62	
Ratio Actual Waste Volume returned to theoretical volume	1.01	0.86	
Percent Down Time	0	25.19	

g. Power

	200 East	200 West
Raw water pumped, gpm	4,010	6,975
Filtered water pumped, gpm	498	1,153
Steam generated, lbs/hr	110,000	200,000
Maximum steam generated, lbs/hr	224,000	284,000
Total steam generated, M lbs.	79,864	144,074
Coal consumed, tons (est.)	4,397	10,094

h. Waste Storage

	Equivalent Tons U	
	Nov.	Oct.
Metal Waste reserve storage capacity-T Plant	167	214
1st Cycle reserve storage capacity-T Plant	216	260
Metal Waste reserve storage capacity-B Plant	685	685
1st Cycle reserve storage capacity-B Plant	74	74
Redox Waste reserve storage capacity	511	623

2. Activities

a. Redox Processing

After replacing the 1S column feed pump (F-8) on November 3, extraction battery rates were raised using the 1A and 1S columns in parallel to 11 tons of uranium per day. This rate was held until November 6 when a cut back to 9 tons per day was necessary due to processing dilute feed. The feed dilution was caused by excessive backflushing of the oxidizer (H-4) to centrfigue feed tank (G-5) transfer jets which began to operate very erratically. The rate was held until November 7 when the plant was shut down to clean out equipment following

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a. Redox Processing (Continued)

processing of low MWD metal. This shutdown lasted until November 12. Equipment repairs including a new H-4 to G-5 jet were made during the time flushing procedures were carried out preparatory to start up on high MWD metal feed. High waste losses requiring rework were encountered after the November 12 start up caused by trouble in the second plutonium extraction column (2A). Rates were restricted to a maximum of 9 tons/day during the rework period. By November 16 first cycle rates were brought to 10 tons/day where they were held throughout the rest of the month except for a 5 ton/day cut back caused by shutting down the 1S column for two hours on November 22. The 10 ton/day rate was chosen as the optimum rate considering column efficiency and the projected production schedule which calls for a major shutdown in December following depletion of the present high MWD metal inventory.

b. Metal Recovery

1) TBP Processing

Except for a minimum of outage time on first cycle as the result of failure of the 002-WR waste pump, operation was maintained in good control all month with no second cycle outages experienced. In spite of processing the greenest material to date, waste losses and product gamma results were good all month.

2) UO_3 Processing

Building production rates were lower this month than last month due to several factors. Redox feeds containing relatively high zirconium-niobium percentages were held back from the process. Even so, a trend to higher gamma product continued and the average gamma shipments remained out-of-specification. Pot foaming, a 56 hour planned outage on absorber equipment and hammer mill difficulties late in the month were cause for not making the November goal. Serious pot foaming experienced near month-end, was attributed to hydrolysis of the TBP in the feed material stored in X-1 tank. This was felt to be caused by excess steam heating of X-1 tank contents in the cold weather.

3) Waste Metal Removal

Two batches of TBP waste were scavenged at 241-CR and sent to 112-C tank for settling. At month-end two batches are held in the blend tanks awaiting installation of pH equipment. Adequate feed supplies were maintained to the TBP Plant all month.

c. T Plant Processing

Special processing was required on Run T-55-11-MRC-7 after laboratory tests showed it contained 20% solids. To allow the Redox Plant to begin the immediate processing of 600 MWD/T irradiated uranium, the 224-T Concentration Building is now processing the recycle solution from the last 59 Redox runs of low MWD material.

d. Isolation and Metal Fabrication

The Isolation facility continued to process only low MWD/T material, handling the total production of the T Plant and a small amount of low MWD/T material from Redox. A portion of the production was converted to oxalate for subsequent processing in the 234-5 Building but the majority of production was for off-plant shipment as plutonium nitrate.

Operations progressed satisfactorily during the month with fewer and less severe equipment difficulties than have been experienced previously. The RMA Line received plutonium feed directly from the Recuplex facility for the first time and no difficulty was experienced in fabricating the material.

e. Purex

Dissolving of 61 tons of depleted uranium was completed. Dissolving operation proved to be very satisfactory and the mol ratio of acid consumed to metal dissolved was approximately three to one whereas that for Redox is four to one. Under optimum operation control a ratio of 2.5 to 1 may be achieved. The first two cold runs were completed and the third one is in progress at month end. Equipment problems detected during the cold runs were erratic performance of column capacitance probes, plugging of the second acid concentrator overflow line and bowl leakage of one organic centrifuge. The capacitance probe was redesigned with a machined flange instead of a packing gland. In general, plant performance was very satisfactory and objectives of the cold runs were achieved.

3. Special Operations

a. Pu Recovery - Metal Fabrication

Hoods 40 and 41 were employed in the dissolution of high MWD/T scrap materials. Material recovered from Hood 41 was fed back directly to the RMA Line. Purity of product from the Recuplex facility was satisfactory and waste losses were improved. The lower waste losses and higher production rates in Recuplex are attributed to use of

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a. Pu Recovery - Metal Fabrication (Continued)

fresh solvent. Miscellaneous impurities in the previous solvent which had not been in use since startup evidently contributed to the higher waste loss and caused flooding of the equipment.

b. In-Farm Scavenging - Metal Recovery

Operations were started at 241-CR but steady operation requires installation and proven good operation of pH control equipment now in process of being installed.

4. Schedule Variance

Redox production exceeded forecast by 13%. Maximum production rates were held to 11 tons of uranium per day.

TBP production was 17 percent over commitment while the UO_3 was 2 percent under goal. Eight cars of UO_3 were shipped.

The production schedule in T Plant was met with 40 runs started, and 40 runs plus 11 MRC's shipped. Unit production was 101% of the commitment.

All production commitments for nitrate and for fabricated and unfabricated material were met in the Z Plant.

B. Equipment Experience

1. Operating Continuity

A total of 121 hours downtime at Redox was experienced giving a mechanical efficiency of 83%. The major cause of downtime was the change over from producing low to high MWD metal.

TBP first cycle was down 21 hours while second cycle was down zero hours. First cycle lost time was associated with the 002-WR waste tank pump failure. UO_3 schedules were adjusted as feed became available. Fifty-six hours downtime was scheduled in November to permit Minor Construction to work on the nitric acid absorber system.

No significant processing time was lost in the T Plant. A total of 270 hours were spent in repairing and replacing equipment and re-working wastes.

There were no equipment failures in the Z Plant which affected the continuity of operations.

2. Inspection, Maintenance and Replacement

a. Cell Equipment Replacement - Redox

The right hand tube bundle on the organic still pot (G-3) was replaced with a new tube bundle which was equipped with a remotely replaceable teflon asbestos gasket. The replaceable gasket on the left bundle on G-3 was replaced with a cork neoprene teflon gasket. Only three stud bolts out of sixteen original stud bolts on the G-3 tube bundle flanges remain in service. The flanges were tightened by means of remotely installed "C" clamps.

A leak in the shell of the H-4 tank has been indicated by build up in the H-S-1 and H-S-2 sumps and by analyses of the H cell floor drainage material. The leak, which averages about one gallon/hour, has not been observed from the crane. If this leak is confirmed by later tests, it will be the first time in the history of the Separations areas that the shell of any process tank has failed.

Replacement of the product concentrator (L-3) steam chest was accomplished on November 11 and 12. This job was made extremely difficult when it was found that orientation of steam and condensate lines on the replacement unit was different from that on the original equipment. The piping was bent and strained into place in time for resumption of the building process.

b. 60 Ton Crane - Redox

The following work was performed on the Redox 60 ton crane during the month:

a. An improved type swivel hook was installed on the one ton hoist.

b. The electrically operated brake on the right hand auxiliary hoist travel was removed on November 15. This travel mechanism brake is not required due to a worm drive, however it was interfering with normal operation.

c. Equipment Maintenance - Metal Fabrication

Major items involving maintenance of the process equipment in the Z Plant included the following: repair of the weighing cage in Task II resulting from mis-alignment of filter boats; replacement of a heating element in Task IV; and eleven thermocouple gauges in Task VII. Removal of the process hoods for Tasks I and II on the RG Line was completed during the month.

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d. T Plant

All process vessels in 224 Building were checked by audio gauge. No thin or weak walls were detected on any of the vessels.

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d. T Plant (Continued)

The 4-5-L reactor was replaced with a unit (3-5-R) which had been removed from service on 5-5-55.

e. 002-WR Waste Pump - Metal Recovery

The discharge pumping rate of the 241-WR-002 tank pump dropped below a required rate and was replaced. In service eleven months, this compares to a much shorter life of one to two months experienced prior to re-routing the stack and vessel vent condensate drain from this tank.

f. Canyon Crane - Metal Recovery

Serious flanging of the building crane drive wheels occurred late in the month. This is a continuation of a problem which began developing about a year ago. Repairs were made without losing processing time.

C. Improvement Experience

1. Process Tests and Revisions

a. Iodine Emission

Redox

Iodine emission has not been a problem during the period. Early in the month two days in which the emission exceeded 1 curie/day were encountered due to heel removals in the dissolver which were nonstandard conditions. During the latter part of the month, while operating with well aged high MWD metal, emissions have been well below tolerance levels.

T Plant

Lack of sufficient data has delayed the calibration of the new gamma scintillation iodine monitor. The delay was due to installing a three piece control jumper on the 3-5-R silver reactor and installation of additional nozzles which will permit the monitor to be switched to any of the three dissolvers. It is expected that calibration will be completed during December.

b. Waste Scavenging

During November, TBP in-plant waste concentration was discontinued and strontium nitrate was substituted for calcium nitrate in the scavenging chemicals. This resulted in 20 - 30 percent higher volume wastes being sent to the tank farms. At current production rates an underground tank is filled about every 12 days.

b. Waste Scavenging (Continued)

The volume of waste produced during waste scavenging and remaining in storage was approximately 70 percent of that expected from the original HW #4 flowsheet.

c. Double Casting - Metal Fabrication

Several Task IV charges were made with double stacking. This included another model which had always before been cast singly. A new "slip cast" crucible was successfully tested which permits two castings to be obtained from one pouring. This will permit a reduction in the amount of recycle from turnings.

2. Inventions and Discoveries

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

D. Events Influencing Costs

The Separations Section manufacturing cost for the month of November is expected to reflect a decrease of approximately 4% from the October level, due to the schedule curtailment of T Plant production and the approximate 16% decrease in Redox uranium throughput, as this facility switched to "high" material. The decrease in cost will be primarily due to the lower essential material consumption associated with the decreased production.

Although Redox uranium throughput decreased by approximately 16%, the plutonium output is expected to increase due to the high MWD level of the uranium processed. This increased plutonium output will be reflected in a decrease, from the previous month, in the Redox and average plutonium unit cost.

E. Plant Development and Expansion

1. Project Status

a. CA-513-A - Purex

This project is complete except for minor jobs being performed at White Bluffs by Minor Construction forces. This includes such items as modification to seventeen (17) new casks and repairs and modifications of the C cell filter.

b. CA-513-E - Purex Expansion

Project Revision No. 5, which now includes $1,500,000 for the installation of a new remote crane and a new crane maintenance

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b. CA-513-E - Purex Expansion (Continued)

platform, has been received from the AEC. Scope design for building modifications and crane specifications is in progress.

The CA-513-E project, not including the remote crane, is approximately 92 percent complete. The present estimated completion date for the iodine monitors on the dissolvers, and vessel vent off-gas systems is February 15, 1956. Attempts to improve this date to meet "hot" startup are in progress.

c. CG-598 - Vacuum Acid Fractionator - Purex

Construction on Project CG-598 was suspended due to lack of funds. The project revision requesting additional funds is being reviewed by management prior to transmitting to the AEC. The A-9 crib is 98 percent complete; however, this crib will not be tied into the waste disposal system until funds are available for Minor Construction to complete their portion of this work.

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

With the completion of the air lift circulators in tanks SX-114 and SX-115, all in-tank work is now complete. The lump sum contractor's work remaining consists of thermowell installation and concrete pads for circulator piping terminal racks. Minor Construction has the eight inch raw water loop to complete in addition to permanent air supply and instrumentation systems.

Operational use of needed tanks is now possible at any time by tying in temporary air and instrumentation as required.

e. CG-603 - 4X Program, Bismuth Phosphate Plants

Design of the B Plant portion of project CG-603 is complete; construction 98% complete. Major items which remain are: 1) The dissolver off-gas sampling facility in the 292-B Building, 2) 221-B Building punch list, 3) area cleanup, and 4) approximately 40% of the deck painting in the canyon. Two shift operation was discontinued on November 11. The target date of December 9 has been established for completion of work by Minor Construction.

f. CG-613 - UO_3 Expansion

Procurement of materials for use by the G. R. Clark Company, the Phase II contractor, is progressing satisfactorily, with the exception of the process bag filters. The installation of these filters will be deleted from the Clark contract, and added to the Phase III contract.

f. CG-613 - UO_3 Expansion

The Phase III Contract has been awarded to the Hoffman Construction Company for $289,800. The major portion of this contract consists of equipment installation.

The Phase IV Contract encompassing the railroad car loading facilities, roads and walks, will be submitted to contractors for bidding during the week of November 28, 1955.

Minor Construction is progressing with the 224-U cell revisions. The A Cell architectural work is complete, piping revision started, and the D Cell secondary uranium concentrator has been installed. Service piping is being installed to this new concentrator.

Revisions to the Luckey pots will be performed by plant forces. The new kettles and agitators have arrived on site. Installation work will start December 5 and approximately five weeks will be required for the revisions. New lids will be furnished when the new pots are installed at a cost of $5,000 to the project.

The project revision requesting $1,000,000, bringing the total project cost to $4,000,000, is being held by the AEC pending a refund to the Commission of $1,000,000 from the CG-603 project. The Commission is drafting a letter to the Design Project Section stating that the CG-613 project will cost about $4,500,000 and requests the Project Section to review the estimates.

g. CG-621 - Redox Contamination Control

E Cell Ozonization: Ozone contactor tank, tower, and jumpers are ready for installation. Instrument piping on E panel should be completed by December 6. Acceptance test on the ozone generating system are tentatively set for the week of December 5. Ready-for-operation date will be late December.

J-6 Precondenser: Design of this system is essentially complete. Bids for the condenser have been requested. Scheduled completion date is March 1, 1956.

Canyon Wash-Down Facility: Detail design of the spray nozzles and instrumentation is nearing completion. Design of all other phases of the system is essentially complete. Scheduled completion date is July 1, 1956.

h. CA-625 - 241-SY Tank Farm

Final drawing approval is being withheld until some time in December pending minor design revisions.

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

Revision 1 of the project proposal has been approved by the AEC and the directive was issued on November 30. Design of the equipment required for installation under revision 1 of the project proposal is essentially complete and procurement of materials for fabrication is in progress.

2. Plant Engineering

a. Work Simplification

The fourth series of Work Simplification Conferences is 60% complete with 29 jobs currently being analyzed for improvements by means of work simplification techniques.

b. Preventive Maintenance

Establishment of the equipment history files in Purex is essentially complete. The next step will be to thoroughly indoctrinate Purex maintenance personnel with the system, followed by the actual reporting of maintenance work by the craftsmen.

Establishment of the Z Plant system was re-initiated with one instrument craftsman obtaining equipment list and data under the direction of the Z Plant Industrial Engineer.

A pre-planning form has been introduced in the Redox Plant to assist the Planner and Scheduler. This form, although very simple, appears to be very effective in establishing job priorities and providing the maintenance personnel with pertinent information regarding radiation and other hazards, time limits, and contacts. By providing the information in a consolidated form it reduces the follow-up required by the Planner and Scheduler with consequential savings in manpower.

c. Cost Reduction, 200-W Laundry

The information obtained from the work sampling program initiated in October is being analyzed to determine where improved methods of material handling can be employed. Also, several possibilities which may reduce the amount of alpha monitoring are being investigated.

d. Maintenance of Standards

The labor standard for the 234-5 Building operation was revised for the forecasted production rates. Essential material standards for the In-Farm Scavenging of twelve underground waste tanks were developed.

A preliminary study has been completed at Purex to be used for development of a janitor standard.

e. Engineering Assistance

1) Noise Control - Purex

Sound level and frequency analysis have been started in the Purex facility. To date, several locations have been found that will require some corrective measures. A complete analysis will be made of the building when the facility goes on stream as "loading" is a predominate factor in noise generation.

2) Long Life Lamp Bulbs

Tests conducted in the section indicate that the use of long-life lamp bulbs will give better than 100% more service at a lamp cost increase of 30%. This not only results in a reduction in material cost, but also an even more significant labor saving. Steps are being taken to arrange with Stores to stock these lamps in place of the regular filament lamps now in stock.

3) Design and Drafting

Progress continues on the over-all as-built drafting program. Items completed during the month include: tube bundle burial capsule, 221-U Building instrument diagrmas, Redox-Purex connector-blocks, 224-U Luckey pots, and miscellaneous jumpers for the Redox Plant. Design was completed on the 211-A caustic unloading facilities.

F. Reports Issued

1. Routine

Number	Subject	Author
HW-40264	Separations Section Redox Plant Sub-Section Monthly Report - November 1955	R.T. Jessen
HW-40308	Separations Section Metal Recovery Sub-Section Monthly Report - November 1955	T. Prudich
HW-40284	Separations Section T Plant Sub-Section Monthly Report - November 1955	C.T. Groswith
HW-40309	Separations Section Z Plant Sub-Section Monthly Report - November 1955	W.N. Mobley
HW-40248	Separations Section Radiation Monitoring Sub-Section Monthly Report - November 1955	A.R. Keene
HW-40213	Separations Section Analytical Control Sub-Section Monthly Report - November 1955	L.M. Knights
HW-40261	Separations Section Projects & Personnel Development Sub-Section Monthly Report - November 1955	O.V. Smiset

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1. Routine (Continued)

Number	Subject	Author
Official Use Only	Separations Section Power & Maintenance Sub-Section Monthly Report - November 1955	C.P. Cabell
HW-40207	Separations Section Purex Sub-Section Monthly Report - November 1955	V.R. Chapman
HW-39757	Essential Materials Consumption for T Plant - October 1955	M.A. Thress
HW-39758	Essential Materials Consumption for TBP Plant - October 1955	M.A. Thress
HW-39759	Essential Materials Consumption for Redox Plant - October 1955	M.A. Thress
HW-39760	Essential Materials Planning, November 1 - November 30, 1955	D.E. Peterson
HW-39761	Essential Material Area Report to Cost and Purchasing, October 1 - October 31, 1955	M.A. Thress
HW-39850	Separations Section Waste Status Summary for October 1955	D.E. Peterson
HW-39796-RD	Official Forecast Revision and Fabrication Schedule, Separations Section, November 1955 - June 1956	B.F. Campbell
HW-39863-RD	Eight Month Goal Forecast-November 1955	B.F. Campbell
HW-39770-RD	202-S Building Production Schedule for Month of November 1955	H.F. Tew
HW-39771-RD	221-224-T Building Production Schedule for Month of November 1955	H.F. Tew
HW-39772-RD	TBP-UO_3 Building Production Schedule for Month of November 1955	H.F. Tew
HW-39773-RD	Z Plant Production Schedule for Month of November 1955	H.F. Tew
None	Status of Projects, Informal Requests, and Budget Items - November 1955	V.D. Rouse
HW-39842	Analytical Control Quality Report	A. Brunstad by C.G. Hough

2. Non-Routine

None	Essential Material Standards for In-Farm Scavenging	R.H. Silletto
HW-40177	Radiation Incident, Class I, No. 541-R	G.E. Backman
HW-40117	Radiation Incident, Class I, No. 543-C	G.E. Backman
HW-40247	Radiation Incident, Class I, No. 513-C	W.G. Westover
HW-39875	Trip Report: Discussion of Operational and Process Problems with Savannah River Plant Personnel	V.R. Chapman and D.E. Braden

III. PERSONNEL

A. Force Summary

	Start of Month	End of Month	Net Change
Section General	1	1	0
Redox Plant Sub-Section	222	221	-1
Metal Recovery Plant Sub-Section	247	242	-5
Z Plant Sub-Section	176	177	+1
T Plant Sub-Section	213	207	-6
Purex Plant Sub-Section	285	283	-2
Power and Maintenance Sub-Section	320	319	-1
Projects & Personnel Development	60	63	+3
Analytical Control Sub-Section	218	232	+14
Radiation Monitoring Sub-Section	160	159	-1
Section Total	1902	1904	+2

Seventy-six Utility Operators were promoted to Process Operators to accommodate the ratio of these two classifications as agreed to in the new HAMTC-GE Contract.

Reduction of Force notices were issued to 26 Utility Operators in order that they might be made available for openings existing within the Reactor Section. This reduction results from the curtailment of activities within the T Plant Sub-Section.

B. Safety Experience

There were no major or sub-major injuries in the Separations Section in October. At the close of the month, both 200 Areas had operated 763 days without a lost time injury, an outstanding achievement since it involves approximately 9,300,000 exposure man hours.

C. Radiation Experience

Three radiation incidents were formally investigated and recorded as Class I incidents. These included: (1) exceeding the batch-size limit in 16-1 tank at T Plant; (2) uncontrolled plutonium contamination spread to a vehicle, the burial ground and a room in the 234-5 Building when a Utility Operator failed to properly monitor himself; and (3) uncontrolled contamination transported to the 1100 Area garage in a carryall from the tank farms, which contained protective clothing contaminated up to 250 mrads/hr. The latter two incidents were basically caused by someone failing to obtain proper monitoring.

Iodine emission was well controlled as a total of 20.7 curies was emitted from the Redox and T Plants.

E. Personnel Activities

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1. Personnel Programs and Training

During the month the training program activities were as follows:

Program	Attendance
For Exempt Roll:	
Job Relations Development	15
For Non-Exempt Roll:	
G.E. Selection Program	6 (4 RM, 2 Oper.)
New Employee Orientation	11
Secretary-Steno-Typist Program	14
Work Simplification	124 manhours

2. Visitations

Executives of the Nuclear Power Group and a representative from the Chicago Operations Office of the AEC visited the Purex Plant on November 28, 1955.

L. M. Knights attended an AEC Accountability Committee Meeting at Oak Ridge on November 10 and left again on November 29 for Argonne National Laboratory to attend another meeting of this Committee.

W. G. Browne attended the 5th Annual Symposium on Statistical Methods, in New York City, N.Y., on November 15, 1955 and visited Oak Ridge, Tennessee on November 16, 1955 to obtain information on continuous dissolver operation.

R. M. Shervem attended a Manufacturing Time Standards Conference during a visit to Schenectady on November 9 through 11.

J. H. Palmer attended a seminar at Argonne National Laboratory in Chicago on November 2 through 4, and presented a paper titled "Air Filtration as it Affects the Ventilation Engineer."

J. H. Warren and W. N. Mobley visited Dow Chemical Company, Rocky Flats, Colorado, on November 7 through 9 to discuss production problems.

3. Public Relations

On November 17 J. H. Warren, Separations Manager, presented a talk before the Lions Club of Sunnyside entitled "Some Interesting Facts About Hanford." In connection with his talk Hugh showed the film "A is for Atom."

3. Public Relations (Continued)

A report entitled, "A Mathematical Approach to Surface Dosage Rate Problems" by Lew Helgeson of Separations, Radiation Monitoring Sub-Section, was recently reproduced and released in pamphlet form through the AEC Technical Information Service at Oak Ridge.

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December 7, 1955

ELECTRICAL UTILITY SECTION

MONTHLY REPORT

November, 1955

I. RESPONSIBILITY

At noon on November 1, the operational and maintenance responsibility of 16.7 miles of Bonneville Power Administration 230 KV line was transferred to the Electrical Utility Section via BPA-AEC lease agreement and letter of direction from AEC to General Electric Co. The line, an intregal part of Project CA-586, will provide HAPO with a third power connection upon completion of the project, scheduled for July 1, 1956.

II. ACHIEVEMENT

A. Operating Experience

Power Statistics (See last page for details)

Plant Contract

Probable time of November Peak . . .	2:30 - 3:00 p.m., November 30, 1955
Telemetered peak for November	178,000 KW
Probable Billing Demand for November	185,000 KW
Probable energy consumption for November	105,517 MWH
Actual BPA Metered demand for October.	182,821.8 KW
Actual Billing Demand for October.	184,000 KW
Actual energy consumption for October.	109,909 MWH
Average monthly energy consumption-4 months of Fiscal Year '56	107,195 MWH
Cost of purchased electricity for October.	$269,109
Actual cost of purchased electricity for 4 months of Fiscal Year '56	$1,051,430

* * * *

The decreased telemetered KW peak in November reflects the reduction of water pumping in the 100-K Areas.

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Low temperatures prevailing over the week-end of November 13, caused ice to form on aerial conductors located on the leeward side of the 107 basins. At 107-D-DR and 100-F, it was necessary to knock the ice off in order to prevent the conductors from swinging together and from becoming physically overloaded. Icing occurred in these lines during the past two winters, however, the increase in vapor has considerably applified the problem. The ultimate solution is expected to be placement of the circuits in underground conduit.

* * * *

During the cold weather conditions, BPA found it necessary to control their system loading by dropping the system frequency during the early evening peak periods. BPA expected to regulate to a minimum of 59.2 cycles, however, the low was 59.46 cycles and this had no adverse effects upon Plant operations.

* * * *

B. Equipment Experience

Due to an operational error at McNary Dam at 5:29 p.m. on November 30, the frequency on the BPA and HAPO electrical systems dropped momentarily to 57.8 cycles, but rose before it was necessary to establish a critical condition on the HAPO system. The 100-C Area scrammed and was unable to come back up. There were no adverse effects when three pump motors at 181-D tripped and when the 100-K Areas separated from the HAPO electrical system as designed to do. We accepted BPA's offer to send us their complete report on the operating incident.

* * * *

The 50 KVA transformer supplying lighting to the 1717-B building failed and was replaced on November 14. Repairs are being made to the internal lead wire which burned and separated from the bushing, apparently due to a loose connection.

* * * *

Station service power to the 151-B substation was carried by a single transformer when the 13.8 KV cable supplying the second transformer grounded on November 21. The point of insulation failure in the defective cable will be located and examined for cause.

* * * *

The 700 foot underground circuit supplying 100-K West Area fence lighting failed on November 23. The first location excavated revealed the shorted conductors and new wire was spliced in, restoring the circuit. By the lack of other evidence, it is believed that the conductor insulation was damaged during installation by Construction.

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Two 230 KV oil circuit breaker bushings were returned from the manufacturer, General Electric Company, after rebuilding. These were from the group of 14 bushings of this type at HAPO which were suspected of premature deterioration and have been checked at regular periods through our capacitance and power factor tests. Previous reference to this condition and the actions taken was made in monthly reports of June, 1954, and August, 1955. The General Electric factory also sent one of two additional bushings as exchanges for two in service which, by tests, are showing an undesirable power factor trend. When these are installed, a total of 6 of the 14 original bushings will have been replaced.

* * * *

The fuse failure at the 300 Area 115 KV primary substation, reported last month, was discussed with the Westinghouse representative and it was decided to send the faulted fuse and two others in substandard condition to Westinghouse for examination and design study.

* * * *

D. Events Influencing Costs

Approximately $1,600 will be accrued each month against operating expense to meet the $19,620 annual cost of leasing the 16.7 miles of BPA transmission line.

* * * *

Overtime hours expended were approximately 1.8% of the total regular hours worked.

Attendance for the month was 98.9%.

* * * *

In analyzing the variance the past three months between the monthly actual Plant electrical demands and the greater amounts which had been contracted for from BPA, the difference was accounted for by the lower than planned operating levels of the 100-K Areas. In the event of the continuance of this situation, we have considered seeking a revision in the schedule of contracted power from BPA. However, latest information is that the production loads will soon require the scheduled power and, in view of this, we now plan on taking no action.

* * * *

[redacted]

E. Plant Development and Expansion

Project CA-586: The W. L. Ridge Construction Co. of Spokane was awarded the contract for construction of four miles of 230 KV transmission line, a terminal station, and a switching station. Their bid was $119,074 and Engineering's fair cost estimate was $145,000. The contractor is assembling equipment and will begin work in December.

* * * *

CG-558 100-B: To date, four of the eight cubicles for new 190-B Build-lines are installed and connected to the 151-B 13.8 KV bus. The remaining four cubicles await scheduled outages of B and C Areas.

CG-558 100-D: Cubicle revisions in 151-D substation are proceeding on schedule. New back cubicle doors are being installed and preparations are made to run new control-wire ducts.

III. ORGANIZATION AND PERSONNEL

A. Organization

No changes in structure or nomenclature.

B. Force Summary

	Beginning	Ending	Net Change
Exempt Personnel	17	17	0
Dispatchers	5	5	0
Electricians	11	11	0
Linemen	21	22	1
Substation Operators	32	32	0
Secretary	1	1	0
Stenographer	1	1	0
Clerks	1	2	1
Draftsman	1	1	0
	90	92	0

There was one additional lineman and one replacement clerk acquired during the month.

C. Safety Experience

A near serious incident occurred on November 23, 1955, when a substation operator received first degree burns to his face and hands while investigating the 100-K West Area fence lighting failure previously mentioned in this report. The incident will be covered by an investigation report.

* * * *

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One minor injury was reported during November.

D. Radiation Experience

No incidents were reported during the month.

E. Personnel Activities

O. Mageehon attended a meeting arranged by S. M. Rhyneer of AEC with personnel of the BPA at Portland on November 30 and December 1. The major subject was the third 230 KV line from Midway Substation (CA-586) and productive results were realized as BPA design and contractual people had not been completely aware of the proper sequence and necessary scheduling of work to best suit HAPO production requirements.

* * * *

At the Section monthly informative meeting, A. A. Maxwell presented diagrams and a discourse on the recent 13.8 KV and 230 KV imposed fault tests. L. H. Holden diagrammed and discussed the 230 KV system as it will be after completion of Project CA-586.

O Mageehon
ELECTRICAL UTILITY SECTION

O Mageehon:nga

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POWER STATISTICS
ELECTRICAL UTILITY SECTION
FOR MONTH ENDING NOVEMBER 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)	30290	23390	48700	46800	83.6	69.4
A-4 Out (100-D)	13390	14650	25600	27000	70.3	75.4
A-5 Out (100-H)	8960	10710	15600	17250	77.2	86.2
A-6 Out (100-F)	5980	6730	13100	14200	61.4	65.8
A-7 Out (100-KW)	20112	18528	32500	32500	83.2	79.2
A-8 Out (200 Area)	6600	6990	10650	11400	83.3	85.2
A-9 Out (100-KE)	21168	20112	48000	33750	59.3	82.8
TOTAL OUT	106500	101110	194150*	182900*	--	--
MIDWAY IN	107701	102671	179200	173600	80.7	82.2
115 KV System (300 Area)						
BB3-S4 Out	2488	2496	4480	4720	74.6	73.4
115-66 KV System						
B7-S10 Out (W. Bluffs)	207	306	675	787	41.2	54.0
Hanford Out (7200 V.)	42	51	--	--	--	--
Hanford In	241	350	900	1000	36.0	48.6
Project Total In	110430	105517	184580*	179320*	--	--

* Denotes Non-Coincidental Demand

Average Power Factor - 230 KV System 86.3

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MANUFACTURING DEPARTMENT
PURCHASING AND STORES SECTION
MONTHLY REPORT NOVEMBER, 1955

I Responsibility

At the request of the AEC, The General Electric Co. agreed to assume responsibility for procurement of "mandatory items" from Government sources of supply, effective January 1, 1956. Mandatory items have been procured by HOO-AEC to date.

Pursuant to an agreement reached with the AEC, The General Electric Co. will take over responsibility for disposal and sale of excess and scrap generated by the Company at Hanford as soon as adequate procedures for handling disposal are developed with the AEC. This responsibility for actual conduct of the sales has been added to other duties presently carried on by the Company in the excess function.

II Achievement

STATISTICS

	September	October	November	FY 1956 Average
Purchasing Sub-Section				
Emergency requisitions rec'd				
Employee & Public Relations	13	32	34	18
Engineering	56	77	82	59
Manufacturing	55	120	116	83
Medical	4	6	5	5
Minor Construction	159	78	75	124
Radiological Sciences	8	2	1	4
Stores	93	130	117	107
Total	388	445	430	400
Average per day	18.5	21.2	21.5	19.1
Total requisitions*				
On hand start of month	844	1,016	962	994
Received	2,509	2,624	2,738	2,668
Placed	2,337	2,678	2,841	2,715
On hand end of month	1,016	962	859	947
* Do not include those assigned to AEC, Viz:	471	508	434	409
Number of purchase orders placed				
General Supplies Unit	1,434	1,536	1,860	1,718
Process Equipment Unit	455	561	602	545
Essential Material Unit	26	30	20	26
Local Purchase	77	95	121	86
Total	1,992	2,222	2,603	2,375

II Achievement - (Cont.)

Purchasing Sub-Section (Cont.)

	September	October	November	FY 1956 Average
Value of purchase orders placed				
General Supplies Unit	$ 474,788	$ 374,753	$ 693,510	$ 526,161
Process Equipment Unit	469,513	947,709	613,607	814,476
Essential Material Unit	569,690	1,091,574	704,647	706,764
Local Purchase	578	532	966	633
Total	$1,514,569	$2,414,568	$2,012,730	$2,048,034
Purchase order alterations				
Number	231	266	307	260
Gross value	$ 590,229	$ 359,188	$282,189	$ 308,252
Expediting				
Orders on hand start of month	2,731	2,728	2,718	2,676
Orders received	2,002	2,154	2,362	2,297
Orders completed	2,005	2,164	2,333	2,308
Orders on hand end of month	2,728	2,718	2,747	2,741

Stores Sub-Section

General Supplies				
Store orders processed	26,912	29,454	28,453	27,430
Value of issues	$321,779	$319,342	$274,244	$296,240
Line items in account	30,195	29,439	31,097	30,187
Back orders on hand	275	534	798	453
Out of stock items	148	249	350	216
Percent of line items out of stock	.4	.8	1.1	.7
Spare Parts				
Store orders processed	1,536	1,826	1,352	1,483
Value of issues	$110,953	$174,152	$113,129	$112,540
Line items in account	29,988	30,004	30,152	29,895
Back orders on hand	356	383	306	314
Out of stock items	273	264	219	264
Percent of line items out of stock	.9	.9	.7	.9
Receiving				
Shipments received	6,138	6,508	4,870	6,102
Receiving reports issued	5,740	6,313	5,709	6,160
Excess Material & Equipment				
Received	$315,751	$232,564	$ 61,216	$187,848
Issues to Project	17,841	7,222	10,191	8,248
Shipped off-Project	24,000	16,539	16,155	36,069
Revenue from scrap and surplus sales	$ 63,354	$ 55,566	$ 15,717	$ 27,880
Requisitions screened	2,566	2,439	2,428	2,503
Items screened	7,230	6,575	6,424	6,199
Items furnished	905	880	591	823

II Achievement -(Cont.)

Traffic

	September	October	November	FY 1956 Average
Savings				
Rate reductions	$ 1,972	$ 4,574	$ 6,386	$ 4,197
Freight bill audit	744	4,654	1,287	2,146
Savings since - September 1, 1946 to date $1,983,874				
Money recovered - Claims				
Loss, damage & overcharge	$ 316	$ 2,229	$ 416	$ 1,005
Ticket refunds	264	1,094	261	706
Household goods	39	59	-	20
Money recovered - September 1, 1946 to date $217,991				
Work volume				
Travel requests	178	146	184	148
Reservations made	602	522	571	473
Expense accounts checked	229	182	240	200
Shipments traced	166	143	98	122
Quotations furnished rates and routes	553	662	501	592
Freight bills approved	1,346	1,591	1,546	1,489
Amounts	$292,478	$303,257	$294,056	$277,763
Carload shipments received	829	948	914	827
Tonnage Report				
Tons received by common carrier	54,508	59,582	57,473	52,641
Total cost	$301,055	$342,388	$323,807	$302,905
Average cost per ton	$ 5.523	$ 5.746	$ 5.634	$ 5.825

A pre-inventory meeting was held during the month with Financial personnel to lay the ground work for taking the annual physical inventory of automotive and heavy duty equipment parts on December 13 and 14, 1955. At months end preparatory work for the inventory was progressing satisfactorily with 6,000 inventory cards written, representing 70% of the total required.

The volume of incoming excess, salvage and scrap continue to be heavy. During the month 118 declarations of excess, consisting of 2,334 items; 105 property disposals covering 2,035 items and 60 truck loads of scrap were received. In addition, 44 shipping documents were processed representing 651,996 pounds of excess property shipped off the project.

The key punching of store orders on IBM cards by Stores personnel is progressing satisfactorily. Four employees have been trained to operate the key punch machines with more to be trained when additional machines which are on order are received. These machines should be sufficient for the ultimate conversion of all Stores record controls to an IBM operation. Weekly IBM reports covering disbursements from General Supplies Inventories are being prepared with a minimum of delay and errors.

II Achievement - (Cont.)

To render better service to the field a Stores' employee was assigned the responsibility of determining the possibility of furnishing substitute materials for all items being back ordered. During a six day period forty-nine contacts were made and thirty-five substitutions were accepted.

During the month, automotive and heavy equipment parts valued at $16,602.83 were removed from our Parts room and delivered to the excess yard.

Two proposed supply contracts with Alcoa for process tubes of special alloys have been presented to A.E.C. for their approval. Alcoa has also received an emergency order for 1000 regular tubes of 2-S aluminum. We have about ten requisitions for zirconium process tubes on which six purchase orders have been placed to date. Three were placed with Allegheny Ludlum Steel Corporation, two with Trent Tube Division, and one with Nuclear Metals, Inc.

Special Mechanical Development Parts valued at $40,000 are being transferred to various General Supplies captions from Spare Parts. Although these items are slow moving and will adversely effect turnover, the transfer was made to conform to the definition of Spare Parts as shown in OPG 04-11.

Status of Contracts

Chlorine - Requirements Contract RO-23, Hooker Electrochemical Company, has been drafted and sent to the Law Department for approval.

Liquid Caustic Soda - Contracts RO-24 and RO-25, Pennsylvania Salt Manufacturing Company and Hooker Electrochemical Company, are being prepared and will be mailed to the vendors for their approval.

Steam Coal - Alterations to the Records of Purchase on Contracts RO-1, RO-2 and RO-3, Kemmerer Coal Company, Republic Coal Company, and Northwestern Improvement Company, are being submitted to AEC to provide for price increases. No supplements to the contracts will be necessary.

Aluminum Sulphate, Sodium Dichromate, Aluminum Nitrate Nonahydrate, Nitric Acid - Forecasts for requirements on the above have been requested. Present contracts on the first two expire March 31, 1956, and the last two expire April 30, 1956.

RO-21 - For one year's requirements of Safety Shoes manufactured by the International Shoe Company. The contract has been routed for internal G.E. approval and is being held in the Legal Department pending the establishment of a suitable minimum quantity.

RO-22,- For one year's requirements of Safety Shoes, manufactured by the Lehigh Safety Shoe Company. The contract has been routed for internal G.E. approval and is being held in the Legal Department pending the establishment of a sutiable minimum quantity.

MRO-1, Supplement No. 1 - To extend the original RCA Electron Microscope repair and maintenance contract for an additional year is presently with AEC for contract signature.

G-107, Supplement No. 6 - For the interpretation of the effects of radiation by the Swedish Hospital in Seattle for a 1-year period. A Record of Purchase has been approved and the contract is in the hands of the vendor for signature.

II Achievement (Cont.)

Status of Contracts (Cont.)

SA-1, - For motion picture editing and processing and furnishing for a 1-year period. Quotations have been received and are being evaluated.

G-64, Supplement No. 1 - To increase the quantity of microfilm images of General Electric Company documents by the Recordax Corporation. Quotation has been received and a supplemental contract is being drawn.

SA-2, - For the care of project-owned sheep for a 1-year period. The Record of Purchase is with A.E.C. for approval.

Project CG-613 continues to cause high cost work for expediting and liaison. The procurement time has been extremely short during the entire history of this project, with important requisitions released to us long after the dates we had requested them. We are now attempting, through very close follow-up, the use of overtime for our account, persuasion of vendors to use overtime for their accounts, and the use of premium transportation to bring all these orders in as close to the required dates as possible.

Orders placed with the same vendor for like materials are now being consolidated in carload shipments which have resulted in considerable savings in freight charges with an improvement in the transit time. One specific case was orders placed with the Chapman Valve Company in which a number of shipments were consolidated resulting in a savings of approximately $1100.

Significant saving has been developed on perforated aluminum dummies. Through Purchasing's efforts in exploring for new and better sources, Smithway Machine Company has proposed a new style aluminum dummy which can be made for approximately 46¢ each now, with an eventual unit price of 30¢ entirely possible. A competitor has bid 33¢ each for the first order. Savings for the first year, based on 240,000 dummies from the low bidder, will be at least $81,600 calculated on the former unit price of 67¢ for the old style. Award of the bid has been taken under advisement.

III Organization & Personnel

Force Summary

	10-31-55			11-30-55			Change		
Component	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	41	51	92	41	56	97	-	5	5
Stores Sub-Section	12	153	165	12	153	165	-	-	-
Total	59	213	272	59	218	277	-	+5	+5

Safety Experience

Three minor injuries were reported.

Five safety and security meetings were held with a total of 198 employees attending.

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TRANSPORTATION SECTION
MONTHLY REPORT
November 1955

Transportation Section personnel forces increased from 489 to 490 by four new hires, one transfer in, three transfers out, and one termination.

Transportation Section expenditures for the first four months of FY 1956 totaled $1,334,918 which is an increase of $9,499 or 0.72% over the same period in FY 1955. The following indicates comparative costs by major service functions:

Function	FY 1956 1st 4 mos.	FY 1955 1st 4 mos.	% of Variance
Railroad	$ 245,076	$ 255,317	- 4.01 %
Plant Bus	461,172	435,075	+ 6.00 %
Heavy Equipment Maintenance	192,308	190,160	+ 1.13 %
Light Equipment Maintenance	200,861	226,022	- 11.13 %
Road Maintenance	68,751	52,481	+ 31.00 % *

* The increase is mainly due to special work on walkways and parking areas.

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

		FY 1956 1st 4 mos.	FY 1956 Bogey	FY 1955 Actual
Railroad				
Cost per car handled -	Commercial	$ 30.74	$ 29.73	$ 31.46
	Process	231.09	232.40	241.89
	Average	52.31	52.34	52.97
Plant Bus				
Cost per mile -	Operating	.3971	.4173	.4043
	Maintenance	.1320	.1281	.1268
	Total	.5291	.5454	.5311
Light Equipment				
Cost per mile -	Maintenance	.0622	.0689	.0614
Road Maintenance				
Cost per mile - Yearly (Primary roads based on 20' roadway - seal coating not included)		228.10	317.74	250.67
Seal coating - per square yard for surfaced areas		.0905	.1108	.1134
Track Maintenance				
Cost per mile - Yearly		2,463.40	2,577.18	2,698.82

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Transportation Section

The Transportation Section FY 1956 Operating Budget of $4,468,352 has been revised to $4,158,762 (gross) in the FY 1956 Midyear Review. This reduction of $309,590 is $135,690 below the bogey and $95,947 above FY 1955 actual. The following is a summary of the major reductions.

Salaries	$169,200
Continuity of Service	18,755
Materials	42,830
Public Liability Accrual	72,000
Other Costs	6,805
Total	$309,590

The reduction in salaries and continuity of service is due to an average of 21 fewer employees and lower average salary rates of 1.77%. The midyear review has an over-all salary increase of 2.61% whereas the original budget and the bogey provided for an increase of 4.38%. The reduction in materials is mainly in the Light Equipment Unit and is due to newer equipment, lower utilization, etc. The reduction in the public liability accrual is in line with the change in July due to the large reserve.

Transportation Section experienced an injury on October 29 which was classified as a major on November 1. The injured was releasing a ratchet type load binder when the handle slipped from his hand and struck his cheek bone causing a provisional fracture of the nose bone which required surgical reduction. The Section had operated 640 days without a lost time injury.

A survey of job hazard breakdowns disclosed that many were outdated. A concentrated effort is being made to ascertain hazards and provide safeguards for each job as it is now performed. This comprehensive review in conjunction with previous experience should produce new control measures and promote safety consciousness.

Unseasonable early snows and cold weather placed an added demand on transportation services. Bus operations were generally satisfactory although a number of to-work buses ran somewhat behind normal schedules. Equipment Maintenance personnel devoted considerable effort to the installation of snow plows, road sanders, lights on motor graders, tire chains, and minor repairs associated with hard starting due to the continued low temperatures. Ice and snow control on roadways and walkways required 1800 man-hours (including 100 overtime hours) and 2000 cubic yards of sand. The hazardous road conditions contributed to several minor accidents involving government [illegible] and two more serious incidents as follows:

a. A passenger sustained a fracture of the right wrist when bus 1D 5122 slipped off the road on November 19 (Stevens Drive at North Richland).

b. Carryall 1D 5601 incurred damages of $685 when it overturned.

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Transportation Section

Maintenance of 11.69 miles of temporary trackage at White Buffs, Central Mix Plant, and the 3000 Area has been performed at the request of the Commission and charged to indirect construction expense. The Commission has terminated this arrangement and maintenance services were discontinued on June 30, 1955 with the expiration of the existing work orders. Preliminary discussions with representatives of the Commission and the Financial Department indicate that it may be feasible to incorporate this trackage into the Plant Railroad System except for 3.37 miles in the 3000 Area which the Commission has indicated will be maintained by the Army.

Furnished additional information to the Auditing Section regarding overtime with special attention to off-plant transportation of overtime workers.

Furnished information to Commission representatives on bus operations and allied transportation services, motor pool operations, and material handling services for the Stores Sub-Section. This action was for a property management appraisal as outlined in the Commission's letter of August 1, 1955.

Revised accounting procedures on shop supplies and non-durable tools, landlord expenditures, road maintenance expenditures, material credits, accident damage backcharges, and evacuation buses.

FY 1956 budgeted funds for equipment not included in construction projects have been reduced by $792,000. This has lead to a comprehensive review of all anticipated requirements. Necessary actions have been initiated toward the acquisition of the most essential automotive equipment which is subject to a quota and/or has the greatest effect on operating costs. Other HO equipment needs are to be justified at an early date to facilitate the necessary coordination with process equipment requirements due to the reduced funds.

Commercial rail traffic during November did not change significantly from October. The following recapitulation indicates the distribution of commercial cars handled:

Carload Movement -	Loads In	Empties In	Loads Out	Empties Out
General Electric Company	989	11	4	1044
L. H. Hoffman Company	1	0	0	1
Kaiser Engineers	21	0	0	20
U. S. Army	25	0	0	32
	1036	11	4	1097

Railroad process service during November decreased by 24.6% over October due to production difficulties.

Railroad car movements consisting of process, commercial, and special service totaled 2485 in November compared to 2580 in October, 2282 in September, 2424 in August, 1631 in July, 2673 in June, 2843 in May, 2463 in April, 2106 in March, 2354 in February, and 2288 in January.

Maintenance of the Plant railroad trackage during November required 6564 man-hours. Relaid 3550 lineal feet of main-line track serving the 100 Areas as a part of the long range improvement program. The materials were acquired as excess at a reduced rate from the AEC installation at Portsmouth, Ohio.

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Transportation Section

Completed the overhaul of locomotive 39-3731 which was removed from service in September.

The Plant Bus System transported 3.38% more passengers in November than October. The following recapitulation indicates the volume of service rendered:

Passenger Volume	178,476
Revenue - Bus Fares	$ 8,923.80
Earnings - Transit Advertising (October)	$ 164.55
Bus Trips	7,288
Bus Miles - Passenger Carrying	206,247
Passenger Miles	5,810,811

The Richland Bus System transported 14% more passengers in November than in October due to the severe weather conditions. The following recapitulation indicates the volume of service rendered:

Total Passengers - Including Transfers	12,846
Revenue - Bus Fares	$ 676.88
Earnings - Transit Advertising (October)	$ 7.48
Bus Trips	1,033
Bus Miles - Passenger Carrying	5,475
Passenger Miles	32,029

Off Plant chauffeured automobile trips (Company business and/or official visitors) totaled 291 which were rendered to the following locations:

AEC Airport	4
Benton City, Washington	34
Enterprise, Washington	1
Grandview, Washington	6
Hinkle, Oregon	8
Kennewick, Washington	84
Mabton, Washington	2
Pasco, Washington	90
Pendleton, Oregon	17
Prosser, Washington	8
Sunnyside, Washington	9
Walla Walla, Washington	1
West Richland, Washington	18
Yakima, Washington	9

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

	Gasoline	Diesel Fuel	50 Cetane	Kerosene	White Gas
Stock at Start of Month	71,120	17,660	12,550	2,260	257
Received During Month	90,995	18,300	27,258	3,675	318
Disbursed During Month	105,775	15,295	35,908	2,975	265
Stock at End of Month	56,340	20,665	3,900	2,960	310

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Transportation Section

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

Motor Overhauls	53
Class A Inspections and Repairs	88
Class B Inspections and Lubrications	1154
Weekly Inspections - Fuel Trucks and Off Plant Vehicles	49
Semimonthly Inspections - Buses	174
Monthly Inspections - Railroad Rolling Stock	13
Front End Alignment and Wheel Balance	86
Routine Maintenance Repairs and Service Calls	2253
Accident Repairs and Paint Jobs	37
Tire Repairs	669
Wash Jobs	407
	4,983

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

Boat 81-4894 used by the Acquatic Biology Unit sank near McNary Dam sometime over the week end of November 13. The unit was moored off shore and presumably capsized from the wave action and a build-up of ice. Recovery was delayed until November 28 by the inclement weather and the extent of the damage has not been fully ascertained.

Discontinued the practice of using methyl alcohol as an antifreeze cooling agent on an experimental basis in two GMC buses. Difficulties were encountered with fumes and flammable vapor when leakage occurred. Moreover, this mixture does not withstand high operating temperatures as well as water or a permanent type solution such as ethylene glycol. The Commission had urged that these tests be made inasmuch as a shellacking condition had been experienced by a number of diesel engines. It was felt that leakage of ethylene glycol into the crankcase was a causative agent rather than the type of oil being used or some other factor. This contention is in opposition to the fact that the same condition was noted in the diesel locomotives without an antifreeze solution.

Completed the installation of a hot water heating unit for improved windshield defrosting and greater driver comfort in each of the 62 older GMC coaches.

Devised permanent measures to greatly improve the effectiveness and reliability of the three air raid sirens for Richland. This action was prompted by two false alarms whereby the controls had been affected by weather factors.

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

Code	Type	No. of Units	Total Mileage
1A	Sedans	347	439,326
1B	Buses	156	222,188
1C	Pickups	409	220,830
1D	Panel,Carryall,Sta.Wagon	157	128,067
1G	Jeeps	2	576
1H	Power Wagons	49	18,165
68 Series	Trucks	210	85,346
		1,330	1,114,498

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Transportation Section

Completed the private car parking lot and enlargement of existing bus unloading lanes at the 200-East Area.

Completed the moving of office furniture and equipment in connection with the mass exchange of space in the 700 Area between AEC and GE. This involved approximately 250 office moves requiring 1,466 man-hours.

Completed the covering of the Redox railroad cut embankment to control contamination.

Maintenance of Plant roads and the production of road aggregate material required 1463 man-hours.

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

	MC 3	MC 5
Stock at Start of Month	0	37.55
Received During Month	30.48	0
Used During Month	0	4.16
Stock at End of Month	30.48	33.39

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

	3/4" to 0 Pre-mix Tons	1/4" to 0 Pre-mix Tons	5/8" Chips Cu.Yd.	1/4"-1/4" Crushed Rock Cu.Yd.	3/4" Crushed Rock Cu.Yd.
Stock at Start of Month	603	626	1,399	319	2,468
Made During Month	0	0	0	0	0
Used During Month	294	131	16	0	360
Stock at End of Month	309	495	1,383	319	2,108

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ENGINEERING DEPARTMENT

NOVEMBER 1955

PILE TECHNOLOGY SECTION

Plutonium yields and quality from low exposure irradiations in the KW Pile were more favorable than those from comparable irradiations in the older reactors. An expected 6% greater yield per MWD was obtained, along with an unexpected 3% lower spontaneous fission count per MWD. Plutonium produced from the C Pile has been giving a 5% higher spontaneous fission count per MWD. This was expected because of the 100° C higher maximum graphite temperature resulting from the full pile burnout experiment.

VSR system strength, measured by the scram transient technique in the DR Pile, was found to be about 10% greater at a 500° C graphite temperature compared to its strength at 100° C. This is within the range of theoretical predictions, and constitutes additional control during abnormal operation such as loss of cooling.

Analysis of problems associated with a full pile demonstration of the NAA safety fuses indicated that such an experiment could not reasonably be initiated before mid-1958, and would cost nearly one million dollars, assuming the fuses operated without a significant number of failures during the test.

Seven slug rupture experiments were conducted in the ELMO-4 loop, including one solid uranium and six wafer elements. The wafer tests were conducted at temperatures of 200 and 280 C. Swelling of the tube was experienced at the higher temperature, but not at the lower one. A surprising feature of the wafer failures was the three-fold increase in the slug length. All the wafer elements split into two or more pieces.

The value of the stable Xenon produced by fission at Hanford has been calculated. At a price of $30 per litre and a total power level of 10,000 MW, the yearly Hanford production is worth about 2 million dollars. Several factors must be considered to decide whether or not it is advisable to recover Xenon from the dissolver off-gases.

The segmented or wafer type I & E fuel elements in the MTR are scheduled to be discharged for examination on December 26 at an approximate exposure of 750 MWD/T. Examination after the first discharge at approximately 250 MWD/T showed no dimensional changes.

Approximately 100 I & E cooled fuel elements were canned by the lead dip process in the Manufacturing Facility.

Fifty "donut converter" slugs were lead dip canned for the Belgian government. The four-inch slugs are similar to the I & E slugs now under development, but have a large (7/8") I.D.

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Various techniques are being investigated for attaching studs or short ribs to the cylindrical surfaces of slugs for centering the slug in ribless process tubes.

One tube of uranium-silicon alloy slugs (1007 MWD/T, 630 KW/tube) showed significantly more warp and greater tendency to crack transversely during irradiation than normal uranium slugs exposed to similar pile conditions.

Three zircaloy-2 billets were extruded by the Chase Brass Company. The first extrusion was successful. However, during the second and third extrusions the zirconium seized on both the mandrel and the die causing severe galling.

The effects of irradiation on the properties of uranium can be studied by comparing the deformation of microtensile, microbend, and microimpact specimens before and after irradiation. Pre-irradiation tests are being conducted in order to evaluate the testing techniques. A colored motion picture has been filmed which shows the formation of twins in unirradiated uranium.

A fair size sample of uranium shot has been procured from Fernald for examination. The shot appears to be clean and round. The various fractions pack to a volume density of 61-63%, and the mixed fractions also pack to approximately the same figure. Employing shot such as this, it may not be possible to achieve densities higher than 63% in a matrix type fuel element.

SEPARATIONS TECHNOLOGY SECTION

Photographs taken of the interior of the final Redox product concentrator showed extreme end-grain and pitting corrosion. On October 25th unirradiated metal was charged to the Purex dissolvers and the tests with cold metal have resulted in low losses and generally good process and operating performance. Metal Recovery process performance has been satisfactory with feeds containing 80% of metal aged about 1 year. In-farm waste scavenging was started during this month.

Accelerated laboratory attention has been given the problem of low UO_3 reactivity from the continuous calciner. Development studies were initiated on concatenated pulse columns and continuous uranium dissolution.

Ion exchange studies were initiated to study their effectiveness in decontaminating various Purex streams. Isotopic exchange of radioiodine with AgI indicates that this technique is extremely efficient for inlet off-gas streams containing low concentrations of radioiodine. Studies are underway to achieve efficient cesium removal from Redox and Purex wastes.

Delivery of the prototype continuous calciner trough assembly has been delayed owing to metallurgical problems which became apparent after heat treatment. Shipment of the furnace unit was made at the end of the month by the vendor.

A recommendation was forwarded to the Design Section that acid recovery and caustic scrubbing be adopted for the auxiliary I-131 control method at Purex. This method is favored in lieu of auxiliary heater-silver nitrate reactor equipment as recent Chemical Research data indicate that the 1961 goal emission requirements may not be met by using additional silver nitrate reactors.

DESIGN SECTION

Design Section effort on design development programs increased substantially during the month, primarily because of the demonstration reactor studies. Process Technology effort in support of plant assistance problems also increased. Design project activity decreased a corresponding amount as the 4-X and Reactor Plant Modifications Programs neared completion. Distribution by major components is as follows:

	Percent of Total Effort
Design Development Programs	40.0
Design Section Projects	38.9
Plant Assistance and Customer Work	21.1
	100.0

Total design for Project CG-558, Reactor Plant Modifications for Increased Production, advanced to 96.5% complete, substantially ahead of schedule.

Total design for Project CG-621, Redox Contamination Control Facilities, advanced to 85.3% complete. Design status for the various project phases is as follows:

E Cell Ozonization, Phase I	Complete
E Cell Ozonization, Phase II	65%
J-6 Pre-Condenser	98%
Canyon Washdown Facilities	70%
Contaminated Equipment Removal	98%

Work is essentially completed for the preparation of design-only project proposals for items submitted in the FY-1957 Plant and Equipment Budget. Proposals for nine budget items are scheduled for submission in early December.

Major reactor design development activity during November involved preliminary scope for a small demonstration reactor for use in the application of advanced reactor technology. Other studies in progress included once-through pressurization and pressurization recirculation systems for existing reactor application.

Preliminary design scope studies are in progress for a new integrated plutonium separations facility utilizing a single uranium cycle and two plutonium cycles.

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PROJECT SECTION

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

Project No.	Title	Completion Scheduled	Completion Actual
CA-512	1706 KER Recirculation Facilities	38%	43%
CA-513-E	Purex Facilities, Part E	74%	81%
CA-539	Additional Waste Storage Facilities	40%	40%
CA-546	Fuel Element Pilot Plant	75%	75%
CG-558	Reactor Plant Modifications, Phase I	28%	34%
CG-558	Reactor Plant Modifications, Phase II	2%	3%
CG-603	Hanford 4X Program, Bismuth Phosphate Plants	91%	98%
CG-613	Hanford 4X Program, Metal Conversion Plant		14%

The jurisdictional dispute which began on October 26 at the 190-B Building Annex continued until November 9, 1955, between the millwrights and electricians. On November 9 the millwrights returned to work, and on November 17 an award was made to electricians for setting the motors and to millwrights for related work.

Because of the eastward movement of the inspection workload, the East Central Area was reactivated as of November 21, and the Los Angeles Area was combined with the San Francisco Area. The major inspection efforts are being expended on process water pumps for the Reactor Plant Modification Program, and the calciners for the Metal Conversion Plant.

Contracts were awarded for the 100-DR Outfall, the 230 KV line and switching facilities, the Phase II work for Redox 241-A Tank Farm, and for the 190-F and H Annexes, including office additions for 190-F, B, and D Buildings.

ADVANCE ENGINEERING SECTION

A study was completed of eight types of reactor-fuel element combinations, the reactors all being water cooled and graphite moderated.

ORGANIZATION AND PERSONNEL

Total on Roll, November 1, 1955	1,414
Net Change	+1
Total on Roll, November 30, 1955	1,415

AB Greninger
MANAGER, ENGINEERING

AB Greninger

ENGINEERING ADMINISTRATION SECTION

NOVEMBER 1955

During November the Technical Information Unit was visited by four Security representatives from the British Atomic Energy installation at Harwell, accompanied by representatives from AEC Security in Washington and the FBI, and reviewed the HAPO document control system and inspected the facilities in the 3760 Building.

The Technical Reports Editor has been placed on a temporary special assignment to edit and consolidate the annual "1955 At Hanford." A member of the staff of Abstracting and Bibliography will carry on his duties temporarily.

During the month the following major contract activities were handled:

1. Special Agreement No. G-72 between General Electric and Battelle Memorial Institute covering research work to be done by Battelle was signed by Battelle on November 8.

2. Special Agreement No. G-73 between General Electric and Tektronix, Inc. providing for the instruction of General Electric personnel in the care, maintenance and use of Tektronix equipment was forwarded to the Manager of Manufacturing for signature on November 11.

3. Modification No. 1 to Consultant Agreement No. 129 between General Electric and Hugh H. Russell providing for a one-month extension of the agreement was signed by the Consultant on November 22.

4. Consultant Agreement No. 130 between General Electric and Arthur S. Nowick for consulting services on internal friction of metals was forwarded to General Electric's Financial Department for review on November 22.

Patent matters handled through November 30, 1955:

Total invention reports processed through HAPO from 6/16/47 through 11/30/55	652
Number of invention reports currently active	104
Number of applications filed by AEC and awards made to inventors	68
Number of applications to be filed by AEC - No awards made as yet (in process)	19
Number of applications returned by AEC. Will not patent, nor will GE patent	422

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Number of applications returned by AEC. Review by GE pending	39
Number of applications released to inventors	9
Disputes settled	4

Manager - Engineering Administration
ENGINEERING DEPARTMENT

WM Harty

PILE TECHNOLOGY SECTION

MONTHLY REPORT

November, 1955

VISITORS

A. E. Austin and L. D. Loch, Battelle Memorial Institute, Columbus, Ohio, visited HAPO, Nov. 15-17, to discuss sub-contract work BMI will be doing for HAPO.

H. E. Brown, ANP-GE, Cincinnati, Ohio, discussed critical experimental facilities at HAPO on Nov. 10.

J. W. Dickinson and E. C. Nollman, Linde Air Products, Seattle, Wash., inspected surplus equipment for modernization at HAPO, Nov. 16-17.

J. Evans, L. G. Miller and J. R. Smith, AEC National Reactor Testing Station, Arco, Idaho, visited HAPO to discuss neutron cross-section measurements, Nov. 14-15.

J. Farr, National Lead, Fernald, Ohio, worked on the broach machine at HAPO, Nov. 3-10.

M. D. Fiske, GE Research Laboratory, Schenectady, visited HAPO as a consultant on operation of a helium liquifier, Nov. 14-15.

N. E. Huston, North American Aviation, Downey, Calif., spent Nov. 22-23 at HAPO discussing NAA safety fuse experiments.

J. R. Keeler and W. Chubb, Battelle Memorial Institute, Columbus, Ohio, visited HAPO to discuss the metallurgy program and assistance to Hanford, Nov. 15-17.

E. Lembersky, WAPD, Pittsburgh, discussed the irradiation of WAPD fuel samples in the KAPL-120 loop at HAPO, Nov. 2-3.

D. N. Reece, National Research Corp., Newton Highlands, Mass., visited HAPO on Nov. 17 to make initial runs of National Research vacuum furnace.

J. J. B. Rutherford, Babcock & Wilcox, Beaverfalls, Pa., visited HAPO regarding stainless steel specifications, Nov. 10-11.

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W. A. Smith, Jr., Knolls Atomic Power Laboratory, Schenectady, discussed vacuum cleaning and neutron irradiation of semi-conductors at HAPO, Nov. 9-11.

The following visitors discussed zirconium metallurgy at HAPO during November: F. Forscher, WAPD, Pittsburgh, Nov. 21-23; Earl Hayes, Bureau of Mines, Albany, Oregon, on Nov. 8; A. N. Holden, KAPL, Schenectady, Nov. 2-4; J. H. Keeler, GE Research Lab., Schenectady, Nov. 15-18, and Paul Loewenstein, Nuclear Metals, Cambridge, Mass., Nov. 10-11.

TRIPS

J. A. Berberet visited Phillips Petroleum, Arco, Idaho, to discuss future irradiations in the Experimental Test Reactor, Nov. 18.

A. G. Blasewitz attended a meeting of the Industrial Polution Control Committee, Detroit, Michigan, Nov. 28-30.

L. P. Bupp recruited technical personnel at University of Minnesota, Minneapolis, and University of Wisconsin, Madison, Nov. 7-11.

J. J. Cadwell spent Nov. 7-8 at the University of Utah, Salt Lake City, recruiting technical personnel.

J. J. Cadwell and O. J. Wick spent Nov. 9-11 at UCRL, Livermore, Calif., consulting on Hanford Assistance to Whitney Project.

R. L. Call attended ASME meetings in Chicago, Nov. 11-20.

J. P. Cooke attended a conference on special valve at the Western Gear Works, Seattle, Nov. 15.

J. M. Davidson and J. F. Fletcher visited Phillips Petroleum, Arco, for discussions regarding proposed experiment in the MTR, Nov. 9-11.

E. A. Evans visited Phillips Petroleum, Arco, to examine irradiated fuel elements, Nov. 1-2.

T. W. Evans observed MTR experiments at Phillips Petroleum, Arco, Nov. 1-2.

G. C. Fullmer and J. H. Brown discussed reactor problems at KAPL on Nov. 21 and observed experimental work of Assistance to Hanford at BNL, Nov. 22-27.

S. Goldsmith and N. G. Wittenbrock spent Nov. 14-18 at the University of California, Berkeley, where they attended a Short Course on Corrosion and discussed high temperature Al. creep rates with Prof. J. E. Dorn.

D. E. Johnson visited Bridgeport Brass, Bridgeport, Conn. and Chase Brass, Waterbury, Conn. regarding zirconium fabrication, Nov. 22-23.

D. C. Kaulitz discussed engineering facilities of the ETR at Phillips Petroleum, Arco, Nov. 18.

R. S. Kemper and A. W. Thiele, members of Civilian Application Document Declassification Team #1, went to Oak Ridge for consultations on Nov. 28 and will remain through Dec. 9.

B. R. Leonard visited Texas Western College, El Paso, Nov. 8-9 to attend a Career Conference and to recruit technical personnel. Mr. Leonard spent Nov. 10 at Los Alamos Scientific Laboratory to discuss problems of nuclear physics.

M. Lewis recruited technical personnel at University of Kansas, Lawrence, and Kansas State, Manhattan, Nov. 7-11. On Nov. 29 Mr. Lewis attended a policy meeting on L-42 position in the MTR at Phillips Petroleum, Arco.

R. K. Marshall visited North American Aviation, Downey, Calif. to inspect customer assembled experiment before shipment, Nov. 29 through Dec. 2.

C. L. Miller visited KAPL on Nov. 21 and ANL on Nov. 28 to discuss reactor problems and observed experimental work of Assistance to Hanford at Brookhaven National Lab., Nov. 22-25.

J. F. Music spent Nov. 24 through Dec. 5 at University of Texas, Austin, and Rice Institute, Houston, recruiting technical personnel.

R. Neidner spent Nov. 1-2 at Phillips Petroleum, Arco, to establish contact at MTR in line with changed responsibility for liaison concerning Hanford experimentation.

H. P. Oakes and F. M. Ritter spent Nov. 7 at Bureau of Mines, Albany, Oregon, and Nov. 8 at Boeing Aircraft, Seattle, to discuss and watch swaging operations.

W. J. Ozeroff recruited technical personnel at University of Pennsylvania, Philadelphia, Nov. 14-16.

R. E. Peterson attended meetings of the American Physical Society, Chicago, Nov. 25-26, and discussed carbon-12 cross-section measurements at ANL, Nov. 28.

N. O. Strand spent Nov. 28-30 at Byron-Jackson, Los Angeles, to witness loop acceptance test.

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J. T. Stringer and O. W. Rathbun visited Mallinckrodt Chemical, St. Louis, and National Lead, Fernald, Ohio, Nov. 1-4, to observe uranium fabrication techniques.

E. C. Wood spent Nov. 14 at the University of Wisconsin, Madison, recruiting technical personnel.

R. W. Benoliel visited AGT Dev. Dept., Evendale, Ohio, to discuss measurement of performance, Nov. 2, and attended Symposium on "Measurement of Management" under auspices of the Society for Advancement of Management, in New York City, Nov. 3-4.

ORGANIZATION & PERSONNEL

Personnel totals are as follow:

	October 31	November 30
Administrative	2	2
Pile Engineering	97	95
Pile Materials	60	64
Fuel Technology	126	126
Physics Research	39	38
Metallurgy Research	80	80
Contact Engineering	2	1
Technical Administration	8	10
Totals	414	416

Pile Engineering: Roy Nilson and D. E. Wood, Engineers I, were hired Nov. 21 and 8, respectively; M. E. Shockley, Engineering Assistant, transferred in from Fuel Technology, Nov. 14; N. W. Pike and F. M. Newby, Engineering Assistants, transferred in from Pile Materials, Nov. 14; F. W. Rider, Technician Trainee, transferred in from Education & Training, Nov. 21; E. B. Scoggins, Clerk, transferred in from Design Section, Nov. 28; J. L. Bond, Engineering Assistant, transferred to Education & Training on Nov. 21 and on Nov. 28 he transferred from Education & Training to Pile Engineering as an Engineering Assistant; R. G. Knirck and M. R. Moon, Engineering Assistants, transferred to Reactor Section on Nov. 1; A. C. Rice, Engineering Assistant, transferred to Separations Technology, Nov. 28; R. E. Johnson and W. J. Morris, Engineers II, transferred to Design Section, Nov. 1; G. E. Wade, Engineer I, transferred to Design Section, Nov. 1; H. W. Resseguie, Technician Trainee, terminated on Nov. 4.

Pile Materials: W. F. Hall and N. D. Stice, Engineering Assistants, were hired Nov. 7; W. A. Oldham, Engineer II, transferred in from Separations Section-Manufacturing, Nov. 1; V. N. Pearson, Engineering Assistant, transferred in from Reactor Maintenance, Nov. 14; T. R. Stoner, Technician Trainee, transferred in from Education & Training, Nov. 22; F. M. Newby and N. W. Pike, Engineering Assistants, transferred to Pile Engineering, Nov. 14.

Fuel Technology: W. C. Craven, Engineering Assistant, was hired Nov. 22 and F. J. Ouren, Engineering Assistant, was reactivated Nov. 10; M. E. Shockley, Engineering Assistant, transferred to Pile Engineering, Nov. 14; R. W. Cross, Engineering Assistant, and W. E. Ray, Engineer II, terminated Nov. 11 and 22, respectively.

Physics Research: D. E. Davenport, Unit Head, terminated Nov. 18.

Contact Engineering: M. W. Carbon, Unit Head, terminated Nov. 30.

Technical Administration: L. C. Clossey transferred in from Chemical Research-Separations Technology, Nov. 15; M. M. Scott, Stenographer, was hired Nov. 14.

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PILE ENGINEERING SUB-SECTION

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PROCESS TECHNOLOGY

Power Level Limitations

The maximum operating power level, during November 1955, was limited by 105 C tube outlet temperatures at C, D, DR, and H Piles and by trip-before-instability limits at approximately 100 C outlet at B and F Piles. B and F Piles still have fine mesh cone screens. At KE and KW Piles, levels are being restricted by emergency water supply considerations.

Process Specification Changes

Specification 31.00, "Composition of Reactor Gas" - The relationship between allowable helium concentration and maximum graphite temperatures was changed in the 460-490 C temperature range at C, DR, and H Piles to provide more operational flexibility.

Pile Operation

A total of 82 tubes at D Pile and 109 tubes at F Pile were replaced during the month. Operating efficiency has been reduced during the month by tube replacement and water leaks at D and F Piles, television installation at B Pile, Ball 3X tests at C Pile and ruptured slugs at B (1), C (5), D (3), and H Piles (7).

Process Tube Leaks

Four pile shutdowns were required due to process tube leaks during November, 1955.

Date	Pile	No. Leaking Tubes
11-20-55	D	3
11-13-55	F	1
11-7-55	F	3
11-1-55	F	3

3X Ball Drop Tests

During the month drop tests were conducted at some of the piles to determine the condition of the balls.

During October and early November, 32 hoppers were dumped at C Pile and 13 did not completely empty. Some required pounding to dislodge the balls. Since that time the balls in 21 hoppers have been replaced with new balls recovered from the K Area start-up tests.

A check of the balls at B and DR during the month showed the balls to be in good condition, however, some condensate was noted on the tops of two hoppers at DR Pile. Previously the balls at H, D, and F had been checked with considerable corrosion of the balls found at F Pile. A gas line has been installed at F Pile to blow dry pile gas through the hoppers to keep the balls dry.

Ruptured Slugs

TABLE I

SLUG RUPTURE EXPERIENCE - NOVEMBER 1955

Type of Metal	Tube No.	Failure Date	Exposure	Failure Type
8" Normal U.-"K" Lot	0961-H	10-31-55	362 MWD/T	Side
8" Normal U.-"K" Lot	1069-C	11-5-55	219	Side
8" Normal U.-"M" Lot	0677-H	11-6-55	320	Side
8" Normal U.-"M" Lot	0982-H	11-8-55	343	Side
8" Normal U.	1179-F	11-9-55	960	Cap
8" Normal U.-"C" Lot	0462-H	11-9-55	189	Side
8" Normal U.	3562-C	11-10-55	211	Cap
8" Normal U.-"L" Lot*	0983-D	11-12-55	376	Side
8" Normal U.-"M" Lot	3985-H	11-17-55	332	Side
8" Normal U.-"L" Lot*	0781-D	11-19-55	394	Cap
8" Normal U.	3283-C	11-19-55	265	Unexamined
8" Normal U.	1364-C	11-24-55	282	Unexamined
8" Cored with crimped U. end plugs	1879-B	11-25-55	398	Side
8" Cored with aluminum end plugs	2179-C	11-26-55	718	Unexamined
8" Normal U.	3291-H	11-26-55	337	Unexamined
8" Normal U.-"L" Lot*	1083-D	11-28-55	436	Unexamined
8" Normal U.	0681-H	11-28-55	423	Unexamined

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

Three of the failures this month occurred in a small region of D Pile in metal which had been cooled in air between the transformation and quenching steps for a longer than normal period of time. To date a total of six such failures have occurred. A total of about 900 tubes were charged with this material at the B, D, and F Piles and to date no other failures have occurred. An investigation is being conducted to determine the reasons for this phenomenon.

Production Tests

(See following pages.)

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Test No.	Type Metal	No. of Tubes	Pile	Goal Exposure	Present Exposure	Remarks
105-570-A	Cored-Lead Dip	4	2-C	2 ruptures	Discharged	Ruptured at 1115 & 1173 MWD/T
			2-F	"	1790-1850	
	Control	4	2-C	"	1 disch. at 1046	1 ruptured at 1128 MWD/T
			2-F	"		Ruptured at 1524 & 1547 MWD/T
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
105-588-A	Development Test of extruded and drilled cored slugs	3 tubes per mo.	1-C	900	Discharged	Ruptured at 797 MWD/T
			3-C	1100		Discharged at 750 MWD/T
			3-D	900	770-790	Charged 3-7-55. 1 ruptured at 772 MWD/T
			5-D	900	640-670	Charged 3-30-55
			3-D	900	360-390	Charged 7-10-55
			12-D	900	110-140	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 slug. One failure in at D at 505 MWD/T and one at B at 398 MWD/T.
		428	D			
		18	D			
		662	F			
		545	B			
105-593-A	Cored-Al. End Plugs	4	C	1-200	Discharged at 213	
				1-600	Discharged at 640	
				2-900	800	1 ruptured at 800 MWD/T
105-593-A Supp. A	Cored-Al. End Plugs	4	C	2 ruptures		
	Control	4	C	2 ruptures	210-240 MWD/T	
105-596-A	Dingot Slugs	9	F	2-300	Discharged	Slugs charged alternately with control slugs from rod-transformed and slug-transformed metal.
				2-600	450-500	
				5-900	500-700	

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105-597-A	Mg-U Matrix	1	B or D	3000	Not yet loaded	2 matrix slugs + 31 reg. slugs
	4 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 6-900	110-140	Delay of 30, 43, 50 and 80 seconds between salt bath and water quench.
105-603-A47-MT	Cored-Crimped U. End Plugs	4	C	1-300 1-600 2-900	390-410	
105-607-A57-MT	Cored-Enriched welded U. and aluminum end plugs 3/8" & 5/8" core diameters	6	C	ruptures	240 for enriched pieces	Compares performance of welded U. and aluminum end plugs and a larger core diameter. Charged 10-15-55.
105-608-A56-MT	Dingot Slugs	16		7-600 9-900		Compares various mechanical and heat treatments of Dingot U. Charged 11-12-55
105-608-A56-MT Supp. A	Dingot Slugs	3	D	Ruptures		Authorizes irradiation of production quantities of Dingot Slugs. Charged 11-16-55
105-608-A56-MT Supp. B	Dingot Slugs	8	C	Ruptures	Approved	Compares performance of dingot and ingot U. slugs.
105-610-A60-MT	Vertically Heat Treated U.	12		2-400 5-600 5-900	Circulating for approval	Rod heat treated in vertical position
105-611-A	Reg. Produc.	33		500 900 1100	5 tubes charged 105-B, 11-12-55	Investigates the effects of pile variables upon slug stability.
105-613-A54-MT	Solid	20		4-400 8-500 8-900	Circulating for approval	Delays 35, 50, and 80 seconds between salt bath transformation and water quench. Heat treated in rod form.

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105-614-A62-MT	Hot Press Canned Solid Slugs	8	C	200,350,500,750 and 2 ruptures	Circulating for approval	Evaluates hot press canned solid slugs having anodized jackets.
	Control	8	C	200,300,500,750 and 2 ruptures		
105-615-A63-MT	Lead Dip Canned I & E	8	C	150,300,500 and 2 ruptures	Circulating for approval	Provides basic information on I & E performance and conversion ratio.
	Control	8	C	150,300,500 and 2 ruptures		

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PILE PHYSICS

Dry Lattice Coefficient Measurement - Brookhaven

Pile Physics Unit personnel participated in a measurement of the graphite coefficient of reactivity in the dry lattice of the Brookhaven pile on November 24 and 25. The cooling transient subsequent to a pile annealing experiment was followed by period measurements over the range from 350 C of both graphite and metal to essentially room temperature. Preliminary results indicated a slightly negative graphite coefficient; although the average exposure over the pile corresponded roughly to 400 MWD/T Hanford material, the more recently charged central region of the reactor probably results in a much lower effective weighted exposure. Tube-by-tube exposure data and complete temperature data are being forwarded to Hanford for detailed test analysis.

KE Graphite Reactivity Coefficient Tests - PT 105-600-A

The sixth He-CO_2 purge test was carried out November 7-8. The measured graphite reactivity coefficient as determined by central thermocouples but not yet corrected for longitudinal weightings has increased from roughly 0.7-0.8 ih/°C at 40 MWD/ton to approximately 1.5 ih/°C at a weighted pile exposure near 450 MWD/ton.

The second horizontal rod calibration required by this production test was carried out November 22-23.

Product Yield and Quality

Information from 200 Areas Accountability and Technology personnel indicate that the KW plutonium yield and quality figures for low exposure materials are more favorable than those for the old reactors by approximately the following percentages: 6 per cent greater yield per MWD and 3 per cent lower spontaneous fission count per MWD/T. C Pile plutonium appears to be showing the results of the graphite burnout experiment, as the spontaneous fission count is running about 5 per cent higher than in the case of the old reactors.

Effect of Moderator Coefficient on Control Rod Strengths - PT 105-606-A

This test was performed in the DR Pile by measuring scram transients due to VSR insertion at the beginning and end of a normal outage on 11-9-55 and 11-11-55. The data indicate that the VSR system strength was of the order of 10 per cent greater in the pile with 500 C maximum filler block graphite temperatures than with 100 C graphite.

Exposure of Bismuth Slugs in Hot Water - PT 105-550-A

Underwater examination of the last pieces to be discharged under this production test from the H Pile reveal them to be in good condition. The polonium content at discharge averaged 8.85 curies per pound in the two columns loaded under this PT; the bismuth slugs were charged as downstream spacers in "C" enrichment columns.

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Pile Data Studies

Initial IBM runs have been made in a study directed toward improving flattening and enrichment column reactivity evaluation. The first two maps analyzed indicated that the flattening values calculated by pile weighting methods were approximately 25 per cent lower than those obtained by present standard methods. Subsequent runs will be chosen to provide information relative to the effect of flattening change evaluations on pile critical predictions.

Shielding Studies

The copper sulfide discs, substituted for pure sulfur as high energy neutron detectors because of high local shield temperatures, held up fairly well in the DR test wells. It is apparent that considerable sensitivity has been sacrificed because of the lower sulfur content; however, it may be possible to use a combination of copper sulfide and pure sulfur depending on the sensitivity required in a given test slab location.

The iron-limonite concrete slabs which had been heated at 320 C for approximately three weeks are now in the test wells for attenuation measurements. Magnetite limonite slabs heated at 320 C will go in next.

PHYSICS DEVELOPMENT

Ruptured Fuel Element Detection

The gamma spectrometer slug rupture detection units installed at H and DR Piles as part of Project CG-578 continued to operate satisfactorily; the two ruptures which occurred at H Pile were readily detected for quick discharge and there were no ruptures at DR Pile.

Engineering development and design support for the project to install gamma spectrometer units at the K Piles has continued. A water-cooled housing design for the scintillating crystal detector was completed. Efforts to redesign a portion of the "readout" circuitry to make faster scanning of the source points possible are also nearing completion.

The designs for a "gamma-scan" system on-pile test, as authorized by Development Test 105-612-A, are substantially complete; installation of the full pile test system at C Pile may be initiated at the first shutdown after December 15. Some consideration has been given the problem of quickly isolating the tube containing a rupture during reactor operation in support of the charge-discharge installation scheduled for C Pile. It is concluded that the initial efforts will concentrate on the "gamma-scan" development and also on the development of a "traveling" gamma spectrometer which could sequentially observe the fission product activity on the outlet of each tube following crossheader identification with the standard gamma spectrometer systems. Lesser priority is being given the alternative of providing instrumentation on the outlet of each tube to sample effluent activity because of the large inherent capital and operating cost of such multiple point systems.

Reactor Safety - Nuclear Instrumentation

The fabrication of the modified sub-critical pile neutron multiplication detector has been completed and will be installed at D Pile during the extended outage scheduled early in December. The D Pile installation is essentially a prototype of the system to be installed at all areas under a project currently being prepared by Design. Components have been procured for an installation of an improved BF_3 filled neutron proportional counter system at D Pile in an attempt to clearly ascertain the extent of improved nuclear safety protection possible to provide through modifications to this system.

Ionization chambers developed for use in octant monitoring systems in B, D, and F Piles failed during mechanical shock testing and are being redesigned. The design is complicated by the requirements for compactness (dictated by the requirement for utilization in process tubes) and the ability to possess long life in a high neutron and gamma flux.

Lattice Neutron Economy

Approximate determinations of the absolute neutron flux in the KAPL-120 loop were made with copper detectors to ascertain the extent of the corrections required in extrapolating neutron flux predictions based on room temperature Test Pile measurements to a position internal to the highly water moderated KAPL-120 loop under H Pile operating conditions; the corrections are for neutron temperature, H Pile flux distortion, and loop coolant expansion at elevated temperatures - none of which can be readily calculated. The measurements indicate that under present H Pile operating conditions the power generation rate in a SAR prototype fuel assembly would be approximately 35 per cent below that expected on the basis of a direct extrapolation to an idealized H Pile situation ignoring the change in slowing down density with changing cooling water volume during high power operation. This correction then lends an expected power generation rate of 20 KW in the SAR fuel element which is approximately that observed.

Preparations have been made to determine the lattice constants for internally and externally cooled slugs designed for utilization in existing piles. Cold, clean lattice conversion ratio determinations will be made in the Test Pile and, also, at C Pile. The initial eight tube loading is expected to be made at C Pile during December.

The replacement of aluminum process tubes with zirconium at the older piles is expected to yield a net reactivity gain of about 150 inhours. However, the replacement would also achieve the equivalent of a C Pile annulus and the added neutron absorption in water is included in the above net gain.

Some additional measurements have been made of the radial distribution of fission products in irradiated uranium; some evidence has been obtained showing that a function of the form I_0 (K, r), where K Is neutron diffusion length in uranium and r the slug radius, fits the observed distribution quite well in the case of irradiations performed in a 105 pile. This is quite different than room temperature irradiations which show a much steeper gradient in the neutron density near the slug surface than the I_0 (K, r) function predicts.

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Water Boilout Experiment

A cooperative experiment with Heat Transfer personnel has been designed to measure the rate at which water is ejected from a process tube during a power excursion simulated on the Heat Transfer mockup. The technique which appears most attractive is that of insulating process tube sections and treating each section as a capacitance with water dielectric; the dielectric then changes as the water is ejected and the resultant effect on an inductance-capacitance circuit measured. All equipment is on order with the delivery on the insulated process tube sections expected to control program schedules. The water boilout times under catastrophe conditions are a major factor in determining the strength and speed required in the safety system to prevent a serious power excursion.

Reactor Safety Project

A preliminary analysis of the research, pre-testing, design, procurement, cost, time scale and production loss aspects of a program to conduct a full pile demonstration experiment on NAA safety fuses has been completed at the request of the Advisory Committee on Reactor Safeguards. It is concluded that such an experiment could not reasonably be initiated before mid 1958 and would cost approximately $940,000 if the safety fuses did not fail during the test.

The schedule and cost of this experiment is largely determined from estimates provided by North American Aviation, e.g., the fuse assemblies are estimated to cost $350 each in lots of 1000 or more and 1,400 per pile are necessary to yield the required 1000 inhours of fast acting control to quickly shut down a reactor if water is lost simultaneously with failure of the vertical rod system. The schedule is dictated largely by the delivery times estimated by NAA - 45 weeks for 1400 elements - and our requirement that an intermediate scale irradiation, consisting of about 50 elements, precede the full pile demonstration experiment.

There appear to be no technical considerations which would preclude performing such an experiment with satisfactorily designed, manufactured and demonstrated safety fuses. The most serious problem in fuse utilization which remains to be solved prior to a full pile experiment is the identification of fuses which have failed during the irradiation. Without such identification it is possible that all fuses, their associated enrichment, and the uranium in fuse loaded tubes, would need to be discharged if as many as 10 to 15 per cent of the safety fuses were to fail in order to continue reactor operation at an efficient level.

Test Pile - Routine Tests

Testing of uranium slugs proceeded routinely; slugs produced from Fernald metal continued to be slightly poorer than average. Fourteen Fernald billet egg lots yielded TDS values ranging from 16 to 19; fourteen Mallinckrodt lots yielded TDS values ranging from 13 to 14.

Test Pile - Special Tests

The reactivity loss per 105 reactor resulting from adding one per cent nickel to the aluminum slug cans was determined to be 32 inhours.

All preparations have been completed for the "long term reactivity gains" determination being conducted jointly with Pile Physics personnel. This experiment involves the measurement of the reactivity of uranium slugs irradiated in the range of 50 to 2000 MWD/T; the difference in the pre-irradiation and post-irradiation reactivity is then interpreted in terms of plutonium buildup and depletion, U-235 depletion and fission product buildup. It is possible to study a much wider range of exposures in the Test Pile through tests on selected slugs following the irradiation than is possible by observing the overall reactivity behavior of a 105 pile as the weighted exposure level increases.

MECHANICAL EQUIPMENT DEVELOPMENT

Slug Column Bowing Tests

Tests were initiated to measure the forces encountered in a slug column due to thermal expansion, mechanical friction and water flow to define the possibility of these forces bowing the slug column. One thousand pounds force were found required to shift the charge upstream in a "C" process tube under normal flow conditions.

One Header-at-a-Time Leak Detector

Work has continued on the detection system, with F and D Piles being successfully tested during the month. The instruction sheet has been revised and is being distributed to Chief Operators and Supervisors. Assistance is being given Reactor Section in installing the equipment at all areas and in training operating personnel.

Heliarc Tube Splitter

A modified Heliarc torch has been used to successfully split a short section of process tube in a graphite block. No damage is evident in the graphite under present conditions. Further work is aimed at materially increasing the rate of splitting above the 15 inches per minute rate which has been attained.

Vertical Rod Studies

Modifications improving the "K" VSR latch are being studied. These modifications consist of a new arrangement of the upper limit switches operating rod, and a method for cushioning the shock experienced by the latch when the rod is raised.

High Pressure-High Temperature Loop

Lack of sufficient heating capacity has limited the operating temperature to 525 F. Additional turns are being added to the induction coil to increase the heat input and allow the temperature to reach the specified 600 F.

Flanging of Zircaloy-2 Tubing

Further attempts to Van Stone "as received" Zircaloy-2 process tubing have been unsuccessful. The satisfactory results which were reported earlier were accomplished on material which had possibly received a short, low temperature anneal.

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Poison Spline

Flow mock-up tests with central zone B-D-F conditions show that insertion of a poison spline reduces flow by 3 gpm with an increase of 40 psi at the Panellit gage. The changes in flow and pressure are nearly linear with respect to the distance the spline is inserted under the charge. A chopper to withdraw and dispose of a hot spline has been fabricated and is being tested.

Reactor Safety

From two to 30 hours after a reactor shutdown for complete loss of cooling water, it is possible that reactions may occur which would cause the reactor to become critical. Methods of introducing and holding BF_3 in the pile atmosphere are being investigated as a last ditch safety measure for use under such conditions. Pile Materials Sub-Section is testing the reactions of BF_3 with hot graphite.

Sub-Critical Monitor

Mechanical components for the test (PT 105-589-A) were completed and are now being tested with the controls by Physics Development Unit. The design of a similar unit which will fit K reactors is in progress.

Graphite Miner

Testing of the new short cutter head with the 189-D graphite mock-up distorted to maximum 105-F values revealed that the cutter removed material from the top of the channel, rather than from the bottom as desired. Alteration of the shaft, placing a flexible joint near the head, is underway, and it is anticipated that this modification will allow the cutter to function properly.

Charging and Discharging Studies

A simple escapement mechanism to allow slugs to be flushed one at a time from a process tube was fabricated and tested. Operation was not satisfactory and another escapement is being designed.

Stainless Steel Process Tubes

A study into the costs and suitability of type 403 and 410 stainless steel for process tubes was discontinued upon learning from Physics Development Unit that about 2000 inhours of reactivity would be lost and the conversion ratio reduced by some 8 per cent.

SPECIAL IRRADIATIONS

KAPL-120 Loop

The KAPL-120 loop operated favorably during the month of November. Over 700 hours of operation at SAR conditions have been logged at equilibrium and near equilibrium pile powers. On November 4 a leaky valve necessitated a shutdown of the loop for a few hours.

Hydrogen has been added to the loop water to maintain specified pH conditions. Decrease in loop flow rates indicate that "crud" is building up in the loop. Preparations are in progress to inject ammonium hydroxide or lithium hydroxide into the loop to eliminate this "crud" buildup.

Flux traverses have been made in the annulus of the in-pile tube between the inner liner and the pressure tube wall. Preliminary calculations on these flux measurements indicate the power generation in the KAPL fuel element should be between 10 and 20 kilowatts. This value brackets the value of about 15 kilowatts determined experimentally from the loop instrumentation. There is still no explanation for the discrepancy between these values and the value of 35 kilowatts calculated from 305 pile tests.

In-Pile Irradiation Studies

The two experimental assemblies charged into F Pile on September 30 for studying reactions between zirconium and pile gas impurities (HAPO 105) continue to operate satisfactorily. The design of two additional assemblies is in progress. Due to the success achieved with gamma type heaters, electrical heaters will be eliminated in the two new assemblies.

Five additional experimental assemblies for temperature monitoring I & E slugs (HAPO 159) are planned. Fabrication of components for the assemblies is in process. Completion of all work including assembling and testing is scheduled for December 15.

Liaison with NAA relative to experiments for testing pile safety fuses (HAPO 162) continues. A trip was taken to the NAA site to observe the assembly of this experimental equipment.

Additional samples of gas released from krypton impregnated uranium have been irradiated as assistance to a program aimed at studying the diffusion of gaseous fission products and uranium (HAPO 166). Difficulties were encountered in the development of counting techniques for detecting the krypton 85 isotope after irradiation. With experimental techniques now being satisfactorily perfected, preparations are in progress to irradiate several more samples.

Responsibility for liaison for the GEH-3 and GEH-4 irradiation programs at the MTR, formerly sponsored by the Metallurgy Sub-Section, was assumed. The GEH-3 program consists primarily of capsule irradiations of various types of metals. The GEH-4 program pertains to the irradiation of slugs of special types in a single pass irradiation facility. At the shutdown of the MTR on November 22, capsules containing uranium-thorium alloy samples were charged under the GEH-3 program. Under the GEH-4 program, I & E wafer slugs previously irradiated for one cycle in the MTR were recharged following examination and dimensional checks. Insulated slugs which had been charged on October 24 were discharged November 4 when it was indicated by analytical data obtained from slugs irradiated earlier that the power generation may have been much higher than had been previously expected. An effort is being made to determine the reasons for the discrepancies in the power generation.

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Gamma Irradiation Studies

The development of calorimeters for the continuous measurement of gamma ray intensities continues. One calorimeter has been developed which has a sensitivity of 1.3 C per 10^5r per hour or a 0.069 mv per 10^5r per hour voltage response. Fifty minutes are required for the calorimeter to reach 95 per cent of its equilibrium value. The Brown recorder has been attached to the calorimeter to check the stability of the calorimeter as an instrument for making continuous gamma measurements and for other tests.

Other methods for measuring gamma intensities are being studied. Due to the high intensity sources to which these methods must be applied, the common ferrous-ferric method of dosimetry is not feasible. Plans are in progress to test a similar method using ceric sulphate.

Facilities and Equipment

A hydraulically-operated guillotine for cutting zirconium process tubes has been developed. This piece of equipment worked quite successfully in removing the zirconium process tube for the loop on the minus 9 level at H Pile. Improvements to further enhance its performance are planned.

Assistance in the preparations for the installation of heavy wall inner tubes at the KE and KW piles has extended to the Projects and Maintenance personnel. This work includes the provision of much heavier walled inner tubing for the front to rear test holes and in the general purpose test facilities at the two K Piles. Provisions are also being made for the removal of the tubes prior to their installation.

Lack of customer interest in the pneumatic facility has led to the decision that this facility will have to be put in moth balls. The in-pile tube will be slightly pressurized with helium and the blowers which now operate continuously will be turned off.

Borescoping and Traversing

Vertical safety rod channel 33 at F Pile was inspected November 18 at the request of Operations following the removal of a broken vertical liner block about 24' from the top of the unit. The channel was inspected to a depth of 26' and was found to be unobstructed and without ledges or cracks where balls would be likely to get hung up.

Vertical height measurements were taken 10-29 on tube 4674 front and rear at C Pile.

A Wild N-3 precision level has been procured for obtaining vertical height data at the K Piles. Detailed procedures are being written which will establish a standard for obtaining vertical height data in the future.

HEAT TRANSFER

Instability Limits

Steady state boiling curves, characterized by instrument signal pressure, were computed and plotted for all orifice and venturi zones of all piles. The curves, which represent the prime source material for establishing instability limits, are based on data previously secured from the electrically heated full scale mockup supplemented in some cases with data from the hydraulics mockup. The curves now available are believed to be more precise and to have been based on stricter interpretation of data than any available heretofore.

During examination of the basic boiling curves data it became apparent that a better technique could be devised for the specification of limits. The new technique stems from the fact that for common outlet temperatures and instrument sensing pressures, boiling curves are remarkably similar in shape when flow rates are expressed as a function of normal flow at the common outlet temperature. This striking similarity holds true regardless of tube power, orifice zone, or whether the tube is filmed or corroded. This permits establishment of a limit specification technique that is technically sound for filmed or corroded tubes, and eliminates the cumbersome "G" factor calculation and the necessity for determining tube flow to determine limits. Further, this technique makes easy the specification of high and low trip limits based on identical tripping flow rates, thus permitting equal degrees of conservatism to be applied to cone screen and tube plugging hazards.

To permit determination of boiling curves at high tube powers with rear header pressures of current interest, the low pressure mockup was shutdown and altered by the addition of new equipment. The main alteration consisted of adding a second condenser to permit low back pressures at high flow rates and high exit quality.

Hydraulics Studies

Since instability limits are to a certain extent dependent on the resistance to flow in the process tubes, and thus dependent on the minor effects of film formation and tube corrosion, operating data from the piles was secured to establish the current variation in tube flow resistance. This data was analyzed and compared with experimental results in the electrically heated and hydraulics mockups to verify the precision of existing boiling curves. Similarly, high temperature flow-pressure data were secured for the H and C Pile outlet geometries to verify predictions of second-order effects instroduced at H Pile by unique rear header Parker fitting configuration and at C Pile by the unique rear pigtail configuration.

Somewhat as a by-product of these studies, the upper limit of accuracy of the H Pile rear thermocouple was determined. These thermocouples are downstream of a vena contracta wherein exists flashing to two phase flow at outlet temperatures less than the saturation temperature in the rear crossheaders. It was found that measurement of outlet temperature was accurate up to the crossheader saturation temperature, indicating probable recombination of the flashing mixture upstream of the thermocouple location.

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A study was made to determine the desired throat pressure for the CU-558 venturi tubes. Possible future operating conditions, such as the use of I & E slugs, and delta pressure flow monitors make low throat pressures desirable. Minimizing the change in flow from cold water service to operating temperature acts to make high throat pressures desirable. Consideration of all factors led to the recommendation of 250 psi as the desired operating point.

Cooling by Boiling Equipment Development

Following delivery and installation of the variable power pre-heater, only one additional component, a high pressure strainer necessary for pump protection, is required to permit operation at design temperature and pressure. All pressure and temperature instruments were calibrated, additional flow instrumentation was designed and ordered, and an improved bus-bar switching arrangement was made. To test apparatus performance, two flow tests at 200 F were performed, and connection of the test section to the instrumentation was started.

Shutdown Cooling Studies

Work continued on analysis of operation of the K Pile high pressure cross tie line, and revised calculations were made on crossheader shut-off characteristics.

Analytical Service

As a service to other groups, the following studies were undertaken: determination of minimum process tube leaks to cause corrosion of adjacent tubes, estimation of between-the-rib water temperature in corroded tubes, estimation of jacket temperatures of cocked or eccentric slugs, estimation of maximum temperatures in a UO_2 fueled reactor, consideration of the feasibility of a corrugation technique for slug centering, estimation of the temperature distribution in cored slugs with uranium end plugs, and in determining process tube pressure drop in special new reactor designs.

PILE MATERIALS SUB-SECTION

GRAPHITE AND MATERIALS DEVELOPMENT

Battelle Cooperative Program

Final negotations for the contract to continue the Battelle Memorial Institute graphite development program were completed. Discussions of this program were held at Hanford with L. D. Loch and A. E. Austin of Battelle. The results of these talks are reported in "Graphite Development Discussions with Battelle Personnel," HW-40168.

High Temperature Graphite Irradiation GEH-9

The GEH-9 equipment which was shipped to the Materials Testing Reactor in October has been inspected there after shipment and is ready for insertion into the reactor. During the inspection, a few wiring faults in the control equipment were discovered and corrected. A faulty thermocouple lead connection in the in-pile test thimble was repaired.

The scheduling situation for the L-42 position was discussed with MTR personnel. The first GEH-9 irradiation has been scheduled tentatively for MTR cycle No. 65. This should occur during early February, 1956. If an earlier opportunity arises, because of currently unforeseen circumstances, the equipment is available for immediate insertion. An operating instruction manual is being written for this apparatus and will be turned over to MTR personnel. A trip report, HW-39963, has been issued covering the activities at the MTR on November 9 and 10.

Mark I Thermal Conductivity Apparatus

During the month additional testing was done on the Mark I thermal conductivity apparatus. This has been referred to as the rapid thermal conductivity device because operator time is saved over previous equipment. Preliminary results indicate a satisfactory accuracy and precision over a conductivity range of 5×10^{-4} to 2.5 cgs units.

Thermal Conductivity Measurements

Thermal conductivity and electrical resistivity measurements were completed on 66 graphite samples of a series irradiated in process tubes under PT 105-507-E. Five runs have been completed on extruded Korite graphite in preparation for hot test hole irradiation.

Thermal conductivity of sodium lead silicate glass with copper oxide additions has been determined for the Coatings and Corrosion Unit. The glass is being considered for use as a fuel element insulator. Special techniques were developed which will be separately reported. In general the results showed that at glass temperatures of 30 to 74 C, the thermal conductivity of this substance is between 1.2 to 1.4 $\times 10^{-3}$ cal. sec.$^{-1}$ cm.$^{-1}$ $^{o}C^{-1}$.

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X-Ray Studies

Forty-three CO lattice parameter determinations were made on core samples taken from tubes 1688-F, 1786-F, and 3173-F. Twenty-nine thermal annealing runs were made while observing the shift of the 002 peak.

Survey of Plastic Materials

A survey has been completed of the unclassified literature for information on the use of plastic materials in radiation zones. Using this information, along with available classified data, a recommendation was made for materials that should be considered in the fabrication of O-rings for use in gamma radiation fields at temperatures up to 150 C. Fluorothene and teflon appear to be the most promising materials. Several other materials on which there are very limited data will also be tested.

PILE GRAPHITE STUDIES

Stability of Chromel-Alumel Thermocouples

Tests on twenty identically prepared 26 gauge chromel-alumel thermocouples have been completed. Bare and carbon sheathed couples were exposed to CO_2 atmosphere at 1000 C for exposure periods of up to 114 hours. Both thermoelectric and physical deterioration was observed. A decrease in thermoelectric power of approximately 5 per cent was noted for the maximum exposure. Embrittlement and an apparent intragranular corrosion attack caused the failure of the carbon sheathed couples at 114 hour exposure. From these data, it is concluded that unprotected chromel-alumel thermocouples are unsatisfactory for operation in a CO_2 atmosphere at such high temperatures. An informal report summarizing the details of this work is being prepared.

Radiation Induced Chemical Reactions

A formal report on this subject entitled "The Promotion of Chemical Reactions by Pile Radiation, Final Report PT 105-504-E," HW-40142, by R. E. Woodley has been prepared and is now being issued.

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

Alterations were made to the follower furnace controller so that it now starts up properly when the pile graphite temperature reaches 300 C. No difficulty has been experienced with any of the other controls during the month. Temperature at the center of the furnace is within $\pm 1^{\circ}C$ of the pile temperature.

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

This test will not be conducted at D Pile because of frequent process tube leaks. These leave an unknown quantity of water in the pile at startup, which would introduce an error in estimating the reactivity effect of nitrogen. It is likely that the test will be conducted at DR instead.

Liquid nitrogen is available in tank cans (capacity 800,000 cubic feet). It will be determined if a partial tank car load is economically feasible and practical to handle, otherwise, small cylinders will be used.

Overboring of Process Channels

Tests by the Mechanical Equipment Development Unit have indicated that some modifications to the overboring tool are needed before determining its effect on straightening tube curvature.

Thermocouple Failure in KE Pile

A large number of thermocouples in the central, near side, and top regions of KE Pile have been giving highly suspicious readings for some time. In each bundle of thermocouples in these regions, most of the thermocouples read the same temperature, regardless of their location. Some have not been sensitive to rod movement in their vicinity, and two instances were found where the entire bundle of thermocouples responded to rod movement at a particular point.

A resistance check of the thermocouples indicates that most of the thermocouple bundles are apparently shorted out somewhere in the vicinity of tube rows 80-85. Both stringer couples and G couples (1C and CA) are affected. There is no satisfactory explanation of what would cause such malfunctioning. There have been no water leaks at KE, nor any ruptures or tube replacement requiring high forces. A major shearing of the graphite stack along a vertical plane could short out all these couples, but this event is extremely unlikely. The phenomenon is being investigated further. Fortunately, there are a number of thermocouple stringers which can be replaced.

A complete resistance check of KW thermocouples revealed no sign of a similar occurrence.

RECIRULATION TECHNOLOGY

Recirculation Studies

A fuel element rupture occurred in the recirculation tube 0691-H; most of the work associated with this facility since the rupture involved removal of the rupture and zirconium tube, decontamination of the loop facilities, and preparation of a report covering the incident. The ruptured pieces was a standard production slug which had been exposed to high purity 180 C water for 52 operating days. Difficulty was experienced in removing the charge, and at one stage of the removal a jet of flame was emitted from the rear of the tube. Some fission product activity (about one curie) was emitted from the 105 stack and caused contamination of the surrounding area. Gross contamination of the loop equipment occurred. Decontamination was initiated using a dilute sulfuric acid-hydrogen peroxide mixture. Data obtained during the first decontamination runs have not yet been analyzed; it is indicated however, that a factor of decontamination of roughly two was obtained. Visual examination of the rupture piece indicates that corrosion penetration of the jacket wall caused the failure. It is suspected that intergranular corrosion of the 2S

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aluminum can was a contributing factor. A production test supplement was initiated for exposure of fuel elements clad with 1 per cent Ni-aluminum alloy, an alloy specially designed to be resistant to intergranular attack.

Prior to the rupture, activity data were obtained from crud samples and from the cation exchanger regenerant solution. Most of the activity in the crud could be ascribed to corrosion products of aluminum, zirconium and stainless steel. Activity in the cation regenerant solution was 95 per cent iron and 5 per cent chromium.

Seven simulated slug rupture tests were performed in ELMO-4, including one solid uranium and six wafer elements. The solid uranium piece was ruptured at 200 C in continuance of the evaluation of rupture effects at intermediate temperatures. The wafer slugs represented several combinations of wafer and spacer thicknesses. The damage to the tube and the flow decrease appear to be dependent on a combination of several variables: wafer and spacer thickness, temperature, tube geometry and flow rate. The interrelation of these effects has not been demonstrated with any consistency. A total of 34 slug rupture tests have been performed in ELMO-4.

A rough draft report covering the technical and economic aspects of converting a K reactor to recirculation cooling has been routed to interested parties for comment. This investigation is essentially complete.

Semi-Works Operation

Operation of the 1706-KE Semi-Works proceeded smoothly. Installation of the building demineralized water supply was completed, and three mock-up loops are nearly finished. The carbon steel loop ELMO-5 was tested at 200 C; ELMO-2 was run in at 180 C; and ELMO-9 was pressure tested at 2940 psi. A layout and schedule was developed for the loop room in 1706 to provide space for installation of present and future loops. Loops ELMO-6 and 7, being fabricated by off-site vendors are practically complete and are scheduled for shipment in December.

KER Recirculation Test Facility

The lump sum contractor began work toward completion of the KER facility; progress to date consists mostly of moving needed equipment into the building. A budget item was prepared for the conversion of the in-pile test section of one KER loop to a side test hole. Preliminary design of the in-pile section for this modification was completed and calculations of the shielding requirements were begun.

Invitations to bid on short length, KER geometry welded tubes were turned down by all vendors receiving invitations. Further investigation is underway to determine methods of procuring the tubes.

PILE COOLANT STUDIES

Production Tests

The zircaloy-2 tube operating under PT 105-555-E in channel 3586-D has operated normally during the month. Discharge of the first aluminum canned metal charge is expected in about two months.

Production Test 105-514-E, which authorizes a reduction of the concentration of sodium dichromate in the process water to 0.5 ppm on the far side of D Reactor, was discontinued this month. Since the interim report on this production test was issued, the number of slug ruptures and tube leaks that have occured on the far side of D Reactor has increased significantly compared with the experience on the near side. The cause of this phenomenon is uncertain; however, in order to avoid compounding the tube replacement situation in the event that reduced dichromate concentration is responsible, it was decided to terminate this production test. With the compilation of a more complete back temperature history for D Reactor it should be possible to correlate the results of this production test and determine whether or not 0.5 ppm sodium dichromate in the cooling water would be satisfactory for continued operation.

One of the 63-S process tubes installed under the provisions of PT 105-543-E was removed from channel 2475-F on November 18. This tube had been in operation for approximately one year when it was removed. Preliminary examination of this tube indicated that there was no appreciable galvanic corrosion on the outside and that the corrosion attack on the interior of the tube was somewhat less than would be calculated.

Corrosion Monitoring

Seventeen process tubes were examined during the month. No new or unusual type of corrosion attack was observed. Tube 2669-F, removed to determine the extent of outside corrosion after four months of pile operation, was found to be lightly corroded with no deep pitting. Three leaking tubes removed from F Reactor, 2166-F, 2169-F, and 2172-F, were examined. Although galvanic corrosion of the outside of these tubes was severe, it is believed that the leaks resulted from reduced rib heights since the holes were all between the ribs. In a five inch length of one of the tubes six holes were found.

A document, HW-39927, "A Study of Tube Conditions, Life, and Replacement," which summarizes our knowledge of the process tube situation to date was issued. In this document a concentrated effort was made to characterize the process tube leak problem.

The following conclusions have been reached:

1. Corrosion induced tube leaks are primarily related to the past temperature history of the tube, and the probability of incurring a tube leak can be predicted from this history.

2. External process tube corrosion has not been a major factor in causing tube leaks to date, and is not expected to become a major problem in the future.

3. In accordance with the above observation, there is at present no "snowballing" effect of tube leaks causing more tube leaks. If care is taken to keep the reactors reasonably dry a "snowballing" effect will not occur.

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4. In order to prevent the reactors from becoming very wet and in order to minimize downtime for leaks or tube replacement, the tube replacement program should be stepped up to replace tubes at a 30 mil residual wall thickness as soon as possible. Under no circumstances should tube replacement be permitted to lag behind a 25 mil minimum wall thickness basis.

5. If outlet water temperatures are cut to decrease the number of required tube replacements there will be a net loss in production.

Miscellaneous Water Plant Problems

Activated Silica Transportation - Several short lengths of pipe and tubing will be tested in the 189-D Flow Laboratory to determine the best material to use for pipelines to transport dilute silica solutions from 183-D to 183-DR and from 183-C to 183-B. Table I is a listing of the materials which will be tested for this service and the present status of procurement.

Table I

Material	Ordered By	Procurement Status
Teflon coated steel pipe (approx. 0.010" coating)	Design	Delivery expected by 12/15/55.
Teflon coated steel pipe (approx. 0.004" coating)	Design	Delivery expected by 12/15/55.
Kel-F coated steel pipe (approx. 0.004" coating)	Design	Delivery expected by 12/15/55.
Pyrex glass pipe	Design	Arrived at 189-D on 11/2/55.
Polyethylene pipe	Free of charge	Delivery expected imminently.
Laminated Teflon pipe	Design	Arrived at 1703-D on 11/22/55.
304L Stainless Steel Pipe	Pile Technology	Arrived at 189-D on 11/14/55.
Plain carbon steel pipe	Pile Technology	Arrived at 189-D on 11/14/55.
Polyvinyl chloride pipe	Design	Delivery expected imminently.

Miscellaneous Water Plant Problems - Many of the filter backwash valves in the K Areas have begun to leak. This trouble has been traced to cracking and breaking of the valve seats from "slamming" of the valves by overtravel of the hydraulic activating pistons. Reactor Maintenance forces are replacing the broken valve seats and installing "stops" on the pistons.

Acid feed equipment probably will not be installed in the water plants until summer or fall of 1956. Control of process water pH within present limits (7.2 - 7.4) with aluminum sulfate addition may be quite difficult during period of high film formation which may occur after January 1, 1956.

Filter breakthrough is unusually rapid this winter. Filter run times are presently as short as five to eight hours. However, no excessive film formation is present, and activated silica can be used, if necessary, to maintain satisfactory filter run times. Further work is being done to determine the exact cause of the breakthrough problem.

When acid feed at KW was finally started, using the caustic addition lines, film buildup was caused due to excess iron in the process water. The walls of the acid pipeline are the probable source of this iron, since this line enters the process water line downstream from the filters (and the acid itself is low in iron content). If this iron release decreases substantially, use of these lines for acid addition will be satisfactory. Installation of the acid addition lines upstream from the filters will alleviate this problem entirely.

Selective washout of filter bed media is occurring to a slight degree in the K water plants. This is probably due to uneven filter bed agitation at the start of the backwash cycle. Instrument adjustments are being made to balance this backwash cycle.

Laboratory Corrosion Studies

Flow Laboratory - The mock-up to test the effect of heat transfer on aluminum corrosion rates has run for a total of about 60 days. The test will run for one more month. Equipment has been installed to more accurately calibrate the flow through this apparatus.

Plans have been made to test in the minitube mockups at 1706-KE the effect of exposing 2-S aluminum samples in zirconium tubes at temperatures of 115, 135, 155 and 175 C. The ribbed zirconium minitubes have been flared and are to be installed in the mockups immediately after the present aluminum tube runs. Data will be obtained in pH 6.5 and 7.0 waters.

A sixteen foot ribless zirconium tube has been installed in the 1706-KE mockup facility. This tube will be used to test "dimpled" or ribbed slugs at approximately 115 C. The test is scheduled to start in December. The slugs for the test were fabricated by Fuel Technology.

1706-KE Operation - The in-pile facilities of the 1706-KE Semi-Works operated normally during the month. Outlet temperatures of the 1706 tubes were limited by pile power level which is being raised slowly, in steps, to the expected equilibrium operating conditions.

Examination of the three weighed metal charges discharged during October showed the slug surfaces to be uniformly attacked in all three pH waters (6.0, 6.5 and 7.0 pH). Weight data are being obtained on these three charges.

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FUEL TECHNOLOGY SUB-SECTION

TECHNOLOGY OF PRESENT PRODUCTION PROCESSES

Untransformed Uranium

Approximately 1.0 percent of the current production solid uranium slugs is still being rejected by the ultrasonic test for verification of beta transformation of the parent rods. Macro studies of sample reject pieces indicate that the majority of the slugs have been completely transformed but possess a fine grain size; however, some of the macro etched reject samples were found to contain small areas of untransformed metal. A statistical sample of the acceptable pieces indicates that no untransformed material is surviving the ultrasonic test. The ultrasonic rejects are being re-heat treated at HAPO in slug form prior to canning. It has been established that FMPC has corrected the heat treating problem. Thus far, all of the untransformed metal found had been heat treated during the period that the FMPC process was out of control.

Ultrasonic testing of cored slugs has shown that the same problem exists in the cored pieces as was found in the solid uranium elements. A new ultrasonic machine has been installed for testing cored pieces using diametric attenuation instead of the tangential method used previously. It has been recommended to the Process Sub-Section that the cored slugs, whose parent rods were heat treated between September 26 and October 17, be charged only to low goal exposure.

Double Length "C" Slugs

Modifications to the Fillerarc welding equipment for double length "C" slugs have not completely overcome the equipment limitations that have prevented consistent production of satisfactorily welded slug pairs. However, tests of a joint design are now in progress, in which the number and/or length of the weld pass are not critical.

Process Specifications

The "B" Process Specifications were revised to comply with changes now incorporated in the "C" Process as regarding unbonded canning, to delete detailed cap and can specifications which are included in HW-19156, and to permit canning of Pd-Cd alloy slugs without sizing the slug assemblies.

Canning Cored Slugs with Aluminum End Plugs

About 34,000 drilled and 8,000 extruded cored slugs with aluminum end plugs have been satisfactorily canned and shipped to the 100 Areas. Difficulty was encountered obtaining a leak-proof seal in some of the latest cores canned. Spectrographic analyses of suspect plugs indicate a high alloy content approximately characteristic of 11S aluminum. Alloys of this type have constituents that melt at temperatures below that of the canning baths.

Hydrogen in Uranium

An agreement has been reached with FMPC to make a study of the effect of hydrogen in production slugs by separately canning and inspecting all slugs in chosen rods that will be sampled and analyzed at FMPC and HAPO. Such a study will continue over as long a period of time (estimated three months) as is necessary to determine the relationship between rapid and total gas content and canned slug quality. The canned slug quality will be determined by testing the slugs at HAPO by sonobond count, frost test, and autoradiographing.

Tru-lining Lead Dip Canned Slugs

The present manufacturing facilities were surveyed to determine the extent of equipment revision required to fabricate production quantities of eight-inch lead dip canned slugs with the Tru-line end contours. Orders for slug cans have been placed; the cap end contour will be machined following canning using present slug caps. Modification of the welding, stamping, and facing equipment will be required. Minor operational changes were recommended, many of which concern prevention of mechanical damage to the finished slug ends.

Uranium Pickling

After replacing the original nozzles of the pilot model spray pickling machine (314 Building) with flat-jet nozzles, the uranium pickled in the spray machine has an air oxidation rate comparable to dip pickled uranium. Currently, a batch of standard production quality uranium is being canned after spray pickling and a pre-determined duration of air exposure. This test contains uranium of three different histories: Z lot or reclaimed uranium; salt bath outgassed; and standard virgin uranium. The results from this test will be helpful in the final evaluation of the spray pickling machine.

PROCESS DEVELOPMENT

Uranium Processing

The evaluation of dingot (direct cast ingot) uranium is continuing on a lot charging basis. Three pilot tubes of dingot slugs from MCW September production (lot V-3) were canned, measured, and shipped to B pile for irradiation. Dingot slugs were selected from MCW October production (V-12) for three pilot tubes and for the to rupture portion of the dingot slug evaluation program. The dingot metal canned during November continued to be of high quality. In addition, the pitting caused by residues from the salt bath surface outgassing was greatly reduced by shortening the storage time between surface outgassing and slug pickling. Results of chemical analyses indicate that the hydrogen content of dingot uranium is decreased by annealing in either a carbonate or chloride salt bath. Analyses of specimens heat treated at 650 C in a carbonate salt bath (salt from FMPC heat treating furnace) show a decrease in total hydrogen of 12 percent after 15 minutes and 13 percent after three hours. Specimens heat treated at 600 C in a chloride salt bath show a decrease in total hydrogen of 17.5 percent after 15 minutes and 35 percent after three hours. The variations in these values probably reflect differences in the hydrogen content of the salt baths.

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The results of induction heat treating experiments carried out in July, August, and September have been studied and compiled for issue as HW-40109, "Induction Methods in the Heat Treatment of Uranium". These studies indicate that it is possible to regulate beta heat treating conditions to produce nearly any degree of preferred oriertation desired with the hope of providing, at the same time, a desirable fine grain size. The range of variation in treatment conditions possible with induction heating, together with its cleanliness and low operating cost, make it an ideal tool both for investigating the optimum conditions of heat treatment, and for applying these conditions, once they have been determined, to production material. A feasibility report (HW-39604) was issued. The recommendation, that suitable induction heat treating equipment should be designed and assembled, was adopted and engineering studies were initiated.

Slugs machined from uranium rods vertically heat treated at Welland, Ontario, Canada, were prepared for charging twelve tubes in C pile. The vertically heat treated rods are believed to contain fewer residual stresses than the horizontally quenched material now used in production; therefore, the vertically heat treated slugs should be more stable dimensionally.

To study the effect of cooling rate on the properties of uranium a series of Jominy specimens were end quenched from the beta phase. Micro examination (500X) of the specimens indicated that the relation of the intergranular network or reticulate structure, observed at the fast quenched end of the Jominy, to the uranium hydride needles, observed in the interior of the specimen, is a function of particle size. As the cooling rate decreases the particle size increases. Macro examination (1X to 20X) of the as quenched Jominy specimens revealed a marked transition from a fast quenched to an air cooled type grain structure at approximately 1.5 inches from the quenched end. Macro examination of the specimens after annealing at 600 C showed the "recrystallized" grain structure to be present in the fast quenched region and to be nearly absent from the air cooled portion of the Jominy bar.

To date there have been five ruptures in the delayed quench production test (PT 313-53-MT) which was designed to determine the in-pile stability of slugs heat treated by a modification of the current slug heat treating process. The ruptures appear to be can failures and are typical of regular production metal ruptures which have occurred in the same piles at approximately the same exposure concentrations. It has been hypothesized that four of the five failures in this test are related to worn ribs in the process tubes and that there is no evidence that the uranium core affected the pile performance of the canned piece.

Assembly Process Development

Fifty "donut converter" slugs were lead dip canned for the Belgian government. The four-inch slugs are similar to the HAPO internally and externally cooled slugs now under development but have a large (7/8") internal diameter.

Canning of fuel elements for the hot press solid core production test (PT 313-59-MT) has commenced. Prior to canning the pile pieces an initial group of about 200 pieces were canned for quality control evaluation. Destructive tests revealed an

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objectionable oxide line in the vicinity of the cap-core-can wall junction. Accelerated corrosion tests in caustic produced serious grooving on about one-third of the fuel elements. Investigation indicated that the oxide line was caused by a folding of the cap-can wall in the hot work punch internal annular space during the closure process. Minor punch and cap dimensional modifications eliminated the folds, so that fuel elements canned subsequently showed no evidence of preferential etching in the closure zone.

A study is being conducted to determine the effects of irradiation on hot press bonds (PT 105-537-SI). The bonds being tested are aluminum-nickel uranium and aluminum nickel-iron-uranium diffusion bonds. The bond test assemblies have been completed and are awaiting shipment to the pile areas. Two tensile specimens of each type will be irradiated at temperatures of 50 and 200 C to exposures of 300, 600, 1000, and 1500 MWD/T. Following irradiation the exposed and the unexposed control tensile specimens will be pulled and subjected to a complete metallographic examination.

Twelve solid uranium cores were canned in zircaloy jackets by a modified "F" process (lead dip canning). Ten of these slugs were evaluated for end closure weldability. Slugs having Al-Si on the can wall were difficult to weld due to what appeared to be actual boiling of the Al-Si. This boiling phenomenon prevented the cap edge from flowing into the can wall to effect a weld joint. Slugs that were chemically etched to remove the Al-Si welded much better.

Post-Assembly Processes

Hot pressed slugs canned in M-388 (2S-1% Ni) have been anodized and sealed in 170 C silicic acid for charging tests and out-of-pile corrosion tests in high temperature deionized water. The second charge of two tubes of anodized slugs (PT 37-M, Suppl. B) has accumulated about 300 MWD/T. The pieces are being exposed in the high temperature tubes of C pile to determine the behavior of the anodic film in water at 120 C. This test will establish the effectiveness of the BMI sealing process (280-305 C silicic acid). It is planned to push these tubes at about 400 MWD/T and recharge with slugs sealed in 170 C silicic acid. The seals at 170 C are feasible with current production autoclaving equipment.

DEVELOPMENT OF NEW FUEL ELEMENTS

Wafer Fuel Elements

The canning of wafer slugs by conventional lead dip methods was investigated since the bonding formed by single dipping in Al-Si often cracked by thermal shock during welding. Two slugs containing wafers without aluminum spacers were lead dip canned and sectioned. There was no evidence of the lead which had been feared would penetrate between the wafers and not be displaced during subsequent "rinsing" and assembling in Al-Si.

Evaluation in the Materials Testing Reactor of two hot-dip wafer slugs is continuing. The slugs showed no significant defects or dimensional changes. They were charged again November 19, and are operating at a power level of 85-110 KW/ft. The exposure is about 400 MWD/T.

Approximately 60 four-inch slugs were fabricated this month for out-of-pile tests. Slugs having 1/32-inch holes in the jackets and containing 1/32-inch or 1/16-inch wafers were autoclaved in static 170 C water. Varying distributions of aluminum spacers 1/32-inch thick were used in some of these slugs and in other slugs there were no aluminum spacers. The slugs were in the autoclave for periods up to 44 hours. In every case they broke transversely during the first 15-20 hours into segments which were readily removed from surrounding sections of process tubing. With continued autoclaving, the segments sometimes reacted further and stuck in the process tubing to the extent that they could not be shaken out of the tubing. At the end of 44 hours water had reached essentially all uranium wafers in most of the slugs, regardless of the number of aluminum spacers. After 44 hours the process tubing typically contained uranium oxide, a number of loose very short sections of aluminum can, aluminum spacers, and loose partially reacted uranium washers. The pieces sometimes block the tube, but none of the twenty slugs tested have distorted or split the process tubing.

In a reactor a slug would normally be restrained at both ends. To check roughly whether such restrictions would prevent transverse splitting, a wafer slug containing a 1/4-inch bolt through the center cooling tube was autoclaved. The bolt was broken in less than 20 hours and the slug was split in two transversely. Two more slugs with a 1/4-inch bolt through the center were tested in 110 C water flowing at about 12 feet/second. After 55 hours the first slug split partly in two, but did not break the bolt. After 144 hours the second slug was split in two transversely and broke the bolt. The first slug was slightly stuck in the process tubing; the second slug was readily removed.

Out-of-pile corrosion tests have not actually simulated in-pile conditions because the slugs were heated externally, rather than internally. Since the temperature of the uranium at the face of a wafer is no higher than that of the uranium just under the jacket, the reaction rate at the two points should be nearly the same. In a slug under irradiation, on the other hand, the face of a wafer is at a relatively high temperature and the relatively rapid reaction at this point should do much to insure that the slug is split in two transversely, as desired, before enough reaction occurs under the jacket to cause swelling and blocking of the process tube.

Six wafer slugs with perforated jackets are being tested by the Recirculation Technology Unit in the ELMO-4 loop.

The manufacture of uranium washers was continued at an adequate rate for canning and "severity-of-failure" studies. Arrangements were made with the National Lead Company to undertake a program to improve the washer fabrication process and to manufacture sufficient good quality washers for an irradiation test at Hanford. In conducting this program National Lead is to develop means of reducing the washer cost while maintaining a satisfactory quality.

Internally and Externally Cooled Fuel Elements

A production test (615A-63MT, HW-39886-A) has been designed for the evaluation of prototype dip-canned I & E slugs. In-pile evaluation of rupture resistance will

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be based on a run-to-rupture test involving four tubes of I & E slugs and four tubes of solid pieces. Two ruptures will be taken in each type of material unless inferiority of the I & E pieces is evident without taking failures in the standard slugs. Four other tubes of I & E slugs will be charged and scheduled to be discharged at varied exposures. Each tube of I & E slugs will be accompanied by a tube of standard slugs. Goal exposures will be 150, 300, and 500 MWD/T. The supplemental tubes have three primary purposes: (1) the four tubes exposed to 500 MWD/T (two I & E, two standard) will be analyzed for plutonium content to determine the percent change in conversion ratio between solid slugs and I & E slugs; (2) unforeseen difficulties that may arise could be discovered by basin examination at the lower exposures. As examples, hot spots peculiar to I & E slugs, increased dimensional instability, increased corrosion rates, could be detected at an early date. If it appeared from these low exposure discharges that the I & E slugs were grossly out of line, a run-to-rupture test might be postponed pending remedial measures; (3) should any tube of I & E slugs in the rupture test be prematurely discharged, for any reason, another tube could be substituted for it.

To measure the differences in temperature of water emanating from the hole and from the annulus, thermocouple pairs will be placed in the I & E tubes at the downstream slug in those tubes to be irradiated to failure. Evidence of serious temperature unbalance in any tube will be cause for discharge of that tube. Components and canned fuel elements will be subjected to all known tests for uranium and can quality, as well as tests for the integrity of the canning process and only those slugs passing all tests will be pile charged. Thus, these fuel elements will represent prototypes of dip canned I & E fuel elements that might be produced during the initial production of large quantities of similar fuel elements.

Approximately one hundred internally and externally cooled fuel elements were canned by the lead dip process in the Manufacturing Facility (313 Building). The canning procedure differed in several respects from the "F" process (lead dip, solid core process) in that the canning cycle was increased from 45 seconds to 50 seconds and only one core was canned each cycle so one operator could handle the caps and the other the tubes. Examination of the pieces canned revealed about half of the pieces were canning rejects, mostly because Al-Si leaked through the tube closure. Also, cracks were found on a number of the tube-cap and tube-base welds. After complete evaluation of these dip canned I & E's, about 700 more will be canned, half of which will be pile charged under PT 105-615-A-63-MT.

Subsequent to canning the first 100 I & E slugs, development work on the aluminum components for the I & E slugs has progressed to a point where an Al-Si tight tube closure can be assured. This is accomplished by spinning over the end of the tube and spot welding the tip.

Fuel Elements for Ribless Process Tubes

Several techniques are being investigated as a means of attaching studs or short ribs to the cylindrical surfaces of slugs for centering the slug in ribless process tubes. Sample weldments from ANL in which sections of 1/4-inch aluminum rod were joined to 5/16-inch aluminum plates by percussion welding were found to

be of good quality. Welds were smooth and continuous throughout the joints. The weld zone was approximately 0.0008-inch thick at the edge of the weld, increasing to approximately 0.003-inch at the center. A very slight change in metal structure was detected for about 0.003-inch on each side of the weld zone. There was no appreciable distortion of the materials. Tensile and bend tests resulted in failure of the components, instead of failure in or near the weld.

Specification drawings for the welding of ribs on lead dip canned slugs by the Sonoweld process have been completed and purchase requisitions initiated for a test quantity of lead dip canned slugs to have ribs added by the vendor, Aeroprojects.

MATERIALS DEVELOPMENT

Zirconium and Zirconium Alloys

A study to investigate the feasibility of joining short lengths of ribbed zirconium process tubes into 40-foot lengths by welding was initiated. A preliminary trial on ten six-inch tube sections indicated that, with correct joint preparation, process tubes can be satisfactorily welded together. Full penetration was obtained except at the ribs, but this difficulty may be overcome by chamfering the inside edge of the tube wall.

Three zircaloy-2 billets were extruded at the Chase Brass Company Plant in Waterbury, Connecticut, on November 23, 1955. The first billet was extruded with moderate success to form a tube blank 23-feet long. A few longitudinal grooves were noted on both the inside and outside zirconium surfaces. The second and third billets seized on the mandrel and die causing severe galling. The ribs in all three tubes were straight.

Annealed zircaloy-3 was cold rolled as much as 80 percent reduction in thickness without cracking.

Aluminum Alloys

A contract with Alcoa for fabrication of 10 process tubes of compacted aluminum powders was approved by the AEC.

Inspection of cans and caps made from alloy M-388, aluminum plus one percent nickel, indicates acceptable adherence to specifications. Reactivity tests in the 305 pile reveal that the addition of one percent nickel will cost about 30 inhours in a 105 pile.

Intergranular Corrosion

Further tests confirm that intergranular corrosion, like that which is causing low exposure failures, can be caused by superheated steam under pile pressures as shown in Table I. The temperatures (300 C) at which this occurs is much higher than the bulk water temperature, but is not impossible if flow disturbances and local boiling occur.

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TABLE I

INTERGRANULAR CORROSION OF ALUMINUM IN WATER VAPOR
(ALLOY, DAMAGE, AND TIME)

Temperature	40 psi	400 psi	2500 psi	Vapor Pressure of Water
325 C		2S undamaged 3 days		1750
350		2S small spots of local attack 1, 2, and 3 days	2S attacked 3½ hour; 2S destroyed 20 hours	2400
375		2S slight attack 24 hours; 2S 75% destroyed 4 days	2S destroyed 2 hour	3200 (critical point)
400	2S undamaged 7 days	2S undamaged 2 hour; 2S slight attack 7 hour; 2S destroyed 3 days	2S destroyed 2 hour; M-388 undamaged 7 days	
425	2S undamaged 7 days		M-388 badly attacked 8 hours	
475	2S badly attacked 7 days			
500	2S undamaged 3 days; 2S destroyed 7 days		2S destroyed 2 hour; M-388 destroyed 2 hours	

The 2S used in these experiments was Alcoa can stock.

The surface temperatures of the experiments in Table I are higher than those previously believed to exist in the pile. Experiments are being extended to lower temperatures and longer times. The Heat Transfer Unit has been requested to calculate the maximum possible surface temperatures.

The case for intergranular corrosion by superheated steam is strengthened by considering the alternatives. Intergranular corrosion of can stock in liquid water has been shown at very high pressures (above 1060 psi) in distilled water; these conditions do not exist in the pile. Also, the corrosion under these conditions gives a hard white oxide, with little distortion of the metal, contrasted with the gray oxide and twisted metal observed in the pile failures. In tap water, no intergranular corrosion occurs at temperatures below the point at which a protective boiler scale comes out, about 110 C in 300 Area tap water and 135 C in pile water. As an added test to prove that intergranular corrosion does not occur in the liquid phase, an autoclave is being operated with three parts deionized water and one part 300 Area tap water at 170 C. This condition is more

likely to produce intergranular corrosion than any condition possible in the pile for liquid phase corrosion. If no intergranular corrosion occurs here, we can be sure the intergranular corrosion now occurring in the pile is a high temperature vapor phase process.

High Temperature Corrosion Studies

A study of the second phase in various nickel-aluminum alloys is being attempted by chemical isolation and x-ray identification of the second phases. A second phase strongly cathodic to the aluminum matrix has been shown to be necessary for corrosion resistance to high temperature water. A 10 percent caustic solution gives a larger yield of insoluble residue than dilute HCl or 10 percent iodine in methyl alcohol. So far however, the x-ray diffraction pictures have been too diffuse to permit characterization of the second phase.

Two small vacuum melts have been prepared, one a 0.1 percent Pb 2S aluminum alloy, the other one percent nickel, 0.2 percent iron in high purity aluminum. Both have been forged and rolled into sheet. These are the first of many alloys which will be prepared and corrosion tested in high temperature water.

Reaction of Uranium and Water at Elevated Temperatures

Five more determinations of the rate of reaction of water with bare and canned uranium were made in the high pressure loop. The rate of reaction of water at 300 C with bare uranium heated to 600 C was found to be 1.5 mils/minute. The rate was also 1.5 mils/minute for water with uranium which had not been preheated. These values fit very well with the data obtained by other investigators.[1,2,3] Evidently the log of the corrosion rate of uranium in water can be plotted against the reciprocal of the absolute temperature of the water over a very wide range (25-350 C) to obtain a straight line.

Canned uranium specimens showed excessive swelling and breaks in the 1/16-inch can wall when exposed to 300 C water through a 1/16-inch hole in the can. This was true for uranium heated to 600 C as well as for unheated uranium.

TESTING METHODS AND EQUIPMENT

Bare Slug Tests

Part time operation of a new transformation test unit was achieved during the month in the Manufacturing Facility. These units were fitted with reject circuitry designed to minimize false rejections resulting from line transients produced by

1. ANL-4862, "Aqueous Corrosion of Uranium and Alloys Survey of Project Literature," J. E. Draley and J. W. McWhirter, 5-14-52.
2. HW-33535, "Design Considerations Regarding Slug Ruptures in the Intermediate Power Level Reactor," W. L. Pearl and C. A. Pursel, 11-1-54.
3. HW-37622, "Quarterly Technical Activities Report, Fuel Technology Sub-Section for April, May, June, 1955," V. R. Cooper, 7-8-55, p. 7.7.

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the operation of the automatic conveyor. Unfortunately, this circuit produced somewhat different sensitivity under dynamic and static conditions and did not agree closely with the rejection circuits used previously. This occasioned considerable debugging effort, particularly in view of the more stringent standards now being used.

Rejection points have now been chosen for the large scale test of the uranium quality testing device; but very little material has been tested, prinicipally because of material shortages requiring immediate processing of uranium received on site.

Finishing Line Tests

The five sets of electronic components for the production model Al-Si penetration test have been checked out and delivered to manufacturing. Various parts of these instruments were made interchangeable, so it should be possible in the event of trouble with one component to establish quickly in which chassis the trouble exists and replace the entire chassis. The old prototype penetration testers are being returned to the unit for use in future development. The ultrasonic bond test continued to operate on as many slugs as possible during the month. To simplify manufacturing operation of the penetration and bond tester, both testing heads were mounted on one conveyor in much the same way as it is planned to mount them in the final design. No mutual interference resulted from doing this. Parts for the new automatic conveyor to be used with these designs are now complete in the machine shop and it is expected that its assembly and check out will be finished next month.

Test Development

A bond tester, the inductobond, which has been developed to detect unbonded (non-diffusion bonded) areas on hot pressed fuel elements, rapidly heats the jacket by induction and causes the jacket to melt or swell away from the unbonded areas. About thirty hot press fuel elements were tested for 5.0 and 5.4 seconds in the inductobond. Nickel diffusion and grain boundary segregation occurred in the jackets of most of the fuel elements which were tested for longer than five seconds. The non-uniform heat distribution which is indicated can be adjusted by (1) a more accurate spacing of coil turns, (2) increasing the length of testing time by decreasing power input, and (3) moving the fuel element through the coil at a uniform rate (as in the frost test).

Penetration and bond testing methods are now being worked out for the internal tube of the I & E slug. A penetration probe has been made but not yet tested pending delivery of some penetration standard samples. Development of the ultrasonic bond test probe has progressed to the point where it is believed we have a testing method available, but considerably more work must be done both to prove out the method and to improve the crude arrangements now in use. The first probe did not follow the tube due to the eccentricity of the tube with respect to the slug O.D. A new device which will actually locate on the tube I.D. has been designed and is being built. This device will maintain constant distance between the tube inner surface and the ultrasonic crystals regardless of the tube eccentricity or diameter variations.

Optimum specimen geometry for use with the woodsplitter (induction cycling test or thermal fatigue test) has been determined. A ten mil deep longitudinal notch in a four inch slug provides controlled splitting of uranium subjected to cyclic thermal stress. A plot of the number of thermal cycles to failure versus the thermal gradient in the slug closely resembles the usual stress induced fatigue plot. At the higher number of cycles to failure, localized corrosion at the root of the notch may contribute to the failure.

Advanced Development

Work is continuing on development and improvement of eddy current testing methods particularly with the view to using wide frequency band techniques. It is planned to complete the experimental work on this project by January 1.

On internal friction, efforts to locate the thermo-elastic internal friction peak were not successful. It was found that, with a three foot as-rolled bar, the internal friction increased steadily (without inflection points) with frequency so that the peak, if one exists, was beyond the frequency range of the measurement. We plan to repeat this experiment with a bar of larger grain size, which should shift the peak to a lower frequency. Contradictory results were also obtained in further studies of the so-called Koster effect. In following the internal friction through a temperature cycle from room temperature to 135 F and back down over a period of two weeks, it was found that the relaxation time after the change in temperature was the same at both temperatures.

IRRADIATION BEHAVIOR

Effect of Pile Variables on Dimensional Stability

Production Test 105-611-A has been written to investigate the effect of pile variables such as exposure, power, thermal cycling, and slug temperature upon the dimensional changes of current standard production slugs. By utilizing the various pile orifice zones, different conditions of irradiation will be obtained. Thirty-three tubes are to be irradiated at tube powers ranging from 300-1000 KW and to exposures ranging from 500-1100 MWD/T. Five tubes were charged into B pile this month. It is expected that the majority of the remaining tubes will be charged in December.

Longitudinal Cracks in Solid Slugs

Photographs of fractured surfaces of solid slugs from ten tubes ranging in exposure from 315 to 1600 MWD/T, showed that all contained slugs with longitudinal internal cracks. These cracks whose prevalence tended to increase with exposure generally passed near the center of the slug and sometimes extended to the uranium surface. The number of longitudinal splits observed in the ten tubes of solid slugs examined to date indicate that longitudinal splitting may be as prevalent as transverse breaking in irradiated solid slugs.

Effect of Surface Flaws, PT 7MR

Tube 2667-H was irradiated to 1123 MWD/T under PT 7MR to determine the effect of acceptable uranium surface flaws on the ability of the slugs to withstand the pile

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environment. The slugs from this tube were partially dejacketed in the 200 Area dissolver and visually examined to determine if the existing surface flaws had caused core cracking or failure. Although about one half of each slug surface was concealed by the incompletely removed jacket, the appearance of the observable flaws indicated that none had caused surface cracking of the core.

Cored Slugs

The data thus far obtained on lead dip canned cored slugs show a similar tendency to split longitudinally whether the slugs had aluminum end plugs or uranium end plugs. A tube of cored slugs with aluminum end plugs (PT 593-A) was discharged at an exposure of 542 MWD/T. Five of 29 slugs charged into the tube had longitudinal cracks that extended through from one surface to the other. In addition, sixteen slugs show the beginning of cracks originating at the inner surface. No slugs broke in the slug breaker at the end plug counterbore as has been observed with cored slugs with uranium end plugs. No ruptures had occurred in the tube. A tube of cored slugs with uranium end plugs (PT 588-A) discharged due to a rupture at 700 MWD/T was examined. In addition to the rupture, fifteen of the slugs were split longitudinally and thirteen additional slugs had small cracks originating at the slug core. One slug in the tube broke transversely at the end plug counterbore as well as in the longitudinal direction.

Irradiation of Uranium-Silicon Slugs

One tube of uranium-silicon alloy slugs irradiated in PT 586-A to an average exposure of 1007 MWD/T at 630 KW/tube showed significantly more warp and greater tendency to crack transversely during irradiation (as indicated by fracture testing) than normal uranium fuel elements exposed to similar pile conditions. No data were derived from the examination of these fuel elements to indicate that the alloy slugs would show a lower rupture rate than normal production slugs. The results and analysis of the data compiled on the tube of alloy slugs are reported in HW-39961.

Standard Comparison Slugs for Production Tests

Because the quality of production slugs varies with time, it is desirable to choose standard elements for production tests from a specific lot of slugs to assure that new fuel elements are evaluated against slugs representative of current production. Use of such a lot would also provide a basis for comparing new elements tested at different times and for comparing different pile conditions that exist at different times. When a standard lot is depleted, a new lot would be evaluated against the old lot. It is recommended that 100 slugs be requisitioned from each day's production for 32 days to provide a "standard" lot of about 12.8 tons of uranium.

FACILITIES AND EQUIPMENT DEVELOPMENT

Pilot Plant (306 Building, CA-546)

Lump sum contract work on structural portions of the chemical processing area (plating room) were completed on November 7, 1955. Installation of equipment by Minor Construction was started on November 10, 1955.

A lump sum contract in the amount of $69,175 was awarded to Frank Lohse Company for the second floor office area construction on November 17, 1955.

A proposal for the design and fabrication of a dilatometer was received from the General Engineering Laboratory on November 10, 1955. The cost estimate was $25,500. A decision was made to request AMES to carry on this development, and the GEL proposal will not be accepted.

Equipment installation and acceptance testing in the 306 Building during this month included the 16 GPM water deionizing unit, welding equipment, partitions around maintenance and welding areas, SS material storage cages, and 5000 square feet of asphaltic concrete laid on the east end of the building.

Design was started on a noise level reducing housing for the 40 HP swaging machine.

Construction of a scale model of the 306 Building was 90 percent complete at the end of the month.

105-C Metal Examination Facility

Equipment revisions in Basins I, II, and III are essentially complete. Work has started on the revisions for Basin IV. Operator training has begun.

Uranium Broaching Tests

A new 20 horsepower, La Pointe Broaching machine, model HP30 was installed in the 314 Building and tested for operation with the assistance of a La Pointe Machine Tool Company representative. After demonstration of satisfactory operation of the machine a series of tests were made on broaching of drilled holes in both steel and uranium. The tests showed that a hole for a cored or I & E fuel element can probably be broached satisfactorily. Further development of tools and broach design will be required to eliminate chatter, metal pickup, and to establish satisfactory tool life. Present plans call for further work to be be carried on off-site by Fernald and the La Pointe Company.

Electroplating Pilot Plant

The plating and nitric acid solutions are operated at elevated temperatures with resulting evaporation and volume reduction. The plating bath is normally allowed to cool over week ends and the nitric acid bath cools each night. These conditions prevent processing material during the first 45 minutes of the day with approximately three hours lost after a week-end shut down.

Automatic volume control equipment has been installed in the plating bath and a time switch and solenoid valves have been installed in the steam lines to the nitric acid baths. These installations will permit retaining the plating bath at operating temperature at all times without danger of destroying the heaters because of low solution level; and the nitric acid baths can be heated before the shift begins. As a result, processing can begin immediately after shift change.

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PHYSICS RESEARCH SUB-SECTION

Reactor Physics

During November, a considerable amount of data was taken in order to determine operating characteristics of the LTR. The results are given below. Throughout, it is assumed that the neutron lifetime in the reactor is 1.6×10^{-3} seconds and that the delayed neutron fraction is 0.755 per cent. For convenience, the reactivity unit used is the dollar, which is the reactivity difference between delayed and prompt critical. It is equal, in a U-235 reactor, to 0.0075 units of k or about 290 inhours. The measurements were made with a circular driver tube loading and a graphite core.

1. Strength of control rods derived from subcritical measurements:

Rod No.	Strength (in cents)
1	68.3
2	59.0
3	54.1
4	67.4
5	67.8
6	54.9
7	56.2
8	66.7

The strength of all eight rods together is $4.85. Because of the symmetry involved, rods 1, 4, 5, and 8 should have nearly equal strengths, as should rods 2 and 7 and rods 3 and 6. This is seen to be only approximately so since most of these measurements were made with more than one rod closed and self-shielding of one rod by another influenced some of the measurements slightly. However, this effect was small and an r.m.s. error of three cents on the individual rods and 25 cents on the total should cover the uncertainties.

2. Strength of safety disks from subcritical measurements:

Front disk	$2.53
Rear disk	$1.11
Two front disks	$5.42
All four disks	$7.47

It can be seen that a front disk is worth more than twice as much as a rear one and that the two front disks are worth almost 75 per cent of the total strength.

3. Results from critical measurements:

a) Sensitivity. One gram of U-235 alloyed in aluminum, when placed at the center of the core, gives a reactivity to the pile of 4.4 cents.

b) In looking for a control rod setting which will give a constant power level, a motion of 0.001 inch on No. 5 control rod is plainly perceptible. Therefore, the constant power level for a given experiment can be found to within about 0.02 cents. However, as indicated below, the day-to-day reproducibility of this setting is considerably worse than this.

c) Strength of rod No. 5 is 67.80 ± 0.2 cents.

d) Slope of calibration curve for rod No. 5 over its linear region is 18.5 ± 0.5 cents per inch.

e) Adding one driver tube (139.4 grams of U-235) changes pile reactivity by 74 cents.

f) In order to make the LTR critical, it was necessary to remove all the steel from around the driver tubes. A measurement showed that each steel tube costs about 45 cents in reactivity. Therefore, steel tubes around 32 driver rods cost about $14.40. From e) above, this is seen to be equal to about 2.7 kg of U-235.

g) Atmospheric pressure coefficient of reactivity:

-0.093 ± 0.007 cents or -0.27 ± 0.02 inhours per mm. of mercury.

All the errors given above are r.m.s. The large error in the slope of the calibration curve is attributed to the fact that this curve is not actually linear over the region covered.

4. Reproducibility of Measurements. Experience thus far indicates that from day to day, reactivity measurements can be reproduced to about 0.1 cents if the position of the movable face is not changed. If this position is changed, reactivity measurements can only be reproduced to about 0.2 cents. It is felt that both these numbers, and especially that for the constant movable face condition, will be considerably improved as more experience is gained.

5. Flux Leveling. Several copper wire and gold foil flux traverses in the longitudinal direction were made for various positions and loadings of the leveling slugs. Definite effects have been observed by moving these slugs but as yet not enough is known to make any statement as to what steps will be necessary in order to level the longitudinal flux in a graphite core.

6. Flux Calibration. The ion chambers in the safety circuits and galvanometer systems have been calibrated by counting the radiations from a gold foil irradiated at the center of the LTR.

7. Rates of Change of Reactivity. The following are the measured maximum rates at which the reactivity of the pile can be changed by moving various elements:

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Physics Research Sub-Section

a) control rods	1.16×10^{-4} in k/sec.
b) safety disks	1.7×10^{-4} in k/sec.
c) movable face	
i) slow speed	1.4×10^{-4} in k/sec.
ii) intermediate speed	17×10^{-4} in k/sec.

All of these rates (except that for the face when it moves at intermediate speed) are well below the figure of 3.75×10^{-4} k/sec which was presented to the Advisory Committee on Reactor Safeguards as the maximum rate at which reactivity would be added to the LTR. Since the pile is subcritical by at least 5 per cent when the face is open far enough to be in the intermediate speed region and since the maximum reactivity is anticipated to be not more than 3 per cent, the exception to the maximum reactivity addition rate at the intermediate speed is of no concern.

Since the reactor has been in operation for only one month, all the results given above should be considered as preliminary. The precision should be improved as further experience is gained. However, these results, as given, are sufficiently accurate for reactor safety considerations.

Lattice Physics

Exponential experiments with C-slug lattices have continued. Additional measurements obtained this month are given below.

Lattice Spacing	Buckling (in units of 10^{-6} cm^2)	
	Dry	Wet
10-3/8"	520	470
6-3/16"		1077
5-3/16"		1325

The results of the application of the theory to these lattices are similar to that of the J-lattices, namely, the theory becomes successively poorer for the smaller lattice spacings, especially for the wet lattices. These measurements together with the J-slug measurements will be summarized in a forthcoming document.

Some measurements on enriched uranium-water lattices were made to obtain information on water reflector savings. It was found that cadmium is only partially effective in removing the effect of a water reflector.

Plans and preparations are proceeding to measure the properties of a wrap-around slug lattice designed for mint production.

Physics Research Sub-Section

Physics Problems Connected with Plant Operation

A theoretical method for estimating the neutron interaction between neighboring chain reacting systems was worked out. This method is based on diffusion theory and will handle three dimensional arrays of a general kind. It is useful for estimating storage limits for fissionable materials.

The value of the stable xenon produced by fission at Hanford has been calculated. At a price of $30 per liter, and a total power level of 10,000 MW, the yearly Hanford xenon production is worth about 2 million dollars. Several factors must be considered to determine whether or not it is advisable to recover this xenon from the dissolver off-gases.

i) Measurement of the isotopic ratio of Hanford xenon would allow determination of the pile flux and therefore pile power levels. This results from the flux dependent burnout of Xe-135 which changes the amount of Xe-136 produced.

ii) A Xenon-Krypton separation would be needed to eliminate the Kr^{85} activity.

iii) A study of the demand for xenon would be needed to see what the effect on the price would be of the addition of the Hanford xenon to the market.

A variety of critical mass problems were worked out for the separations plants.

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METALLURGY RESEARCH SUB-SECTION

Fundamental Studies

Two U/Zr couples annealed 336 hours at 450 C (842 F) did not interdiffuse based on initial x-ray and metallographic studies. Two other U/Zr couples were annealed 77 hours at 695 C (1283 F). Diffusion apparently occurred in both of these couples; the uranium penetrated approximately 0.001 inch into the zirconium as indicated by hardness measurements and metallographic and x-ray diffraction techniques. On the basis of the hardness of the diffusion product, the uranium content of the diffusion zone is predicted to be either 30 to 70 w/o or 98 w/o. Diffusion in these couples was very non-uniform due to lack of uniform surface contact. A U/AlSi couple which had been annealed 24 hours at 303 C (577 F) was found to have diffused at a number of points throughout the interface. The penetration of uranium into the AlSi was approximately 0.0006 inch. Methods of determining the maximum penetration of uranium into both AlSi and zirconium are being investigated.

Six quartz ampules containing between 10^{-10} and 10^{-8} gram atoms of krypton were exposed in-pile this month. After the radiokrypton samples were transferred to glass ampules, it was found that the relative amounts of krypton present could be determined by gamma spectroscopy to within 5% of the known values. The 0.150 Mev gamma radiation was used as it was about twice as active as the 0.300 Mev isomeric transition gamma radiation. The half-life of the decaying isotope was determined to be 4.68 hours by the graphical method, giving further evidence that the gamma activity present was caused by the krypton-85 isotope. The above method of analysis will be used in the following months to determine the amount of krypton diffusing through silver and uranium specimens. Samples of the diffused gas will be collected at various times of diffusion annealing and analyzed by irradiation and counting.

Preliminary x-ray diffraction studies have been made on five specimens from PT-105-514-SI, "The Effect of Irradiation on Dimensional Stability of Uranium." These samples have received exposures of 300, 685, 685, 710, and 1150 MWD/T. The only results complete enough to be reported are those obtained from the 300 MWD/T specimen. This sample originally possessed a high [020] texture and grew 34 percent in length during the irradiation. A post-irradiation x-ray diffraction pattern indicates that the (020) type of orientation previously mentioned has increased. The diffracted intensities from the(020), (040) , and (060) planes are greater than those obtained from the control material. In addition, the (110) peak intensity has decreased. This difference could be due to a small variation in orientation between the specimen and control piece, but it must be pointed out that a similar phenomenon was observed and reported in previous studies. A plentiful supply of samples of this same general type are available from the dimensional stability test and will be utilized as soon as conditions permit to determine the veracity of these observations.

Essentially non-radioactive replicas of irradiated uranium and zirconium have been obtained using Hanford type slave manipulators. In order to permit greater ease and success in applying and stripping Faxfilm replicas, small manipulators have been fabricated and tested on non-radioactive specimens. Incorporation of these replication manipulators into a multicurie cell will greatly enhance the quality and quantity of metallographic studies on irradiated materials.

Metallurgy Research Sub-Section

The effect of irradiation on the properties of uranium can be studied by comparing the deformation in microtensile, microbend, and microimpact specimens before and after irradiation. Non-irradiated uranium of various heat treatments and quality is currently being studied under various test conditions to first establish the normal deformation and fracture modes by metallographic and x-ray diffraction techniques. A colored motion picture which shows the formation of twins in unirradiated uranium has been filmed.

Mechanical and Physical Properties of Fissionable Material

Four NaK-filled Zircaloy-2 capsules containing uranium tensile specimens were exposed one cycle in the Materials Testing Reactor (GEH-3-11) for an estimated exposure of 1.8×10^{20} nvt (~600 MWD/T) with the gage section of the samples at a calculated temperature of 300-400 C. These capsules were opened in the Radiometallurgy Laboratory without incident. Three of the samples had warped in much the same manner as previous samples of the same lot of material. The one straight specimen was tested at room temperature. The properties obtained are compared below with values for specimens of the same material exposed at the MTR to 475 MWD/T at 125-150 C, and for material exposed at HAPO to 620 MWD/T at 125-150 C.

TENSILE PROPERTIES OF IRRADIATED URANIUM

		As Irradiated		
	Control	475 MWD/T	620 MWD/T	~600 MWD/T
Exposure Temperature °C	--	125-150	125-150	300-400
Ultimate Strength, psi	97100±700	93500	76000±1500	78100
0.2% Yield Strength, psi	37800	80000	--	65240
0.1% Yield Strength, psi	32400	59000	71500±4500	45120
Elongation, % in 1-inch gage	19±1	0.6	0.36	0.4

Work was continued on the examination of a production test (PT-105-3N) designed to obtain the mechanical and physical properties of irradiated uranium at 620 MWD/T. Tensile sample 5-D, which had previously warped when annealed at 700 C, was re-annealed at 800 C in the High Temperature Tensile Tester while a light load was applied in an attempt to straighten the sample. This was only partially successful in that, while the gage length was straightened, a slight bend remained on the tapered section at one end. After re-annealing, the sample was tensile tested at room temperature. The sample failed at a low load at a point outside the gage length, the break occurring at the opposite end from the bend. The appearance of the break indicated that a crack had been present for some time prior to testing.

Reproducible values of ±1.5 percent of the calibrated standard have been achieved with a standard in the thermal conductivity unit at temperatures of 100 C and 120 C. At temperatures of 123 C and 148 C, the values were ±4.0 percent.

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Reactor Structural Materials

Weight gains of zirconium and Zircaloy-2 specimens at 500, 600, 700 C (930, 1110, and 1290 F) in moist air are substantially the same as those previously observed in dry air. The reaction rates during the initial exposure period are the same, while two sets of specimens -- the only ones exposed long enough to enter the second reaction stage -- exhibit the rate change at the same times as similar specimens in dry air. These tests are being conducted in flowing air to which enough water is added to give about 50 percent relative humidity at room temperature.

The 300 C creep tests on cold-worked Zircaloy-2 have been discontinued with the last specimens having run for 3300 and 1900 hours. Minimum creep rates for these two specimens are 5.7×10^{-5} percent elongation per hour at a stress of 34,000 psi and 5.2×10^{-7} percent per hour at a stress of 26,000 psi. These are the same creep rates noted at the beginning of second stage creep for each sample, and since there was no change in creep rates for these low loads after an additional 1000 hours of test, the samples were removed.

A comparison between the tensile and notch bend properties of sample process tube sections was made on three types of tubes. The first was a Zircaloy-2 tube made by the tube reducing process; the second was the same except that it was made of zirconium, and the third was prepared from a rolled sheet that was formed into a ribbed tube by welding. Results of the tests are summarized as follows:

1. In the unannealed condition the ultimate tensile strength of the Zircaloy-2, zirconium, and welded zirconium tubes are 116000 psi, 99000 psi, and 53000 psi, respectively; and the fracture moments are 6.4, 5.7, and 5.4 inch pounds, respectively.

2. In the annealed condition the ultimate strength of the Zircaloy-2, zirconium, and welded zirconium are 76000 psi, 68000 psi, and 61000 psi, respectively; and the bending moments are 6.1, 5.7, and 5.7 inch pounds.

3. The tube reduced zirconium tube shows a consistently higher strength and a lower ductility than is shown by the welded zirconium tube. This is probably caused by a higher oxide impurity content in the tube reduced material.

4. The Zircaloy-2 is consistently stronger than the zirconium tubes in both the annealed and cold worked condition, and it shows good ductility under triaxial stress condition of loading.

Fuel Materials

The study of reaction kinetics between hot (200-300 C) water and uranium metal heated 300-400 C above water temperature is continuing. In initial experiments in which the loop was cooled before the specimen corrosion was halted, a uranium specimen heated to 660 C, and exposed to 300 C water, lost less than half the volume lost by an unheated specimen in the same environment. In later experiments the specimens were exposed to flowing 300 C water for 20 minute intervals. After 20 minutes the reaction chamber was closed, and water was expelled from the

chamber. In these experiments a specimen heated to 600 C before contact with 300 C water corroded at 1.5 mils/minute, exactly the same rate as that shown by an unheated specimen. These data are at variance with the results from the 660 C specimen. Further runs will be made with specimens heated to 660-800 C. Additional runs have been made with canned specimens. Rupture of the can wall of both heated and unheated specimens occurred in 300 C water in less than 12.5 minutes and in 200 C water in less than 20 minutes. Maximum initial temperatures achieved in canned specimens have been undesirably low, and corrosion rates observed in heated specimens have been as high as, or higher than, those observed in unheated specimens.

In preparing UO_2 or UO_2 cermet compacts, it has been found that fracture of the green compact occurred unless a binder material was used. Two weight percent carbowax 4000 has proved to be effective giving the green compact considerable strength. The binder is volatilized at low temperature during the sintering process. Carbowax 4000 has been added in an isopropyl alcohol solution to the UO_2. After thorough mixing, the alcohol is volatilized, leaving the individual UO_2 particles coated with a film of carbowax. A number of cermet samples have been prepared for metallographic examination. Included are sintered compacts of UO_2 plus Ni, Fe, Cu, Si, and Mo. Samples of UO_2 and these metals have been prepared at two metal concentration levels. In addition, UO_2-Fe cermets have been prepared from iron powders of three different ranges of particle size. It is hoped information will be forthcoming from metallographic examination of these materials which will indicate which cermets actually appear to have formed a bonded system within the compact. The UO_2-Fe cermet pieces appear to have considerable strength after sintering. Some larger pieces will be prepared for use as tensile specimens.

A ten-pound sample of uranium shot produced by pouring molten uranium onto a rotating disc has been received from NLO (Fernald) for HAPO evaluation. The shot is clean and appears to be fairly uniform in roundness. The sample was screened into nine size fractions, the particles ranging in size from about 2400 μ to 200 μ. Ninety percent of the shot falls in the size range 1650-300 μ. The packing densities of the fractions range from 61-63% of uranium metal.

Six zircaloy canned specimens of Th-2 w/o U-235 alloy have been loaded in the MTR. It is expected that the first capsule should be returned to HAPO in early March, 1956, after reaching 0.5% burnup.

A survey has been made of proposed organic reactor coolants with the hope of finding some that may be compatible corrosion-wise with a U-Mg matrix fuel element. Bi-phenyl and ter-phenyl look promising because of their high specific heat, boiling point, stability under heat and irradiation, and fair moderating capacity. A sample of "Dowtherm A" (eutectic of biphenyl-diphenyl oxide) has been requested for preliminary corrosion testing.

Fuel Element Evaluation

The examination of the two cored insulated slugs which were irradiated in the MTR continued. Burnup analyses of samples from both slugs have been completed. Two determinations were made of the sample submitted from the unplugged piece, and the values reported were 0.108 percent and 0.103 percent uranium burnup due to fission. The value reported for the plugged slug was 0.091 percent. These burnups

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represent exposures of 780-930 MWD/T and specific powers of about 80 kw/ft including gamma heating. The density of a transverse bar cut from the unplugged slug was found to have decreased 6.6 percent to a value of 17.67 g/ml. Metallographic examinations of a transverse wafer from the unplugged slug revealed numerous evenly distributed microvoids. The macrostructure consisted of very large columnar grains which radiated outward from the center of the wafer with very little twinning observed. Hardness measurements made on this wafer ranged from Rockwell G 50-65 at the center to 65-75 near the edge.

Spiders to support the proposed KER cluster fuel element were successfully forged from corrosion resistant aluminum-1% nickel alloy. These spiders will be used with a KER cluster fuel element mockup in a 305 pile test. Neutron flux distribution will be determined by monitor pins spaced radially through the cross section of one of the four fuel rods. With these data a more accurate power generation calculation can be made. The canning and weld closures of one mockup have been completed and await machining to fit the support spiders.

A model for the mechanical behavior of uranium has been needed in order to analyze the stress and strain conditions in uranium fuel elements. The rough draft of a document describing a model which includes the time and temperature dependence of uranium is completed. The document is entitled "A Model of Mechanical Behavior Evaluated with Creep Tests Applied to Alpha Uranium." Actual analyses are now being run by IBM using this model.

In studying the effects of the various operating conditions on fuel elements, the idea of using a gap as a design variable has developed. This idea was suggested previously for coaxial fuel elements. In analyzing the time dependent conditions during startup of insulated fuel elements, the analysis showed that a gap can be used to anneal the surface. When radiant heat transfer exists between the fuel material and the jacketing material, the heat produced by gamma sources during shutdowns of a reactor will be sufficient to anneal the surface material. The rough draft of a document describing the effects of a gap in an insulated fuel element has been completed. It is entitled, "Temperature Distribution in an Insulated Fuel Element During Power Increase."

Methods currently in use for fabricating metal clad high density uranium oxide fuel elements involve the insertion of the uranium oxide into the cladding with what amounts to a hand fit. This requires very rigid dimensional tolerances on both the sintered oxide and on the inside dimension of the metal tube. A fabrication method which would obviate the close dimensional tolerances is being investigated. The method involves the swaging of an oversize metal tube upon an unground sintered oxide piece such as might be obtained by the process of extruding and sintering. No such oxide being presently available, the method was tried on a rod of Alsimag-393, a sintered, brittle, fine textured refractory having about 15% porosity. A length of 0.485" diameter Alsimag was slipped into 3/8" schedule 40 stainless steel pipe (0.493" ID) which was sealed by welding a plug in each end. The assembly was swaged to an outside diameter of 0.636". This was a somewhat smaller diameter than originally planned so the Alsimag density was actually increased by six percent. It is expected that a proper selection of die sizes will allow swaging of the cladding to meet the surface of high density sintered uranium oxide rods. Two zircaloy capsules containing UO_2 sintered to about 85 percent theoretical density are being

prepared for irradiation in the MTR. One oxide piece has two machined sections which will provide clearances of 0.005" and 0.010" between oxide and cladding. The other oxide piece has been machined to provide two areas with continuously variable clearances of from 0.001" to 0.010" between oxide surface and can wall. This experiment is designed to test the significance of the heretofore specified rigid clearance tolerances between oxide and can wall.

Radiometallurgy Examination

Preliminary examination of three four-inch slugs, which have been irradiated to approximately 700 MWD/T in the MTR fuel element test facility, was completed. This group of slugs included a standard AlSi canned solid slug, an AlSi canned cored slug, and a nickel-plated hot-press solid slug. Measurements showed that the AlSi canned solid slug suffered a decrease in length of 0.010 inch, an increase in diameter of 0.003-0.004 inch, and a minor amount (0.005 inch or less) of ellipticity. Post-irradiation dimensions of the AlSi canned cored slug indicate a decrease in length of 0.010 inch, an increase of 0.010-0.012 inch in diameter, and a noticeable amount of ellipticity (0.010-0.015 inch difference between major and minor diameters). No pre-irradiation measurements were available for the nickel-plated hot-press slug; however, post-irradiation measurements were similar to those obtained for the solid slug. Considerable necking of the aluminum can, with a corresponding decrease in diameter of approximately 0.010-0.012 inch, was observed about 3/8" from the base end of the solid slug and a similar distance from the cap end of the cored slug. No appreciable amount of warp was observed on any of these slugs.

The examination of two unruptured nickel-plated hot-pressed slugs (PT-105-577-A) which was requested by Fuel Technology has been completed. Transverse wafers were cut from both slugs for metallographic examination. The wafer from the slug which exhibited a large "hot spot" on the surface of the jacket included a portion of this zone. The bond layer was found to have undergone extensive deterioration around the entire circumference of the wafer; however, it was particularly severe directly underneath the "hot spot". This deterioration may be described as a separation of the jacket from the uranium at the uranium-nickel interface. The bond of the second slug was found to have undergone the same type of deterioration, however, not to as great an extent as the "hot spot" slug. The unusual bumpy surface of the aluminum jacket could not be attributed to distortion of the uranium surface and the microstructure of a transverse section of the jacket appeared normal. Consequently, it appears that this unusual surface resulted from corrosive attack. Uranium macro and microstructures of both slugs were normal except for the presence of severe intergranular cracking in the core of the bumpy slug.

Separations Plant Structural Materials

Oxalic acid has been used as a cleaning agent for stainless steel process equipment on occasion in the past, and proposed process changes involve the use of oxalic-nitric acid mixtures. However, since there has been some doubt as to the magnitude of the corrosion damage incurred by its use, a cursory investigation was made to determine the order of magnitude of the corrosive attack of 10 and 20 w/o oxalic acid at 80 C and boiling temperature upon types 304L and 347 stainless steels, both of which had been subjected to a sensitizing heat treatment. The samples were

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exposed for a total of 240 hours, with solution changes and weight loss measurements performed every 48 hours. Both materials tested exhibited corrosion rates of approximately 0.003 ipm in both 10 and 20 w/o oxalic acid at 80 C and approximately 0.007 ipm in both 10 and 20 w/o boiling oxalic acid. Since it is highly unlikely that process equipment will be exposed to oxalic acid at the concentrations involved in this investigation for periods as long as 48 hours, further work is desirable to determine corrosion rates for exposure periods on the order of one hour or less and to determine if any corrosion accelerating interaction occurs when oxalic and nitric acid are combined.

As part of the investigation to evaluate the corrosion problem expected in the Purex acid concentrators, type 312 stainless steel is being studied as a potential replacement material. Experiments, where type 312 specimens have been exposed to boiling synthetic Purex waste concentrate with metal temperatures of 145 C and 112 C, have indicated corrosion resistance which is superior to types 304L and 347 stainless steel under the same conditions. The wrought specimens which had been heat treated at 1250 F one hour and water quenched exhibited corrosion rates of the order of 0.0010 ipm when exposed at 145 C. This rate appears to be constant with time. Since these indications are all favorable, further investigation will be made to determine the effects of welding, heat treatment, and carbon content on the corrosion resistance of this alloy.

A continued search is being made for materials to be used as a bearing material for submerged rotating process equipment. Samples of types 17-7 PH and 17-4 PH precipitation hardening stainless steels in both the annealed and fully hardened conditions are presently being evaluated. The precipitation hardening stainless steels are those stainless steels which may be machined to the desired shape in the annealed condition and then may be hardened by heat treatment. In the heat treatment of these alloys a constituent such as aluminum or copper is precipitated out from a supersaturated solid solution, thus hardening the alloy. Preliminary results indicate that both the types 17-4 PH and 17-7 PH in the fully hardened condition exhibit corrosion rates of approximately 0.005 and 0.040 ipm, respectively, in boiling 65% nitric acid. However, these same alloys have corrosion rates several orders of magnitude less when exposed in the fully annealed condition. Since there is a large difference in corrosion resistance between the hardened and soft conditions, further tests are being performed to establish if there is an optimum hardness which will provide adequate corrosion resistance and still be useful as a bearing.

Welding Development

A "Roto-Arc" welding unit for welding caps on small containers by means of a cylindrical electrode and a moving arc driven by a magnetic field has been built. The design of this unit was derived from a similar device utilizing the same principles initially developed at Argonne National Laboratories. The apparent advantages of this welding process are that there are no moving mechanical parts and that the entire closure weld is made at once, minimizing distortion and cracking. The process also appears to lend itself readily to automation. Initial experiments indicate the system operates in a manner that shows promise of success pursuant to necessary development work. Reasonably good welds have been produced on aluminum cans.

Evaluation of data resulting from experiments relating weld quality of Zircaloy-2 weldments to welding conditions is partially completed. Preliminary indications

show that only minor differences exist in hardness, grain size, ductility, and corrosion resistance.

Metallurgical Examination

Two type 304 stainless steel pigtails failed in service and were removed from the rear face of 105-H reactor early in October, 1955. Both connectors had been on the reactor since startup. The connectors were decontaminated, and the scale which had been deposited on the surfaces of each was chemically removed. Visual examination revealed that the failure was due to cracking in a section within 10 inches of the process tube end of the connectors. The radial, intergranular cracks did not appear to be associated with any forming operation or with the longitudinal weld seam. Samples of the scale which were removed are being analyzed, and the cracked samples are presently being examined metallographically in an attempt to establish the cause of failure.

The high level iron pickup in the Redox product concentrating units indicated a serious corrosion problem. In order to prevent a costly leak in the system, the L-3 tube bundle was removed from service prior to actual failure on November 11, 1955. During the removal photographs were taken of the top flange, "bell" reducer, and adjoining pipe. These photographs revealed severe "end grain" corrosion of the adjoining pipe where it jointed the "bell" reducer. There was also indication of accelerated attack in the weld joint. On the basis of these observations a new lower loop of the unit embodying changes in design is being fabricated on an expedited basis as a replacement. The tube bundle which was replaced is being sectioned for metallurgical examination and observation.

Leaking occurred in the bellows of one of the many valves in the sample gallery at Purex during the preliminary testing before startup. The bellows of the valve was removed and examined in an attempt to determine the cause of failure. The bellows was type 347 stainless steel, and the remainder of the valve was type 304L stainless steel as specified. The bellows was formed by fusion welding the edges of narrow strips of stainless steel. A crack at the base of the weld was the cause of leaking and was due to the formation of "eutectic carbides" in the weld of columbium stabilized stainless steels. The susceptibility to cracking could be considerably reduced by fabricating the bellows from type 304L instead of type 347 stainless steel.

The TD-4 nitric acid fractionator, No. 1, has been used in the UO_3 plant to produce 60 w/o nitric acid for approximately 18 months and 25 w/o nitric acid for 22 months. The lower section of the fractionator, consisting of the reboiler section and seven "bubble cap" trays, was removed from service on October 11, 1955. The fractionator was fabricated entirely of type 347 stainless steel and welded with type 347 welding electrodes except the plate forming the transition cone between the reboiler and the bubble cap tower which was type 304L stainless steel. Observation ports were cut along the length of the unit and detailed observations of each tray and the reboiler were made. The unit was completely photographed, and samples were trepanned for metallurgical examination. The general observations revealed severe "end grain" corrosion of all the exposed edges, "knifeline" corrosion in the fusion zone of most of the welds, "centerline" attack on many of the welds, and a definite gradation in severity of corrosion over the length of the unit with the most severe

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corrosion occurring in the reboiler and lower trays. Corrosion damage had rendered the three lowest trays completely inoperative and had seriously impaired the effectiveness of the next three trays. A complete metallurgical examination of the trepanned samples is currently being conducted.

The failure of several flange studs used for remote connections in the G-7-1 tank pump support and the E-F-6 acid concentrator in Purex is being investigated. Of the four studs examined, three had failed in the base metal of the stud in the heat affected zone adjacent to the weld, similar to those failures in Redox equipment where hot cracks had formed in the stud during welding to the flanges. Subsequent loading had caused the cracks to propagate to failure. It has been determined that the studs are tempered type 414 martensitic stainless steel. These studs must be attached to the equipment by screw threads without welding since after welding the studs are embrittled and may contain cracks in a zone adjacent to the welds. The fourth stud which was examined failed in the threaded section. A progressive type of fracture was observed with its origin at the root of the threads. There was no significant difference in hardness throughout the stud. However, since the stud was "calked" in the flange, there was no embrittled or hardened zone or cracks as would be expected if the stud had been welded in the flange. It is concluded that the stud broke from overloading during impacting due to a stress concentration at the root of the thread.

Plutonium Metallurgy

Plutonium metal was cast to shape for machining two large pieces. Shrinkage data from previous castings were reduced and the results used in designing a mold for precision casting a large piece. Small test molds were made of graphite and will be used to investigate carbon and nickel diffusion to plutonium during casting.

The production of small diameter nickel lined holes in uranium for PCTR monitor slugs has been further investigated. The metallography of uranium chill cast about nickel coated rods, wires, and tubes shows very heavy attack on the nickel by the uranium. Attempts to cast uranium about thin nickel coatings have been abandoned. There was no inter-diffusion of carbon and uranium when uranium was cast around bare 14-mil graphite and clay rods as evidenced by metallography at 250X. The graphite rod was easily drilled out of the uranium.

Metallurgy Research Sub-Section

The most recent low melting fused salt electrolyte to be tested has been rejected as unsuitable for plutonium deposition. It was noted that certain alkali polyhalides have melting points below 100 C. KI_3 was prepared dry but was unstable at room temperature. $KIBr_2$ was also prepared dry but was found to decompose before melting. This anomalous result, in view of a reported 31 (45) and 60 C melting points, respectively, can be explained by the dissociation pressure and vapor pressures of halogen halide. The melting of these compounds is actually its solution in its own decomposition products and occurs when the decomposition pressure equals the pressure of halogen halide over this solution. Water increases the stability so that KI_3 is only stable as a hydrate, and in the case of stable compounds extreme drying will raise the melting point, until decomposition occurs first. Thus, all polyhalides must be rejected since a low melting point also indicates a higher dissociation pressure. The free halogen product would react then with deposited metal.

Project CG-645 providing ventilation and services for the plutonium fabrication laboratory in 231 Building is about 80% complete. The remaining work to be done by project funds will be completed on or about December 23, painting excepted. All piping, electrical, and ventilation will be available for the equipment when it arrives. Tardy delivery of the lathe, creep machine, and Universal testing machine necessitated an extension in the expected final completion date.

The NRC high vacuum induction furnace is about 90% complete in its installation and will be given its run-in trials within a few days. The impact machine has been modified and will be installed as soon as its hood is delivered.

All hoods for PCTR work have been sealed and tested. The eight kilogram balance is in operation, thus making the balance hood "hot". Cold canning with dummy slugs is in progress so that canning techniques can be perfected. The uranium charging billets have been ordered cut to size to get correct alloy weights with optimum crucible loading. Anodized cans have not been received to date.

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CONTACT ENGINEERING UNIT

PROJECT ACTIVITIES

Project CA-512

Numerous modifications to the process water plants are being made to overcome deficiencies which became apparent after startup. These are aimed primarily at providing more reliable emergency backup in the pumping plants.

The modified Beckman systems have been put into service in the Safety Circuit. Some trouble is still being experienced with the power supply to these instruments.

Project CG-558

The Design Council has approved the recommendation of the Project Representatives that new front face fittings should remain in the scope of this project.

The Manufacturing Department has experienced considerable difficulty with the new Panellit gages installed at DR and H. The present difficulty is due to leaking gages which have frequently caused pile shutdowns. In view of this, and other gage difficulties, it has been decided to delay the Panellit installation at B and F piles until more operating experience has been gained and sufficient data have been obtained to evaluate gage adequacy.

The recent installation of Poison Column Facilities at 105 DR demonstrated an inadequacy in the charging machine design, malfunctioning of the ball valves, and certain problems in conducting the Acceptance Test Procedures due to operating limitations. It has been decided to delay any further installation of Poison Column Systems pending resolution of these problems.

Construction of Phase I of this project continues on schedule. Contracts for the major portion of the lump sum work under Phase II have been let.

Project CG-600

The Project Representatives met once during the month to formally revise the scope of the project to conform with the recent decision to eliminate front face nozzles from the project.

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Project CG-642 (Charge-Discharge)

The first meeting of the Project Representatives was held on November 23, 1955. This was only an organizational meeting to acquaint the members with the scope of work to be covered and establish a regular meeting time.

E.T.R. Liaison

Contacts have been made with Phillips Petroleum Company at Idaho Falls to secure test facilities in the Engineering Test Reactor which is now under construction.

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 November, 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
M. J. Sanderson	A Stationary Power Reactor
L. C. Lemon	Cutting Torch for Slitting Long Tubes from the Interior

O.H. Greager
Manager - Pile Technology
ENGINEERING DEPARTMENT

OH Greager:cvf

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VISITORS AND BUSINESS TRIPS

C. H. Linder, D. E. Chambers, H. W. Gouldthorpe, C. C. Leader, A. Pechukas, R. W. Porter and H. A. Strickland of General Electric Engineering Services visited Hanford on 11-9 thru 11-11-55 to discuss the overall engineering program.

Murray Nash, AEC Office of Declassification, Washington, D. C. visited Hanford 11-2-55 to discuss possibility of declassifying 321 Building.

Jacob A. Marinsky, Ionics Inc., Cambridge, Mass. visited Hanford on 11-2 and 11-3-55 to present talk on Ion Exchange Membranes Applied to AEC Processes.

George Watt, Consultant, Univ. of Texas, Austin, Texas visited Hanford Separations Technology personnel 10-31 thru 11-4-55.

W. P. Bebbington, W. Winsche of the duPont, Savannah River Laboratory, Augusta, Georgia visited Hanford on 11-4-55 to discuss the Purex process.

B. S. Tucker, C. H. Wheeler Manufacturing Company of Philadelphia, Penn. visited Hanford on 11-7-55 to discuss valves and pumps.

L. J. Haight, Johnson Pump Co., Los Angeles, California visited Hanford on 11-29 and 11-30-55 to inspect equipment.

Richard Rowe, General Machinery Co., Spokane, Washington visited Hanford on 11-29 and 11-30-55 to inspect equipment.

F. W. Woodfield, R. E. Burns, and R. G. Geier, of Hanford visited the duPont Savannah River Plant, Augusta, Georgia on 11-14 & 11-15-55 to discuss the Purex Process.

M. C. Lambert of Hanford visited the Oak Ridge National Laboratory at Oak Ridge, Tenn. on 11-5 thru 11-9-55 to discuss UO_3 research studies and the Battelle Memorial Institute, Columbus, Ohio on 11-10 and 11-11-55 to discuss X-ray Diffraction Studies - UO_3.

F. J. Leitz of Hanford visited the California Institute of Technology, Pasadena on 11-7 thru 11-9-55 and the Univ. of California at Los Angeles, Calif. on 11-10 and 11-11-55 and the Univ. of California, Berkeley, California on 11-14 thru 11-16-55 and Stanford University, Palo Alto, California on 11-17-55 for technical recruitment.

W. R. DeHollander of Hanford visited the Univ. of Chicago, and the Illinois Institute of Technology, Chicago, Illinois 11-26 thru 11-30-55 for technical recruitment.

E. E. Voiland of Hanford visited the Purdue University, Lafayette, Indiana on 11-29 thru 12-3-55 for technical recruitment.

O. F. Hill of Hanford visited the Univ. of Illinois, Urbana, Illinois on 11-14 thru 11-18-55 to recruit technical personnel.

K. M. Harmon of Hanford visited the Dow Chemical Company, Rocky Flats Plant, Denver, Colorado on 11-8 and 11-9-55 and the Los Alamos Scientific Lab., Los Alamos, New Mexico on 11-10-55 to discuss processing plutonium and weapons fabrication.

M. J. Stedwell of Hanford attended the American Institute of Chemical Engineers meeting in Detroit, Michigan on 11-28 and 11-30-55 and visited the National Lead Company, Fernald, Ohio on 11-30 thru 12-2-55 to discuss uranium refining and UO_3 calcination.

ORGANIZATION AND PERSONNEL

	October	November
Separations Technology General	2	2
Plant Processes Sub-Section	59	59
Chemical Development Sub-Section	81	81
Chemical Research Sub-Section	62	60
Contact Engineering Unit	6	6
Analytical Laboratory Unit	34	34
Technical Shops Unit	30	29
	274	271

Plant Processes Sub-Section - A. C. Rice, Engineering Assistant, transferred into the Sub-Section from the Pile Technology Section.

Chemical Research Sub-Section - L. C. Clossey, Supervisor, transferred from the Sub-Section to the Technical Administration.

Technical Shops Unit - E. N. Olson, Draftsman I, transferred into the Unit from the Design Section and R. D. LeClair, Draftsman I, transferred from the Unit to the Design Section. L. E. Scott, Drafting Trainee, terminated 11-18-55 to enter the armed forces.

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PLANT PROCESSES SUB-SECTION

REDOX PROCESS TECHNOLOGY

Summary

The new three-month test program, HW-39852, was discussed and concurred upon by members of the Manufacturing and Engineering Departments in the field, and is currently circulating for the required approvals.

Approximately the first ten days of the report period were devoted to removing low MWD/T metal heels from the dissolvers and completing the processing of the low exposure material in preparation for reversion to high MWD/T metal. The necessary column flushes and equipment maintenance and replacement were begun on November 7, 1955, and solvent extraction was started on high exposure metal on November 12, 1955.

Aside from the severe cold weather which combined with normal troubles to produce an unusually difficult startup, the principal concern when processing was resumed was a series of abnormally high uranium and plutonium losses. These, however, rapidly returned to normal and are believed to have resulted almost entirely from startup troubles rather than from technological errors. A maximum of almost eight per cent plutonium loss was experienced from the 2A Column raffinate, probably as a result of an inadequate extractant flow rate combined with abnormally dilute feed solution.

By November 16, a processing rate of approximately 120 per cent of Phase II was reached and was maintained virtually unchanged for the balance of the report period. Plutonium decontamination was good at startup and remained so for the balance of the month. Uranium decontamination was poor upon startup but improved very rapidly and remained fair to excellent for the rest of the month.

Photographs taken of the interior of the final plutonium product concentrator reboiler section showed very severe end grain and pitting corrosion. Shortly after replacement of the tube bundle in this unit, a small leak developed at the feed inlet tee as might have been anticipated from an inspection of the photographs. A new flanged unit is currently being designed for replacement.

Due to the extended cooling times of the irradiated high MWD/T metal charged to the dissolvers, the emission of iodine-131 presented no serious problem. A maximum of 0.35 curie reached the stack in a 24 hour period, and the average was approximately 0.15 curie per day.

The first charge of high MWD/T metal to the dissolvers was made on November 4, 1955. The average exposure of the high MWD/T material for the month was 891 (521 to 1060) MWD/T, its average cooling time was 165 (108 to 217) days, and the over-all recoveries of plutonium and uranium were 98.8 and 99.1 per cent, respectively. Concentrated plutonium product ranged from 82.5 to 103.9 grams of plutonium per liter, with an average of 97.4 grams per liter.

Feed Preparation

Although the first charges of high MWD/T metal were received on November 4 and dissolved in the next two days, the intervening period of storage (processing was not started until November 12, 1955) appeared to have no adverse effect on the subsequent behavior of the feed solution during solvent extraction. Due to inadvertent return of approximately 800 units of low n/g-s plutonium from final concentrator flushes to the feed preparation steps during the shutdown, the initial batches of feed were somewhat dilute with respect to uranium. These were processed without incident although the rate was, of necessity, slightly low due to the dilution.

Decontamination

As is usual following column flushes, the uranium decontamination on startup was very poor, producing material from five to twenty fold above the desired gamma contamination maximum. Very rapid improvement, however, resulted in acceptable product soon after startup and decontamination remained generally excellent for the balance of the month. All plutonium product following startup and for the balance of the month showed excellent decontamination. Logarithmic over-all decontamination factors for the final week of the report period were 6.6 and 7.6 for uranium and plutonium, respectively.

Solvent Extraction

No attempt was made to use the special flowsheet which was successfully tested the previous month at 150 per cent of Phase II rates. Rather, the normal flowsheet was used instead, with adjustments as needed to allow for the increased plutonium content of the irradiated metal.

Difficulties encountered immediately after startup which resulted in excessive plutonium loss (primarily from the 2A Column) were traced to a combination of low extractant flow rate and excessive, variable dilution of the feed by a new large capacity jet installed during the shutdown. Remedial action quickly brought the losses down from almost eight per cent to consistently below 0.2 per cent, and after still further changes to the IB and 2A Column flowsheets, the 2AW losses were down to levels seldom exceeding 0.07 per cent at report time. One such change was the ten per cent increase in the concentration of salting agent in the IB Column aqueous phase to compensate for the jet dilution of the 2A Column feed. This salt concentration was later returned to normal, and the IB scrub stream acid concentration was doubled in an attempt to alleviate the partial plugging of the IBU overflow line which reappeared less than a week after startup. This again resulted in more dilute 2AF, and 2AW losses rose to 0.4 per cent. To counteract these losses, the 2A Column scrub stream salt concentration was increased approximately 50 per cent. Until the 2A Column extraction section was returned to its normal salting strength, however, extractant flows were increased by as much as 10 to 15 per cent to minimize losses. Despite comparatively good performance at present (see above), the plutonium loss in the 2A Column raffinate is still about five fold higher than a year ago, even with the current flowsheet which uses 15 per cent more extractant than the one then in use. (NOTE: The IBU plug later disappeared and has caused no trouble since.)

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Following startup, higher than normal amounts of plutonium were noted in the uranium solution fed to the second uranium cycle. To reduce the possiblity that its source was the IB Column, the concentration of ferrous ion in the IBX stream was doubled. This had very little effect on the plutionium in uranium problem which was subsequently traced to abnormally erratic flow control and low rate of salt addition to the 3A Column feed stream which, in turn, resulted in plutonium loss to the raffinate. This 3A Column raffinate is backcycled as salt to the feed stream of the second uranium cycle.

Waste Loss

The principal source of both uranium and plutonium loss is a leak (or leaks) in the feed preparation cell. Its exact location has not been determined but is believed to be the Oxidizer (H-4) and is postulated to be the result of corrosion, which, as shown by previous failures and by laboratory tests, is rather severe in this service.

Plutonium Concentration

While the Concentrator (L-3) tube bundle was being replaced with a Purex plant spare during the shutdown, photographs of the interior of the reboiler section piping were obtained. Severe pitting and end grain corrosion is clearly evident from these photographs, and it appeared at the time they were submitted for inspection that failure was imminent. Shortly after the concentrator was reassembled and put back in service, a leak occurred at the juncture of the feed line (from the stripper to the concentrator) with the reboiler, the magnitude of the leak being estimated at about one-fifth to one-fourth of a gallon per day. A replacement unit is currently being designed with bolt and flange connections to permit easier future assembly and disassembly.

Although the concentration of iron in the final plutonium product is currently only one-third to one-half that reported last month (30,000 to 35, 000 parts per million parts of plutonium as compared with 75,000 to 100,000). This is due to the increase in plutonium rather than to a decrease in corrosion rate. The total amount of iron per day leaving the process with the final product remains essentially unchanged.

Iodine-131 Emission Problem

Presumably as a consequence of the extended cooling time of the metal charged to the dissolvers, plus the lower ratio of iodine-131 to the inert isotopes in the high MWD/T metal, the emission of iodine-131 presented no serious problem. The largest amount to reach the stack in any 24 hour period was less than 0.5 curie and the daily average was about 0.15 curie. The apparent efficiency of the silver reactors is low, as might be expected upon a shift from dissolving metal with high content of iodine-131 to dissolving metal with low content of iodine-131, since the former should leave a relatively high concentration of iodine-131 (relative to total iodine) on the silver reactor, and the iodine vapor pressure over the reactor is believed to be a function of the dissolver off-gas compositions. Thus, as the iodine-131 on the reactor decays, the emission experience should improve even further.

Some difficulty was encountered during the severe cold weather when water in the instrument air lines froze and caused erratic operation of the dissolver vent jets, which, in turn, may have contributed to partial plugging of one of the reactors. This occurred during the period of the largest emission and may have contributed to it.

PUREX PROCESS TECHNOLOGY

Summary

A total of 63 tons of canned, depleted uranium slugs, first charged to a dissolver on October 25, were dissolved. Cold uranium runs were started on November 3, with the first run devoted to calibration and balancing of instrumentation. The second run was made under equilibrium conditions at a capacity factor of 1.4 on HW No. 3 Flowsheet. Over-all plant performance was generally good, with satisfactory uranium recovery. Difficulties in controlling the interfaces in organic continuous columns have been experienced as a result of the presence of emulsions in the disengaging sections.

Feed Preparation

Canned, depleted uranium slugs, first charged to a dissolver on October 25, were dissolved in A and B dissolvers. A total of 63 tons of uranium was dissolved, with an average nitric acid consumption of 3.4 moles nitric acid per mole uranium. Terminal acidity averaged 0.2 M HNO_3 with the end point of dissolving at a specific gravity of 1.80 at boiling.

Solvent Extraction

The first cold run (AC-1) was started on November 3 and completed on November 15, with the run following the scheduled plan closely. In general, operation and calibration were excellent at rates from a capacity factor of 0.6 to 1.4, but operation at a capacity factor of 0.6 was generally less stable than at higher rates. Difficulties encountered during this initial run were quite expeditiously overcome by the joint efforts of all groups concerned.

The second cold run (AC-2) was started on November 15, without a shutdown of the plant after Run AC-1, and was completed on November 23. This run was made at a capacity factor of 1.4 on HW No. 3 Flowsheet in order to obtain operating and process data under equilibrium conditions. Uranium losses from the A Columns were normally less than .01 per cent of feed uranium, and uranium partitioning in the B Columns indicated a future plutonium purity of less than 0.5 per cent uranium in plutonium. Uranium losses from the C Columns were satisfactory even down to 60 per cent of the HW No. 3 extractant flow ratios at 60 C. The thorium-234 decontamination across the plant was on the order of 500, with no decontamination achieved across the 2A Column.

During operation of the columns, difficulty has been experienced in interface control of these columns (HC, IC, 2E, 2A, IO, and 2O) which are organic continuous and have an interface at the bottom of the column. After extensive

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investigation of the problem, it has been determined that excessive emulsification at the interfaces has caused the capacitance probe to indicate a false interface position. A hot 60 per cent nitric acid flush was given the C and O Columns on November 17, but the efficacy of this flush is dubious because the problem has not been improved appreciably.

Waste Concentration and Acid Recovery

The acid waste concentration and recovery equipment has operated to produce approximately a 50 per cent nitric acid product. Approximately a two fold over-concentration occurred in the No. 1 Waste Concentrator E-F11 prior to November 15, and the overflow line was found to be plugged by white solids. Upon further investigation of the concentrator contents, several pounds of this solid were found in the concentrator and on the tube bundles. The solid is high in phosphorous and iron and apparently has an organic base. The concentrator was physically flushed with water and placed back in operation. Since it is believed that the over-concentration and resultant lack of a continuous purge of impurities from the system caused the formation of the solids, a recurrence is not expected.

Organic Treatment

Since the start of the cold runs, a total of 46,000 gallons of 30 per cent TBP has been added to the system. By November 19, approximately 24,000 gallons had been discarded because of the interface control difficulties, organic centrifuge seal problem, and normal losses. Between November 19 and November 26, only 1100 gallons were lost, representing approximately 0.3 per cent of the organic throughput during this period. The uranium distribution coefficients for organic in both systems has been approximately 0.02 on an average during the month.

URANIUM RECOVERY PROCESS TECHNOLOGY

Summary

During the month, the TBP Plant has processed feed blends in which 70 per cent of the uranium has been aged 11 1/2 to 12 months from pile discharge. While processing this uranium, the plant produced acceptable product with fission product activity equivalent to roughly 140 per cent aged natural uranium gamma activity. Approximately 80 per cent of the total fission product activity was zirconium-niobium, with the remainder essentially ruthenium. Plant solvent-extraction losses during the month were acceptable, with the composite solvent-extraction losses averaging 1.1 per cent. The RCW loss for the month averaged 0.6 per cent. Since an RCX flow equivalent to 80 per cent of HW No. 6 Flowsheet flow was required to maintain RCW losses this low, production was limited by intercycle concentration capacity. At month's end, an informal request was approved for obtaining additional intercycle concentrating capacity by modifying the Section 8 and the Section 6 concentration equipment to permit operation in series. Completion of the modifications is expected during the last week in December.

Metal Removal

A summary of the source, age, and irradiation history of the metal removed from the two operating tank farms is given below:

Tank Sluiced	Fraction of Uranium Removed	Minimum Age From Pile Discharge, Months	Average Exposure Level of Uranium, MWD/T
103-U	0.10	20	444
107-U	0.51	16	201
101-TX	0.39	12	197

Solvent Extraction

RCW losses averaged 0.6 per cent and generally ranged between 0.4 and 0.8 per cent of the feed uranium. They appeared to be much more sensitive to changes in RCX temperature than changes in L/V. The only significant variation was a three fold increase from 0.5 to 1.5 per cent when adjustment of the RCX temperature caused a sudden ten degree decrease in the column operating temperature (REU from 55 to 45 C). To maintain these losses, it was necessary to operate with an RCX rate equivalent to 80 per cent of that of HW No. 6 Flowsheet flow. As a result, the plant capacity was limited by intercycle concentration capacity. To augment the intercycle capacity, an informal request for funds to build jumpers so that the Section 8 intercycle evaporator may be used in series with the Section 6 evaporator to provide increased intercycle evaporation capacity, was approved. It is expected that the jumpers will be ready for installation by January 1, 1956.

Gamma decontamination performance was adequate. Over-all logarithmic decontamination factors increased consistently from 4.9 to 5.3. As the amount of 12 month aged feed from 101-TX tank was increased from 0 to 70 per cent of the total processed product (REU) activities increased from 1 to 1.8 times that of aged natural uranium (average approximately 1.4). The specific fission product data are anomalous. However, most of the activity increase appears to be due to niobium and zirconium.

Generally, solids were not a serious problem for the columns operated stably at high frequencies, and the RCU and RDF gamma activities were, for the most part, identical with occasion arithmetic decontamination factors up to three being encountered. The RDF activity was generally about 100 times that of aged natural uranium. The filtration of REU gave arithmetic decontamination factors of about 1.5, slightly lower than "normal". Filtration of second cycle organic phase caused no significant decrease in the ROO gamma activity.

RDIS filtration through sintered stainless steel was continued. A portion of the solids in the scrub were identified as pump packing and packing grease. The offending pumps have been replaced and the filter should now plug less frequently and be more easily backflushed.

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Construction of an organic phase decanter to remove gross quantities of solvent from the RCU before it is stripped with steam was started. It is expected that the decanter will be ready for installation in Tank 4-1 (RCU holdup tank) late in December.

Waste Scavenging

Recent nickel ferrocyanide scavenging procedures (supplemented by the addition of calcium or strontium nitrate to precipitate concurrently calcium or strontium phosphate with the nickel ferrocyanide) have continued to be effective in the removal of strontium-90 and cesium-137. In fact, based on soil column tests performed by the Earth Sciences Unit, it was possible to dispose of an earlier tank (11-106-BY, of high strontium-90 concentration and relatively low phosphate concentration, and which had an early breakthrough in soil columns) in combination with a current tank (17-108-BY, of low strontium-90 concentration and high phosphate concentration, and exhibiting excellent soil absorbing characteristics). To date, approximately 7,500,000 gallons of scavenged waste have been disposed of to crib.

Routine scavenging of the UR Plant waste with strontium nitrate to obtain supplemental removal of strontium-90, and without concentration, was started with the filling of Tank 19-107-BY.

Actual "in-farm scavenging" in the CR facility was started during the month. At report time, only three 12,000 gallon batches of waste have been treated because of numerous startup difficulties.

In-Line Monitors

Difficulties stemming from a periodically plugged sampler suction line accounted for the only undesirable operation of the Tank 11-6 pH monitor and pH controlled waste neutralization system during the month. To minimize difficulties of this nature, a Tank 11-6 cleanout procedure involving the dissolution of accumulated precipitate has been recommended.

URANIUM CONVERSION PROCESS TECHNOLOGY

Process

The fission product gamma activity of UO_3, as determined by HAPO analytical methods, exceeded the specification of 100 per cent aged natural uranium by an average of 11 per cent during the month since the activity of the non-standard UNH solution processed was contributed primarily by zirconium and niobium which are not volatilized during calcination. Otherwise, shipments have met process specifications. Total product metallic impurities averaged 80 parts per million parts of uranium, and the reactivity ratio averaged 1.13, using a nominal 0.05 weight per cent sulfamic acid as a calcination pot additive.

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Two test pots were sampled before and after denitration to determine the extent of an ruthenium and zirconium-niobium decontamination obtained during calcination. The mass spectrometer data indicated an arithmetic ruthenium decontamination factor of 2.5 and no zirconium-niobium decontamination during calcination. Since the feed solution (approximately 150 per cent aged natural uranium activity) contained very little ruthenium (less than 20 per cent Ru), the magnitude of the ruthenium decontamination is subject to question.

Following a two day plant shutdown during which unstripped REU was inadvertently held at a high temperature (up to 100 C), considerable foaming in the denitration pots occurred. Use of anti-foam agents minimized the foaming difficulties.

Equipment

Two inch drain lines were installed in place of the one inch lines on the nitric acid absorber (TA-1) and the acid cooler (EA-2). These large lines should eliminate the acid absorber and acid cooler flooding encountered during periods of peak production.

Electric pot 13 liner was replaced when several long and deep cracks in the pot bottom were observed during a routine Class A overhaul.

The blade tips of the triangular cross section test agitator installed in electric pot 9 have bowed in approximately 1 1/2 inch. The agitator has been in service since June 11, 1955. Buildup of side wall cake and thermal stresses associated with the large areas of welding probably contributed to the distortion.

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

Peroxide Precipitation (231 Building)

Redox PR solution containing 150,000 ppm iron was processed through the plutonium peroxide process in the 231 Building. The high iron content caused the formation of finely divided, slowly settling precipitates. The losses from individual runs made from identical feed lots ranged from 2.5 to 50 per cent, indicating that the difficulties in handling the precipitate were responsible for the high average loss to recycle of 13 per cent.

Oxalate Precipitation (Task I)

Recuplex product was processed satisfactorily through Task I, both as it came from the solvent extraction system and after steam stripping and evaporating. Losses to recycle in Task I, whether processing Recuplex product or Redox PR solution, continue to be variable, and appear to be associated with the condition of the filters to such an extent that no correlation with feed composition has been found.

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RECUPLEX DEVELOPMENT

The Recuplex solvent extraction system was operated 414 hours during the report period (October 26 to November 26) for an on-stream efficiency of 84 per cent. During the processing of dissolved fluoride-oxalate powders early in the month, considerable flooding occurred in the extraction columns; thereafter, physical operation of the system was generally stable. The feed input consisted primarily of Task I supernatants and dissolved skulls, reduction crucibles, and fluoride powders. Approximately 75 per cent of the plutonium input was virgin to the facility, and 25 per cent was recycled from within the system. Cribbed extraction waste losses represented 0.8 per cent of the total plutonium input. The solvent inventory, which had been in continuous use for four months, was replaced with fresh material.

A misfired Task III reduction charge (which had been screened for calcium removal) was added to a wet dissolver. The resultant gas evolution was rapid enough to pressurize the charging enclosure of the slag-and-crucible hood. Precautions were immediately taken to control any hydrogen evolution during the charging and dissolution of all Task III powders, irrespective of the history and classification.

Responsibility for routine operation and maintenance of the Recuplex facility was assumed by the Manufacturing Department during the month. Run planning, process control functions, and non-routine maintenance remain under the direction of the Engineering Department.

Column Performance Studies

Solvent extraction studies during the month were primarily directed toward the over-all problem of controlling the waste losses, with little emphasis placed upon column capacity limits or detailed correlations of performance with operating parameters. Extremely wide variations in waste losses (0.0002-0.08 g/l plutonium) were experienced under essentially the same physical operating conditions. The conflicting results were not directly attributable to any one known variable. A number of presently uncontrolled factors apparently upset the system periodically and tend to override the effects normally anticipated from changes in the physical operating parameters.

Some items of general interest are:

1. Stable column throughput rates of up to 1150 gal/hr/ft^2 were obtained with Task I supernatants as the feed source.

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2. Displacement of the old solvent inventory with fresh material was accompanied by a 120 hour period of low waste losses, during which column performance reacted normally to changes in operating parameters. Subsequent introduction of new solvent into the system was accompanied by unexplained, uncontrolled losses.

3. High plutonium concentrations in the organic raffinate from the stripping column have been accompanied by both low and high plutonium concentrations in the extraction waste, indicating varying degrees of "unstrippable" plutonium.

4. The rate of accumulation of "unstrippable" plutonium in the organic raffinate has varied by a factor of 25 under essentially the same operating conditions.

5. During the month, two periods of high waste losses occurred during which the plutonium(IV) content of the waste stream was as low as ten per cent of the total plutonium present in one case and as high as 90 per cent in the second case.

6. The effectiveness of the second extraction column varied considerably, the column generally being less effective during periods of low waste losses.

Equipment Maintenance

Six air operated and one manually operated G. W. Dahl valves failed during the month due to rupture of the teflon diaphragm. Specially fabricated stainless steel diaphragms were installed in two of the valves.

The two pumps presently associated with the stripping agent feed tank both failed during the month. The Roth submerged regenerative turbine pump failed twice, once due to chipping of the graphitar shaft seal and subsequent entry of the chips into the pump, and the second time due to misalignment of the inlet port. The Eastern centrifugal pump failed three times, twice due to corrosion of the mechanical seal, and once due to improper installation of the seal.

As of November 23,1955, the pulse generator bellows in the H-1 and H-2 Columns and in the H-3 Columns had operated 9.1×10^6 and 13.5×10^6 cycles, respectively.

Process Chemistry

The recent high aqueous waste losses (CAW) prompted distribution measurements to determine if these losses were due to improper valence, complexing, or other equilibrium effects. Using Recuplex CCW, CAIW, and CAW, the distributions of Table I were obtained. These values show that the solvent is capable of reducing the plutonium concentration from the H-1 Column effluent to 0.001-0.002 g/l if as much as one stage is available in H-2. Some evidence of either wrong valence or complexing is apparent at the 0.0005 g/l level. The effect of DBP in the solvent is evident in the stripping test.

Table I
DISTRIBUTION VALUES FROM RECUPLEX STREAMS

Solutions Contacted(1, 2)		Plutonium Concentration After Contacting		
Organic	Aqueous	Organic Pu g/l	Aqueous Pu g/l	E_a^o
Recuplex CCW	Recuplex CAW	0.0230	0.00150	15.3
Recuplex CCW	Recuplex CAIW	0.0284	0.00185	15.3
Recuplex CCW	Synthetic CAW	0.0202	0.00107	18.9
Recuplex CCW	Synthetic CCX	0.0139	0.00542	2.6
Synthetic CAX	Recuplex CAIW	0.0066	0.00097	6.8
Synthetic CAX	Aqueous from above	0.00124	0.00070	1.8
Synthetic CAX	Aqueous from above	0.00087	0.00059	1.5

(1) Original concentrations of Recuplex CCW, CAIW, and CAW were 0.0201, 0.00545, and ca. 0.0031 g/l, respectively.

(2) L/V = 1

234-5 DEVELOPMENT

Continuous Task I

Room temperature strikes can be used to start continuous precipitation, as evidenced by laboratory scale runs. A readily filterable slurry was produced after one throughput using Recuplex concentrated CCP for feed. Another method of starting continuous operation consists of precipitating batchwise 20 per cent of the operating inventory at room temperature, then adding feed and precipitant simultaneously until the operating level is reached, then proceeding with continuous operation. The minimum residence time required to get readily filterable precipitates is less than ten minutes.

Precipitation of Plutonium(IV) Fluoride

A readily filterable plutonium(IV) fluoride can be obtained by using hydrofluosilicic acid as the initial precipitant. Previously, a filterable double salt was obtained with ammonium fluosilicate. The present procedure entails adding one mole of hydrofluosilicic acid per mole of plutonium(IV) at 40-80 g/l and 0.7-2.2 M H^+. Solids appear after 15 to 20 minutes. Hydrofluoric acid is added to complete conversion to the tetrafluoride and supply up to 0.5 M excess fluoride. The precipitate is readily filterable through M sintered pyrex or M micrometallic filters, and can be easily washed. Although waste losses of 0.2 g/l Pu were observed, purification factors for the common impurities were encouragingly high. Part of the compound will be dried and reduced to metal.

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CHEMICAL DEVELOPMENT SUB-SECTION

HOT SEMIWORKS PUREX STUDIES

Hot Semiworks activities during the month have included completion of data correlation for recent Purex runs, continued equipment changes in "B" Cell, and decontaminating in "A" Cell. After extensive tank flushing in A Cell, several plugged lines and the sump, all reading greater than 500 rads/hr., have contributed to a high (1 to 5 rads/hr.) background reading in the cell. Continued flushing plus judicious shielding is slowly reducing the background radiation level in A Cell. Gamma scans have indicated the residual activity is greater than 95 per cent zirconium-niobium.

The last major alteration items being completed in B Cell are: (a) installation of the new HA mechanical pulser, (b) installation of differential pressure transmitters on HA and IA Columns to indicate flooding, and (c) the addition of facilities for introducing organic solution around the HC and IO pulser bellows to reduce radiation exposure to the teflon bellows.

Separations Equipment Development

Hot Semiworks Pulse Generators. The mechanical pulse generator (SK-2-50142) tested last month in 321 Building was installed on the Hot Semiworks HA Column and given an operability test. Supply oil for the pulser's hydraulic motor is delivered via 200 feet of 5/8-inch 16-gauge tubing. The pulser discharges to the 250 psig, two-inch-diameter header that supplies oil to the piston driven pulsers. Under these conditions, a hydraulic pump pressure of 1000 psig. was required to attain a 92 cycle/minute pulse frequency when oil with a viscosity of 300 SSU. at 100°F. was employed. It has been recommended that oil with a viscosity of 100 SSU. at 125°F. be used in the system.

To improve the operation of this unit, the hydraulic motor will be altered to reduce the oil consumption from 1.54 cu.in./rev. to 0.58 cu.in./rev. At 100 cycles/minute this will reduce the oil consumption from 16 to 6.0 gallons/minute.

Teflon Bellows. The most recent test data indicate that the Hot Semiworks HC and IO Column bellows failures are caused by phenomena induced when the bellows contact the process solution. These data were developed when 3/8-inch wide segments of a V-type bellows were flexed after they were removed from the inside of the Semiworks HC and IO bellows that failed during the last Hot Semiworks operating period. The segments taken from the HC Column bellows had been immersed in process solution about 310 hours while on the other hand, the segments taken from the IO Column bellows were not exposed to process solution because the IO bellows failed during decontamination flushing. The two segments from the HC Column bellows flexed 30,000 and 186,000 times respectively before failure. The two segments from the IO Column and two unexposed control segments have now flexed about 8×10^6 times without failure. The IO and HC Bellows had flexed about 1×10^6 times when they failed.

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Pulse Column Flood Detection. Differential pressure transmitters installed across sections of a pulse column detect changes of the fluid density when the impulse lines are filled with liquid. Sensitivity of the system is improved when the signal line is snubbed to minimize fluctuations caused by pulsing in the column.

Stainless steel D/P cells (Foxboro and Republic) installed across the scrub section and the anti-backmixing cap, and across the anti-backmixing cap and the extraction section of a demonstration unit HA Column adequately detected floods and changes in flow rate of the various process streams. The high pressure leg of each D/P cell was filled with a solution of known density and the signal to the recorder was dampened with pressure snubbers so that pulsing caused a response of about one division on the chart. This system was not sensitive to changes of pulse frequency but rapidly reflected density changes in the column.

PUREX DEVELOPMENT

Process Chemistry

Evaluation of HAP. Poor interface control in the Purex HC Column, causing solvent to be fed to the HCP concentrator, prompted an investigation of the emulsification characteristics of plant HCP. Tests involving an HC type miniature pulse column run simulating the plant HC Column, and dispersion and disengaging studies using both stainless steel and Kel-F fluorothene agitators, with and without air bubbling through the solutions, were made. No tendency toward crud formation was observed in the column run. Dispersion and disengaging times were normal under all conditions tried.

Removal of Brown Crud from Purex Columns. A brown solid deposited throughout Purex Plant columns, presumably due to the use of off-standard solvent recovered from floors and sumps after spills, could be partially dissolved, and so changed physically that it could be removed by flushing, with NaOH solution (10% or greater). Other agents tried, strong acids, organic solvents, and wetting agents, were not effective in dissolving or removing the solid.

Chemical Engineering Development

Pulse Column Studies. Thirty-seven runs were made during the month in the 4-inch-diameter Demonstration Unit HA Column scrub section to investigate the operating characteristics of anti-backmixing caps. The cap, located between the extraction and scrub sections (above the HAF feed point), was designed to minimize backmixing from the feed zone into the scrub section. These studies were carried out in an effort to explain the fact that the anti-backmixing caps designed for the 32-inch-diameter prototype HA Column did not function as efficiently as had the 4-inch-diameter caps. The runs were made using Purex HW #3 Flowsheet conditions with sodium as the backmixed component. Some of the runs were made with Lucite caps and a glass riser to permit visual observation of the cap interior.

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The highlights of the findings are:

1. At pulse frequencies up to 80 cycles/minute, equivalent plant uranium processing rates of 10 and 20 tons U/day, and with sufficient cap overlap to maintain the annular volume between the riser and cap greater than the pulse volume, the anti-backmixing cap performed efficiently in reducing backmixing.

2. At a pulse frequency of 100 cycles/min., 10 tons U/day, and sufficient cap overlap, the efficiency of the cap decreased but there was no evidence of a major breakthrough of backmixed component.

3. Annular volumes between the cap and riser equal to or less than the pulse volume resulted in a breakthrough of backmixed component.

4. As long as sufficient cap overlap was maintained, there appeared to be no effect of cap diameter on efficiency.

5. Serrating the edges of the cap had no deleterious effect on efficiency.

6. At pulse frequencies below 80 cycles/min., the organic-aqueous interfaces inside the riser and in the annulus between the cap and riser were sharp and distinct. At 80 cycles/min., a coarse emulsion approximately 1/2-inch thick formed at the interface. At 100 cycles/min., the emulsion thickness increased to as much as three inches. The emulsion showed some tendency to spill over the riser at the top of the pulse stroke.

7. Coalescence or any other condition resulting in increased organic holdup in the extraction section gave erratic backmixing results, usually in the direction of decreased cap efficiency.

8. Two attempts to start a run failed because of emulsification and eventual shad-roe formation in and below the anti-backmixing cap. In both cases the difficulty was found to result from high HAF U concentration (125% flowsheet) and high HAF feed rate (120% flowsheet). Both contributed to saturation of the organic phase.

REDOX DEVELOPMENT

Process Chemistry

Thiosulfate Feed Pretreatment. Uranium and plutonium losses in a simulated IA Column extraction were from 20 to 40 times higher for a thiosulfate pretreated feed (thoisulfate precipitate not removed before dichromate oxidation) than for a non-treated feed. Reduction of the thiosulfate concentration used from 0.033 to 0.01 M did not reduce these losses as expected. Addition of

either 0.05 M ferric or manganous ion to the feed prior to the thiosulfate treatment reduced the extraction losses by a factor of two. Thus, while dichromate oxidation without removing the thiosulfate precipitate does not detract from the gain in decontamination due to the treatment, unattractively high uranium and plutonium losses are produced. These increased losses are not observed if the thiosulfate precipitate is removed before oxidation.

Silica Gel Tail-End Studies. The relatively poor decontamination experienced in the Redox silica-gel facility is thought to be due to the relatively low (-0.05 M) acidity of the feed. A series of batch contacts of silica gel with portions of Redox silica gel feed (e.g., E-12 Solution) acidified to 0.2 M acid and simmered at 60-70°C. for one and four days was made to determine the effect of increased acidity. One volume of HNO_3 pretreated silica gel was contacted for 30 minutes with five volumes of UNH solution. Decontamination factors obtained are shown in the following table:

Solution	Gamma Ratio	No Treatment	24-Hour Simmer	4-Day Simmer
E-12	35.3	1.28	2.82	2.46
E-12	4.3	1.65	1.27	2.04
Redox SiO_2 Gel Effluent	1.72	1.35	1.56	1.80

In a similar study portions of a Redox E-12 sample having a gamma ratio of 43 (>95% Zr-Nb) were brought to various acidities and refluxed at boiling before being contacted with the silica gel. The following decontamination factors were obtained.

	Gamma Decontamination Factors(1)			
	4-Hour Reflux		24-Hour Reflux	
Acidity, M	30 Min. Contact	24 Hr. Contact	30 Min. Contact	24 Hr. Contact
0.05	1.83	4.96	2.33	16.5
0.15	1.96	6.82	2.82	19.2
0.45	2.16	8.10	3.48	21.7

(1) Gamma D.F. with non-acidified, non-refluxed solution 1.41.

These data show generally that increased acidity, increased reflux time, and temperature, and increased contact with the gel all improve the decontamination factor obtained.

Batch contacts of an E-12 sample having a gamma ratio of 4.54 and acidity -0.05 M with one-tenth and one two-hundredth volumes of silica gel showed that an approximate approach to equilibrium adsorption of Zr-Nb by the gel required five to seven hours contact time. Thus the Redox columns, in which the

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residence time is about 30 minutes, are not operating at equilibrium. It is also noteworthy that the total activity removed from solution was the same with the two different amounts of silica gel, indicating that decontamination is limited by the presence of non-adsorbable species of Zr-Nb rather than by capacity of the gel.

Salt Free Uranium Cycle. A uranium cycle free of any inert salting agent is under consideration for the Redox process. Freezing points, pH, and uranium distribution data were needed for solutions containing 0.5 M uranium nitrate, 0.0025 M ferrous ammonium sulfate, and 0.0025 M sulfamic acid and which were 0.05, 0.1, 0.2 and 0.3 M acid deficient, respectively. The freezing point of all four solutions was -3 ± 0.1°C. The pH of the solutions was 2.6, 2.8, 3.0 and 3.3 for the four different acid deficiencies in the order given. Uranium distribution ratios on contact of these four solutions with equal volume portions of 0.4 M uranium in hexone were 0.081, 0.074, < 0.067 and < 0.068, respectively in the order given.

Plugging of the IBU Overflow Line. Recently the Redox Plant IBU overflow line to the IC Column has shown signs of plugging. Coincident with this tendency, the IBX composition was increased from 1.30 to 1.65 M $Al(NO_3)_3$, 0.1 to 0.5 M HNO_3, 0.05 to 0.1 M ferrous ammonium sulfate and 0.05 to 0.1 M sulfamic acid. In preparing synthetic IBX in the laboratory it was observed that about 15 minutes were required for complete dissolution of solids at the lower concentrations while 45 minutes were required for the higher concentrations. A longer agitation time was suggested for the make-up of plant IBX. No precipitate was formed when synthetic IBX (high concentrations) was held in contact with synthetic IBFS for four days.

URANIUM RECOVERY DEVELOPMENT

Process Chemistry

Evaluation of Reagents for Solvent Recovery. Last month's report summarized laboratory tests of one to 20 per cent NaOH and Na_2CO_3 and one to 10 per cent Na_2HPO_4 and Na_3PO_4 as washing agents for uranium recovery process solvent. Dispersion and disengaging tests with the washed solvents have been made. In no case was the dispersion or disengaging time abnormally high although disengaging times tended to be higher with the more concentrated than with the more dilute washes. A similar evaluation of Na_2SO_4 (3, 5, 10 and 20 per cent) was made. As expected, activity and uranium removal was less than with more alkaline washes although the solvent quality with respect to dispersion, disengaging, and uranium E_a^o was excellent.

Laboratory studies simulating combination of Na_2CO_3 and 1 M HNO_3 solvent washes in TK18-3 and of the resulting solution with RAW in TK 13-6 indicate that no difficulty due to gassing or foaming would be experienced in the plant if 20 per cent Na_2CO_3 was used for solvent washing. This test was carried out in view of recent difficulty with disengaging in the RO Column and the observation that disengaging is more rapid when 20 per cent Na_2CO_3 is used for solvent washing instead of the present three per cent solution.

Recovery of Off-Standard Solvent in Tank 387. Although activated carbon filtration and washes with three and 20 per cent Na_2CO_3 reduced the uranium E_a^o of a 6500-gallon batch of off-standard solvent to ca. 0.01, and produced a solvent having normal dispersion, disengaging, and uranium transfer rates, RA-RC miniature pulse column runs showed excessive interface crud formation, high uranium losses and low gamma decontamination. The solvent has not been returned to process and other recovery procedures are being investigated.

Calcination Studies. Highlights of further runs in the laboratory scale continuous calciner are as follows. Potassium dichromate as an additive (1000 ppm.) produced a slow reducing powder (7 min. to 98% complete reduction at 575°C.) having a moderately high reactivity ratio (0.83) under standard test conditions (590°C. reduction - 410°C. hydrofluorination) which increased to 0.97 in the high temperature reduction test (800°C. reduction - 410°C. hydrofluorination). Although chromium is highly undesirable from the customer's standpoint, this powder is interesting in that it is the only one so far produced whose reactivity ratio increases with increased reduction temperature. Aluminum sulfate (100 ppm. S) produced a moderately rapidly reducing powder (3 min.) with a standard reactivity ratio of ca. 1. However, with high temperature reduction the reactivity ratio was only 0.57. A powder produced with nickel sulfate (100 ppm. sulfur) reduced very rapidly (1 min.) and exhibited a good standard reactivity ratio (1.0). High temperature reduction lowered the reactivity (0.67) of this powder also. Other additives tried ($KMnO_4$, butyl phosphate mixtures, activated carbon, and oxalic acid) had no significant effect on the quality of powder produced.

Samples of powders produced in all runs in which no additive was used have been sent to K-25 for evaluation under their revised reactivity ratio test; reduction at 925°C. for two hours and hydrofluorination at 560°C. for three hours. In view of recent discussions with K-25 personnel, necessary modifications to the Process Chemistry reactivity ratio equipment are being made to permit making the test under these conditions. It is believed these new test conditions more nearly simulate those the powder will experience in the K-25 Feed Plant.

A miniature semi-continuous calciner has been constructed and is being tested in the laboratory. It is expected that this device will prove adequate for evaluating the effect of additives permitting more use of the three-inch diameter laboratory continuous calciner for testing of operating variables.

Further studies of heat and hydration treatments of the powder produced during Run 33 in the 321 Building 16-in. diameter calciner show that heating in nitrogen for one hour at temperatures of 400, 450 and 500°C. had little effect on the standard reactivity ratio of the powder. Partial hydration of powder from Drum 218 (by adding water slowly to the stirred powder and allowing hydration powder to stand for 48 hours) definitely improved the standard reactivity. Ratios for "as received" powders increased from 0.47 at zero to 1.04 with five weight per cent added water while milled powder ratios increased from 0.80 at zero to 1.19 for the same range of added water. The high standard ratios observed for the hydrated powders were not lowered by 800°C. reduction. Reactivity ratio tests with reduction temperatures below standard (down to 450°C.) also increased the reactivity ratios.

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Chemical Engineering Development

Continuous Calcination. The semi-plant scale continuous calciner was modified to permit greater flexibility in the independent temperature control of the feed and finishing sections, and to decrease the intermixing of powder between these sections. This was accomplished through the installation of a baffle with a variable dam opening between the last UNH feed point and the discharge dam. The exact location of the intermediate dam is 29 inches from the discharge end of the reactor. The finishing section has an independent heat supply.

Aid to the Instrument Design Unit was provided in the testing of an air-transmitter type UNH feed rotameter planned for installation on the plant continuous calciners. This test work is continuing and will be reported later.

WASTE TREATMENT DEVELOPMENT

Chemical Engineering Development

Silver Reactor Studies. Redox Plant silver reactors (24-inch diameter) are presently regenerated by spraying 10 liters of 7-molal (5.5 M) $AgNO_3$ solution over the top of the packed bed (8-ft. depth of 1/2-in. Berl saddles) and drying the packing by passage of hot air through the bed. Excess solution that leaks through the bed has been found in the Plant to be detrimental to subsequent reactor operation.

Regeneration procedures were studied by following this procedure in a 4-in. glass pipe packed 8-ft. deep with silver-nitrate-coated saddles. The following observations were made:

(1) Near the top of the column, where there is ample liquid flow to flood the packing, a "saturation zone" exists in which the packing is wet to a high degree by the regenerant solution. The height of this zone depends upon the quantity and the rate of the regenerant application.

(2) Below this "saturation zone", there is not sufficient free liquid volume and flow to maintain even wetting of the packing, and channelling occurs, leaving a considerable portion of the packing not wetted by the regenerant.

(3) The quantity of liquid effluent from the bed is not proportional to the quantity of regenerant applied because of the variable depth of the "saturation zone".

Regenerant Volume[a] Ml.	Effluent After 30 Minutes, Ml.
200	7
400	75

(a) 300 Ml. is scale-down from Plant practice.

(4) The regenerant dissolves silver nitrate from the packing and the effluent is nearly saturated, regardless of initial strength.

(5) Channelling occurs along approximately the same paths for succeeding applications of regenerant solution whether or not the packing is dried between applications.

(6) The first effluent appears within one minute after regenerant application, and continues for 10 to 20 hours unless the packing is dried.

On the basis of the studies to date, the following recommendations can be made:

(1) Employ a concentrated regenerant solution.
(2) Apply the regenerant in one shot and as rapidly as possible.
(3) Dry the packing as soon as practicable.
(4) Expect up to 500 ml. effluent per regeneration for present Redox practice.

Present Redox practice conforms very well to the above recommendations except for rapidity of regenerant application. Future work is planned on regeneration with emphasis on better spray head design and internal distribution.

MISCELLANEOUS SEPARATIONS PROCESS DEVELOPMENT

Chemical Engineering Development

Concatenated Pulse Columns. Piping fabrication has been completed to carry out a test program on concatenated pulse columns. Initial plans call for investigation of a single undersized pulse leg, two undersized pulse legs in parallel without check valves, and two undersized pulse legs equipped with opposing check valves. Pressure measurements and column observations will be made during the tests.

Continuous Uranium Dissolution. A two-inch-diameter tower-type continuous dissolver was operated using countercurrent flow of unjacketed uranium slugs and 60% nitric acid. The objective of the runs was to determine the effect of tower height on dissolution rate and product composition. As shown in the following table the performance with a 12-foot dissolving height was considerably better than with a 6 or 9-ft. dissolving height.

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CONTINUOUS URANIUM DISSOLUTION

Countercurrent flow of unjacketed uranium slugs and 60% nitric acid. The influent acid to the 2-inch-diameter tower was at the boiling point.

Acid Feed Rate, L./Hr.	Dissolving Rate, Kg. U/Hr.	Product Moles HNO_3/Mole U
	Dissolving Height = 6 Ft.	
10.0	1.7	9.9
8.2	1.6	8.0
7.2	1.5	7.3
5.5	1.4	5.2
3.8	1.2	3.5
	Dissolving Height = 9 Ft.	
10.0	1.9	7.6
8.2	2.0	6.0
7.2	2.2	4.5
5.5	2.2	2.4
3.8	1.6	1.7
	Dissolving Height = 12 Ft.	
10.3	6.7	2.3
8.3	5.9	1.1
7.8	4.8	1.9
7.2	5.2	0.7
6.7	4.0	2.1

In-Line Chemical Instrumentation

Purex Plant In-Line Monitors. Instruction classes were held with plant instrument personnel on November 15 and 22. The in-line instruments now installed or authorized for installation in the Purex Plant were functionally described and likely servicing problems were discussed. An operations and maintenance manual covering the Purex Plant instruments is about fifty per cent complete. A working copy of this manual will be available to plant personnel the first of January.

Iodine Monitor. The prototype dissolver off-gas iodine^{131} monitor at "T" Plant continued to respond rapidly to changes of radio-iodine concentration in the off-gas line monitored. In general, gross iodine emissions have been traced to operational activities such as dissolving which accounts for most emissions. Unusual operations, such as turning on silver reactor heaters after a shutdown have also caused emissions, though these are rare. Background activity remains low so long as cell flushes are employed. An interim report (HW-39966) summarizing the iodine monitor development and operation to date has been issued.

Technical Specifications. Technical Specifications for the In-Line Gamma Scintillation Monitors (HW-39821) and the In-Line Uranium Colorimeters (HW-39823) were issued during the month.

New In-Line Installations. A complete study of the analysis requirements in the Redox and Purex Plant was made with the cooperation of personnel of the two plants. As a result of this study recommendations have been made to install 15 new in-line instruments in the Redox and Purex Plants. These include: (1) colorimeters for uranium determination on the Purex IAF and 2DF feed streams, (2) gamma monitors on the Redox final uranium silica gel absorber inlet and outlet, IAFS, 2DF, 2AF, 3AF and 3BP streams, and (3) alpha scintillation monitors on the (a) Purex IAW and 2DW streams (b) Redox IOW, FO, IAW, and L-9 tanks or streams. In addition, it was recommended that one gamma spectrometer be assigned to the Redox Plant, arranged so that gamma-energy scans can be made when desired for each sampling station which is equipped with a gamma scintillation monitor.

Separations Equipment Development

Johnston P-19-7 Pump. Johnston Pump 221-U-P-19-7, a deepwell turbine pump from the TBP production plant failed after 3,179 hours of operation while pumping 60% HNO_3 at 8 gpm. against a head of 87 feet in a test designed to evaluate various bearing materials. Failure was characterized by erratic discharge rates and heads indicating one or more loosened impellers. The lower impeller was found to be free on the shaft. The tapered lock collet had loosened during operation and no longer secured the impeller. Two similar failures have occurred in production plant service within the last month.

Concurrently with the loosening of the impeller, two fiberglass filled Teflon bearings were found to be badly worn and the mating journals were deeply scored.

The pump has been reassembled with porcelain enamel, molybdenum disulfide filled Teflon and Polypence K-51 bearings for continued testing.

Corrosion Inhibitors. Additional testing to firm up the data previously obtained when aeration was employed to inhibit nitric acid corrosion has shown that the earlier data are in error. This error can be attributed to two factors: (1) the vessel had corroded through and slowly leaked solution, therefore, the tubes were subjected to a low-liquid level, and (2) the corrosion products from a Type-316 stainless steel air sparger used in the earlier tests had deposited on the heat exchanger tubes as a slime decreasing the heat transfer coefficient. The best corrosion inhibitor for nitric acid stainless steel systems found to date is urea, which decreases the corrosion of Type 347 and Type 304-L stainless steel 49 and 26 per cent, respectively.

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Materials Testing. Fluoroflex-T, a glass-cloth-reinforced Teflon pipe manufactured by the Resistoflex Corporation lost 10.8 per cent of its weight during a sixty-day exposure to boiling 60 per cent nitric acid.

Kraftkote, a casting resin manufactured by the Multiplastics Company and currently used by the 300 Area Instrument Shop, was tested by static immersion in 60 per cent nitric acid, 10 per cent nitric acid, 50 per cent caustic soda, carbon tetrachloride, tributylphosphate, and nitric acid saturated Purex organic solution (30% TBP - kerosene). The material was severely attacked by 60 per cent nitric acid after one week but was virtually unaffected by the other solutions after 48 days.

Process Planning

Three papers have been prepared for the conference on the disposal of radioactive wastes scheduled in Cincinnati on December 6 to 9, 1955. These meetings are sponsored by the Reactor Development Division of the A.E.C. and the U.S. Public Health Service. One paper entitled "Estimated Magnitude of Future Waste Disposal Problems," by D. P. Granquist and R. E. Tomlinson, presents the problem of waste disposal in a nuclear power economy from the viewpoint of the businessman, and emphasizes that adequate protection of the public health at minimum cost will be primary bases for the choice of disposal method. It is pointed out that the present method of semi-permanent storage in tanks is the only method demonstrated on a large scale, and can probably be effected at a cost equivalent to less than 1% of the cost of producing electrical power from nuclear energy. A second paper entitled "Heat Problems in Disposal of High-Level Radioactive Wastes," by E. A. Coppinger and R. E. Tomlinson, discusses the rate of heat generation that can be expected in tanks storing the fission products from the irradiated fuel of a nuclear power reactor, and reviews the limitations that this heat generation places on the disposal methods employed. A third paper entitled "The Removal of Cesium and Strontium from Radioactive Aqueous Wastes," by W. W. Schulz and T. R. McKenzie, discusses the removal of these isotopes by precipitation techniques. Test data are included under operating conditions.

Two papers are being prepared for presentation at the Arco Power Reactor Fuel Processing Symposium scheduled for January 18 thru 20, 1956, at Idaho Falls, Idaho. The first paper, HW-39884 RD, "Case Studies of Particular Reactor Fuel Cycles, Low Enrichment and Blanket Materials," by A. M. Platt discusses the processing problems and production costs associated with processing such fuels in three plants with capacities of 10, 20, and 250 tons per month, respectively. The effects of using different claddings such as zirconium, stainless steel, and aluminum are described.

The second paper, HW-39879 RD, "Present Facilities, Capabilities and Limitations, Processing of Normal and Depleted Fuels," by A. M. Platt, briefly describes the physical features of Redox and Purex (both H.A.P.O. and S.R.P.) Plants. The effects of cladding materials and enrichment levels on processing potential of the plants is noted.

CHEMICAL RESEARCH SUB-SECTION,

PUREX

Solvent Studies

It was reported last month that six impurity fractions aggregating approximately one milliliter had been isolated by chromatographic techniques from recycled Hot Semi-Works solvent (30 percent TBP - Soltrol 170 used in HSW Run PX-6). The effect of these impurities on zirconium-niobium scrubbing efficiency has been evaluated by measurement of scrubbing rate and equilibrium distribution for zirconium and niobium. For the purpose of these studies 0.1 ml of the liquid impurity fractions was spiked into 20 ml of laboratory grade 30 percent TBP - Soltrol 170. In the case of "Fraction No. 5", which is a solid, 0.1 gram of the solid was dissolved in 20 ml of 30 percent TBP - Soltrol 170. The concentrations of fractions 3, 4, and 5 in solvents prepared in this fashion are approximately 25-fold greater than the concentrations of these materials in the recycled HSW solvent from which these impurities were isolated. In the case of fractions 1 and 2, the concentration level is somewhat lower since these fractions are contaminated with unknown amounts of TBP.

Equilibrium zirconium-niobium distribution ratios obtained in batch contacts simulating the first scrub stage of a Purex HA column were as follows for the five impurity fractions tested. The spiked solvents were not washed with carbonate prior to use.

Fraction No.	E_a^o (Zr-Nb)
1	0.01
2	0.01
3	0.013
4	0.047
5	6.5 - 10
Lab 30% TBP-Soltrol 170	0.008
Recycled HSW 30% TBP-Soltrol 170 (Run PX-6)	0.02

It is apparent that fraction 5 contains a complexant which results in efficient extraction of zirconium and/or niobium into the organic phase. It is of further interest to note that zirconium and/or niobium extracted into an organic phase containing this material are stripped essentially quantitatively to the aqueous phase on contact with 0.01 M HNO_3.

Extraction of zirconium-niobium by solvents containing the fraction 5 material is much reduced by carbonate washing. Solvents spiked with the same concentration of the fraction 5 material as in the above experiment gave zirconium-niobium distribution ratios in batch contacts simulating the first scrub stage of an HA column of 0.14 after one wash with 0.5 volume of 3 percent Na_2CO_3 and 0.03 after two washes with

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3.5 volumes of 3 percent Na_2CO_3. Thus, it appears that deleterious effects arising from the fraction 5 material can be suppressed by carbonate washing but that exhaustive carbonate washing may be necessary to completely regenerate such solvents.

The fraction 5 material has not been completely characterized. It is a wax-like solid, melting with decomposition at 200 - 220 C. It is soluble in water and in methanol but is insoluble in nonpolar solvents. An oil (soluble in nonpolar solvents) separates on addition of nitric acid to a water solution of this material. The infrared spectrum of the fraction 5 material shows a phosphoryl frequency at 1250 cm^{-1} and a phosphorous ester frequency at 954 cm^{-1}. A band usually assigned to the butyl group is present at 907 cm^{-1}. Weak bands due to diluent degradation products are also present.

Additional studies are planned to characterize the Fraction 5 material further and to ascertain if this material is present in solvents from other sources, viz., recycled Hot Semi-Works 30 percent TBP - Shell E2342 and recycled 30 percent TBP - Shell E2342 solvent used in the Purex plant cold runs.

In an effort to correlate results of recent studies of the effect of solvent impurities on fission product behavior with earlier work on the chemical stability of Purex solvents, laboratory grade solvents were degraded chemically and their deterioration followed by fission product transfer rate measurements as well as by measurements of color and "C" contact Eℓ(U). To date, data are available only for 30 percent TBP - Soltrol 170. Results obtained on degrading laboratory grade 30 percent TBP - Soltrol 170 solvent by contact at 70 C with an equal volume of an aqueous phase initially six molar in nitric acid and 0.1 molar in sodium nitrite are shown in the accompanying table.

CHEMICAL DEGRADATION OF 30 PERCENT TBP - SOLTROL 170

Contact Time at 70 C (hrs)	"C" Contact Eℓ(U)	Equilibrium Eℓ (Zr-Nb)	Optical Density at 330 mμ
0	0.0008	0.008	0.1
1	0.014	0.067	20
3	0.029	--	26
5	0.034	0.085	29
23	--	--	55
27.5	0.19	0.27	58

It will be noted that all parameters measured follow similar patterns, increasing rapidly during the early stages and more slowly thereafter.

The rate of transfer of zirconium-niobium in a batch contact simulating the first stage of a Purex HA column is roughly proportional to the equilibrium distribution ratios cited above. This may be seen from the tabulation following.

For comparison results obtained in the same test with other solvents are included.

RATE OF TRANSFER OF Zr-Nb IN BATCH CONTACT SIMULATING HA COLUMN SCRUB SECTION

"Instantaneous" E_a^o(Zr-Nb)

HAP-HAS Contact Time(Sec)*	Lab Grade TBP Soltrol	HSW Rec'd TBP-Soltrol (Run PX-6)	UR Plant $R_1$00	TBP-Soltrol Degraded 1 hr at 70 C	TBP-Soltrol Degraded 5 hrs at 70 C	TBP-Soltrol Degraded 27.5 hrs at 70
5	0.57	2.3	1.47	1.8	--	19.8
15	0.16	0.45	0.91	1.05	3.1	3.8
35	0.14	0.20	0.63	0.24	1.05	0.98
60	0.063	0.082	0.36	0.18	0.49	0.98
120	0.022	0.033	0.36	0.11	0.24	0.80
300	0.008	0.038	0.16	0.094	0.13	0.30
600	--	0.020	0.13	--	0.11	0.24
Equilibrium E_a^o(Zr-Nb)	0.008	0.020	0.15	0.067	0.085	0.27

* Uranium concentrations so adjusted as to minimize uranium transfer.

It will be noted that chemical degradation of 30 percent TBP - Soltrol 170 by the described technique yields solvent of about the same quality as the recycled HSW solvent used in HSW Run PX-6 after approximately one hour's contact and of about the same quality as Uranium Recovery plant $R_1$00 after approximately five hours' contact.

The fact that chemical degradation of TBP-Soltrol solvents was found to proceed at an initially rapid rate and at a lower rate thereafter suggested that the overall rate of chemical degradation of TBP-hydrocarbon solvents could be reduced by additional purification of the diluent prior to blending with TBP. Accordingly, samples of Shell E-2342 and Soltrol 170 were purified from polar impurities by passage over a silica gel column. Those product fractions which showed no absorption in the ultraviolet were made up to 30 percent TBP with vacuum-distilled TBP. The degradation of these solvents by contact with 6 M HNO_3, 0.1 M $NaNO_2$ at 70 C was compared with that of solvents made up from the "as received" diluents. Results obtained were as follows:

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CHEMICAL DEGRADATION OF 30 PERCENT TBP-HYDROCARBON SOLVENTS PREPARED FROM PURIFIED DILUENTS

Diluent Used Preparing Solvent	Contact Time at 70 C(hrs)	"C" Contact E&(U)	Optical Density at 330 mu	M HNO_2 in Organic Method 1	M HNO_2 in Organic Method 2	M NO_2^- in Aqueous
Purified Soltrol	5	0.023	5.3	0.024	0.007	0.022
	28	0.040	21.2	0.018(?)	0.021	0.030
	47	0.034	26.9	0.050	0.026	0.031
"As Received" Soltrol	5	0.031	14.0	0.028	0.008	0.024
	28	0.059	27.6	0.018(?)	0.021	0.037
	47	0.053	35.6	0.055	0.020	0.032
Purified Shell E-2342	1	0.034	4.1	0.015	0.009	0.023
	5	0.079	22.0	0.060	0.018	0.025
	24	0.12	40.0	0.081	0.051	0.030
	48	0.14	96.0	0.127	0.008(?)	0.018(?)
"As Received" Shell E-2342	1	0.048	8.2	0.017	0.008	0.025
	5	0.089	41.6	0.049	0.018	0.034
	24	0.099	50.0	0.073	0.047	0.031
	48	0.47	124	0.129	0.007(?)	0.019(?

In these experiments, use was made of the Griess reaction (diazotization of sulfanilic acid followed by coupling with α-napthylamine) to determine nitrous acid spectrophotometrically. In "Method 1" the solvent is washed with 3 percent Na_2CO_3 solution and nitrite determined in the carbonate wash solution. In "Method 2" the analysis is performed directly on the organic sample. It is presumed that the lower values obtained by direct analysis of the organic solutions imply that a portion of the nitrous acid in the degraded solvents is bound sufficiently strongly that alkaline hydrolysis is necessary before nitrite can be freed to participate in the Griess reaction. It is of interest to note that both methods give identical results on fresh solvent immediately after equilibration with nitrous acid.

A slightly lower rate of degradation is noted for the purified diluents as compared with the "as received" diluents. However, it may be noted that the differences between the purified sample and the "as received" sample of either diluent are small compared with those between the two diluents.

It is planned to characterize these solvents also by measurement of scrub transfer rate and scrub equilibrium distribution ratios for zirconium and niobium.

The short-term effects observed in decontamination performance in the Hot Semi-Works have stimulated an interest in following the deterioration (if any) of Purex plant solvent during the cold runs. Accordingly, arrangements have been made to

obtain samples of Purex plant solvent at a frequency of one sample per run.

This solvent will be characterized by the usual solvent-quality tests and by measurements of fission product scrub transfer rate and equilibrium distribution ratio.

Results obtained to date on characterization of solvents from Purex Run AC-1 are as follows:

Sampling Point and Time	Vol. % TBP	g/l DBP	"C" Contact $E_a^o(U)$	"C" Contact $E_a(U)$ after Carbonate Wash*	g/l HNO_2 (Method 1)	Optical Density at 330
H-3 (HCW) 11/14	31.8	0.015	0.016	0.010	0.040	2.4
G-1(10F) 11/14	31.8	0.093	0.12	0.012	0.165	2.6
R-5(100) 11/14	31.5	0.042	0.023	0.011	0.007	1.7
G-7(200) 11/15	31.6	0.0054	0.011	0.011	0.007	2.5

* Measurements made after three two-minute contacts with one-volume portions of 3 percent Na_2CO_3.

The scrub transfer rate and equilibrium distribution ratios for zirconium and niobium were essentially identical for the plant HCW (after thorough carbonate washing in the laboratory) as for freshly prepared laboratory solvent.

These data indicate that little irretrievable damage to the solvent was incurred in the first cold run. It appears, however, that the solvent treatment system has bee functioning poorly from the standpoint of DBP removal.

Chemistry of Zirconium and Niobium in Purex Systems

An experimental program has been undertaken with the objective of characterizing those species of zirconium and niobium which resist separation in the Purex HA column. Studies planned include the following:

(1) Measurement of diffusivities of zirconium and niobium in organic and aqueous phases appearing at various stages in batch extraction-scrub operations simulating the operation of a Purex HA column.

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(2) Studies of the TTA extraction behavior of zirconium appearing in aqueous phases at various stages in batch extraction - scrub operations simulating the Purex HA column.

(3) Studies of the partition of zirconium and niobium between aqueous phases appearing at various stages in Purex HA column batch extraction - scrub operations and cation and anion exchange resins.

(4) Recycle of organic product solutions obtained in Purex HA column batch extraction - scrub operations to the extraction section of a cold Purex HA batch countercurrent battery. It is hoped in this fashion to map the operating diagram of the difficultly removed zirconium-niobium species throughout the extraction section of the Purex HA column.

At present this work is still in a preliminary stage. An apparatus for measurement of diffusivities has been assembled and tested by applying it to the measurement of the diffusion coefficient for cesium in 0.1 molar potassium chloride. A diffusion coefficient of 1.97×10^{-5} cm^2/sec was measured, in good agreement with the accepted value of 2.04×10^{-5} cm^2/sec. Preliminary experiments with a one-hundred fold dilution of Hot Semi-Works HAF solution indicate that adsorption of zirconium or niobium will not be serious on dri-filmed diffusion capillaries.

Preliminary ion exchange experiments confirmed that zirconium in three molar nitric acid is principally cationic in character, in agreement with McVey's observations on the complexing of zirconium by nitrate(1) and with results obtained by Lister and McDonald(2) in electromigration experiments.

Plutonium Dibutyl Phosphate Complex

Further studies have been made of the partition of the plutonium(IV) dibutyl phosphate complex(es) between aqueous nitrate solutions and carbon tetrachloride. Results obtained may be summarized as follows:

(1) Extraction of plutonium(IV) into carbon tetrachloride out of aqueous solutions initially 2.1×10^{-5} molar in plutonium(IV) and 4.2×10^{-4} molar in di-n-butyl phosphate is decreased on increasing either the acidity or the nitrate concentration.

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(1) McVey, W. H., Zirconium Chemistry - The Nitrate and Thenoyl Trifluoracetone Complexes and the Hydrolytic Species", HW-21487, June 29, 1951 (Unclassified).

(2) Lister, B. A. J., and McDonald, L. A., J. Chem. Soc. 1952, 4315.

Varying the acidity over the range 0.6 molar to 3.0 molar (keeping the ionic strength and nitrate concentration constant by addition of sodium nitrate) alters the distribution ratio (organic/aqueous) for plutonium(IV) by more than ten-fold (from the order of unity to less than 0.1). A plot of log E_a^o(Pu(IV)) vs. log (H^+) is linear with a negative slope of 1.9.

Varying the nitrate concentration from 0.6 molar to 3.0 molar (maintaining the acidity and ionic strength constant by addition of perchloric acid) decreased the plutonium(IV) distribution ratio. A plot of log E_a^o(Pu(IV)) vs. log (NO_3^-) is linear with a negative slope of 0.7.

(2) Organic-favoring complexes predominate at high DBP to plutonium(IV) ratios. The distribution ratio (organic/aqueous) for plutonium(IV) out of a solution 1.0 molar in nitric acid and initially 4.6×10^{-6} molar in plutonium(IV) increased from the order of 0.01 to about 300 as the di-n-butyl phosphate concentration was varied from 10^{-4} molar to 4.5×10^{-3} molar. A plot of log E_a^o(Pu(IV)) vs. the logarithym of the DBP concentration is not linear but has a steadily decreasing positive slope.

(3) The distribution of plutonium(IV) dibutyl phosphate complexes between aqueous nitric acid solutions and carbon tetrachloride is also influenced by the plutonium(IV) concentration(!). Increasing the plutonium(IV) concentration from 8.4×10^{-7} molar to 3×10^{-5} molar with the DBP concentration held constant at 4.6×10^{-4} molar increases the plutonium(IV) distribution ratio (organic/aqueous) out of 1.0 molar nitric acid into carbon tetrachloride from 1.1 to 25.

NEW PROCESSES

Ion Exchange Studies

Application of a uranyl hydrogen phosphate "exchanger" to the removal of zirconium and niobium from Purex HAP resulting from a Purex HA Mini run gave an overall gamma decontamination factor of approximately 3. During the period of steady state operation zirconium-niobium decontamination factors were in the range 6 to 7. No decontamination from ruthenium was obtained.

The column employed for this experiment was 1.0 cm in diameter by 10.0 cm long and contained 8.76 grams of powdered silica coated with 0.41 grams UO_2HPO_4. The column holdup was determined to be 2.5 ml. The attainable flow for the organic HAP solution through this column was low (only 8 ml/hr) but even so the removal of zirconium and niobium appears to be rate-limited. This is inferred from the fact that the first two 2 ml portions of effluent collected after a sixty hour shutdown in the middle of the run showed decontamination factors of 13 and 37, respectively, significantly higher than those obtained during steady-state operation.

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Further studies of this operation will seek to determine the equilibrium distribution for zirconium-niobium between HAP and such solid phases and variables (e.g. temperature) influencing the rate of approach to equilibrium.

WASTE TREATMENT

Silver Reactor

Reductions in the specific activity of gaseous iodine of a hundred-fold or greater were obtained in preliminary testing of isotopic exchange as a means of reducing dissolver off-gas radio-iodine content below tolerance levels. A series of experiments was performed with laboratory-scale silver iodide exchange columns varying iodine concentration, nitrogen dioxide concentration and temperature of the air stream. The two columns used were (A) 1.8 cm in diameter by 20 cm long, packed with 1/8" Berl saddles coated with silver iodide (8.2 mg/cc) and (B) 1.8 cm in diameter by 16 cm long, packed with silver iodide deposited throughout high porosity tabular alundum (105 mg/cc).

ISOTOPIC EXCHANGE OF RADIO-IODINE WITH SILVER IODIDE

Column	Temperature (deg. C)	Gas Velocity (cm/sec)	NO_2 Conc. (percent)	Inlet I_2 Conc. (g/ft^3)	I-131 DF
A	320	10	0	0.16	220
A	320	15	14	0.12	10,000
B	350	22	5	1.6×10^{-7}	45
B	350	19	15	7.5×10^{-7}	350
B	250	19	15	7.5×10^{-7}	290

Although insufficient experiments have been completed to permit definite conclusions, tentatively there appears no great dependence on packing, temperature, or iodine and nitrogen dioxide concentration. Most important, substantial I-131 decontamination (i.e. reduction in iodine specific activity) was achieved on gas streams containing extremely small iodine concentrations in the presence of nitrogen dioxide by a relatively short silver iodide bed. As reported last month, iodine concentrations in the 10^{-7} to 10^{-6} g/ft^3 range were obtained as effluents from laboratory silver nitrate reactors in the presence of nitrogen dioxide. Thus, incremental I-131 decontamination factors required to achieve the specification of 1 curie/day would be in the order of 5 to 100, well within those promised by these initial experiments.

Additional investigation of the effect of nitrogen dioxide on the removal of iodine from a silver nitrate reactor confirms the preliminary observation that iodine pressure increases with the square of the nitrogen dioxide concentration. Variation of iodine removal with gas flow rate was anomalous, i.e. iodine removal increased with flow rate, perhaps due to suspension of particulate matter at high flows. The second power dependence of iodine on nitrogen dioxide concentration is based on results obtained at the lowest flow rates which should be closest to equilibrium.

Cesium Removal from Purex Waste

Several cesium recovery runs have been made using as feed material Purex HAW obtained from Mini operations (300 MWD/T, 200 day cooled). Recoveries in excess of 97 percent were obtained on scavenging with 0.005 M nickel ferrocyanide. These recoveries were unaffected by urea concentration (0 to 0.05 M, added to destroy nitrite as indicated in tracer runs) and also were independent of time between scavenger reagent addition and centrifugation or time between centrifugation and sampling (5 min. to 24 hrs).

Cesium recovery with 0.05 M ferric ferrocyanide was consistently lower, being approximately 75 to 90 percent. Again, recoveries were independent of urea concentration and time between centrifugation and sampling. Reducing the time between scavenger reagent addition and centrifugation below 15 minutes does significantly reduce the cesium scavenging ($<$ 30 percent at 5 minutes, for example). The color of both the precipitate and supernate indicate that oxidation of ferrocyanide to ferricyanide is not excessive.

The time independence with either ferric or nickel ferrocyanide scavenging indicates that radiation damage of the precipitate is not appreciable (or rapidly reaches a steady state). However, for reason(s) not yet understood the cesium decontamination factors are significantly lower than those previously observed in tracer experiments: 30 to 60 vs $\geq$ 500 with nickel ferrocyanide and 4 to 10 vs. $\geq$ 200 with ferric ferrocyanide.

The ferrocyanide precipitates from the above runs contained, in addition to the cesium, about 5 percent of the total zirconium-niobium activity and 3 percent of the total cerium-praseodymium activity. The extent of ruthenium carrying was not determined. Cesium recovered (ca. 95 percent) from the precipitates by leaching with caustic solution contained only a trace of zirconium-niobium and cerium-praseodymium, but appreciable amounts of ruthenium-rhodium. Evaporating the hydroxide supernate to dryness and fuming with perchloric acid to remove ruthenium yielded a radio-cesium product containing only minor amounts of other radioisotopes ($\leq$ 5 percent of the cesium activity).

Cesium and Strontium Removal from Redox Wastes

A simplified decontamination flowsheet was tested on simulated Redox D-13 waste (pooled, unconcentrated waste, single back-cycle). The three successive steps involved scavenging with (1) 0.02 M ferric ferrocyanide at low pH for primary cesium removal, (2) ferric hydroxide at high pH for primary strontium removal, and (3) 0.005 M nickel ferrocyanide for combined cesium and strontium clean-up.

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DECONTAMINATION OF REDOX D-13

Step	1	2	3	Total
Cs-137 D.F.	100	1	2.0	200
Sr-90 D.F.	1.2	280	12	4.2×10^3
Precipitate volume gal/ton U	200	120	<20	--

The strontium decontamination attained is quite promising, approaching the 5×10^3 factor required to reduce the radio-strontium content to 0.1 uc/cc. However, the scavenging precipitate volumes are quite large and the cesium decontamination achieved in the third step is much lower than expected, perhaps due to an excessively high pH. These points are the subject of further investigation.

Radiation Chemistry

Since hydrogen and oxygen are both produced from the radiolysis of aqueous solutions, the presence of hydrogen gas in waste storage tanks would be expected. If the hydrogen concentration were to exceed four percent, there would be a serious explosion hazard. However, none has been detected in samples taken from tanks currently being filled. The inference is that the gas is being effectively swept out by air and steam circulation above the liquid or that the hydrogen atoms are reoxidized by some component in solution before they escape as gaseous hydrogen. Assuming the former is largely responsible, then older tanks containing a more stagnant atmosphere might have more hydrogen present.

Gas samples were obtained from Redox tanks, one of which had been filled, self-concentrated, and re-filled, and the other filled in cascade from the first. The first tank was boiling at the time of sampling, the second was not. Although not the optimum condition for high hydrogen content, some would be expected. In each case the hydrogen was found to be less than 0.01 percent. An interesting observation was that the oxygen nitrogen ratio in the gas from the first tank was 24 percent higher than in air while that from the second was 8 percent lower. From the drop in argon concentration in the first sample, one may conclude that the air was diluted with nearly pure oxygen.

A synthetic waste (a saturated solution of sodium nitrate and sodium aluminate) exposed to about 10^6 r with the Co-60 radiation facility yielded a low oxygen nitrogen ratio while one diluted with four volumes of water yielded a high ratio. In both cases the hydrogen yield was about 0.006 cc of gas per ml of solution, a significant amount but less than would be expected for ordinary dilute aqueous solutions.

Since the possible consequences of radiolysis in concentrated solution could be important and since little information exists on this subject, studies are being planned to determine the reactions occuring in waste solutions as a result of

radiation.

A rough calibration has been made for one sample position in the Co-60 radiation facility. Using the most active source (about 500 curies) a 25 ml sample in the turntable will receive a dose rate of about 3×10^5 r/hr. Larger samples may be employed at higher radiation levels at some sacrifice of uniformity. This dose rate is roughly 10-20 times the maximum expected in an extraction column or a waste storage tank. Use of the other sources (100, 50, and 2 curies) will give correspondingly lower rates. An adequate range for many chemical studies is 10^3 to 10^5 r/hr.

Ruthenium Chemistry

The effect of homogeneous sulfide precipitation of ruthenium from dissolver solution on subsequent solvent extraction behavior of plutonium has been investigated in a Redox system and appears not to be deleterious. A simulated dissolver solution (2 M UNH, 0.2 M HNO_3, 0.05 g/l $K_4Ru(NO_2)_6$, 0.4 g/l Pu) was made to contain 0.05 M sulfamic acid, 0.010 M $Cu(NO_3)_2$ and 0.011 M thioacetamide. This solution was heated at boiling for 15 minutes, cooled, and centrifuged. The supernatant solution was adjusted to -0.2 M HNO_3, 0.1 M $Na_2Cr_2O_7$, and boiled with reflux for four hours to oxidize the plutonium to Pu(VI). From the resulting solution, a IAFS feed (1.0 M UNH, -0.27 M HNO_3, 1.15 M ANN, 0.05 M $Na_2Cr_2O_7$, 0.2 g/l Pu(VI)) was prepared and extracted with five successive portions of freshly distilled hexone. The hexone had been previously equilibrated with a 1.2 M ANN, -0.2 M HNO_3 solution and was used at a 3:1 volume ratio with respect to the IAFS. After five extractions, the aqueous phase retained 0.023 percent of the original plutonium in the case of head-end treated dissolver solution as compared to 0.019 percent in the case of an untreated control. Although this indicates that the plutonium was extractable as required, plutonium material balances in the individual extractions were poor and the experiment is being repeated.

No new alternate sulfide precipitants have been found. Ferrous sulfide dissolves in simulated dissolver solution but does not cause copper sulfide precipitation. Apparently the high uranyl nitrate concentration of dissolver solution oxidizes the sulfide to sulfate or some other soluble sulfur ion before copper sulfide can form.

Radiochemistry

Uranium solution and americium counting standards have been prepared, checked and shipped to the laboratories participating in the Bluenose program. Further laboratory work on this problem awaits receipt of samples for analysis.

Continued investigation of the gas scintillation fission counter indicate operability under a variety of conditions, some not considered possible previously.

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For precision performance, as desired for plutonium isotope ratio measurement, counter chamber variables thought to have the greatest effect are as follows:

Gas - Although pure helium or argon are not suitable, addition of nitrogen (0.1-0.2 percent with helium, 10 percent with argon) makes them operable. Apparently the nitrogen acts as a wave length "converter", transforming the ultra-violet to radiation visible by the photomultiplier tube. Other concentrations of nitrogen than those cited, and any quantity of oxygen (air) worsen the gas performance. The helium-base mixture seems preferable to the argon-base.

Phosphor - The tetraphenyl butadiene-styrene mixture originally intended as converter on the chamber wall has not been effective. With the optimum rare gas-nitrogen mixtures in the chamber, the fission counter has behaved as well without as with the phosphor present. Cooling the phosphor to 0 C, as suggested in the literature, has not improved performance.

Dimensions - Chamber dimensions appear to affect the slope of the fission plateau, implying that the fission fragment range in helium is smaller than predicted. Since a plateau with minimum slope is desired for precision fission counting, further investigation of optimum chamber dimensions is in progress to provide a sound basis for the five-chamber unit design.

URANIUM PROCESSING

Uranium Reduction

The study of the reduction of uranium trioxide by calcium metal was continued. Several experiments were performed to duplicate the 35 percent metal yield previously reported; however, a reproducible yield of only 26 percent was obtained. Several variations in conditions were made in an attempt to isolate the sensitive variable; calcium excesses of 10 and 50 percent were used, the calcium chloride barrier layer was added either as non-dried or dry molten salt, and both hydrated calcium chloride and hydrated uranium trioxide were tried. The button of best appearance resulted from a charge consisting of a layer of calcium (150 mole percent with respect to uranium trioxide) overlaid with non-dried calcium chloride and a barrier layer of molten calcium chloride (ratio of total $CaCl_2$ to UO_3, 1.33) which separated the oxide from the reducing agent.

The use of some new crucibles composed of calcium oxide containing two weight percent calcium fluoride resulted in massive metal yields poorer than those obtained using magnesia crucibles. This is somewhat surprising since the use of calcia prevents the reaction

$$U + 2MgO \rightarrow UO_2 + 2Mg$$

which proceeds readily above 1400 K and is believed to be partially responsible for low massive metal yields when magnesia crucibles are used.

Chemical Preparation of Uranium(IV) Fluorides

The previously reported process for removing contaminant iron from uranium fluorides produced by iron(II) reduction of uranyl compounds has been tested experimentally in two runs. Sodium uranium fluoride was precipitated from 500 ml of solution containing 0.24 molar uranyl nitrate and 0.42 molar sodium sulfate by the slow addition of 250 ml of solution 1.2 molar in ferrous chloride and six molar in hydrofluoric acid. Two-thirds of the washed precipitate was stirred with 500 ml of one molar sodium hydroxide, yielding a dark brown precipitate of uranic hydroxide (?) which exhibited good washing and settling properties. This material was washed by decantation and then dissolved in 100 ml of 7.2 molar sulfuric acid. After addition of 0.21 moles of sodium sulfate, the sodium-uranium double salt was reprecipitated by the addition of 300 ml of three molar hydrofluoric acid to the boiling solution. The initially precipitated double salt contained about 0.16 percent iron (2400 parts per million parts of uranium). After metathesis and reprecipitation the iron content was about 0.02 percent (300 parts per million parts of uranium).

Flurex Process

Initial experiments to determine the permselectivity of the Flurex Process ion exchange membranes have been concerned with the Amberplex A-1 (anion permeable) membrane. The transference number of nitrate ion in this membrane was found to be lower than expected; 0.37 with 0.5 molar nitric acid as both the catholyte and the anolyte and 0.74 with 0.1 molar nitric acid as both electrolytes. That this low transference number is due to the competition of the highly mobile hydrogen ion was confirmed by an experiment in which 0.5 molar nitric acid was used as the catholyte but 0.5 molar potassium hydroxide was used as the anolyte. In this case (where potassium ion and nitrate ion compete rather than hydrogen ion and nitrate ion) the nitrate ion transference number was 0.94. The permselectivity of the membrane for nitrate ion is therefore controlled by the acidity of the anolyte. Overall process conditions will dictate the extent to which loss of anion permselectivity can be tolerated. The behavior of fission products in Flurex type systems has been investigated in two batch runs using as feed solutions dissolver solution diluted 1:100 (Run 1) and 1:10,000 (Run 2) with 0.2 molar uranyl nitrate solution. Table I portrays the fission product distributions at the termination of each run. The following conclusions may be drawn from the data of these two runs.

(1) A fission product decontamination factor of greater than 100 has been effected for uranium. The final product of Run 2 contained 21 times the gamma activity of natural uranium; cerium, zirconium-niobium, and ruthenium accounted for this activity in the ratio of 20 to 2 to 1.

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Decontamination from those fission products expected to be present after a single solvent extraction cycle (zirconium, niobium, and ruthenium) appears to be excellent.

(2) The behavior of zirconium-niobium is extremely interesting. In Run 2 after 30 minutes the catholyte activity was measured at greater than 10^5 γ/m,ml. It then dropped steadily reaching a uniform value of about 10^4 γ/m, ml after three hours. A possible explanation is that the initial surge is due to a highly cationic species that readily penetrates the membrane. This is followed by a second species which enters the catholyte at a much slower rate. Removal of zirconium-niobium occurs through an electrode process and by precipitation with the double salt. A comparison of the gamma activity distribution between anion membrane and anolyte for runs 1 and 2 implies either a slow penetration of the gamma emitter (probably zirconium-niobium) or a slow conversion on the membrane to a permeable species.

(3) Activity on the anion exchange membranes was mostly due to zirconium-niobium while that on the cation membrane was largely cerium. Ruthenium was found on both but to a lesser extent.

(4) Cerium was present in the anolyte(!), but not in the catholyte. This was apparently due to its deposition on the platinum cathode, and to a lesser extent its precipiation with the $NaUF_5$ product.

(5) Zirconium-niobium favored the anolyte over the catholyte by a factor of about 20.

TABLE I
FISSION PRODUCT MATERIAL BALANCE - FLUREX RUNS 1 & 2

	Gross Gamma Activity			
	Run 1(1)		Run 2(2)	
	γ/min	%	γ/min	%
In feed initially	1.06×10^{10}	100	7.88×10^7	100
After electrolysis:				
Feed	3.5×10^8	3.3	5.3×10^6	6.8
Anolyte	1.6×10^9	15	4.2×10^7	53.3
Catholyte	3.7×10^8	3.5	3.5×10^6	4.5
Anion permeable membrane	4.3×10^9	40.4	4.74×10^6	6.0
Cation permeable membrane	1.1×10^9	10.1	1.53×10^7	19.4
Electrodes	--	27(3)	--	10.6(3)
Product ($NaUF_5$)	--	<1	4.4×10^5	0.56

- - - - - - - - -
(1) After three hours
(2) After eight hours
(3) By difference

ISOTOPE SEPARATION

Thermal Diffusion

The first thermal diffusion experiment has been completed making use of a refrigerated glycol solution. Using the uranyl nitrate tributyl phosphate system, a twelve day run was made at an average steam temperature of 116 C and average coolant temperature of -15 C. The heat consumption was 12 percent higher than in earlier runs and resulted in a separation after 11 to 12 days equal to that previously obtained in 32 to 34 days. Extrapolation of the data indicate a higher steady-state separation value. This point is being checked by a current experiment of hopefully longer duration.

Electromigration in Aqueous Systems

The 290 hour run previously reported resulted in borderline enrichments of uranium-235 in the cathode region and similar depletions in the anode region.

ANALYTICAL DEVELOPMENT

Studies of UO_3 properties continue by means of measurements of surface areas, x-ray diffraction patterns, and properties of the reduction product, UO_2. Samples of a particularly reactive UO_3 (by the standard laboratory test) were reduced to UO_2 at 590 C and 800 C. The x-ray diffraction patterns corresponded with that of normal UO_2, and they were identical except for considerable nonsymmetrical line broadening in the case of the reduction product obtained at 800 C. This unexpected result indicates crystal strain, and hydrofluorination rate tests will be made to check for an effect on reactivity.

A specimen of red UO_3 prepared by rapid calcination at 550 C at the K-25 laboratories was obtained for comparison with similar materials prepared locally. This UO_3 is designated as Type II and is about equal in reactivity to the Mallinckrodt standard.

A study of the ceric ion oxidation method in the coulometric titration of plutonium was nearly completed. The desired precision (apparent standard deviation) of 0.25 percent was obtained, but the conditions were rather critical. Several alterations remain to be tested, and further work will include comparisons between the ceric and permanganate oxidation methods.

A routine procedure for the determination of chromium, nickel, iron and zirconium in pile coolant was established. The boil-down spectrographic method mentioned last month was adapted successfully by locating a suitable silicone grease for coating the graphite electrodes so that the acidic concentrated sample can be evaporated on the electrode, and by establishing a limited acid concentration range.

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A new set of standard plates for the spectrographic analysis of plutonium was made, and the errors mentioned last month were eliminated. Tests of the extraction procedure were completed, and this method is also ready for routine application. Normally, seven elements in plutonium can be determined quantitatively and 24 elements semiquantitatively. The precision (standard deviation) for a quantitative determination will be between ± 5 and ± 20 percent, depending upon the element. A summary of the above work is being reported in Document HW-39958.

A prototype model of a direct reading adapter for the Jarrell-Ash spectrograph, which was designed on site, was received from the shops, and it is being wired and installed for testing.

Some difficulty in determining cesium-137 is common in plant waste solutions (cribbed supernates) where high ruthenium-106 interferes. Because of this a study of methods for removing the ruthenium is being made. Fuming perchloric acid oxidation(volatilizing ruthenium tetroxide) is effective, but since the use of perchloric acid in the plant control laboratories is discouraged, other oxidants are being tested. The most effective of the weak oxidants (periodate) resulted in a decontamination factor of only about ten. Several carrier precipitants, such as ferric sulfide, were also found unsatisfactory.

A study of gamma counting as a method for the determination of uranium-235 in slightly enriched uranium HAPO fuel elements was completed, and a subject report, HW-39939, is being issued. Using standard slugs for calibration, the method can yield results within ± 0.03 weight percent U-235 in a one-hour gamma count at a selected gamma energy. The ultimate precision is about ± 0.01 percent, obtainable by means of longer counting times. The method is slightly more precise than the spectrographic method presently used for the isotopic analysis of "I" slugs.

A study of techniques important to polarography for rapid oxygen removal from solutions by inert gas sparging was concluded, and a report is being prepared. It was found that two minutes of gas sparging from a fritted gas distributor is more effective than 45 minutes of bubbling without the frit.

The x-ray photometer which has been fabricated for the Purex laboratory by the technical shops was tested during the month. The instrument compares very favorably in all performance characteristics with the prototype, and at month's end, it is ready to deliver to the laboratory. As-built prints and an instruction manual are being prepared.

Five uranium standards for fluorimetric and x-ray photometric methods testing and calibration were prepared for the Analytical Laboratories Unit. In addition, considerable progress has been made in the preparation of standard plutonium solutions. The purification of about four grams of plutonium nitrate has been nearly completed.

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IN-LINE ANALYSIS

The studies with a medium scanning rate polarograph of various capillary designs with slow dropping rates and of static micromercury electrodes have been essentially completed. Some of the electrodes studied offer practical advantages in in-line analysis. The diffusion currents obtained have not been treated theoretically, but the electrodes can be calibrated, yield conventional half-wave potentials, and are as sensitive and precise as the conventional dropping mercury electrode. A subject report is being prepared.

A new in-line uranium photometer sensing unit has been designed, and a prototype has been built for test in the Hot Semi-Works. The unit incorporates the new components discussed in last month's report and will be installed as a single-point recording unit with automatic standardization. The photometer will be about three times more sensitive for uranium and will be less subject to errors due to the solvent color than the present standard unit.

A laboratory study of americium-241 as a gamma absorptometer source material was concluded, and a subject report, HW-39971, is being issued. The use of americium-241 for the determination of plutonium or uranium improves the sensitivity of this method by a factor of two over that obtainable using a thulium-170 source. The longer half-life of americium-241 provides another advantage. The major disadvantage encountered in the use of americium-241 in this technique is a low photon intensity. The largest practical americium source is about 200 milligrams because of the limitation imposed by self-absorption. This factor restricts one to the use of the absorptometer for concentrations of uranium or plutonium no greater than 100 grams per liter.

Miscellaneous activities in the in-line analysis program include the completion of Chapter IV and the revision of Chapter VI of the Operation and Maintenance Manual for the Hot Semi-Works instruments, the assistance in the design of an in-line gamma absorptometer monitor and an in-line uranium photometer for the Purex Plant, and the design of Purex gamma monitor alterations to permit routine calibrations with an oscilloscope while retaining a range up to 5000 times the sensing unit background. The Uranium Recovery plant gamma monitor changes are nearly complete, and the electronics have been tested. A written proposal for testing a galvanic-cell type analyzer which was developed in the unit laboratories on a pile gas stream is being prepared. The design concept of an air operated sampling pump for plant sampling applications was sketched for study purposes.

A promising technique for making zinc-sulfide scintillation screens for liquid-contact alpha counting was tested during the month. A Kel-F bond and a hot-molding technique was used to apply a thin Teflon film to the phosphor screen on a glass backing plate. The pulse amplitude and counting rate for a given alpha source are nearly 60 percent of that for a top grade, uncovered scintillation screen.

LABORATORY SERVICES

Activities of Laboratory Services Personnel for November may be summarized as follows:

One hundred and twenty thousand gallons of "crib" level waste were transported to 200 SL cribs in West Area for disposal. In addition, three million gallons of "retention" level waste were discharged to ground at the 300 Area.

Approximately 100 hours of overtime was worked by Laboratory Services personnel during November to provide extra service for the disposal of waste generated during a special decontamination project in the 327 Building, to overcome difficulties caused by the freeze-up of "crib" waste transportation tanks during the cold weather, and to compensate for the lack of one of the crib waste transportation tractors which was out of service during the entire month. In addition, larger volumes of "crib" waste are being received from 327 Building since the addition of a full swing shift crew in that building.

Manufacturing personnel have been contacted and requested to investigate the possibilities of installing another drain header at 200 SL cribs. This would expedite the movement of crib waste by allowing both crib trailers to be emptied at the same time. At present, only one can be emptied and it has sometimes been necessary to hold the second trailer over into the next shift in order to empty it

Work was started on a second pipe field at 300 North Burial Ground. This field will consist of about 20 culvert pipes set vertically in the ground. High level waste will be discharged into these pipes, and wet mixes of concrete added. Experience has shown this to be an economical and safe method of high level waste disposal.

A work order has been issued to cover boxes in the 300 North Burial Ground with dirt. This should lessen the fire hazard, prevent the spread of contamination, and reduce field readings which are becoming quite high in the vicinity of the pit.

All other building services, laundry, and waste disposal functions were accomplished in a routine manner.

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ANALYTICAL LABORATORIES UNIT,

General Chemical Laboratory

The major portion of the work load for the Laboratory was in support of testing "anti-back mixing bubble caps" in the cold semi works operation. Analytical requirements included a continuation of sodium analysis on a controlled basis, in both organic and aqueous phase samples.

An investigation was conducted for the determination of carbon in calcium metal employing the evolution technique and utilizing an induction furnace. Previous methods depended upon oxidation of the carbon by an air-oxygen mixture and without fluxing the calcium metal. Significant improvements were noted by carrying out the ignition in an atmosphere of pure oxygen when the metal was fluxed with tin. This modification elminated a high residual blank which was difficult to lower and/or remove.

Two methods have been selected from the literature for determination of oxygen in uranium dioxide. The assembly of apparatus for testing one of the methods, evolution of oxide as CO_2 when heated in an atmosphere of carbon monoxide, is underway. Determination of density of uranium dioxide pieces by mercury displacement and improvements in this measurement are being made currently.

Radiochemical Laboratory

Increased interest in uranium burn-up measurements, as reported in last months report, resulted when two HAPO samples were shown to have received exposures of a factor of 2 higher than shown by conventional means of measurement. The method as employed appears to be more accurate and reliable than previous methods utilized. Errors in the method appear to be less than three (3) per cent.

Krypton (as a fission product) in metals is of interest to Metallurgists. To establish an analytical method for the determination of this element, ampoules containing helium spiked with krypton were irradiated and an attempt was made to measure Kr-85 direct by gamma scanning. During irradiation, the quartz ampoules acquired considerable beta activity from Si-31 and some high energy gamma activity from Na-24 both of which completely obscured the 0.15 Mev gamma of Kr-85. A gas transfer apparatus was built for transferring the helium plus Kr-85 from the ampoules to cold vessels for scanning. Excellent results were obtained including a confirmation of 4.4 hour half-life for Kr-85.

Modifications giving shorter time cycle and increased safety have been worked into the analytical ruthenium chemical separation method. Perchloric acid has been replaced by periodic acid with no increase in cost, shorter distillation time required, more rapid exchange between active ruthenium and carrier, and less chance for explosion if organics are inadvertently present. The ruthenium oxide distillate is trapped in 6 M HCl and reduced directly with magnesium to ruthenium metal. There modifications have been successful for a variety of types of samples thus far, and performance testing over long use is now in progress.

Spectrochemical Laboratory

Routine sample analysis and preparation of an Analytical Manual proceeded in the Spectrochemical Laboratory.

Considerable time and effort were spent in the interpretation of rare earths spectra in connection with utilization of rare earths as a stand-in for plutonium in research investigations.

Mass Spectrometry Laboratory

All mass spectrometers operated routinely throughout the month. In addition to regular 100 Areas pile gas and essential material gases, sample analysis on the General Electric and Consolidated-Nier instruments included dissolved gases in KAPL-120 Coolant, gallium chloride, off-gas from metals by vacuum fusion, and other miscellaneous gas samples.

U-235 measurements in support of isotopic enrichment studies continued. A sample taken from the 300 Area retention basin was analyzed for 235 content after separation and purification. Weekend coverage of the mass spectrometers was reduced from one inspection every 24 hours to one inspection per weekend. Indications are that this reduced coverage is sufficient.

A General Electric Ion Resonance mass spectrometer was received and preparations are being made to assist in setting up, calibrating, and operating this instrument.

Water Quality Laboratory

A marked increase in the workload of the Water Quality Laboratory resulted from increased activity of the 1706-KE semi works and the start up of routine sampling of the KAPL-120 Loop.

Studies of the cationic exchange resin (Dowex 50) columns for concentrating impurities in water samples on a laboratory scale were discontinued due to the fact that chromium was not being scavenged from the process water samples and iron recoveries were erratic. Further studies will be made spectrographically on samples concentrated by the boil-down procedure.

Work Volume statistics for the Analytical Laboratories Unit are as follows:

	OCTOBER		NOVEMBER	
	No. of Samples	No. of Determinations	No. of Samples	No. of Determinations
Research and Development				
Pile Technology				
Metallurgy Research	32	263	63	221
Pile Engineering	0	0	2	7
Pile Materials	43	946	202	957
Fuel Technology	31	580	37	538
Separations Technology				
Chemical Research	295	559	676	1453
Chemical Development	1110	1883	722	1575
Plant Processes	57	147	108	124
Process Technology	547	1861	460	2476
Other Customers	90	456	73	400
Total	2205	6695	2343	7751

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TECHNICAL SHOPS UNIT

Mechanical Shops

Four machinist journeymen were hired during the month bringing the force to within two of the desired complement. This has assisted in decreasing the backlog from approximately 12,000 hours to approximately 10,000 hours. 1411 hours of overtime were worked during the month to complete the more urgent projects.

A review of the shops accounting practice is in progress at this time. This review is being conducted with the assistance of the Auditing Section for the purpose of assuring the shop management that the practices which are followed are acceptable and well tailored to Hanford operation.

Buildings and Grounds

Project CG-576, "General Improvements to the Laboratory Area Buildings" was 89% complete at months end. The tensile tester shielding cell was still the outstanding item.

The project proposal for ER-3124 "Graphite Machining Facility" has been approved up to the Appropriations Unit.

The project proposal for Alterations to the Laboratory Area Buildings ER-3135 is about 30% complete.

The first of the Technical Shops Safe Procedures Forums was held this month. The subject, "Heat Treating" was discussed by a panel made up of a machinist from the shop, a chemist, two metallurgists, a metallurgical engineer, and a safety engineer. The Buildings and Grounds engineer acted as moderator. The purpose of the forum is to develop recommendations for shop safety rules.

The Buildings and Grounds engineer was appointed H.A.P.O.'s representative for the Hot Lab. Committee vice L. D. Turner.

Drafting and Design

Total productive man-hours for the month were 2845 including 80 hours overtime. This included the productive time of two men on loan from the Graphics Unit and one man from the Design Section. Work continued on the 4X prototype installation in the 200 Area, and the vacuum welding box for the Metallurgy group. A new project started during the month is the vacuum rolling mill which is being designed for the 231-Z Building.

Glass Shop

The light work load experienced during the month permitted the commencement of many of the jobs shortly after their arrival in the shop. Total productive man-hours were 1046 with no overtime being necessary. 148 jobs were processed during the month which included 13 quartz fabrications.

Photo Laboratory

Operation was normal during the month with all orders for photography work completed as requested.

CONTACT ENGINEERING UNIT

Delivery of the prototype continuous calciner trough assembly has been delayed owing to metallurgical problems which became apparent after heat treatment. Shipment of the furnace unit was made at the end of the month by the vendor.

A recommendation that acid recovery and caustic scrubbing be adopted for the auxiliary I-131 control method at Purex was forwarded to the Design Section. This method is favored in lieu of auxiliary heater-silver nitrate reactor equipment because recent Chemical Research data indicate that the 1961 goal emission requirements may not be met by using additional silver nitrate reactors. Other possible high-efficiency reactor alternate methods felt to be within accomplishment of development were revealed in the Chemical Research studies, but would require time in excess of that allowed to fill the immediate needs for improved I-131 emission control at Purex.

Purex Run Plans AC-3 and AC-4 (HW-39845 and HW-40163) were issued as part of the cold uranium shakedown operations program.

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 November, 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.

Inventor(s)	Title
R. H. Moore	"A Method for Preparing High Flow Beds from Reactive Adsorbents"

R.B. Richards

Manager, Separations Technology
ENGINEERING DEPARTMENT

RB Richards:khs

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MONTHLY REPORT
DESIGN SECTION

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VISITORS AND BUSINESS TRIPS

Henry Webber of the Republic Flow Meter Company, Seattle, Washington visited Hanford October 31st through November 4th to check performance of boiler instrumentation in the 165-K Building and to review Purex Plant instrumentation.

R. L. Tower of the Tower Equipment Company, Mercer Island, Washington visited Hanford November 11th for inspection of Process Tube Mock-up instrumentation.

A. F. Sperry of Panellit, Incorporated, Skokie, Illinois visited Hanford November 21st through November 23rd for consultation on reactor pressure and temperature monitor problems.

R. L. Tower of the Tower Equipment Company, Mercer Island, Washington visited Hanford November 21st through November 23rd for consultation on reactor pressure and temperature monitor problems.

C. S. Slenning of the Brown Instrument Company, Richland, Washington visited Hanford November 28th for consultation on instrumentation for Purex heating and ventilation.

B. O. Shaver visited the Argonne National Laboratory, Chicago, Illinois November 1st through November 5th to attend the Fourth AEC Air Cleaning Conference.

L. E. Kusler visited the Carborundum Metals, Akron, New York, Nuclear Metals, Boston, Massachusetts, Allegheny Ludlum, Waterveliet, New York, Superior Tube, Norristown, Pennsylvania, Allegheny Ludlum, Pittsburgh, Pennsylvania, AEC, Pittsburgh, Pennsylvania November 3rd through November 11th to discuss zirconium fabrication techniques.

W. R. Thorson visited the General Electric Company, Schenectady, New York November 7th through November 18th to witness tests on electrical furnaces for UO_3 Plant.

C. A. Rohrmann visited Washington State College, Pullman, Washington November 8th to present a technical paper.

R. S. Peterson visited the George Scherr and Company, New York City, New York, The American SIP, New York City, New York, Moore Machinery Company, Bridgeport, Connecticut, Pratt Whitney, Hartford, Connecticut and the ASME Convention, Chicago, Illinois November 8th through November 18th to check on equipment for neutron spectrometer and attend the ASME Meeting.

E. R. Rudock visited the Resistoflex Corporation, Newark, New Jersey November 9th through November 14th to establish procurement specifications for reactor flexible connectors.

W. A. Richards visited Panellit, Incorporated, Skokie, Illinois, Foxboro Company, Foxboro, Massachusetts, Lewis Engineering Company, Naugatock, Connecticut, Revere Corporation of America, Wallingford, Connecticut, General Electric Company, Bridgeport, Connecticut and Hoke, Incorporated, Englewood, New Jersey, Thomas A. Edison Company, West Orange, New Jersey, Royson Engineering Company, Hatboro, Connecticut, Automation Exposition, Chicago, Illinois November 12th through November 23rd for instrument consultation on Reactor Plant Modification Program and Temperature Monitoring for 100-K.

R. R. Cone visited the Fischer-Porter Company, Hatboro, Pennsylvania, General Electric Company, Schenectady, New York and Foxboro Company, Boston, Massachusetts November 14th through November 17th to review proposals of flow monitor work.

F. E. Tippets visited the ASME, Chicago, Illinois, Argonne National Laboratory, Lemont, Illinois and the University of Minnesota, Minneapolis, Minnesota November 14th through 18th to discuss recent developments in the technology of cooling water and attend the ASME Meeting.

A. B. Carson visited the University of Washington, Seattle, Washington November 17th to deliver a lecture.

O. H. Pilkey visited the State College of Washington, Pullman, Washington November 17th to present a technical program to the Student Chapter of the A.S.C.E.

R. C. Hoffman visited the Declassification Branch, U.S. AEC, Oak Ridge, Tennessee November 21st on document declassification.

ORGANIZATION AND PERSONNEL

Personnel Statistics:	October 31			November 30		
	Exempt	Non-Exempt	Total	Exempt	Non-Exempt	Total
Design Management	2	1	3	2	1	3
Process Engineering Sub-Section	64	12	76	70	12	82
Design Planning Unit	18	13	31	18	13	31
Design Engineering Sub-Section	80	9	89	79	10	89
Design Drafting Unit	7	76	83	7	76	83
Total Section Personnel	171	111	282	176	112	288
Technical Graduates (Rotational)	-	3	3	-	3	3
Total	171	114	285	176	115	291

Accessions - 12

Separations - 6

GENERAL

Design Section engineering and drafting effort on design development programs increased substantially during November, primarily because of demonstration reactor studies. Process Technology effort in support of plant assistance problems also increased. Design project activity decreased a corresponding amount as the 4-X Program and Reactor Plant Modifications Program neared completion.

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	Engineering Man Months Expended	Drafting Man Months Expended	% of Section Effort
Design Development Programs	73.5	20.9	40.0
Design Section Projects	57.0	35.6	38.9
Plant Assistance and Customer Work	26.9	24.2	21.1
	157.4*	80.7*	100.0

*Equivalent man months expended included 219 hours of engineering and 102 hours of drafting overtime, which represents 1.6% of the Section based on the total available hours for a normal 40 hour week.

The Design Drafting Unit production for November was 189 drawings and 317 drawing revisions for an equivalent of 5.2 man days per drawing.

DESIGN DEVELOPMENT

The total number of engineering and drafting man months applied to design development activities for November were as follows:

	Engineering		Drafting	
	Man Months	% of Total	Man Months	% of Total
Metallurgical Design Development	4.4	6.0	-	-
Reactor Design Development	40.3	54.8	7.6	36.4
Separations Design Development	24.0	32.7	8.3	39.6
Chemical Processing & Reduction Design Development	2.9	3.9	2.5	12.0
234-5 Design Development	1.9	2.6	2.5	12.0
Total	73.5	100.0	20.9	100.0

Metallurgical Design Development

Preliminary scope studies were prepared for fabrication facilities to produce new type fuel elements for use in proposed new reactor types. Fuel elements included in these studies were clusters of massive uranium in conventional cans, uranium oxide in zirconium cans and massive uranium with co-extruded zirconium jackets.

Advance design studies were started for fuel element plant items to be included in the FY 1958 budget. The major study involves production facilities for an internally and externally cooled diffusion-bonded fuel element.

Other active fuel element development items are zirconium fabrication, slug pickling, and mechanized slug unloading.

Reactor Design Development

Major effort was devoted to the preliminary scope study of a small water-graphite demonstration reactor for use in the application of advanced reactor technology. The proposed

facility together with supporting equipment and services would cost a maximum of $3,000,000. The purpose of these studies, in addition to developing basic criteria, costs estimates and schedules, is to define the manner in which such a facility would be integrated into Engineering Department research and development programs. The general fields of reactor technology in which significant contributions could be made at HAPO by use of a demonstration reactor experiment are reactor fuel cycle investigation, heat transfer behavior studies and reactor materials demonstration.

Limited progress was made on engineering feasibility studies for a new reactor facility to provide supplementary plutonium production at HAPO. Proposed development test programs in support of a supplementary production reactor design have been outlined. These include water wall evaluation, effect of higher temperatures on shielding properties of heavy aggregate concrete, and application of charging procedures and equipment to large process tubes and cluster fuel elements.

Work continued on preliminary scope studies for increasing existing reactor capacity by means of rear face pressurization. Alternates being considered include a once-through pressurization system and a recirculating system. Various methods for the addition of quench water in the one pass system are being evaluated. Preliminary layouts for the primary loop in a recirculating cooling system have been completed. The selection of optimum design conditions for the use of externally cooled cored slugs for both systems have been completed and the selection of process conditions for the use of internally-externally cooled slugs is in progress.

Work is nearing completion on a study of the effects progressive with time of reactor effluent disposal to the river and the advantages of an alternate method of handling these wastes by a canal and lake disposal system.

The process tube flow monitoring development program continued. Test work is in progress on several prototype differential pressure transducers. The study to determine basic operating requirements and operating criteria for a flow monitoring system to meet the requirements of future reactor power levels and operating temperatures is scheduled for completion in December. Zone temperature monitoring for older reactors has been scoped and has been incorporated in a proposal to be included as a revision to the Reactor Plant Modification Program (CG-558).

Separations Design Development

Preliminary scope studies for new integrated plutonium separations facilities continued. During November major work was done on Study No. 2 for an idealized Purex process using one uranium cycle and two plutonium cycles. Results of this study indicate that this plant is economically feasible with a provision of sufficient lead time for development testing. Preliminary estimates indicate a capital cost of approximately $49,000,000. Further studies to be done include a new plant based on a Redox process and a Purex plant based on three cycles, and requiring a minimum of development work.

A study of remote charging machines for separations dissolvers continued. Present effort is directed toward a revised version of a machine developed by the Oak Ridge National Laboratory. Three systems have been studied in order to select a prototype for further testing.

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Scope designs were completed for the nitric acid and the caustic scrubbing alternate for iodine removal from the dissolver off-gases of the Purex facility.

Preliminary scope for modifications to the UNH loading station at Purex for improved uranium accountability and protection against accidental overloading of tank trucks was completed.

A study for revised Redox silver reactors was completed. The proposed scope utilizes the existing silver reactor with modifications to permit regeneration without need for intermittent jumper hook-up. Permanent jumpers for use during regeneration are to be provided instead.

Advance design studies were initiated for replacement of the Metal Conversion Plant batch pots with continuous calciners. The preliminary scope provides for installing three continuous calciners in Cells E and F in the 224-U Building in place of the existing electric and Luckey pots. The existing powder handling system, acid recovery system and parts of the 100 per cent UNH feed system would be utilized.

Mechanical development studies which were active in November include prototype alpha monitor, in-line instrumentation for Purex and Redox processes and process tank agitators.

Chemical Processing and Reduction Design Development

Equipment arrangement drawings covering two alternates for installing a new RM line in the 234-5 Building were completed and issued for comment.

Study drawings for installing the Task I process in the 233-S Building were completed. Similar study drawings have been started on an alternate for installation of the Task I process in the Purex Plant.

Shop fabrication on the vertical replacement type Task II furnace has been completed. Final shop heat runs for the furnace are scheduled for December.

A process flow diagram and an equipment arrangement drawing for converting the Task I process from batch to continuous were completed and issued for comment.

234-5 Design Development

The preparation of design scope for installation of permanent mold casting in the metal fabrication line continued. Two study drawings have been completed.

Studies are continuing on methods for improving and mechanizing the final inspection area in the 234-5 Building. Present emphasis is being placed on faster and more accurate gauging methods. Discussions will be held with vendors concerning development of a set of air gauges and recorders that will simultaneously measure and record critical dimensions.

Engineering Standards and Materials Development

The status of progress on standards during November is as follows:

a. Three new standards and eight revised standards were completed.

b. HWS-8068-S, Standard Specification for Wrought Austenitic Stainless Steel - 70% complete. HWS-8005-S, Standard Specification for Metal-Clad Switchgear, 4.16 and 13.8 KV - 60% complete. HWS-8002-S, Standard Specification for Thermoplastic Insulated Wire and Cable - 90% complete. HWS-8003-S, and HWS-8006-S, Standard Specifications for Polychloroprene Jacketed Cable - 90% complete. HWS-8001-S, Standard Specification for Metal-Clad Switchgear, 600 volt - 50% complete.

c. An addendum to DG-300-W, The Welding of Miscellaneous Metals and Alloys - 70% complete.

d. Standard instrument drawings for Five-Fold Hand and Foot Counters - 80% complete.

DESIGN PROJECTS

Statistics

Engineering and drafting effort of the Section on project activity for the month of November was as follows:

	Engineering		Drafting	
	Man Months	% of Total	Man Months	% of Total
UO_3 Plant Expansion	5.7	6.8	0.6	1.0
Reactor Plant Modifications for Increased Production	13.2	15.7	5.9	9.9
Purex Modifications	7.3	8.7	7.7	12.9
100-K Reactor Plants	12.6	15.0	8.0	13.4
Redox Contamination Control	4.2	5.0	3.5	5.8
Other Design Projects	14.0	16.7	9.9	16.6
Process Technology and Customer Work	26.9	32.1	24.2	40.4
Total	83.9	100.0	59.8	100.0

CA-512 - 100-K Area Facilities

Work continued during November on CA-512, Revision 4, which covers the modification, correction and installation of various systems for satisfactory completion of the 100-K Area facilities. The design work covered by this revision is estimated at approximately $85,000 and includes design for the following major items: Gamma Monitoring System - 105-K, Acid Addition Facilities - 183-K, 107-K Retention Basin Foundations and Effluent Sampling and Monitoring, and Ventilation System Corrections - 1720 and 1704-K.

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CA-513 - Purex Separations Facility

Design status for currently approved major phases of CA-513-E, Purex Plant Modifications, was as follows at the end of November:

Waste Storage Tank Circulators	100%
Iodine Monitoring Facilities	99%
Continuous Sampling Facilities	95%

CA-514 - 300 Area Expansion

During the month, detailed design for the addition of a caustic waste station in the 313 Building was completed. Three drawings were revised to provide additional float switch interlocks in methanol handling equipment in the 311 and 313 buildings, and a design for an explosion-proof methanol probe housing was issued for comment.

CA-539 - Additional Waste Storage Facilities - Redox

Detailed design of Phase II facilities was completed during November. Bids for the motor control center were reviewed and approved during the month.

CA-546 - Fuel Element Pilot Plant

Over-all design for this project advanced to 97% complete during November.

CG-558 - Reactor Plant Modifications for Increased Production

Total design for this project advanced to 96.5% complete during the month, with construction drawing preparation 98.6% complete. Lump sum contracts for the 190-F and H Buildings were awarded during November, completing contract awards for all 190 buildings. The drawing for replacement of the filter media at 183-F was revised to enable this work to be done on a lump sum contract basis. Major design items which remain to be completed include acceptance test procedures, requisitions, and the review of vendor drawings. A project proposal for Revision 5 to Project CG-558, which requests authorization for the provision of a zone temperature monitoring system at 105-B, C, D, DR, F and H Buildings, was awaiting Management approval at the end of the month.

CG-600 - 100-C Alterations

Design completion status remained at 96% during November, with further design progress dependent upon receipt of vendor information.

CG-603 - Hanford 4X Program - Bismuth Phosphate Plants

Detailed design for this project was completed during October. During November, preparation of as-built mechanical drawings was completed.

CG-613 - Hanford 4-X Program - Metal Conversion Plant

Detailed design for the addition to the UO_3 Plant advanced to 99% complete during November. Design of the car loading area was completed during the month, and the preparation of acceptance test procedures and necessary drawing revisions are proceeding at an accelerated rate.

CG-616 - Installation of Acid Feed Equipment - 100-B, C, D, DR, F and H Areas

Detailed design for this project advanced to 94% complete during November.

CG-621 - Redox Contamination Control Facilities

During November, total design for Project CG-621 advanced to 85.3% complete. Design status for the various phases of the project is as follows:

E Cell Ozonization - Phase I	100%
E Cell Ozonization - Phase II	65%
J-6 Pre-condenser	98%
Canyon Washdown Facilities	70%
Removal of Contaminated Equipment	98%

CG-625 - Additional Waste Disposal Facilities - 200 Area

Detailed design for Phase I of this project was 80% complete at the end of November. This is a reduction from the completion percentage previously reported due to a revision in scope for the recirculation facilities. The overall completion status of Project CG-625, including the Phase II tank farm addition, was 39% at the end of the month.

CG-631 - Crib Replacement Facilities - 241-T Tank Farm

A revised project proposal, which was approved during October, changed the scope of work of this project from the provision of a new crib to the provision of facilities for transferring supernatants from Tank 241-T-112 to the existing 241-TX-3 crib. Detailed design on the basis of the revised scope of work was completed during November on an expedited basis.

CG-634 - Replacement of Redox 216 S-1 and 2 Cribs

Detailed plans and specifications for the replacement of Redox 216 S-1 and 2 cribs were completed during the month.

CG-635 - Redox Stack Particulate Sampler

At the end of November, detailed design for this project was 92% complete.

CG-638 - Alum Activated Silica Water Treatment Facilities - Phase II

Design work was started during the month for the provision of alum-activated silica water treatment facilities in 100-B, D, DR, F and H Areas. Consideration was given during the month to the integration of this project with Project CG-616, Installation of Acid Feed Equipment - 100-B, C, D, DR, F and H Areas, in order to effect savings in both design and equipment and piping costs.

CG-642 - Design of Continuous Charge-Discharge Equipment - C Reactor

A project proposal requesting $200,000 for design of full-scale continuous charge-discharge equipment for C Reactor was approved by HOO-AEC during November, and design had been started at the end of the month.

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CG-643 - Redox Capacity Increase - Phase III

Status of detailed design for the first phase of this project, which consists of removal of equipment limitations which will be imposed by process changes to be made in connection with Project CG-621, Redox Contamination Control, was as follows at the end of November:

2-E Column Modifications	75%
F-3 and F-6 Condenser Modifications	30%
Control Valve Requisitioning	100%

CG-646 - Modifications to Pickling Machines - 313 Building

Preliminary design work was continued during November on modifications to convert 300 Area Metal Preparation pickling machines from a spray process to an immersion-dip process.

CG-647 - Back-up Radioiodine Removal Facilities, Purex

During the month a preliminary project proposal requesting $60,000 for the initiation of design of back-up radioiodine removal facilities for the Purex Plant was approved by HOO-AEC, and scope design was started.

D. O. 101362 - Power Factor Study of Electrical System

The power factor study of the HAPO electrical system advanced during the month to 65% complete.

D. O. 101398 - Feasibility Study - Dummy Decontamination Facilities - 100 Areas

Issuance of a final recommendation report on the feasibility and economics of methods for decontamination of aluminum dummies used in the 105 building was held up during November pending receipt of comments from the Manufacturing Department.

D. O. A-00104 - Sub-Critical Neutron Flux Monitors, 100 Areas - Project Proposal

Work was started during November on a project proposal for the provision of sub-critica neutron flux monitors for the 105 buildings in all the 100 areas.

D. O. A-00153 - Design of Stored Energy Apparatus

Design for the refinement of existing stored energy apparatus advanced to 96% complete during the month.

D. O. A-00157 - Auxiliary Radioiodine Removal and Nitric Acid Recovery Facilities, Redox - Project Proposal (CG-648)

During November, a preliminary project proposal for the provision of auxiliary radioiodine removal and nitric acid recovery facilities for the Redox Plant was approved by HOO-AEC.

D. O. A-00158 - Preparation of Project Proposal for Plant and Equipment Budget Items

During November, drafts were completed for project proposals to obtain advance design funds for the following FY 1957 Plant and Equipment Budget items:

1. Horizontal Rod Instrumentation
2. Reactor Increased Outlet Temperature Test Facility
3. Improved Reactor Gas Instrumentation
4. Additional Purex Waste Disposal Facility
5. Heat Recovery from Process Concentrators - Purex
6. Critical Mass Laboratory

Work on the following additional items has been deferred pending determination of the scope of the work involved:

1. Auxiliary Crane - Redox
2. Improved Task II Facility
3. Improved Reactor Vertical Safety Rod
4. Reactor Temperature Instrumentation
5. Plutonium Purification Facility - Purex
6. Organic Clean-up Facility - Purex
7. Automatic Sampling and Monitoring of Radioactive Process Streams - 200 and 300 Areas

D. O. A-00164 - Flow Loop, 314 Building - Project Proposal and Preliminary Design

Work continued during the month, on the basis of a reduced scope of work, on the preparation of a project proposal requesting total project funds for the installation in the 314 Building, 300 Area, of a test loop for simulating reactor flow conditions.

D. O. A-00168 - New VSR Tower (CA-548)

During November, a design criteria for a new VSR Test Tower was completed. It is proposed that design, fabrication and erection of the tower be performed by a fixed price contractor.

D. O. A-00174 - Installation of Beta Monitors on Retention Basin Effluent Lines - 100-B, C, D, DR, F and H Areas - Project Proposal

Work continued during the month on a project proposal for the installation of beta monitors on retention basin effluent lines in 100-B, C, D, DR, F and H Areas.

D. O. A-00176 - Water Plant Component Test Loop - Project Proposal

Preparation of a project proposal for the installation of a water plant component test loop in the 1706-KE building continued during November.

D. O. A-00179 - Steam Auxiliaries for 165-K Buildings - Project Proposal

Work continued during the month on a project proposal for the provision of steam-driven auxiliaries for steam generators in the 165-KE and 165-KW buildings.

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D. O. A-00187 - Process Technology - 300 Area Expansion Facilities

Work continued during the month on a plant assistance program aimed at achieving satisfactory operation of the 300 Area facilities which were installed under Project CA-514. Items on which effort was expended during November include design of an alternate method of recovery processing of slugs, development of a stop-gap means of reducing the quantity of nitric acid being exhausted from pickle machine stacks (to be used until pickling machine modifications can be accomplished under Project CG-646), and a study of the difficulties being experienced with the use of the Acme-Gridley cut-off machines.

D. O. A-00188 - Redox Plant Ventilation System Improvements - Project Proposal

During November a project proposal for design, fabrication and installation of equipment for the correction of deficiencies in the Redox Plant ventilation system was completed and forwarded to Management for approval.

D. O. A-00218 - SWP Service Facilities, Redox - Project Proposal

Preliminary work was started during the month for a project proposal covering expansion of SWP service facilities in the Redox Plant.

D. O. A-00226 - Process Technology - Improved Purex Plant Silver Reactor

Design work was started during the month for a prototype two-stage reactor to be used as a replacement for one of the existing in-canyon silver reactors in the Purex Plant.

D. O. A-00228 - Metal Loading Facilities - 100-B, D, DR, F and H Areas - Project Proposal

Work was started during November on a new project proposal for the provision of metal loading facilities for the 100-B, D, DR, F and H Areas.

D. O. A-12884 - Purex Plant - Prototype In-Line Alpha Monitor

At the request of the Separations Technology Section, Design Section is directing the procurement for and fabrication of a prototype alpha monitor, which is to be installed on the 2AW stream in the Purex Plant. At the end of November, all material had been ordered and fabrication was 50% complete.

D. O. C-79326 - Underwater Cutting and Etching Equipment - 105-C Metal Examination Facility

Preparation of a scope study of equipment for underwater cutting and etching of irradiated fuel elements in the 105-C Metal Examination Facility advanced to 80% complete during the month.

D. O. C-98574 - Engineering Study of Construction Budget Items - 300 Area

Preparation of a study of proposed modifications to the 327 Building advanced to 70% complete during November.

Design Work Completed During November

D. O. 100856	Ball Third Safety System As-Builts (CG-438)
D. O. 101283	Building 327 - Cell for Tensile Testing Machine (CG-576)
D. O. 101369	Graphite Hot Shop and Storage Facilities (CA-555)
D. O. 101382	As-Builts, Air Mask System, 105 DR and H Areas (CG-574)
D. O. A-00117	Roof Repairs - Central Stores
D. O. A-6558	Protective Shield - 105-B, D and F Buildings
D. O. A-12906	Steam Line Extension - 211-A to 275 EA
D. O. A-13015	Redox Plant - Design for Piping Changes
D. O. A-13732	241-SX - Diversion Box Connectors
D. O. A-13742	Redox Plant - Redesign Silica Gel Filter
D. O. C-57563	230-KV Crossarm Stress Analysis
D. O. C-79796	Ventilating System Study - 3760 Building
D. O. C-85358	Redesign Sampler Containers
D. O. C-93137	Addition to 1706-KE Building
D. O. C-96297	190-C Pumping Equipment - Engineering Analysis
D. O. C-98383	T Plant - Drawings for Silver Reactor

INVENTIONS

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

RH Beaton

Manager - Design
ENGINEERING DEPARTMENT

RH Beaton:HDT:rd

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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	Dec.	Jan.	Feb.	Mar.	Apr.	May	Bal. of FY 1956 & Later	Total
Purex Modifications	11.6		3.4	5.0	8.2	3	2	2	1			.2	8.2
CG-558 & CG-600	19.9		1.0	1.5	18.9	1	2	2	2	2	1	8.9	18.9
4-X Program	18.2		1.1	1.6	17.1	1	1	1	1	1		12.1	17.1
Reactor Charge-Discharge		40	.5	.7	39.5	2	3	3	3	3	3	22.5	39.5
Other Projects	15.6	78*	7.5	11.2	86.1	12	14	13	13	12	12	10.1	86.1
Reactor Design Dev.	192.6		31.6	46.6	161.0	27	27	26	26	26	27	2.0	161.0
Separations Design Dev.	158.2		17.5	25.8	140.7	17	15	16	16	17	17	42.7	140.7
Metallurgy Design Dev.	22.5		3.0	4.4	19.5	2	2	2	2	2	2	7.5	19.5
234-5 Design Dev.	13.3		1.5	2.2	11.8	1	1	1	1	1	1	5.8	11.8
Weapons Design Dev.	9.4		.7	1.0	8.7	1	1	1	1	1	1	2.7	8.7
Ant. Future Projects								1	2	3	3	4.0	13.0
	461.3		67.8	100.0	511.5	67	68	68	68	68	67	118.5	524.5

DESIGN ENGINEERING SUB-SECTION

Description	Backlog Start of Mo.	Work Sch'd Dur. Mo.	Time Spent Dur. Mo.	% of Total Effort	Backlog End of Month	Dec.	Jan.	Feb.	Mar.	Apr.	May	Bal. of FY 1956 & Later	Total
Purex Modifications	55.0		2.9	3.9	52.1	3	4	4	4	4	4	29.1	52.1
CG-558 & CG-600	126.2		10.8	14.5	115.4	10	9	8	7	6	6	69.4	115.4
CG-616	11.4		2.2	3.0	11.8	1	1	1				8.8	11.8
CG-621	27.0		3.2	4.3	23.8	3	3	2	1			14.8	23.8
CG-625	34.6		1.6	2.1	33.0	2	2	2	2	2	2	21.0	33.0
CG-638		21	1.5	2.0	19.5	3	3	3	3	3	1	3.5	19.5
CG-642		50			50.0	1	2	3	4	4	4	3.2	50.0
CG-643		40	.9	1.2	39.1	3	5	5	6	6	5	9.1	39.1
CG-648		28	.5	.7	27.5	2	4	5	5	4	2	5.5	27.5
4-X Program	22.9		5.5	7.4	17.4	3	2	1	1			10.4	17.4
Other Projects	57.4	60**	15.9	21.3	101.5	16	16	16	17	16	16	4.5	101.5
Design Development	121.1		14.2	19.1	116.9	14	12	12	12	12	12	42.9	116.9
Customer Work	63.1	21	15.3	20.5	68.8	14	12	12	10	10	10	.8	68.8
Ant. Future Projects								1	3	8	13	17	42.0
			74.5	100.0	676.8	75	75	75	75	75	75	268.8	718.7

Present total backlog is distributed over the five engineering branches in terms of man months as follows:

	Authorized Work FY 1956 & Later	Anticipated Future FY 1956	Totals
Arch. & Civil	118	7	125
Mechanical	222	15	237
Electrical	116	6	122
Instrument	163	10	173
Standards	58	4	62
	677***	42	719

*Includes 35 man month Process Technology & 43 [illegible] months for advanced design FY 1958 budget studi

**Includes 28 man month Process Technology & 25 man months advanced design for FY 1958 budget studies

***Includes Design Development.

I. SUMMARY

A. Organization and Personnel

At the end of the month the Separations Project Sub-Section was dissolved. The inspection functions with R. W. Copeland as Unit Head and the engineering functions were transferred to the Project Engineering Sub-Section. W. B. Webster, Acting Manager, Separations Projects, accepted a transfer to the Commonwealth Edison Project as Dresden Site Manager. There are now unfilled positions for 14 exempt and two nonexempt employees. Following is a summary of personnel changes in Project Section during the month:

	October 31, 1955	November 30, 1955	Net Change
Employees on payroll	345	342	-3
Technical Graduates, Rotational	6	4	-2

The end-of-month status involved these changes:

	Project Section	Technical Graduates Rotational
Payroll additions	4	
Payroll removals	7	
Transfers into Section	1	
Transfers from Section	1	2
Transfers within Section	7	

B. Scope of Activities

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

Project No.	Title	Completion Scheduled	Completion Actual
CA-512	100-K Area Facilities	100%	100%[a]
CA-512	1706 KER Recirculation Facilities	38%	43%
CA-513-A	Purex Facilities, Part A	100%	100%[a]
CA-513-E	Purex Facilities, Part E	74%	81%[b]
CA-539	Additional Waste Storage Facilities	40%	40%[c]
CA-546	Fuel Element Pilot Plant	75%	75%
CG-559	Reactor Plant Modifications, Phase I	28%	34%
CG-559	Reactor Plant Modifications, Phase II	[illegible]	3%
CG-603	Hanford 4X Program, Bismuth Phosphate Plants	91%	98%
CG-613	Hanford 4X Program, Metal Conversion Plant	d	14%

a Excepting design changes and start-up items.
b Percentage of completion based on work now approved.
c General Electric portion of work remaining as of October 24, 1955.
d A revised schedule is being prepared according to Revision No. 3.

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C. Craft Labor

The jurisdictional dispute which began on October 26 at the 190-B Building Annex continued until November 9, 1955, between the millwrights and electricians. On November 9 the millwrights returned to work, and on November 17 an award was made to electricians for setting the motors and to millwrights for related work. Discussions and meetings continued throughout the month. No final estimate of delay was made, but it is believed to be substantial.

An incident concerning loading of pipe at White Bluffs warehouses and yards occurred on November 7. A pipefitter on the truck objected to loading by swampers, and the pipe was not loaded until officials of the fixed-price contractor and the labor service contractor assigned the work to swampers. In the future the fixed-price contractor will accept the load at the warehouse dock, or will load from the storage yard.

D. Safety and Security

Nine regular meetings for discussions of safety, security, and health topics were attended by about 195 Project Section employees. Two security violations were incurred, and monitoring systems were revised to improve coverage. Two major injuries occurred, one in the White Bluffs sheetmetal shop and one in 221-B Building canyon. Four area mass meetings were conducted in the field for labor service contractor personnel, and one special hazards orientation was given to seven men.

E. Highlights

Project Auxiliaries Sub-Section

The primary actions with personnel consisted of the transfer of the Construction Inspection Unit to Project Engineering. A physical move of the 700 Area personnel into 760 Building was effected during the month. Routine administrative, engineering, and control functions were continued throughout the moves. Estimating Unit workload increased slightly to 72 estimates on schedule, of which 32 were completed. Field Surveys continued with additional work on the resurvey of Richland, Washington, and also provided routine services to the manufacturing and construction areas. Reproduction output increased by over 126,000 square feet to a total of 498,134 square feet. The main cause of the increase was production of bid assemblies for the AEC. Engineering Files Unit distribution increased to 175,340 prints, including over 1800 classified items. For the tracing rehabilitation program, 68 photo tracings were completed.

Inspection Sub-Section

The workload of orders requiring inspection increased slightly to a total of 744, and a leveling-off tendency has become evident in both number and dollar value of orders. Of the 690 orders now assigned to inspectors, 572 were assigned off-site, 104 on-site, and [illegible] to government agencies. The workload for the Corrosion Testing Program increased slightly to totals of 230 corrosion tests, 121 etch tests, and 33 chemical determinations. The Head, Engineering Inspection, attended the recent Quality Control Conference in Schenectady, New York, for a training conference on quality control procedures, techniques, and cost breakdowns. Because of the

eastward movement of the inspection workload, the East Central Area was activated as of November 21, and the Los Angeles Area was combined with the San Francisco Area. The major inspection efforts are being expended on process water pumps for the Reactor Plant Modification Program, and the calciners for the Metal Conversion Plant.

Minor Construction Sub-Section

According to manpower distribution, the primary Minor Construction work was on the Reactor Plant Modifications, Bismuth Phosphate Plants, Metal Conversion Plant, various crib replacements, and the Fuel Element Pilot Plant. The forces of the labor service contractor decreased by ten per cent to about 800 men in the field, plus 77 nonmanual employees and 50 craftsmen on furlough. The Sub-Section completed its assigned work on one project and 45 work orders; and it accepted work assignments as follows: 35 work orders, two projects, and two addendums for the Reactor Plant Modifications. Plans were completed to transfer the Material Take-off function to the labor service contractor as of December 1, 1955. All Minor Construction requirements for stainless steel are now being controlled by one coordinator. An automatic welding machine has been obtained by modifying one left by previous contractors. To date 146 items of construction and transportation equipment have been received from other AEC installations. During the upgrading program, 104 pieces of equipment have been sent to the AEC Sales Yard.

Project Engineering Sub-Section

Plans were completed for acceptance of project assignments and functions of the Separations Projects Sub-Section on December 1, 1955.

The workload continued to increase to a total of 43 project items, three informal requests, and miscellaneous engineering requests. The Sub-Section completed assigned work on three projects and one engineering request. New work assignments consisted of three projects and five engineering requests. Major progress on projects included start of work by the fixed-price contractor at 1706 KER facilities, completion of circulator installation in eight tanks for Redox, enclosure of 190-B and setting of equipment, and obtaining beneficial use of 221-T Building on November 7. Contracts were awarded for the 100-DR Outfall, the 230 KV line and switching facilities, the Phase II work for Redox 241-A Tank Farm, and for the 190-F and H Annexes, including office additions for 190-F, B, and D Buildings. Site preparation at 190-F was completed, and work was continued toward the expected completion of 190-H site by December 15, 1955. Process water pumps #5 and #6 for 190-B were shipped on November 30.

Separations Projects Sub-Section

Final plans and preparations were completed for dissolution of the Sub-Section and for transfer of its remaining functions to Project Engineering Sub-Section. A summary of completion dates for the Purex Facilities, Parts "A", "B", and "C", was prepared; and a detailed summary was made of the known items of authorized work to be completed. Revision No. 5 to the project proposal, which included the 40-ton remote crane among other features of Part "E", has been forwarded to AEC in Washington. The A-9 and A-10 Cribs have been essentially completed, and the contractor has started work on the industrial burial garden. For the Iodine Monitoring Facility, a work order for $45,300 has been issued, and work is about five per cent complete.

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For CG-598, Purex Vacuum Acid Fractionator, minor revisions were made to Revision No. 2 of the project proposal, and it is being routed for signatures. Construction work remained at about 39 per cent complete.

F. Monthly Report of Inventions and Discoveries

All persons in Project Section engaged in work that might reasonably be expected to result in inventions or discoveries 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.

None.

J. S. McMahon, Manager - Projects

II. STATISTICAL AND GENERAL

A. Significant Assignments

1. Initial Reporting

CG-638, Alum-activated Silica Water Treatment Facility, Phase II

A letter giving justification for the work planned for plant forces and Minor Construction is being forwarded to AEC for approval.

CG-646, Modification to Pickling Machines, 313 Building

The Design Section has prepared purchase specifications for the two units with an alternate specification for purchase of a single unit. The present procurement authorization is for $10,000.

CG-648, Auxiliary Radioiodine Removal and Nitric Acid Recovery, Redox

The project proposal for design funds was prepared by Design Section and transmitted to AEC on October 20, 1955. The project proposal for construction funds is being prepared by Design Section.

ER 1231, Installation of Soundproofing Facilities in 1706-KE Building

With preliminary design completed, a detailed estimate is being prepared by Estimating Unit. A statement of field conditions has been prepared and transmitted to Design Planning.

ER 2772, Improvements to Redox Plant Ventilation

The project proposal is being circulated for approval.

ER 3122, Equipment Installation in the 314 Building

The Pile Technology Section has requested a scope revision. Continuance of work awaits an increase in engineering request funds.

ER 3133, Alteration of Lab Area Buildings

The project proposal is being prepared.

ER 3136, 350°C Flow Loop, 314 Building

The information based on the engineering request was transmitted to Design Section for use in the project proposal.

2. Final Reporting

CG-617, Additional Air-drying Facilities, Building 234-5

Construction progressed two per cent to completion, and the acceptance papers have been signed without exception. Information for the physical completion notice was assembled.

ER 2766, 221-U Section 9 Conversion to Intercycle Concentration

Plans for submittal of a project proposal have been cancelled, and the engineering request has been closed out.

3. Current Projects

CA-512, 100-K Reactor Facilities

A physical inspection of backwash valves in 183-KW revealed that ten additional valves need refitting. To date eight 183-KW backwash valves have been repaired, and 38 stops have been installed. The remaining valves in 183-KE are being inspected.

Replacement and repair work proceeded on instrumentation for the 100-K reactors and the retention basins. Tools required for test hole tube replacement are being fabricated, and the replacements are to be accomplished at 105-KE during early December 1955.

Work in 1706-KE Building is proceeding on a series of work orders. Installation of service piping was complete except for testing and tie-in. Fabrication of electrical ducts was continued. Correction of the slug traps was completed in both 105 Buildings during the month.

Consultations with Design and Manufacturing personnel were continued concerning the probable installation of the auxiliary equipment in the 165 Buildings. Comments were returned to Design Section on drawings and specifications of heating and ventilation systems in 1704-K and 1720-K.

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CA-512, 1706 KER Recirculation Facilities

Over-all construction progressed four per cent to a total of 43 per cent.

Following award of the $329,000 contract on October 31, 1955, the contractor moved to the site on November 1 and 2, and craftsmen started work on November 3. Preliminary work was done by painters and electricians, and the fitters began shop fabrication of front and rear face piping. Subcontractors for electrical and mechanical work are proceeding with preparatory work on trays between the 165 Buildings, instrument ducts, service water lines, and tie-ins.

The construction schedule issued by the contractor was returned without approval and with a request for breakdown into more components.

Procurement of fittings and equipment to be furnished the contractor was in a critical status on about 20 purchase orders. Expediting pressure is being applied, but the delivery dates apparently cannot be met.

Minor Construction has essentially completed service piping in the 1706-KE Building to the point of testing and tie-in with other installations. Preparation work was started for installation of Ball 3X valve assemblies in 105-KE Building, and Minor Construction has working space within the Building.

CA-513-A, Purex Facility

Design is complete on the Purex condensate crib, industrial burial garden, modified wheel stops for transfer areas. Revision to instrument as-built drawings has been started.

For Part "A" of the Purex Facility, the status of the principal items of authorized work was as follows: extension to the 202-A Building Railroad Tunnel, 89 per cent complete; construction of a burial ground by a lump-sum contractor was started at the end of November; and area paving was completed except for portions to be finished after completion of Part "E" and the Purex Vacuum Acid Fractionator. Work orders have been issued for fabrication and installation of boral plates, alignment of pulse generator coupling, and installation of car puller brackets on three flat cars. Design work is in progress for installation of two pumps and jumpers, and installation of interface capacitance probes. Also design is to be performed for installation of a third air compressor and for installation of hydraulic accumulators for centrifuges.

The A-9 and A-10 cribs have been essentially completed.

CA-513-E, Expansion of 200 Area Facilities

Construction progressed 11 per cent to a total of 81 per cent, the percentage being estimated according to work now approved.

The estimated direct construction cost of the iodine monitoring facility is $60,000. One work order for $45,300 was issued to Minor Construction, and this portion of the work was about five per cent complete.

A lump-sum contract for the Recirculation Facility, 241-A Waste Storage, was awarded. The excavation permit has been issued, and preliminary field work was started at the end of the month.

Delivery of spare columns J-2 and K-2 has been requested for July 1, 1956. The estimated cost for procurement, testing, and as-built drawings is $47,500.

CA-539, Additional Waste Storage Facilities for Redox

Construction progressed three per cent to a total of 40 per cent; this represents the General Electric portion of work remaining as of October 24, 1955.

Essentially all purchase orders have been placed for Phase II material. Shipment of the instrument panel was not promised until March 21, 1956, which is too late to meet the completion date of April 1, 1956.

Minor Construction completed tie-in of the eight-inch raw water line to the 20-inch water line near Building 202-S.

The contractor completed Phase I work, installation of circulators, in eight tanks on November 27, 1955. Redox waste had been routed to Tank #108 on November 7.

Bids for Phase II work, air supply and instrumentation, were combined with work on 241 Tank Farm. The award for Phase II of the 241-SX Tank Farm was made for $147,000, compared with the fair cost estimate of $104,000.

CA-546, Fuel Element Pilot Plant

Over-all construction was 75 per cent complete.

The contractor completed the floor slab and structural additions for the electroplating room, including minor exceptions, on November 9. Minor Construction began its work on ducts and the overhead crane on November 14.

A contract for construction of additional offices was awarded for about $69,000, with completion scheduled for April 5, 1956. The contractor began work at the end of November.

The deionizing equipment is being tested.

CG-558, Reactor Plant Modification for Increased Production, Phase I

Construction progressed five per cent to a total of 34 per cent.

With the supply of process water pump castings greatly improved, the stress on procurement has moved from the foundry to machining by the vendor. Pump #5 was ready for shipment somewhat behind schedule, and Pump #6 was being completed ahead of schedule; so both pumps were shipped on December 1, 1955. Pump deliveries are improved sufficiently to keep pace with installation, which has been hindered by cold weather.

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Because of production requirements, the replacement of Panellit gauges and installation of the poison column system at 100-B have been rescheduled for January 1956. The 190-B Building has been enclosed, and temperature has been raised to allow final setting of equipment. Since partial settlement of the millwrights' strike by November 9, 1955, work has proceeded on equipment bases, motors, piping, and service lines. At 183-B the high tank pump and one new process pump have been put into operation, and another new process pump was prepared for testing. Raw water lines are being tied-in, and valves are being installed.

At 100-D Area, replacement of Panellit gauges was completed, and the installation was being tested. The 151-D switch house addition was completed except for joining it to the original building. Cable trays are being installed in the vault, and concrete foundations are being placed for transformer and power line structures. The #2 pump at 181-D has been reinstalled upon assurance of the vendor that the present vibration is not harmful to the equipment. The backwash pump at 183-D is being aligned and tested, and the high tank pump is in operation. For 190-D Annex, the structural steel has been erected, and work was continued on walls and equipment foundations. The underground electrical duct was completed, and installation of cable trays was about 85 per cent complete. Piping work was continued within the building and toward the 105-D Building.

At 100-DR Area, replacement of the 183-DR filter beds was complete. The 190-DR suction header piping was tied in, thus essentially completing the building modification. In the pump rooms, floor slabs, beams, and equipment foundations are being placed. A contract for the DR Outfall System was awarded on November 10 for $212,000. The contractor began moving equipment to the site on November 21, and preliminary work is being done. Any necessary decontamination has been done, and the contractor is planning two ten-hour shifts per day.

CG-558, Reactor Plant Modifications for Increased Production, Phase II

Construction progressed one per cent to a total of three per cent.

Bids for construction of 190-F and H Annexes, and office additions to 190-F, D, and B, were opened on November 22. The contract was awarded to Morrison-Knudsen Company for a total of $1,869,580, subdivided as follows: 190-F Process Addition, $908,380; 190-H Process Addition, $868,800; and the office additions at 190-F, $51,500, and at B and D, $20,400 each. Minor Construction has completed preparations for the contractor to begin work at 190-F Annex. For the effluent line from 105-F to 107-F, the piers have been placed and the lower halves of ring girder assemblies have been installed. The anchor block at the angle joint has been placed. Information for the 183-F filter has been forwarded for inclusion in the bid assembly.

Site preparation at 190-H proceeded toward completion by December 15, 1955. All concrete was placed for the addition to the 151-H switch house. Pipe supports for the relocated steam line were completed and pipe for the relocation is on hand. Expansion joints for the effluent line are being fabricated.

CA-586, First Capacity Increase, 230 KV System

At the end of the month, Minor Construction work was well ahead of schedule.

A conference is to be held in Portland, Oregon, during December among representatives of Bonneville Power Administration, Atomic Energy Commission, and General Electric to coordinate work at the Midway Substation.

The contract for construction of the transmission line and related switching facilities was let to W. L. Ridge and Company, at a total figure of about $119,000. A bid of $76,178 by John L. Nichols of Grandview, Washington, was withdrawn because of an error in bidding.

Installation work included the cable tray in the 165-KE-KW tunnel and the cable for 480-volt service from 165-KE to the switching station.

Four carloads of tower steel were received and unloaded by Minor Construction.

CG-603, Hanford 4X Program, Bismuth Phosphate Plants

Construction progressed six per cent to a total of 98 per cent. Acceptance testing of 221-B has been completed, and the canyon deck is being painted. Minor Construction is proceeding with clean-up, the air sampling system, and stack sampling.

Beneficial use of 221-T Building was obtained on November 7; and clean-up work was continued toward possible completion during December 1955. Completion work at 241-C Farm depends upon receipt of materials which are expected in early December 1955. Work on TBP Scavenging was about 90 per cent complete, and completion also depends upon material deliveries during December.

The canyon is being cleared of all unnecessary materials. The target date for construction personnel to leave the facility is December 9.

CG-613, Hanford 4X Program, Metal Conversion Plant

Construction progressed 4.4 per cent to a total of 14 per cent. A revised construction schedule is being prepared according to Revision No. 3 to the project proposal.

Procurement of the absorber tower and gas cooler was progressing satisfactorily. Delayed delivery of process bag filters has caused a change for their installation to be done under the Phase III contract. The pump orders are being delayed by problems in casting the stainless steel bodies, and casting problems are also expected during manufacture of Star Valves. The process control panel furnished by Foxboro will be shipped the first of December. The Luckey pots were received and are ready for installation. Witness tests on the first furnace and motor were completed, and the units are being prepared for shipment.

Fabrication of calciners is being delayed by shortage of corrosion-passed materials and of qualified welders. The calciner fabricator is experiencing considerable difficulty in the welding and stress relieving operation of the stainless steel trough. The prototype trough was found to be cracked at the end. Attempts to repair the crack in the weld caused elongation and spreading of cracks into the parent metal. AEC and General Electric representatives have visited the vendor to improve results and obtain a firm schedule.

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Construction work by the contractor on Phase III 224-UA Building Structure included installation of the storage bin, collection bin, and two cyclones in the product delivery system. The steel siding, partitions, and deck have been installed. Roofing and sheetmetal work was complete, and the rolling steel doors are in place. Installation of heating and ventilation facilities progressed satisfactorily.

Minor Construction installed the new ED-7 evaporator in "D" Cell, and has essentially completed architectural work in "A" Cell. Other work included the new drain line in 224-U Building, modifications to the existing TA-1 absorber tower, and the lunch room addition.

The Phase III contract for installation of process equipment in 224-UA was awarded for $289,800. Electrical work and piping fabrication are progressing, and the contractor is accumulating material for the major work.

Plans and specifications for Phase IV, the car-loading facilities, and roads and walks have been completed for bidding purposes.

B. Other Assignments

CA-548, Reactivated Project Proposal for New VSR Test Tower

The design criteria have been prepared and circulated for comments. The AEC is formulating a decision on the type of contract to be made.

CA-555, Graphite Hot Shop and Storage Building

The contractor completed process and sanitary sewer connections, interior installation, and area paving. A critical procurement item, the bag filter, has been shipped. Minor Construction completed installation of ventilation units and has continued work on electrical services, piping, and tie-ins.

CG-572, Particle Problem Animal Exposure Equipment

All work was completed except weather stripping of four doors which must await receipt of material. Information for the physical completion notice is being assembled.

CG-576, General Improvements to Laboratory Area, 300 Area

Construction completion was revised downward to 81 per cent, because of reassignment of work and development of punch list items. Minor Construction forces completed work except for the water diversion line to 329 Building. Plant forces completed assigned work except for installation of the cells in 327 Building.

CG-578, Effluent Water Monitoring Improvements, 100-B, D, F, DR, and H Areas

Construction progressed eight per cent to a total of 56 per cent, compared with scheduled completion of 75 per cent. No shutdowns were scheduled during November. The 105-D Area is scheduled for equipment installation during December

A revised project proposal to request extension of completion date only is being prepared. The current schedule for shutdowns includes installation of gamma monitoring in 105-D between December 5 and 16, 1955; in 105-B between January 2 and 6, 1956; and in 105-F between January 15 and 27, 1956.

Progress during the month included instrument checks fabrication, of drains for 105-F, and installation of instrument panels for 105-D.

CG-579, Effluent Water Monitoring Improvements, 100-C Area

The revised project proposal is being circulated for General Electric approvals. All ten spectrometers for installation in 105-C have been received.

CG-587, TBP Waste Scavenging

Completion status remained at design 100 per cent, construction 88 per cent. Plant forces continued procurement of materials. The make-up tank is being installed in the 271-U Building, including piping connections.

CA-590, Fly Ash Collection Equipment, Building 384

The AEC provided comments on design criteria on November 1, 1955, and the criteria are being written accordingly.

CG-598, Purex Acid Fractionator

Over-all construction remained at 38 per cent complete, compared with scheduled completion of 42 per cent.

All engineering equipment is on order. Revision No. 2 to the project proposal was revised during the month and is being routed for signatures. The revision requests an increase in funds from $590,000 to $920,000 and an extension of completion date from December 1, 1955, to September 1, 1956.

CG-600, 100-C Alterations

The final four per cent of design work is being delayed to obtain more information. Construction remained at .3 per cent complete.

The AEC Directive, HW-343, Modification #1, authorized $675,000 to cover work as previously planned except for the addition of a new pump, and deletion of front face nozzles, connectors, and venturi tubes. Minor Construction has been released funds for construction, and a schedule is being prepared. Plant forces have been issued a $48,000 work order for poison column work.

CA-601, 300 Area General Improvement Program

With preliminary design completed, the design criteria have been transmitted to AEC for bidding purposes.

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CG-614, Hanford 4X Program, 300 Area

Construction progressed 15 per cent to a total of 43 per cent. The autoclaves were received and installed, and piping is being connected. Work was continued on the installation of welding machines, partitions, trench covers, electrical service, and piping. Installation of duct work for the furnace coil exhaust was started.

Minor Construction is fabricating half of the necessary autoclave tube liners, and the other liners are being procured off site.

CA-615, Mechanical Maintenance Shop Centralization, 100 Areas

Since the Washington AEC office withheld approval of this project, additional justification has been prepared and forwarded to Hanford Operations Office.

CG-616, Installation of Acid Feed Equipment, 100-B, C, D, DR, F, and H Areas

Arrangements have been completed for an off-site vendor to repair the existing acid pumps. A vendor's representative has scheduled inspection of the seven acid pumps during early December 1955.

CG-618, Replacement of Steam Line Support Poles

Because of scope changes, completion status was revised downward to 32 per cent. Field work was stopped because of inclement weather. The project proposal is being revised to request an extension of time and a reduction of scope.

CG-620, Melt Plant Modifications, 314 Building

The project is being rescoped. One potential vendor gave a preliminary quotation of $39,990 for the basic melt furnace and pumping equipment. The total cost of equipment and installation has been estimated at $120,000. The using department has requested a review of work to investigate the possibilities of reducing the cost to the range of $80,000 to $90,000.

CG-621, Redox Contamination Control Facilities

At the end of the month, design was about 85 per cent complete. The design criteria for Redox E Cell ozonization was completed and issued during November.

For Phase I, In-cell Ozonization, the elctrical work in the Hivox room was complete except for a safety cage around the transformers. Instrumentation work was continued, and all other work was awaiting the December shutdown of Redox.

A requisition for the J-6 pre-condenser was out for bids. Shop work on jumpers and dunnage is to start about mid-December 1955. Requisitions for some spare replacement vessels are being processed.

CG-624, Redox Railroad Tunnel Ventilation Barrier

The requisitions for electrical items have been placed. Final vendor's drawings for the doors have been received for approval.

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A field release for $27,500 was issued to Minor Construction for the start of procurement and for preliminary construction with available materials. An official construction schedule is being prepared.

CA-625, Additional Waste Disposal Facilities, 200 Area

Over-all design was 48 per cent complete. This represented 80 per cent completion for the recirculation facilities and four per cent completion for Phase II work. Final approval of all drawings was withheld to await reviewing of possible process operating changes.

CG-626, Alterations to Redox Inert Gas Vent System

Construction progressed 20 per cent to a total of 50 per cent. Modifications to the filter were completed except for repacking, and alterations to nitrogen bleed piping were completed. Fabrication of dunnage was essentially completed. Other work was continued toward completion for the December 1955 shutdown.

CG-630, Minor Construction Fabrication Shops Modifications

Detailed design was started on the All-crafts Shop No. 2 and on work to be done by a lump-sum contractor. A design order and a work release were issued to Minor Construction on November 22, 1955.

CG-631, Crib Replacement Facilities, 241-T Tank Farm

Over-all construction was about 75 per cent complete. The waste line from Tank #112 to an existing crib was installed and tested during the month. Temporary tie-ins to the electrical service and the tank pump were made to obtain beneficial use of the facility during the month.

CA-633, Remodeling of Facilities, Kadlec Hospital

Revision No. 1 to the project proposal was transmitted to AEC on November 18, 1955. The revision requests approval of sprinkler systems and for rewiring the old portion of Kadlec Hospital.

CG-634, Replacement of Redox 216-S-1 and 2 Cribs

Over-all construction was 16 per cent complete. Bids were opened on November 16, and a fixed-price contract was awarded. Minor Construction forces started work on November 4, 1955, with erection of temporary fences and excavation for the pipe encasement. Concrete was placed for the pipe encasement and cover slabs. Jumpers for the diversion box are being fabricated.

CG-635, Redox Stack Particulate Sampler

Comment prints are being checked, and prints are being prepared for the detailed cost estimate.

CG-636, Redox Service Facilities Expansion

The project proposal is being revised by Design Section and is expected to be complete in late January 1956.

CG-637, TBP Product Tail-end Treatment Facilities

The project proposal has been processed for signatures to the Separations Section of Manufacturing Department. This Section is withholding approval to await clarification of the future 4X Program.

CA-639, Painting Water Plant Structures, 100-DR Area

The AEC is withholding the release of money to await clarification of responsibility for writing specifications and performing construction inspection work.

CG-642, Continuous Charge-discharge Facility at 105-C

The AEC has approved $200,000 for Engineering. The first official project meeting was held on November 23, 1955.

CG-643, Redox Capacity Increase, Phase III

With $100,000 authorized for design work, the project proposal has been revised to request procurement and construction funds. The most urgent needs are installation of the 2-E columns and jumpers, and the F-3 and F-6 condensers with jumpers.

CG-645, Plutonium Fabrication Laboratory

Over-all construction was about 84 per cent complete. Service piping has been installed and tested. Other work consisted of placing the ventilation system, laboratory furniture, and the preparation hood.

CG-649, FY-1955 Water Tank Replacements, 100-200 Areas

The project proposal was transmitted to the AEC on November 17, 1955.

IR-191, 321 Building Fire Protection and Staging Study

Design was completed on November 7, 1955. All material to be procured by General Electric Company was requisitioned on November 8, 1955. Plant force work is scheduled to begin in early December 1955.

IR-198, Redox Stack Spray Piping Modification

With preliminary design completed, Minor Construction proceeded with procurement. Field work was started November 21, 1955, and it consisted of erecting ladders inside the stack and fabrication of piping.

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The following studies and Engineering Requests, involving preparatory work and scoping of future projects, were active during the month:

ER A-1219, 105-KW Laboratory

A revised rough draft of the project proposal has been prepared. The project proposal is being routed for General Electric approvals.

ER A-1227, Provide Additional Storage and Shop Space in the 105-B, D, and F Buildings

The project proposal is being routed for General Electric approvals.

ER A-1229, Installation of Raw Water Cross-tie, 105-C

The project proposal is being routed for General Electric approvals.

ER 2764, 2101 Building Conversion

The project proposal is being routed for General Electric approvals.

ER 2767, Additional Redox Liquid Cooling Waste Cribs

The project proposal is being routed for General Electric approvals.

ER A-3122, Replacement of Steam Plant Deaerator, 384 Building

Operating efficiency tests are being conducted by Manufacturing Department.

ER 3124, Graphite Machining Facilities, 300 Area

The informal request letter is being routed for General Electric approvals.

ER 3125, Roof Repairs, Central Stores

The detailed design has been submitted to AEC for approval.

ER 3126, Replacement, Repair, and/or Removal of Valve Houses, 100-B, D, and F Areas

The project proposal is being routed for General Electric approvals.

ER 3127, Painting of Two High Tanks at 105-C Area

Painting of one tank was about 70 percent complete. The contractor has requested an extension of contract time in order to perform a better painting job under more favorable weather conditions. This has been agreed to by Manufacturing Department.

ER 3128, Decontamination Facilities, 100-H, 200-W, and 300 Areas

The project proposal is being routed for General Electric approvals.

ER 3130, Conversion of Sprinkler System and Rewiring of Old Portion of Kadlec Hospital

The final draft of the Revision No. 1 to the project proposal is being routed for General Electric approvals.

ER 3131, Shielded Personnel Monitoring Station, 747 Building Addition

The project proposal is being prepared by Design Section.

ER 3134, General Improvement, Central Stores

Rough drafts of the informal request are out for comments. The present estimate for this work is $17,000.

ER 3135, Office Addition to 141-M Building

The project proposal is being prepared.

C. Related Functions

The increase of the inspection workload continued to a total of 744 orders requiring inspection, and a leveling-off tendency has become evident at this number representing about $11,250,000. Of the 690 orders assigned for inspection, they were distributed as follows: off-site, 572; on-site, 104; and government agency, 14. A gradual increase of on-site inspection work has led to plans for increase of personnel and inspection at HAPO.

The Corrosion Testing Program workload has increased slightly during November to totals of 230 corrosion tests, 121 etch tests, and 33 chemical determinations.

Following is a resumé of inspection activities during the month:

Items	Number	Value
New orders received during the month	120	
Total orders for items requiring inspection	744	
Cumulative orders assigned to inspectors	690	$11,278,953
Orders assigned to inspectors this month	147	821,075
Orders completed during the month	109	1,048,541

The major off-site inspection efforts were concerned with process water pumps for the Reactor Plant Modifications and calciners for the Metal Conversion Plant Expansion.

Because of AEC requests for bid assemblies, the workload for Reproduction and Engineering Files Units increased sharply. Reproduction output increased 126,663 square feet to a total of 498,134. Engineering Files distributed 175,340 prints, including about 1800 classified items. The largest single order was 29,282 prints for Reactor Plant Modification, followed by 5270 prints for 100-K Areas.

Estimating Unit workload increased slightly to 72, of which 32 were completed. The completed estimates included the following: project proposal, 11; study, 11; fair cost, five; and construction, five.

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Field Surveys continued with the additional work on the resurvey of Richland, Washington, including assistance to the Community Engineering Unit. Other work consisted of routine survey, topographical, and control work in the manufacturing areas.

Routine project cost control functions were continued, and two property evaluations were completed. Special studies and analyses were made on budgets, vendor inspection costs, and work order procedures.

Project Administration Unit provided routine services and realigned its functional groups to improve services.

D. Craft Labor

See Summary above.

III. REPORT OF VISITORS

A. To Hanford, November 1955

D. R. Edwards, Coast Pro-Seal and Manufacturing Company, Seattle, Washington, visited P. J. O'Neil on November 18 to discuss samples of Thiokol.

N. A. Rasmussen, Fryer-Knowles Company, Seattle, Washington, visited R. M. Griffith on November 30 to assist with equipment for 300 Area.

C. S. Slenning, Minneapolis-Honeywell Company, Minneapolis, Minnesota, visited Messrs. McIntosh, Shaver, Reilly, and Bell on November 22 to check equipment for CG-572.

B. To Other Installations, November 1955

J. M. Heffner visited Struthers-Wells Corporation, Warren, Pennsylvania, on November 5 to 12 to assist with engineering and expediting on process water pumps.

W. W. Walker visited General Electric Company, Schenectady, New York, on November 14 to 18 to attend the Quality Control Engineering Conference.

J. C. Hamilton visited Pittsburgh, Pennsylvania, on November 16 and 17 to confer with vendor inspectors and activate the East Central inspection area.

H. H. Hubble visited Detroit, Michigan, on November 27 to 30 to attend the Annual meeting of the American Institute of Chemical Engineers, as a member of the National Membership Committee.

G. L. Swezea visited the Bonneville Power Administration, Portland, Oregon, on November 30 to perform design liaison on the new 230-KV transmission line.

[redacted]

HW-40182 DEL

November 30, 1955

ADVANCE ENGINEERING SECTION

MONTHLY REPORT

NOVEMBER 1955

A study was completed of eight types of reactor-fuel element combinations, the reactors all being water cooled and graphite moderated. A rough draft report has been prepared for use in connection with the A.E.C. reactor survey task force.

P. F. S. for F. W. Albaugh
Manager, Advance Engineering
ENGINEERING DEPARTMENT

FW Albaugh:acj

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EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

MONTHLY REPORT SUMMARY - NOVEMBER, 1955

PERSONNEL PRACTICES SECTION

The number of applicants interviewed in November was 1550 as compared with 1335 for October. In addition, 71 new applicants applied by mail. Open, nonexempt, nontechnical requisitions decreased from 172 at the beginning of the month to 167 at month end. Ninety-five employees were added to the roll and 63 removed during the month. The separation rate for fiscal month of November was .51% and fiscal month of October was .62%. These rates when converted to annual rates are 6.65% and 8.80% respectively. During November 71 new requests for transfer to other type work were received by Employment and 21 transfers were effected. Attendance recognition awards were distributed to 209 employees in November, including 28 who qualified for five-year awards.

Five employees died during the month of November. One hundred and twenty-six visits were made to employees confined to Kadlec Hospital, and 15 checks were delivered to employees confined at the hospital or at home. At month end, participation in the Pension Plan was 98.6%, in the Insurance Plan 99.6%, and the Employee Savings and Stock Bonus Plan 53.4%. At month end there were 631 nonveterans registered under Selective Service and 699 military reservists were on the roll. Since August 1, 1950, 427 employees have terminated to enter military service, of which 168 have returned, 52 have not claimed re-employment rights, leaving 207 still in military-leave status.

Sixty-seven adopted suggestions were approved for awards in November resulting in cash awards totaling $1,885 with a total net savings of $11,985.58.

Since the beginning of the 1955-56 season, 18 offers have been extended to BS/MS graduates for the Personnel Development Program. There have been 3 acceptances to date. Acceptances have been received from 14 experienced candidates. To date 230 PhD cases have been considered, 39 have been invited to visit and 6 have accepted invitations to visit.

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

The Press Relations Unit issued 40 releases during the month, 9 of which were especially planned for national publicity purposes and were sent to the Schenectady Press Relations Section. Six manuscripts were approved for publication, and ten technical papers received all required approvals. Arrangements were made for six speeches to be delivered before public groups. The Community Newsletter was written and distributed to community leaders in Pasco, Kennewick, and Richland. Five Management News Bulletins were produced and distributed to all exempt personnel during the month.

The story on the Hanford heat exchanger was well received. Story and pictures were carried by a national TV show, the New York TIMES, HERALD TRIBUNE, Chicago TRIBUNE and other media. The Seattle TIMES carried photos and story on the front page.

"Operation 4-S", a communications program conducted in the autumn of 1954 to increase the quality and quantity of suggestions submitted at Hanford, was cited as one of the year's three best suggestion plan promotional campaigns in american industry and business at the annual convention of the National Association of Suggestions Systems.

Two new television series were developed and scheduled for telecasting on a regular basis: THIS WEEK AT HANFORD, RTVC (closed circuit, Channel 2 (cable) weekly at 1:45 PM on Fridays, beginning December 2, 1955; and HANFORD SCIENCE FORUM, KEPR-TV, Channel 19 (direct), alternate Wednesdays at 10:00 PM (tentative time) beginning December 14, 1955.

A total of 286 photographic assignments were covered for the month of November, and 19,093 prints were produced.

UNION RELATIONS SECTION

Collective bargaining agreements with the four HAPO bargaining units (HAMTC, HGU, BSEIU, and Community Firemen) were ratified and executed during the month.

On November 23, 1955, written understanding was reached with the Hanford Atomic Metal Trades Council in which they agreed to withdraw the pending law suit charging unilateral disregard for a "working agreement" originating in the 300 Area.

Several meetings on the interpretation and application of our new union agreements were held during the month with field supervision.

The HAMTC has informed us of a desire to arbitrate the Company's action in establishing the new classification of Gauge Worker. A determination regarding whether or not we will accept this issue as an arbitrable one is dependent upon our ability to agree on the precise issue to be submitted to the arbitrator.

SALARY AND WAGE ADMINISTRATION

The revisions to the Exempt Employee Appraisal Guide were distributed during the month. Revised forms are available from Stores.

EDUCATION AND TRAINING

Following 1 addition, and 5 placements in other departments, the Rotational Program now includes 52 trainees.

Approval has been obtained from the Atomic Energy Commission to enlarge the summer program for college personnel in 1956.

HEALTH AND SAFETY SECTION

A second accidental death for the year occurred when a coal handler was buried in a coal slide. This is the third fatality arising out of operations activity since 1944 when plant operations started. This brought the total of major injuries for the year to seven and a frequency rate of 0.44 injuries per million man hours worked. Total injuries for operations for the month were 347.

AUXILIARY OPERATIONS AND PLANT PROTECTION

Relocation of AEC personnel in 703 Building was completed during the month. This exchange of office space entailed a total of approximately 300 office moves with attendant revision of working areas to accommodate relocated occupants. The move also necessitated the relocation of approximately 350 telephones.

Unaccounted for documents are 196 as compared to 197 last month.

COMMUNITY SECTION

Unusual cold weather for the month of November caused bad road conditions and froze irrigation distribution grid systems which were not yet winterized, and also froze quite a number of water service lines which required a great amount of overtime beyond that originally forecast.

LLGerman/jak
12/19/55

Employee and Public Relations

PERSONNEL PRACTICES

Employment	October, 1955	November, 1955
Applicants interviewed	1,335	1,550

273 of the applicants interviewed during November were individuals who applied for employment with the Company for the first time. In addition, 71 applications were received through the mail.

	October, 1955	November, 1955
Open requisitions		
Exempt	1	2
Nonexempt	172	167

Of the 172 open, nonexempt, nontechnical requisitions at the beginning of the month, 115 were covered by interim commitments. Of the 167 open, nonexempt nontechnical requisitions at month end, 92 were covered by interim commitments. During November, 76 new requisitions were received requesting the employment of 123 nonexempt, nontechnical employees.

	October, 1955	November, 1955
Employees added to the rolls	127	95
Employees removed from the rolls	69	63
NET LOSS OR GAIN	+ 58	+ 32

	Fiscal Month October, 1955		Fiscal Month November, 1955	
	Male	Female	Male	Female
Separation Rate:	.36%	1.82%	.31%	1.44%

	Fiscal Month October, 1955	Fiscal Month November, 1955
Over-all Separation Rate:	.62%	.51%

During November, 4 employees left voluntarily to accept other employment 1 left for business for self, and 4 left to enter military service.

Employee and Public Relations

PERSONNEL PRACTICES

Transfer Data

Accumulative total of requests for transfer received since 1-1-55	782
Number of requests for transfer received during November	71
Number interviewed in November, including promotional transfers	82
Transfers effected in November, including promotional transfers	34
Transfers effected since 1-1-55, including promotional transfers	466
Transfers effected in November for employees being laid off	26
Number of stenographers transferred out of steno pool in November	9
Transfer requests active at month end	367

ADDITIONS TO THE ROLLS

	Exempt	Nonexempt	Community Firemen	Total
New Hires	7	77	--	84
Re-engaged	-	--	--	--
Reactivates	1	10	--	11
Transfers	-	--	--	--
TOTAL ADDITIONS	8	87	---	95

TERMINATIONS FROM THE ROLLS

	Exempt	Nonexempt	Community Firemen	Total
Actual Terminations	10	26	--	36
Removals from rolls(deactivates)	2	22	--	24
Transfers	3	--	--	3
TOTAL TERMINATIONS	15	48	--	63

GENERAL

	10-1955	11-1955
Photographs taken	180	163
Fingerprint impressions	115	88

PERSONNEL SECURITY QUESTIONNAIRES PROCESSED

	10-1955	11-1955
General Electric Cases	113	135
Facility Cases	18	18
Total	131	153

Employee and Public Relations

PERSONNEL PRACTICES

The Separations Section gave notice of force reduction to 26 Utility Operators to be effective December 12, 1955. All of these surplus operators have been placed as follows: Eighteen were offered assignments with Reactor Section as Utility Operators, four as Craft Trainees, one Groundman, one Engineering Assistant, one Field Clerk and one Patrolman.

Advertisements were placed in the newspapers in Denver, Colorado and Salt Lake City, Utah on the week end of November 13 for Stenographers and Draftsmen. An Employment representative recruited through the State Employment Service Office in Denver on November 14, 15 and 16. Response to our advertisements in both cities were very limited, however, it may have been due partly to the severe weather conditions in both locations.

Eight business colleges and five high schools were contacted in Denver and three business colleges in Salt Lake City. The employment representative spoke before a group of 100 students at the Park School of Business in Denver and 30 students requested applications.

At this time about half of the high schools and business colleges in Walla Walla, Yakima, Sunnyside and the Tri-City area have been contacted to determine if they have commercial students graduating at mid-term, who might be interested in stenographic positions with the Company.

The G. E. Supervisory Selection Program was used for the first time by the Minor Construction Sub-Section of the Engineering Department.

Personnel Records and Investigations

INVESTIGATION STATISTICS	10-1955	11-1955
Cases received during the month	144	168
Cases closed	241	257
Cases found satisfactory for employment	147	146
Cases found unsatisfactory for employment	10	31
Cases closed before investigation completed	6	13
Special investigation conducted	9	12

PERFECT ATTENDANCE RECOGNITION AWARDS

Total one-year awards to date since January 1, 1950	5448
One-year awards made in November for those qualifying in October	51
Total two-year awards to date since January 1, 1950	3137
Two-year awards made in November for those qualifying in October	42
Total three-year awards to date	1863
Three-year awards made in November for those qualifying in October	40
Total four-year awards to date	958
Four-year awards made in November for those qualifying in October	48
Total five-year awards to date	312
Five-year awards made in November for those qualifying in October	28

Employee and Public Relations

PERSONNEL PRACTICES

SERVICE RECOGNITION

Total Service Recognition Pins presented to date	5452
Five-year Service Recognition Pins presented during November to Exempt personnel	7
Five-year Service Recognition Pins presented during November to Non-exempt personnel	36
Twenty-year Service Recognition Pins presented during November to Exempt personnel	1

During November, 17 people whose continuity of service was broken while in an inactive status were so informed by letter.

Employee Services

The following contacts were made with employees during the month:

Employee contacts made at Kadlec Hospital	126
Salary checks delivered to employees at Kadlec Hospital	14
Salary checks delivered to employees at home	1

At the end of the month, participation in the Benefit Plans was as follows as compared with last month's participation:

	OCTOBER	NOVEMBER
Pension Plan	98.5%	98.6%
Insurance Plan	99.5%	99.6%
Savings & Stock Bonus Plan	53.4%	53.4%
Good Neighbor Fund	70.5%	70.2%

Five employees expired during the month of November, namely:

John A. Paseka	W 6080-6431	11/22/55	Manufacturing
Leonard T. Nord	W 17433-6602	11/23/55	"
Frank M. Snorf	W 7826-6173	11/24/55	"
Joel H. Downing	W 7428-6166	11/25/55	"
Raphael Clement	M 307-342	11/24/55	Employee & Public Relations

One retired employee expired during the month of November, namely:

George Beard	11/17/55	Normal Retirement

All necessary arrangements have been made to settle all matters of business in connection with the named deceased employees at an early date.

Employee and Public Relations

PERSONNEL PRACTICES

Employee Services

Six employees retired during the month of November, namely:

Alfred W. Carse	W 8191	Normal Retirement
William Virnig	W 5142	"
Edgar P. Smith	W 6409	"
Albin T. Soderquist	W 7130	"
Leslie A. Vosmer	M 2000	"
Ellis C. Carlson	W 6004	Optional Retirement

All matters pertinent to retirement have been discussed with these employees, in order that they will be fully informed of their retirement benefits.

A total of 87 new employees attended Orientation Programs given by members of this group during the month of November. Of this number, 100% have signed up to participate in the Pension Plan, *99% have signed up to participate in the Insurance Plan, and 86% have signed up for the Good Neighbor Fund program.

*One waiver was received because this employee is covered as a dependent.

35 letters were written in regard to matters concerning deceased employees and their families during November regarding payment of monies from the Company, and general information.

Military Reserve and Selective Service

Total number of non-veteran employees subject to military service training through Selective Service System 631

Number Classified 1A	151
Number Classified 1AO	1
Number Classified 1D	54
Number Classified 2A	106
Number Classified 3A	232
Number Classified 4A	3
Number Classified 4F	82
Number Classified 2S	2
	631

Number of Technically Trained & Engineering Personnel for whom deferments are currently being requested 114

Number of Non-Technically Trained & Engineering Personnel for whom deferments are being requested 5

Total 119

Accumulated total of deferments requested	1573
Accumulated total of deferments granted	1265
Current number of deferment requests pending	30
Current number of deferment requests denied	1
Current number of deferment requests granted	9

<u>During Month of November</u>

Number of deferment requests pending at Local Board Level	23
Number of deferment requests pending at Appeal Board Level	6
Number of deferment requests pending at Presidential Appeal Level	1
Total	30
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	9
Number of deferments granted by State Appeal Boards	0
Number of deferments granted by Presidential Appeal Board	0
Total	9
Number of Technically Trained & Engineering Personnel denied, or requesting no further appeal, now pending induction	11
Number of Technical Graduates with over two years of deferments	77
Number of Selective Service vulnerable Technical Graduates Enlisted	1
Number of Selective Service vulnerable Technical Graduates Drafted	0
Number of Technical Graduates called to active duty under R.O.T.C.	0
	1

Reservists Data - Total Number of Reservists on Roll

Number of Active Reservists	166
Number of Inactive Reservists	512
Number of employees in the National Guard	21
Total	699

Employee and Public Relations

PERSONNEL PRACTICES

Military Reserve and Selective Services

Reservists and National Guard members subject to drills, tours of duty, Cruises, Summer Camp and/or Weekly or Monthly meetings		257
Military Service Leaves of Absence - August 1, 1950 thru Nov. 29, 1955		
Reservists		129
Selective Service System		290
Female Employees Enlisted		8
	Total	427
Total number returned to roll		168

Reservists	72
Sel. Serv. Sys.	96
	168

Known number not claiming reemployment rights	52
Number of employees still on military leaves	207

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

Suggestion Plan	October	November	Total Since 7-15-47
Suggestions Received	219	275	18239
Acknowledgements to Suggesters	216	238	
Suggestions Pending Acknowledgement	19	56	
Suggestions Referred to Depts. For Investigation	255	290	
Suggestions Pending Referral to Departments	22	58	
Investigations Completed and Suggestions Closed	201	238	
Suggestions Adopted - No Award	1	1	
Adopted Suggestions Approved by Board for Award	53	67	
Total Net Cash Savings	$22,553.89	$11,985.58	
Total Cash Awards	$2,715.00	$1,885.00	
Total Number Suggestions Outstanding to Departments	470	513	

Cumulative suggestion statistics for the first eleven months of 1955, compared with 1954, are:

	1955	1954	Increase
Received	2,618	2,307	13.5%
Adopted	947	677	39.9%
% of Adoption	36.2%	28.6%	--
Awards	$21,419	$15,380	39.3%
Savings	$158,814	$116,040	35.1%
Award/Savings	13.5%	13.2%	--

The OPG regarding decentralization is ready for distribution to department managers except for a few items that require clarification. It is expected that the guide will be distributed to managers for their review before the middle of December.

Life Insurance

Fifty-nine requests for code information were received from insurance companies and investigation agencies and furnished during the month of November, 1955. The code information is supplied in accordance with a prearranged plan whereby employees of this project may be insured on the same basis of those working elsewhere.

Insurance Statistics

Claims reported to Department of Labor

October, 1955	
Long Forms	Short Forms
42	442

November, 1955	
Long Forms	Short Forms
41	493

Total Since September, 1946 - 30,087

EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT

WORKMEN'S COMPENSATION AND SUGGESTION PLAN

Insurance Statistics, Continued

	October, 1955	November, 1955
Claims reported to Travelers	10	*8

Total Since September, 1946 - 1,031

Workmen's Compensation

a. Fletcher Collins, 8001370 -- Date of Injury: 12-5-52; Employer: General Electric Company; Nature of Injury: Ruptured Intervertebral Disk

Mr. Collins filed a claim with the Department of Labor and Industries for an alleged back injury of December 5, 1952. After the claim was rejected by the Department he appealed to the Board of Industrial Insurance Appeals. He had also filed three other claims with the Department for back injuries possibly related to the injury of December 5, 1952. In October the Board ruled in favor of the employer and the Department of Labor and Industries and on November 14, 1955 Mr. Collins appealed to the Superior Court of the State of Washington for Benton County.

Liability Insurance

a. M. T. Powell vs. General Electric Company, B-6835907

Mr. Powell, a janitor in the Reactor Section of the Manufacturing Department, filed a Summons and Complaint on June 2, 1955 alleging loss of vision in his right eye as a result of an injury allegedly sustained when he was struck by an ashtray thrown by a fellow workman. The Complaint alleged damages in the amount of $25,000. Mr. Powell's deposition was taken on October 17, 1955 and on November 1, 1955 The Travelers' attorney, Mr. John Gavin, was in Richland and depositions were taken from Messrs. R. J. King, William Mathias and Ray Roestel, all Reactor-Power employees. The case has been set for trial in Federal Court for the Southeastern District of Washington before Judge Lindberg on December 27 and 28, 1955.

b. 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 employee, O. F. Hultman, struck the rear of a private sedan in which Mr. Jack Traum was a passenger. Mr. Traum subsequently filed an action against General Electric alleging damages in the sum of $90,175 plus costs. On November 2,

* Of the claims reported to Travelers Insurance Company during the month of November seven were property damage and one was a bodily injury claim.

1955 Dr. P. A. Fuqua's deposition was taken. The case went to trial on November 28, 1955, however, a settlement was reached after the jury had been selected and the plaintiff had presented one witness. The settlement figure was $29,000.

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

Messrs. Riste and Swearingen brought separate actions against General Electric Company and Dr. P. A. Fuqua alleging negligence on the part of General Electric doctors for failure to properly diagnose a tubercular condition at the time of their annual physical examinations. The cases were consolidated in order to save time and expense. At the Superior Court level the defendants' demurrers were sustained and the plaintiffs appealed to the Washington State Supreme Court. The Supreme Court reversed the Superior Court with respect to General Electric, however, with respect to Dr. P. A. Fuqua, the demurrers were sustained. General Electric has since submitted a Petition to the Supreme Court for a rehearing requesting a reversal or modification of the Supreme Court's decision.

Technical Recruitment

During November Hanford representatives participated in BS/MS recruiting at 1 school in Region 4, 5 in Region 5, and 8 in Region 6. The majority of students contacted will not graduate until June and will be seen again in the spring before any offers will be made.

Status of the BS/MS Personnel Development Program may be summarized as follows:

	Offers Extended			Acceptances			Open Offers			Rejections			On the
FIELD	BS	MS	Total*	BS	MS	Total*	BS	MS	Total	BS	MS	Total	Roll
Engineering:													
Chemical	9	2	11	5	1	6	4	1	5				3
Electrical	3		3				3		3				
Mechanical	3		3	1		1	2		2				1
Metallurgical	1		1				1		1				
Science													
Chemistry	4	2	6	2	1	3	2	1	3				
Physics		2	2		1	1		1	1				1
Other:	1		1				1		1				
TOTALS	21	6	27	8	3	11	13	3	16	-	-	-	5

*Offers and Acceptances totals include 9 carry-over offers from the 1954/55 season of which 8 were acceptances not on the roll as of 9/1/55.

BS/MS Experienced Recruiting

Sixty-one new cases were considered during the month of November resulting in 14 invitations to visit, 7 offers were extended and 7 acceptances were received. Cooperation from the field in scheduling interviews has been excellent.

BS/MS Experienced Recruiting (continued)

The following table summarizes the Experienced BS/MS Recruiting to date:

	Cases Considered	INVITATIONS Ext.	Visited	To Visit	Open Inv.	OFFERS Ext.*	Acc.*	Open*	On The Roll
Engineering:									
Chemical	13	4	3	-	1	4	3	-	2
Electrical	22	1			1	7	3		2
Mechanical	24	5	3	1	1	6	5		1
Industrial	5	2	1	1		2	2		1
Metallurgical	5	1							
Civil	6	1			1	1	1		1
Geological	5	2	2			3	2	1	1
Science:									
Chemistry	21	2	1		1	8	7		5
Physics	22	3		1	2	3	2		2
Math-Statistics	17	5	1		2	3	2		1
Other:	71	6	3	1	1	12	7	—	7
TOTALS	211	32	14	4	10	49	34	1	23

*Offer totals include 24 carry-overs from the 1954/55 season of which 20 were acceptances not on the roll as of 9/1/55, and 4 were open offers at that time.

PhD Recruiting

During the fall 1955 season 22 HAPO representatives have visited or are scheduled to visit 38 colleges and universities in GE Company-wide PhD recruiting. The last 8 campus visits will be completed during the first 16 days of December. This represents about a 30% increase over the number of schools regularly visited by HAPO representatives in previous years. Eight of the schools had never been visited previously by HAPO PhD representatives at any time, and eight recruiters had never represented HAPO on PhD trips before. Five schools visited in previous years (M.I.T., Harvard, Cornell, Delaware, and Northwestern) were not included in this year's schedule because of the lack of available HAPO representatives. This Unit was responsible for coordinating 9 of the GE campus PhD visits. The Company as a whole scheduled close to 50 PhD campus visits this fall, the additional schools generally being covered by a single Company representative from the east.

PhD Recruiting (continued)

HAPO action during the current PhD season to date may be tabulated as follows:

	Cases Consid.	Invitations			Visited to date	Offers			On the Roll
		Inv.	Open	Acc.		Made	Open	Acc.	
New PhD's	240	73	29	36	28	21	6	9	4
Experienced	34	7	2	3	2	1	1	—	—
Sub-Totals	274	80		39	30	22		9	4
1954/55 Carryovers	44	41	2	33	20	13	5	7	0
55/56 Totals	230	39	31	6	10	9	7	2	4

Terminations

During November there were 8 terminations of technical or major exempt employees. Four left for other jobs, 1 to enter military service and 3 transferred to other GE sites. One transfer was to APED, San Jose.

Employee and Public Relations Department

EMPLOYEE COMMUNICATIONS & PUBLIC RELATIONS

During the month of November, Press Relations issued 40 releases. The breakdown by category, distribution and content was as follows:

Subject		Distribution	
Pay and Benefits	5	Hanford Area	24
Employment Services	5	West Coast Area	7
Good Will	2	National	7
Technology and Research	19	Other Special	2
Safety, Fire	4		
Security	1	Content	
Administration and Legal	1		
Organization Changes	2	Information	8
Richland-Hanford Protection	1	Pictures	5
		Short	22
		Long	3
		Feature	2

National publicity releases sent to Schenectady Press Relations with carbon copies to H. A. Beaudoin included: a picture with cutlines of a small oven made of gold and having platinum wire heating elements used in research; a feature-length article with pictures (including color transparencies) about Carl M. Unruh, who heads the protective clothing study group at Hanford; a feature-length story with pictures on the effects of radioactive materials on waterfowl; a feature story about experiments with rainbow trout which are fed radioactive minnows to find out effects of radiation on living things; a feature on the Hanford heat exchanger: a picture and cutlines of the "dummy mask head"; a picture and cutlines of uranium glowing underwater and additional pictures and cutlines of the underwater camera used in underwater lab.

The story on the Hanford heat exchanger received a very good play. The story and pictures were carried by a national TV show, the New York TIMES, HERALD TRIBUNE, Chicago TRIBUNE and many other media. The Seattle TIMES carried photos and story on the front page.

NUCLEONICS has scheduled a cover photo and illustrated article about the underwater examination basin at 100-C for its January cover.

H. A. Beaudoin, Manager of Advertising and Sales Promotion and Public Relations for Atomic Products Division, spent three days at Hanford during the month.

Harry Kramer's name was submitted to Community Relations, New York, as a candidate for a special feature on the December 25 GE Theater telecast. Instead of the commercial, employees who have done outstanding public service as employees will be featured. Harry Kramer's name was submitted in view of his water level forecasting during the 1948 flood for which he received a Coffin Award.

LIFE magazine at New York has expressed interest in a story about the Nuclear School of Engineering. They may send in a writer and photographer to do a story.

Announcement of the appointment of Robert E. Rose to head the Employee Communications and Public Relations section at Hanford was made in a release to the daily list.

EMPLOYEE COMMUNICATIONS & PUBLIC RELATIONS

A release to the daily list announced that "Operation 4S" initiated at Hanford had been cited as one of the year's three best suggestion plan promotional campaigns in American business and industry.

A technical paper to be discussed by a GE engineer at a Seattle, Washington meeting of the Society of Nondestructive Testing was described in a release forwarded to the science-engineering list.

Presentation of a paper discussing the effects of radiation on the mechanism of inheritance in living cells by Dr. F. P. Hungate was given publicity in a release distributed to the science-engineering and local lists.

Appointment of W. M. Harty to position of Manager, Engineering Administration, was announced in a release circulated to local and science-engineering lists.

Associated Press in Seattle requested more information on heat recovery story. They were told that the limits of the story were defined by the AEC, and that the information requested could not be made available.

A request was received from the PORTLAND OREGONIAN on the question of why electric power is not generated from Hanford reactors. This request was referred for answer to the AEC's Information Office here at Hanford.

Presentation of a paper discussing the atomic age by W. J. Dowis was given publicity in a release distributed to the science-engineering and local lists.

Notice that the first three-per-cent general pay increase for non-exempt, non-bargaining unit employees at Hanford would be reflected in November 4 paychecks was given in a local release.

A local release described a technical paper to be presented by a GE ventilation engineer from Hanford at the Air Cleaning Conference at the Argonne National Laboratory.

Local releases also covered employee suggestion award winners, promotions, attendance awards, employees entering armed forces and retirements.

A technical paper to be discussed by J. L. Jaech at the Fifth Annual Statistical Symposium of GE's Engineering Laboratory in New York was described in a local release.

A technial paper to be discussed by B. F. Butler at the Joint Eastern Computer Conference in Boston was described in a local release.

Notice of a talk to be given by W. J. Dowis at the Richland Lions Club was distributed to local papers, TV stations, and radio station.

COLUMBIA BASIN NEWS is publishing a series of stories about Richland's coming incorporation. The first of several interviews were arranged during the week for the CBN reporter and GE people who manage community facilities. Two articles based on the interviews appeared last week as part of the series.

EMPLOYEE COMMUNICATIONS & PUBLIC RELATIONS

The local COLUMBIA BASIN NEWS reporter requested the average amount to be paid in retroactive paychecks. He was furnished with examples of two typical payments to be made.

A story about an employee fatality was released to the two local papers.

Closing of community and plant facilities during the Thanksgiving holidays was announced in a local release.

Talk to be given by J. F. Cline, Hanford biologist, to Sunnyside, Washington Rotary Club members was described in a local release.

Local COLUMBIA BASIN NEWS requested and was provided additional information on the new Insurance Plan.

Heat recovery story sent to Schenectady Press Relations earlier in the month was forwarded to local list.

Verbal releases were made to the local papers on two small accidents that occurred on plant highways.

Notice of a talk to be given by L. D. Turner was distributed to local papers and radio stations in Spokane, Washington.

A verbal release was made to Dale Cook of COLUMBIA BASIN NEWS on the list of people on the declassification teams going to Oak Ridge, Tenn.

A talk to be given by J. R. Triplett on relative merits of different Power Reactors at Pullman, Washington was described in a local release.

At the request of the Schenectady Press Relations office, a story on the wide angle atomic ray detector developed by GE scientists was sent to FORTUNE magazine.

Story about Ray and Eugenia Edmerson, both workers at Hanford, was sent to EBONY magazine.

Arrangements for transportation, tour, dinners, etc. were completed for representatives of Atomic Power Development Associates and the Nuclear Power Group during the month.

The Community Newsletter was written and distributed to the community leaders in Richland, Kennewick and Pasco.

The unit worked with Miss Fulmer to arrange for a group of 10 high school and junior high math teachers and 15 math students to tour Computing & Procedures facilities in the 700 Area.

The following manuscripts received all required approvals during the month:

E. F. Curren, "UNH Conversion," written for publication.

D. C. Kaulitz and J. E. Miner, "High Pressure Loop Design for Studies of Reactions Between Heated Metals and High Temperature Water," for distribution as an unclassified formal report.

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

R. S. Kemper, Jr., "The Effect of Irradiation on the Mechanical Properties of Arc-Melted Bureau of Mines Zirconium with Various Degrees of Cold Work" for publication in a professional society journal.

S. Marks, N. L. Dockum, "Histopathology of Sheep Thyroid in Chronic Administration of I^{131}," for publication in the AMERICAN JOURNAL OF PATHOLOGY.

F. E. Tippets, "Heat Transfer Analysis of Internally-Externally Cooled Cylindrical Fuel Elements for Nuclear Reactors," for transmittal to and sale by the OTS in Washington, D. C.

Bergene Kawin, "Study of Kinetic Tissue Distribution and Excretion of Intravenous Radioyttrium in Rats," for submission to the New York Academy of Sciences for publication.

A report on the status of signed articles being written by Manufacturing department authors was furnished to H. A. Carlberg at his request.

A manuscript, "Mechanical Agitators for Heat Treating," by C. E. Frantz, Engineering, has been scheduled for February 1956 publication in PRODUCTION magazine.

The following papers, abstracts and outline received all required approvals during the month:

G. R. Hilst, "Some Observations of Particle Distribution with Height in the Lower Atmosphere," for presentation at the Air Cleaning Conference, Argonne National Laboratory in Chicago, Illinois on November 2-4, 1955.

J. H. Palmer, "Filtration As It Affects the Ventilation Engineer," for presentation at the Air Cleaning Conference, Argonne National Laboratory in Chicago, Illinois on November 2-4, 1955.

R. E. Rostenbach, "General Aspects of Radioactive Waste Disposal and the Hanford Program," for presentation at the Pacific Northwest Sewage and Industrial Wastes Association, Victoria, B. C. on October 28, 1955.

R. B. Socky, "The Role of Nondestructive Testing at Hanford," for presentation at a Seattle meeting of the Society of Nondestructive Testing, November 4, 1955.

B. F. Butler, "Operations Control With An Electronic Computer," for presentation at the Joint Eastern Computer Conference to be held in Boston, Massachusetts on November 7, 8 and 9 and for publication in the proceedings.

S. Marks, N. L. Dockum, "Histopathology of Sheep Thyroid in Chronic Administration of I^{131}," for publication in the AMERICAN JOURNAL OF PATHOLOGY.

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

F. E. Tippets, "Heat Transfer Analysis of Internally-Externally Cooled Cylindrical Fuel Elements for Nuclear Reactors," for transmittal to and sale by the OTS in Washington, D. C.

C. E. Michelson, "A Polarograph Employing a Rapid Scanning Rate and Self-Synchronized Drop," an abstract for presentation at the Seventh Annual Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy in Pittsburgh, Pennsylvania on February 27 to March 2, 1956.

U. L. Upson, "In-Line Analysis -- Key to Chemical Process Automation," an abstract for presentation at the Seventh Annual Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy in Pittsburgh, Pennsylvania on February 27 to March 2, 1956.

M. L. Mickelson, "Radiological Safety," an outline for presentation to sales engineers at the General Electric Seattle Office on November 21, 1955.

The following speeches were arranged during the month:

Presentation or Submission Date	Subject and Organization or Publication	Author
November 17	"Some Interesting Facts About Hanford," and show the movie, "A Is For Atom," at the Sunnyside Lions Club.	J. H. Warren
November 15	"Atomic Energy and Its Future," at a meeting of the Richland Lions Club.	W. J. Dowis
November 28	"The Use of Atomic Energy in Agriculture -- Present and Future," at a meeting of the Sunnyside Rotary Club.	J. F. Cline
November 30	"The Atomic Age," at the annual 4-H Club Leaders annual banquet.	W. J. Dowis
December 1	"Customer Relations," at a meeting of the Richland Exchange Club.	V. J. Byron
December 1	Present the narration and film, "Hands Across the Atom," at the Inland Empire Section of the American Society of Metallurgical & Mining Engineers.	L. D. Turner

The Supervisor-Employee Communications transferred to the Education and Training section, effective November 28.

Five Management NEWS Bulletins were produced and distributed, publicizing: Payroll Practices concerned with pay increases and Pension and Insurance contributions; appointment of R. E. Rose as Manager-Employee Communications and Public Relations; changes in the film projection services; and Company organizational changes which were effective December 1.

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

Printed programs were produced and identification nametags were prepared for use during the visits of the Atomic Power Development Associates on November 3 and 4 and the Nuclear Power Group on November 28.

An article titled, "Understanding People in Modern Industry," by Dr. G. C. Sutch, was printed and distributed to members of the Management Information Group.

A folder, "Investment for the Future," outlining the main features and advantages of the Employees Savings and Stock Bonus Plan, and a cover letter were produced at the request of Employee Services Unit for distribution to supervisors of recently hired employees who are not participating in the Plan.

"Operation 4S," a communications program conducted in the autumn of 1954 to increase the quality and quantity of suggestions submitted at Hanford, was cited as one of the year's three best suggestion plan promotional campaigns in American business and industry at the annual convention of the National Association of Suggestion Systems.

Revisions were completed on selected sections of the booklet, "Here's Hanford" which is kept on hand for distribution to visiting officials from off-site.

At the request of Radiological Sciences Department a "radiological defense handbook" was edited and placed in production at Printing.

At the request of Engineering Department, work was begun on the revision of a descriptive booklet concerning Hanford's Radiometallurgy Building.

The November health bulletin, "Are You Living in a Haunted House?", published by the National Association for Mental Health, was distributed to all employees. At the request of Safety and Fire Prevention Unit, the November safety topic was cancelled, and the December safety topic, giving supervisors guidance in the preparation and presentation of effective safety meetings, was prepared and placed in production.

The revised Insurance Plan booklet was distributed to employees' homes with a cover letter prepared for the signature of the General Manager.

Final draft of a copy for the Technical Recruiting booklet, "Horizons at Hanford," was submitted to Technical Recruitment Unit for approval.

At the request of Radiological Sciences Department, a pamphlet on respiratory protection, "Air-Tight," was prepared and placed in production. A second pamphlet, concerning Hanford's Bioassay program, titled "Double Check," was written and submitted to Radiological Sciences for approval prior to publication. Also at the request of Radiological Sciences Department, work was begun on revision of the handbook, "Radiation Protection For You."

Copy and photographs for the Hanford Section of the recruiting booklet published by the New York office, titled "10 Programs for College Graduates," were revised and forwarded to Public Relations Services Division.

1000 copies of a booklet titled, "About Radiation... a Guide for Visitors at Hanford," were produced at the request of Radiological Sciences Department and delivered to that department for distribution to visitors.

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

Classified recruitment advertisement for Stenographers and Draftsmen were prepared for publication in the November 11, 12, 13 and 14 issues of the Denver POST and Salt Lake City TRIBUNE at the request of Employment Unit.

Information notice concerning the Thanksgiving holidays was prepared for posting on plant bulletin boards and publication in three issues of the GE NEWS prior to the holidays.

At the request of Union Relations, typographical instructions for the revision of the HAMTC-GE Agreement booklet were prepared and forwarded to the Walla Walla Union Bulletin, where reprinting of the booklet was begun.

Transfer of the film projection and poster service to the Plant Library and Security and Patrol, respectively, were effected during the month.

Arrangements were made to include Chief Operators and Dispatchers among regular recipients of the "GE Review" and "Monogram" beginning with the January, 1956, issue.

Major news stories announced the pay increases reflected in current checks as a result of the "better living" program; the receiving of retroactive "better living" pay increases; ratification of the five-year agreement with the Company by the HAMTC; announcement of the AEC's proposed priority regulations for the sale of Richland homes; a 25% increase in the dividend rate on GE Common Stock; and the citation by the National Association of Suggestion Systems to the "Operation 4S" communication program.

Two organization changes were publicized in the GE NEWS: appointment of Robert E. Rose as Manager-Employee Communications and Public Relations, and of W. M. Harty as Manager-Engineering Administration.

GE NEWS features included the third in a series on proper use of telephones at Hanford; personality portrait of the new Employment Representative for Women; introduction and use of Intrafax facsimile communications between Hanford facilities; current Separations Safety Stampede activities; research and development work carried on by two Engineering Units for improving graphite quality; functions of the Plant Photography Unit; and contributions of five HAPO authors to the November issue of the GE REVIEW.

Six promotions from nonexempt to exempt positions were announced in the GE NEWS.

Suggestion Plan awards totalling more than $2500 during October, and the winning of the attendance awards by 152 HAPO people, were featured in the GE NEWS during the month.

Throughout the month conversations and correspondence were conducted with the Tri-City HERALD concerning improvement in the printing quality of the GE NEWS. The HERALD business manager reported success in the purchasing of a linotype machine to be used exclusively for such job work as the GE NEWS. The GE NEWS editor was consulted and suitable new type faces were agreed upon and ordered by the HERALD. The linotype and new type faces are expected to be available and in use by January 1, 1956.

On November 14, the Manager of Olympic Engravers, to whom the GE NEWS has a two-year contract for engraving service, reported that because of business troubles

he would be forced to discontinue operation of the Kennewick shop. Conference was held by the representatives of the GE NEWS, the engraver, Purchasing Sub-Section and Legal Department, and an alternate engraving service was worked out on a trial basis.

Artwork for publications produced by the Employee Communications commercial artist during the month included: final art for the pamphlet "Air-Tight," concerning respiratory protection; layout and final artwork for the December safety topic and health bulletin; layout for the front cover of the Technical Recruiting booklet, "Horizons at Hanford" and layout and final artwork for a poster concerning the Science Forum television series.

Twenty color cartoons for title pages of a Richland Fire Unit report, "1955 Fire Prevention Activities," and the mounting of photographs on 19 Report pages, were completed at the request of the Richland Fire Unit.

Four full-page photo layouts were prepared for the GE NEWS.

Four GE HANFORD SCIENCE FORUM radio programs were developed and broadcast over a regional radio station during the month. A special feature was the guest appearance of Clarence H. Linder, Vice President, Engineering.

Four export editions of the radio program INSIDE HANFORD were broadcast over KIMA, Yakima during the month.

Three features for the new INSIDE HANFORD series were readied for broadcast. Initial broadcast of the new series is scheduled for 8:45 P.M. Thursday, December 15, 1955 over KWIE.

Two new television series were developed and scheduled for telecasting on a regular basis: THIS WEEK AT HANFORD, ETVC (closed circuit, Channel 2 (cable) weekly at 1:45 P.M. on Fridays, beginning December 2, 1955; and HANFORD SCIENCE FORUM, KEPR-TV, Channel 19 (direct), alternate Wednesdays at 10:00 P.M. (tentative time) beginning December 14, 1955.

The HANFORD REACTOR EXPANSION PROGRAM was assembled at the California studio, and the composite print received and reviewed by GE and AEC officials.

The second edition of the script, THE KW REACTOR INCIDENT, was reviewed with the Engineering Department. Recommendations were incorporated in a third edition and the execution of necessary graphic illustrations and still photo enlargements was initiated.

An agreement was reached with the Head of Technical Recruitment to produce two feature-length motion pictures to be known as the PARTNERS IN PROGRESS series. One film will cover manufacturing activities, and the other engineering activities and the performance of technical employees on their jobs.

Distribution of Graphics November Assignments

	Percent
General Administrative (Including Operations Research)	0
Employee and Public Relations	20
Engineering	36
Manufacturing	18

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

	Percent
Financial	8
Radiological Sciences	14
Atomic Energy Commission	4
	100

	October	November
Total assignments completed	53	48
Total assignments backlog	49	54

Graphic services were furnished for both the Atomic Power Development Association meeting of November 4 and the G.E. officials meeting of November 14. These assignments required last minute preparation of visual aids, touch-up and revisions to existing aids and general assistance in arranging the meeting room and furnishing all required material.

Seventeen figures were developed on a priority basis for the Engineering Department report, Document HW-39927, titled "Study of Process Tube Conditions." This assignment required detailed preparation of color and transparent overlays to show various conditions on tube corrosion grids developed to represent tube locations for the Dr, D, B, H and C Reactors.

Graphic assignments completed for Technical Publications were as follows: seven figures for Document HW-39170 titled, "Third Interface Monitoring"; four photo plates for Document HW-39552 titled, "The In-Pile Performance of Uranium Fuel Elements"; five figures for Document HW-39313 titled, "Pre-Irradiation Evaluation of Dingot Uranium"; fourteen figures for revised Document HW-38813; ten graphs for Document HW-39190 titled, "Reaction Kinetics of Zirconium and Zircaloy-2 Alloy"; eleven photo plates for Document HW-38982 titled, "Diffusion of Uranium into Aluminum"; four figures for Document HW-39043 titled, "Evaluation of Texas Coke Graphite for "K" Piles"; and eleven plates for Document HW-37439 titled, "Secondary Corrosion Behavior of Nickel and Iron Nickel Coatings".

Approximately sixty visual aids were prepared for business reviews held by Sections of the Radiological Sciences and Manufacturing Department.

A perspective of a proposed method of loading product containers on a flat car was prepared for the HOO to use in a hearing in Washington, D. C.

Work is in progress in developing a series of illustrations and process flow charts on an "Idealized Separations Plant."

A detailed perspective is being prepared of a "Profilometer". This is one of the last pieces of equipment to be developed for the 100-C Examination Facility series of drawings.

The illustration of the "702" IBM Room was completed this month. This is a perspective view showing all equipment in such a manner that it can be adequately used to demonstrate the varied sequences of operation.

Additional funds were made available by the Engineering department for completion of the "Fuel Element Pilot Plant Model." Although the model is not yet complete, it was shipped to the 300 Area for a showing to the Nuclear Power Group this month. It is estimated that final completion of this project will be accomplished in the first week of December.

EMPLOYEE COMMUNICATIONS AND PUBLIC RELATIONS

Graphics Statistical Summary	Charts or Graphs	Illustrations	Others
Report Material (Includes Technical Publications)	35	8	17
Technical or Scientific Illustrations	-	9	-
Mechanical Art (Flow charts, schematics, maps, etc. - not for publication)	34	-	-
Lecture Material (Includes plates for slides)	77	14	-
Posters	4	-	-
General (Posting of current data, assembly, revisions, etc.)	57	-	8
	207	31	25

Total plates completed - 263

A total of 286 photographic assignments were covered for the month of November, 19,093 prints were produced of which 7,800 were identification photographs; 11,293 were area and news. 851 negatives were exposed.

See attached statiscal report for Photography Unit.

PHOTOGRAPHY UNIT MONTHLY REPORT NOVEMBER, 1955	Requests	2" X 2"	2" X 4"	4" X 5"	5" X 7"	8" X 10"	8½" X 11"	11" X 14"	16" X 20"	N E G	35mm Color Slides	35mm B&W Slides	3¼" X 4" Color Slides	3¼" X 4" B&W Slides	16mm M.P. Film
OPERATIONS RESEARCH	2									2			2	13	
EMPLOYEE & PUBLIC RELATIONS	11	369												114	
SALARY & WAGE ADMINISTRATION															
Salary Control Records	1					3				4					
PERSONNEL PRACTICES															
Employment	1														
Employee Services	2					6				4					
Suggestion System & Workman's Comp.	1					9				3					
Technical Recruit.	12					38	2	4		50					
EDUCATION & TRAIN.	1		1							2					
Train. & Develop.	2					3				2					
EMP. COMM. & PUBL. RELATIONS															
Public Comm.	29		58	2	2	221	6			37					
Empl. Comm.	35		18	12	12	86				119			17		
AUXILIARY OPER. & PLANT PROTECT.															
Telephone	3					33				25				11	
Security & Patrol	1	7157													
COMMUNITY															
Fire	17			213	61	7				43					
Police	4	45		8		5				21					
Library	4			12	3	32				15					
HEALTH & SAFETY															
Safety & Fire Prevention	2			4		1									

PHOTOGRAPHY UNIT MONTHLY REPORT NOVEMBER, 1955 (Cont.)	Requests	2" X 2"	2" X 4"	4" X 5"	5" X 7"	8" X 10"	8½" X 11"	11" X 14"	16" X 20"	N E G.	35mm Color Slides	35mm B&W Slides	3¼" X 4" Color Slides	3¼" X 4" B&W Slides	16mm M.P. Film
Industrial Med.	1														
ENGINEERING															
DESIGN															
Process Engr.	2					2	88			6					
Design Engr.	2					10		2		7					
PROJECT															
Project Aux.	1	20													
Project Engr.	4			129		98				28					
Minor Construct.	3			4			8			6					
ENGR. ADMIN.	1						1652			4					
PILE TECH.	4						39			15					
Metal. Res.	20			401	49		5078	181		85					100
Pile Materials	6			50		6	276			9					
Pile Engr.	9					140	68			35		1			
Fuel Tech.	24			4		3	1243			98			1	22	
SEPARATIONS TECHNOLOGY	1					6									
Chem. Devel.	3	77					6			5					
Chem. Research	5						25			8					
MANUFACTURING															
REACTOR															
Process	2														400
SEPARATIONS	1					11									
Shops	2					38				8					
General Engineering	2						50								400
METAL PREP.															
Lab. Analysis	2				102										
Manf. Engineer.	2						6			1					
Inst. & Elec.	1						2			1					
Maint. ng.	1									2					
Contract Eng.	2						8			3					

PHOTOGRAPHY UNIT
MONTHLY REPORT
NOVEMBER, 1955 (Cont.)

	Requests	2" X 2"	2" X 4"	4" X 5"	5" X 7"	8" X 10"	8½" X 11"	11" X 14"	16" X 20"	N E G.	35mm Color Slides	35mm B&W Slides	3¼" X 4" Color Slides	3¼" X 4" B&W Slides	16mm M.P. Film
Operations	1					2				8					
Redox Operations	1					12				4					
Maintenance	1						42								
Purex Plant	1														100
Z Plant	1					38				23					
TRANSPORTATION															
Rail Operations	1					36									
ELEC. UTILITY	2			24		20				4					
FINANCIAL	9	35													
RADIOLOGICAL SCIENCES															
RADIOLOGICAL RECORDS & STANDARDS	7	28		10		130				42					
BIOPHYSICS	3						31			5					
BIOLOGY	9			26	10	36	10			60			6	4	
RADIOLOGICAL ENGINEERING	1			20											
RADIOLOGICAL ADMINISTRATION & COMMUNICATIONS	8	5				80	2			54					
A.E.C. PROPERTY MANAGEMENT	2					2				1	24				
A.E.C SAFETY	7			13	8	93				1					
A.E.C.SECURITY	3	64								1					
TOTALS	286	7800	77	932	247	1207	8643	187	0	851	24	1	26	164	1000

PHOTOGRAPHY UNIT
MONTHLY REPORT
NOVEMBER, 1955 (Cont.)

	SEPTEMBER	OCTOBER	NOVEMBER
TOTAL ASSIGNMENTS	315	315	286
TOTAL NEGATIVES	1,189	1,390	851
TOTAL PRINTS	14,918	16,236	19,093

UNION RELATIONS

Collective bargaining agreements with the Hanford Atomic Metal Trades Council, Hanford Guards Union, Building Service Employees International Union, and Community Firemen were ratified by the respective unions and executed during the month. The agreements with the Council and the Guards will be reproduced in booklet form and are currently in the hands of the printer. Delivery is anticipated around the middle of December.

A law suit brought by the Hanford Atomic Metal Trades Council against the Company in June, 1955 charged unilateral disregard for a "working agreement" originating in the 300 Area which had been signed by supervision and a group of Chemical Worker stewards in May, 1953. On November 23, 1955, an understanding was reached with the Council in writing in which they agreed to withdraw the action.

Meetings for the purpose of discussing the interpretation and application of our new union agreements were continued during the month. Seventeen such meetings were conducted which were attended by some 335 supervisors.

The Hanford Atomic Metal Trades Council has informed us of a desire to arbitrate the Company's action in establishing a new classification to accomplish the routine calibration of panelit gauges. It is the Council's position that the Company is contractually prohibited from setting up a new classification without the Council's concurrence. The work involved has heretofore been done by instrument personnel as an incidental part of their regular duties. With the advent of a routine replacement program, however, the volume of work increased substantially to the point where full-time employment for some eight to twelve people can be provided. Several months of negotiation with the Council failed to resolve this issue, and we unilaterally established a Gauge Worker classification as a Grade 8 job and are currently in the process of hiring women employees to perform the work.

A determination regarding whether or not we will accept this issue as an arbitrable one is dependent upon our ability to agree on the precise issue to be submitted to the arbitrator. Our contract specifically restricts the authority of any arbitrator to establish or modify wage rates or job classifications. A refusal to arbitrate on the part of the Company would probably result in a complaint filed with the National Labor Relations Board charging an unfair labor practice. The Company's position in both instances is considered good and defensible.

Grievance Statistics:

A total of forty-eight (48) grievances were received and two (2) Step II grievance meetings were held during the month. A breakdown of the grievances received and processed follows:

ALL DEPARTMENTS

	HAMTC	HGU	BSEIU	Total Unit	Total Nonunit	Total
Received this month	46	1	1	48	0	48
Received this year	425	6	2	433	17	450

UNION RELATIONS

ALL DEPARTMENTS (Cont'd.)

	HAMTC	HGU	BSEIU	Total Unit	Total Nonunit	Total
Step I						
Pending October 31	0	0	0	0	0	
Settled this month*	37	0	0	37	0	37
Settled this year	301	3	0	304	7	311
Pending November 30	0	0	0	0	0	
Step II						
Pending October 31	47	1	0	48	0	
Settled this month**	1	1	0	2	0	2
Settled this year	109	3	0	112	10	122
Pending November 30	60	1	1	0	0	
Arbitration						
Pending October 31	0	0	0	0	0	
Settled this month	0	0	0	0	0	0
Settled this year	0	1	0	1	0	1
Pending November 30	0	0	0	0	0	
Total settled this month	38	1	0	39	0	39
Total settled this year	410	7	0	417	17	434

BY DEPARTMENTS

	Received		Settled Step I*		Settled Step II**	
	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year
Manufacturing						
Reactor - Unit	21	191	21	133	0	48
- Nonunit	0	1	0	1	0	0
Separations - Unit	16	119	7	96	1	20
- Nonunit	0	9	0	4	0	9
Metal Preparation - Unit	4	49	2	30	0	12
- Nonunit	0	1	0	0	0	1
Transporation - Unit	1	20	0	11	0	9
Electrical - Unit	1	5	0	2	0	2
Stores - Unit	0	5	0	4	0	4
Employee & Public Relations						
Community - Unit	2	9	2	4	0	3
Aux. Ops. & Pl. Pro. - Unit	2	22	1	12	1	11
Health & Safety - Unit	1	1	0	0	0	0
Radiological Sciences - Unit	0	12	4	12	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	48	450	37	311	2	122

*Grievances brought to Step II prior to September 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 September 1, 1955 are, for the purpose of this report, considered settled at Step II.

Employee and Public Relations

UNION RELATIONS

BY SUBJECTS

	Manufacturing		Emp. & Pub. Relations		Radiological Sciences		Engineering		Financial	
	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year	This Mo.	This Year
Unit										
Recognition	0	1	0	0	0	0				
Discrimination	0	3	0	0	0	0				
Jurisdiction	21	158	2	13	0	2				
Health-Safety-Sanitation	0	11	0	3	0	2				
Hours of Work	1	18	0	3	0	0				
Overtime Rates	8	65	0	3	0	4				
Vacations	0	1	0	0	0	0				
Seniority	3	35	0	2	0	2				
Wage Rates	3	25	0	1	0	0				
Miscellaneous	5	68	2	4	0	2				
Sick Leave	2	4	1	1	0	0				
Grievance Procedure	0	2	0	0	0	0				
Nonunit										
Continuity of Service	0	1	0	0	0	0	0	0	0	0
Overtime Rates	0	0	0	0	0	0	0	0	0	1
Wage Rates	0	7	0	0	0	0	0	1	0	0
Miscellaneous	0	0	0	0	0	1	0	1	0	0
Health-Safety-Sanitation	0	1	0	0	0	0	0	0	0	0
Working Conditions	0	1	0	0	0	0	0	0	0	0
Work Assignment	0	0	0	0	0	0	0	0	0	1
Holidays	0	1	0	0	0	0	0	0	0	0
Total	43	402	5	30	0	13	0	2	0	1

Employee & Public Relations

SALARY & WAGE ADMINISTRATION

In addition to the normal flow of routine work in Salary & Wage Administration, the following work was conducted during November:

1. The revisions to the Exempt Employee Appraisal Guide were distributed during the month. Revised forms are available from Stores.

2. The consolidated salary data report compiled by Accounting Services was reviewed. Several suggestions have been made regarding the reporting of HAPO data to achieve greater consistency in interpretation and comparison.

3. A study of the first-line supervisory pay differential was initiated.

4. Final listing of jobs in the Clerical-Functional group of the Wage Rate Study will be complete by month end. Secretarial and stenographic positions were evaluated during the month. Work continued on the proposed new pricing structure for Clerical-Functional and Semi-Technical jobs.

5. Revisions to the Bargaining Unit and Non-Unit Wage Rate Manuals to reflect the August 29 general adjustment were completed and distributed.

Employee and Public Relations Department
EDUCATION AND TRAINING SECTION

Personnel development courses were presented as follows:

COURSE	NUMBER OF TIMES PRESENTED	NUMBER IN ATTENDANCE
Job Instruction Training	1	8
Job Relations Development	2	23
Responsibilities of a Supervisor ("McGregor")	1	15
Conference Leading	3	28
Your Stake in American Industry	2	23
Principles and Methods of Supervision	1	11
Supervisor's Accident Prevention	1	9
Secretarial-Stenographic	3	51
Effective Human Relations (final conference)	1	18
Job Methods Improvement	1	9

Assistance was given to other organizations in conducting special meetings as follows:

Employee information meetings on pension and insurance plans	3	376
Safety Consciousness	1	10

Studies are now being made regarding revisions and scheduling of courses for the first quarter of 1956, preparation of new personnel development courses booklet for next year, and compilation of attendance statistics showing areas of participation.

SCHOOL OF NUCLEAR ENGINEERING

Continued high attendance and participation of the paid-up students was shown during November. A few withdrawals have been made.

The University of Washington notified us that all courses except one, and all new instructors have been approved by the departments and faculty committees.

During November, D. S. Roberts and H. C. Mayer visited the campus of the University of Idaho, Washington State College, and the University of Washington to meet many of the science and engineering faculty members at each school and discuss with the Dean of Engineering the MS in Nuclear Engineering which had been proposed earlier by G.E. Favorable comments were received but no action has been taken.

The lineup of Spring courses is coming very well. The School is preparing for another large enrollment next term.

PERSONNEL DEVELOPMENT PROGRAM FOR NUCLEAR ENERGY

I. Present Assignments

Department	Last Month	This Month
Engineering		
Pile Technology	12	12
Separations Technology	7	8
Design	3	3
Project	5	4
Engineering Administration	1	1
Manufacturing		
Metal Preparation	2	1
Separations	11	10
Reactor	11	9
Radiological Sciences		
Biology	0	0
Records & Standards	1	0
Bio-physics	0	1
Radiological Engineering	1	1
Financial		
Procedures & Computing	2	2
Total	56	52

II. Permanent Placements

There were five placements off the program as follows:

Separations	2
Reactor	2
Records & Standards	1
Total	5

III. Additions

There was one addition to the program; namely, a chemist returning to employment after military service due to ROTC commitments in college. He was a 1952 graduate from Texas A & M.

IV. Selective Service

There was one loss of a young technically trained man to military service. This was an enlistment in Officers Candidate School. A total of 68 men have entered the armed forces due to Selective Service motivation. Two of this number have completed their two year terms and have elected to attend graduate school before re-entering industry.

Personal letters were written to all of the men in the armed forces during the month. Included in each letter were listings of the names and addresses of all Hanford men in service to facilitate contacts among them and also a listing of pertinent books and periodicals which should be of use to them in maintaining and enhancing their knowledge in the atomic energy field. All of the men are regularly sent the "Works News" and the "G. E. Review". Letters received from the men in service from all parts of the world indicate genuine appreciation of the interest shown in their welfare.

A letter was sent to the Army Reactor Branch, Division of Reactor Development, recommending five former Hanford men now in the service for atomic energy work. These men all had outstanding records at Hanford. It is hoped that this contact will be instrumental in promoting transfers from their present duties which generally are of a non-engineering type.

TECHNICIAN TRAINING PROGRAM

There have been four losses from the Technician Training Program which began with thirty members in September. The reasons for these losses are:

Return to college	1
Female-married (home responsibilities)	1
Not qualified	1
Dissatisfied with advancement possibilities	1
	4

In launching this program, it was anticipated that there would be a number of losses and that of the thirty starting the program only fifteen would complete it. Interviews were held with twenty-four members of the program during the month to evaluate their interest in the work and studies. Most of them are having difficulty comprehending the Physics course. This is understandable due to the lack of adequate mathematics background. Based on these findings, Physics will not be taught until the second year with future groups.

One of the trainees is still without security clearance. All others are placed in regular assignments as follows:

Engineering	
Pile Technology	13
Separations Technology	2
Manufacturing	
Separations	5
Reactor	2
Metal Preparation	3
Employee & Public Relations	
Community	1*
Total	26

* Awaiting security clearance

UNIVERSITY RELATIONS PROGRAM

The response to letters sent to several universities listing talks which were available by Hanford people has been favorable. The following requests have been met and are established for future dates:

School	Number of Talks
Stanford University	1
Montana State College	3
Gonzaga University	1
State College of Washington	1
University of Washington	1
University of Idaho	1

Approval has been obtained from the Atomic Energy Commission to enlarge the summer program for college personnel in 1956. The numbers compared with this past summer are as follows:

	1955	1956
College Professors	7	12
Graduate Students	5	10
College Juniors	9	15

EMPLOYEE & PUBLIC RELATIONS DEPARTMENT
HEALTH & SAFETY SECTION
NOVEMBER 1955

General

Personnel Changes

One ad ition and five deletions resulted in a decrease to 216.

Employee Relations

Employee attendance at 49 meetings was 367. A business review of section activities was presented to supervisors.

Visits

Mr. McKinnon attended a meeting in Olympia in preparation for the Governor's Annual Safety Conference.
Mr. Bakko attended a meeting of the Council on Professional Practice of the Washington Hospital Association in Seattle.
The public health nurse supervisor attended a school health workshop in Wenatchee.

Industrial Medicine

Dispensary visits decreased from 6,190 to 5,161 while medical examinations decreased from 948 to 912.

Absenteeism Statistics

	Oct.	Nov.	Year to Date 1954	Year to Date 1955
Sickness	1.97%	1.58%	1.59%	1.57%
Total	2.68%	2.27%	2.36%	2.32%

Safety & Fire Prevention

A second accidental death for the year occurred when a coal handler was buried in a coal slide. This has resulted in numerous discussions at all levels of management to try to prevent further serious accidents. This is the third fatality arising out of operations activity since 1944 when plant operations started. This brought the total of major injuries for the year to seven and a frequency rate of 0.44 injuries per million man hours worked. Total injuries for operations for the month were 347 continuing the recent favorable trend.

Kadlec Hospital

The average daily adult census decreased from 55.5 to 49.2, an unexpected low. This represents an occupancy percentage of 45.1 and will result in a budgetary deficit for the month. The average daily newborn census was 8.6 which is the lowest since 1951.
The City Council has recommended that Kadlec Hospital be transferred to a private entity as soon as possible and that the community preference of agency to take over hospital operation be determined on the March ballot.

Public Health

Communicable diseases increased by a third to 66 with chickenpox and mumps being most prevalent. As part of a state wide program, food handlers will be required to pass an examination in the fundamentals of food handling sanitation in order to receive a food handler's permit. A tuberculin test will also be required.

HEALTH & SAFETY SECTION

NOVEMBER 1955

Industrial Medical Services

Dispensary visits during November dropped to 5,161 as compared to 6,190 during the previous month. The November total for 1954 was 4,772. This year to date total is 62,326. All stations except the 700 Area station showed decreases. There was one General Electric employee fatality and two sub-major injuries. Contractor employees sustained two major injuries. There were 28 nurses and one nurse aid required for medical services in ten locations.

The total number of physical examinations was 912 as compared to 948 during the previous month. The year to date total is 10,573.

There was one information meeting and one scientific meeting for the Industrial Physicians staff. At the scientific meeting Dr. P. E. Kendall discussed practical problems of cardiovascular disease findings.

Plant funds for Project CA-HW-39256, expansion of examination facilities, were not approved by the Commission. It is our intention to request funds for this project at the time of the community FY 1958 budget review, which will be made during the spring of 1956. It now appears that funds could not be made available for this project prior to July 1957.

A meeting of those concerned with noise control was held on November 21st. A review of the progress of control measures was made and locations for mandatory personnel protection were re-evaluated. It was decided to prepare and publish information for employees as to the progress of noise control measures accomplished.

The Health Activities Committee met on November 17. The health topic on "Itching" was prepared for distribution throughout the plant. Sickness absenteeism for October was 1.97% bringing the year to date figure to a total of 1.57%. The November 1954 year to date total was 1.58%.

Net costs for the month of October decreased approximately $900 from the September level due to a decrease in salary costs, offset in part by a decrease in expense credits. Other costs remained at approximately the same level as during the previous month.

Costs-Operations	Oct.	Sept.	Increase (Decrease)
Salaries	$35,269	$37,084	$ (1,815)
Continuity of Service	3,174	3,338	(164)
Laundry	172	134	38
Utilities, Transportation, Maintenance	4,372	4,541	(169)
Supplies and Other	5,312	4,925	387
Total Gross Costs	48,299	50,022	(1,723)
Less: Revenue	987	984	(3)
Expense Credits	10,473	11,291	818
Net Cost of Operation	$36,839	$37,747	$ (908)

Industrial Medical Services (Continued)

Costs for October very closely approximated the monthly average for the first four months with net costs being only $500 higher than the average month year to date. November costs may be higher due to the double holiday to be observed over the Thanksgiving weekend.

HEALTH & SAFETY SECTION

NOVEMBER 1955

Industrial Medical Services (Continued)	October	November	Year to Date
Physical Examinations			
Operations			
Pre-employment	84	83	1313
Rehire	9	13	161
Annual	326	335	2624
Interim	20	35	420
A.E.C.	28	30	294
Re-examination and recheck	134	130	1582
Termination	52	45	978
Sub-total	653	671	7372
Contractors			
Annual	3	3	96
Pre-employment	93	44	1515
Recheck	28	14	452
Re-examinations	0	0	1
Termination and Transfer	118	112	717
Interim	53	68	420
Sub-total	295	241	3201
Total Physical Examinations	948	912	10573
Laboratory Examinations-Clinical			
Operations			
Government	128	128	1167
Pre-employment,Termination,Transfer	942	861	22771
Annual	1911	1878	14595
Recheck (Area)	139	154	2272
First Aid	17	30	187
Sub-total	3137	3051	40992
Contractors			
Pre-employment,Termination,Transfer	1314	1135	6385
Total Clinical Laboratory Examinations	4451	4186	47377
X-Ray			
Operations			
Government	9	16	136
Pre-employment,Termination,Transfer	120	107	3194
Annual	389	409	3453
First Aid	41	35	834
Sub-total	559	567	7617
Contractors			
Pre-employment,Termination,Transfer	133	129	786
First Aid	10	11	50
Sub-total	143	140	836
Total X-Ray	702	707	8453
Electrocardiographs	146	139	1314
Physical Therapy Cases Referred	109	81	2279

HEALTH & SAFETY SECTION

NOVEMBER 1955

Industrial Medical Services (Continued)	October	November	Year to Date
First Aid Treatments			
Operations			
New Occupational Cases	480	495	5808
Occupational Case Retreatments	1841	1486	20014
Non-occupational Treatments	3770	3115	32781
Sub-total	6091	5096	58633
Construction			
New Occupational Cases	25	15	693
Occupational Case Retreatments	65	43	2180
Non-occupational Treatments	9	7	820
Sub-total	99	65	3693
Total First Aid Treatments	6190	5161	62326
Major Injuries			
General Electric	1	1	7
Contractors	0	2	5
Total	1	3	12
Sub-Major Injuries			
General Electric	2	2	25
Contractors	0	0	3
Total	2	2	28
Nurse Visits			
Calls made	0	2	19
Employee Personal Illness	0	2	16
No. absent due to illness in family	0	0	1
No. not at home when call was made	0	0	2

HEALTH & SAFETY SECTION

NOVEMBER 1955

Kadlec Hospital

The average daily adult census decreased from 55.5 to 49.2 as compared with 60.2 a year ago. This represents an occupancy percentage of 45.1 broken down as follows: Mixed Service (Medical, Surgical, Pediatrics) 47.3; Obstetrical Service 36.1. A further breakdown of the Mixed Service shows an occupancy percentage of 33.5 on Medical, 69.1 on Surgical and 37.4 for Pediatrics.

The minimum and maximum daily census ranged as follows:

	Minimum	Maximum
Mixed Service	25	57
Obstetrical Service	4	13
Total Adult	29	70

The average daily newborn census decreased from 13.8 to 8.6 as compared with 10.1 a year ago.

Nursing hours per patient per day:

Medical, Surgical, Pediatrics	4.11
Obstetrical	7.25
Newborn	4.18

The very substantial increase during the month of November in nursing hours per patient on the obstetrical and newborn infant services resulted from a sharp drop in the number of babies born this month. It is not possible to adjust staffing needs rapidly enough to meet such sudden and extensive changes. Births for November which numbered 57 are the lowest since January, 1951, when the same number of births were recorded. Every effort is made during these periods of low census to utilize temporarily any "extra" nurses from the obstetrical and newborn infant services in other areas of the hospital.

The ratio of inpatient hospital employees to patients (excluding newborn) for October was 2.26. When newborn infants are included the ratio is 1.81

The net expense for the operation of Kadlec Hospital for October was $19,269 as compared with $20,993 for September. Summary is as follows:

Kadlec Hospital net expense $19,269
This is a decrease of $1,724 from the month of September. Gross costs increased $1,840 but revenue increased $3,091 and expense credits increased $473 to more than offset the higher costs.

The Business Review of Health and Safety activities which included a hospital section, was presented to the supervisors of the Health and Safety Section.

Following is a summary of employee relations meetings held in the Health and Safety Section during the month of November.

	Meetings	Attendance
Hospital	34	258
Industrial Medicine	5	24
Public Health	8	44
Safety & Fire Prevention	1	11
General	1	30
	49	367

HEALTH & SAFETY SECTION

NOVEMBER 1955

Hospital Unit (Continued)	October	November	Year to Date
Kadlec Hospital			
Average Daily Adult Census	55.5	49.2	56.7
Medical	18.1	12.4	15.8
Surgical	14.3	22.1	21.0
Pediatrics	10.4	7.1	9.9
Mixed	42.8	41.6	46.7
Obstetrical	12.7	7.6	10.0
Average Daily Newborn Census	13.8	8.6	10.8
Maximum Daily Census:			
Mixed Services	55	57	83
Obstetrical	19	13	20
Total Adult Census	65	70	95
Minimum Daily Census:			
Mixed Services	23	25	20
Obstetrical Service	8	4	3
Total Adult Census	37	29	29
Admissions: Adult	442	368	4916
Discharges: Adult	454	347	4900
Medical	138	76	1173
Surgical	138	155	2069
Pediatrics	88	56	807
Mixed	364	287	4049
Obstetrical	90	60	851
Newborn	84	58	793
Patient Days: Adult	1721	1475	19154
Medical	562	371	5273
Surgical	444	664	7044
Pediatrics	323	213	3287
Mixed	1329	1248	15604
Obstetrical	392	227	3550
Newborn	427	258	3619
Average Length of Stay: Adults	3.8	4.3	3.9
Medical	4.0	4.9	4.5
Surgical	3.2	4.3	3.4
Pediatrics	3.7	3.8	4.1
Mixed	3.7	4.3	3.8
Obstetrical	4.4	3.7	4.1
Newborn	5.1	4.4	4.6
Occupancy Percentage: Adults	50.9	45.1	52.0
Medical	48.9	33.5	42.7
Surgical	44.7	69.1	65.9
Pediatrics	54.7	37.4	52.1
Mixed	48.6	47.3	53.1
Obstetrical	60.5	36.1	47.6
Newborn	53.1	33.1	41.5

(Occupancy Percentage based on 109 adult beds and 26 bassinets.)

HEALTH & SAFETY SECTION

NOVEMBER 1955

Hospital Unit (Continued)	October	November	Year to Date
Avg. Nursing Hours per Patient Day:			
Medical, Surgical, Pediatrics	3.89	4.11	
Obstetrics	4.09	7.25	
Newborn	2.61	4.18	
Avg. No. Employees per Patient (excluding newborn)	2.26		
Operations: Major	53	50	677
Minor	65	49	745
E.E.N.T.	18	61	576
Dental	0	1	8
Births: Live	84	57	789
Still	0	1	12
Deaths	1	4	43
Hospital Net Death Rate	.19%	.74%	.33%
Net Autopsy Rate	0	50.0	37.2
Discharged Against Advice	1	0	6
One Day Cases	144	73	1503
Admission Sources:			
Richland	86.2	82.4	82.5
North Richland	.2	.5	3.6
Other	13.6	17.1	13.9
Admissions by Employment:			
General Electric	83.2	80.2	76.8
Government	1.8	1.6	2.7
Facility	3.6	5.2	5.6
Contractors	1.4	5.1	5.7
Schools	0.7	0.8	1.1
Others	9.3	7.1	8.1
Hospital Outpatients:			
First Aid	519	414	5326
Clinical Laboratory	124	144	1546
Bacteriological Laboratory	51	48	533
X-Ray	149	116	1712
Physical Therapy	226	215	2960
Physical Therapy Treatments			
Outpatient Treatments	226	215	3084
Hospital	102	22	798
Total	328	237	3882
Pharmacy			
No. of Prescriptions Filled	2608	2254	26852
No. of Store Orders Filled	552	479	5444

HEALTH & SAFETY SECTION

NOVEMBER 1955

Hospital Unit (Continued)	October	November	Year to Date
Kadlec Hospital (Continued)			
Clinical Laboratory Examinations			
Outpatient Examinations	329	381	4168
Hospital	3489	2986	37122
Public Health	0	0	1
Total	3818	3367	41291
X-Ray Examinations			
Outpatient Examinations	165	122	1773
Hospital	199	210	2252
Public Health	4	3	80
Total	368	335	4105
Electrocardiographs			
Outpatient Examinations	0	0	15
Hospital	25	20	263
Total	25	20	278
Bacteriological Laboratory			
Treated Water Samples	172	198	2209
Milk Samples (Inc.Cream & Ice Cream)	38	34	414
Other Bacteriological Tests	443	405	4867
Total	653	637	7490
Patient Meals			
Regulars	2778	2311	29656
Children under 8	643	524	6882
Specials	748	474	7638
Softs	415	591	5966
Tonsil and Adenoid	34	105	874
Liquids	150	135	1541
Surgical Liquids	57	46	848
Total	4825	4186	53405
Cafeteria Meals			
Noon	1321	1313	16036
Night	312	233	3055
Total	1633	1546	19091

HEALTH & SAFETY SECTION

NOVEMBER 1955

Public Health Unit

Communicable disease reports increased by 32% over October. Leading the list of 66 cases reported were 18 cases of chickenpox, 13 of mumps and 11 of ringworm. Two delayed reports of poliomyelitis brought the year's total to date to 8 cases.

An increase of 15% was recorded in field nursing visits. This is partially accounted for by the increase in communicable disease cases necessitating more home visits. A greater factor, however, is the increase in field visits in connection with the hearing program. The hearing screening program is now completed in the elementary schools. Group testing and puretones have been done. Screening for hearing in secondary schools will begin after the first of January.

The nurses held classes with all fifth and sixth grade girls using the film "Story of Menstruation" as a basis for discussion. Meetings were held with mothers of elementary school children where they were given an opportunity to view the film and discuss it before the classes with the children.

A program on colds was given in all elementary schools. A film "How to Catch a Cold" was shown. The classroom teachers were expected to follow this up by distributing pledges to the youngsters re-enforcing the message of the film. A series of six posters will also be used in the schools as a reminder of the lessons the film made.

Of the 84 contacts made by the social service counselor this month, 37 were directly concerned with family relationships, 19 related to marital conflict, 14 to difficulties between parents and their children and 4 with unmarried parenthood.

Personality and behavior problems were the focus of 28 interviews. There were 3 direct contacts with children and 25 with adults.

Six contacts were in regard to intellectual retardation and 13 cases were regarding medical financial problems.

Regular monthly inspections of food handling establishments were made. Two restaurants were degraded to a "B" in accordance with the grading program. Two restaurants are in the process of renovation.

One case of food poisoning was investigated involving five persons from Richland who ate Thanksgiving dinner in Spokane with relatives. Samples of the turkey were obtained and bacteriological examination revealed a salmonella type organism to be present. Inadequate refrigeration of turkey appears to be the principle cause of the outbreak. The matter has been referred to the Spokane Health Department for further investigation.

Public Health Unit (Continued)

Bacteriological examinations of pasteurized milk and water samples were satisfactory.

Arrangements are being worked out for a new food service worker's permit system which will be adopted on a state-wide basis. All food handlers will be required to pass an examination on food handling practices, and will be given a tuberculin test. It is planned to put the new system into effect after the first of January.

HEALTH & SAFETY SECTION

NOVEMBER 1955

Public Health (Continued)	October	November	Year to Date
Education			
Pamphlets distributed	10,989	9,990	123,930
News Releases	4	12	97
Staff Meetings	1	4	13
Classes	24	18	128
Attendance	98	522	1,745
Lectures & Talks	15	5	87
Attendance	444	351	3,792
Films Shown	3	22	150
Attendance	105	1,990	6,759
Community Conferences & Meetings	23	15	168
Radio Broadcasts	12	9	88
Immunizations			
Diphtheria	0	0	235
Diphtheria Booster	0	0	915
Diptussis	0	0	15
Tetanus	0	0	1
Tetanus Booster	0	0	276
Pertussis	0	0	1
Pertussis Booster	0	0	272
Schick Test	0	0	1
Smallpox	2	1	1,650
Tuberculin Test	1	0	53
Typhoid	0	0	1
Typhoid Booster	0	0	1
Immune Globulin	0	1	94
Other	0	0	1
First Polio Series	0	0	795
Second Polio Series	0	0	476
Social Service			
Cases carried over	31	39	782
Cases admitted	9	10	133
Cases closed	1	14	207
Remaining case load	39	35	708
Activities:			
Home Visits	3	2	29
Office Interviews	83	82	2,496
Conferences	19	31	467
Meetings	2	5	105
Sanitation			
Inspections made	74	59	1,084
Conferences held	21	10	[illegible]

HEALTH & SAFETY SECTION

NOVEMBER 1955

Public Health (Continued)	October	November	Year to Date
Communicable Diseases			
Chickenpox	15	18	257
Erysipelas	0	0	1
German Measles	1	6	78
Impetigo	0	2	10
Influenza (U.R.I.)	0	0	4
Infectious Mononucleosis	0	0	11
Infectious Hepatitis	0	0	17
Measles	1	2	34
Meningitis	0	0	2
Mumps	7	13	451
Pinkeye	0	3	12
Pneumonia	0	0	1
Poliomyelitis	2	2	8
Rheumatic Fever	0	1	2
Ringworm	14	11	43
Roseola	5	2	28
Salmonellosis	0	1	2
Scarlet Fever	4	2	125
Strep. Infection (Throat)	0	3	45
Tuberculosis	0	0	6
Whooping Cough	1	0	17
Total	50	66	1,154
Total No. Nursing Field Visits	266	307	3,948
Total No. Nursing Office Visits	33	11	418

COMMUNITY SECTION

NOVEMBER 1955

ORGANIZATION AND PERSONNEL:

	BEGINNING OF MONTH		END OF MONTH	
	Exempt	Nonexempt	Exempt	Nonexempt
Community Administration	1	1	1	1
Maintenance & Renovation Unit	9	145	9	141
Police Unit	15	25	15	25
Commercial & Residential Property Unit	7	25	7	25
Fire Unit (Includes 33 Firemen)	50	0	50	0
Transfer Study	1	0	1	0
Community Operations Administration	1	1	1	1
Electrical Unit	5	15	5	15
Engineering Unit	6	4	6	4
Water & Sewerage Utilities Unit	6	23	6	23
Library Unit	4	10*	3	10*
Public Works & Recreation Unit	6	33	6	33
	111	282	110	278

	Exempt	Nonexempt
Additions to Payroll	0	0
Transfers In	0	1
Removals from Payroll	1	2
Transfers Out	0	3

Net Decrease 5

*Includes two half-time employees

MAINTENANCE AND RENOVATION UNIT

November, 1955

		Exempt	Nonexempt
Employees -	Beginning of month	9	145
	Transferred out	0	2
	Terminations	0	1
	Retirement	0	1
Employees -	End of month	9	141

INTERIOR PAINT REPORT - FY 1956

November, 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	405	32	72	333
B	347	33	85	262
C	160	33	42	118
D	2	0	1	1
E	23	4	6	17
F	64	8	17	47
G	5	0	1	4
H	68	9	22	46
K	57	7	11	46
L	37	0	0	37
M	7	0	0	7
Q	28	1	2	26
R	21	0	0	21
S	5	0	0	5
T	0			
U	77	1	1	76
V	183	4	10	173
Y	17	2	12	5
Z	2	0	0	2
1BP	7	1	5	2
2BP	25	2	16	9
3BP	7	2	5	2
Tract	19	0	1	18
1BR Apt.	26	0	0	26
2BR Apt.	69	7	12	57
W-13 Apt.	0			
Dormitories	5	0	0	5
TOTAL	1666	146	321	1345

5 Units added.

Est. MH B. F.	8,749	Actual MH B. F.	8,829½
Est. MH This Month	7,646	Actual MH This Month	7,882½
Total Est. MH	16,395	Total Actual MH	16,712

PLUMBING SHOP

November, 1955

FOREMAN: F. L. ELSENSOHN

Electric water heaters replaced	20	
Laundry trays replaced	7	
Miscellaneous plumbing work orders completed	33	
Cleared major sewer stoppages caused by tree roots	64	
Cleared major stoppages in main sewers for Public Works	2	
Plumbing for floor and sink linoleum	76	
Steam work orders completed	7	
Radiators completely overhauled in dormitories and the hospital	28	
Shower stalls replaced	6	
Street steps replaced	4	
Loaned one plumber to Public Works	40	hrs.
Furnished men to screen sand at Sewage Disposal Plant for sandblasting	28	hrs.
Furnished operator to run Backhoe Machine at 200-E Area	8	hrs.
Worked on service orders thawing frozen pipes and repairing damage done due to cold weather	240.8	hrs.
Furnished men to do routine plumbing and steam-fitting at Kadlec Hospital and Public Health Bldg.		

Made routine steam inspection once each week in Government owned commercial facilities, dormitories, and apartments.

Excavated with backhoe machine and handwork for the cleanout 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	1554
B.	Received during the month	2666
C.	Completed during the month	2619
D.	On hand at end of month	1601

E. A total of 158 manhours were spent on work orders.

F. Backlog of service orders by craft:

Plumbing	712
Electrical	753
Carpentry	136
Total	1601

RENOVATION AND LABOR CREW

November, 1955

FOREMAN: B. C. BAIN

Houses renovated	45
Minor carpenter repairs to renovated houses	38
Trash pickups	31
Minor repairs to dormitories	5
Renovation minor paint jobs	30
Redecorated following a fire	1
Houses sprayed for insect control	3
Dormitories sprayed for insect control	11
Renovation houses deodorized	3
Floors cleaned and sealed in renovation houses	8

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	392
Routine furnace inspections	160

Routine work performed at Kadlec Hospital by 1 man.

B. Sheetmetal Crew:

Smoke pipes replaced	9
Installed coal hatch flashings	28
Replaced metal thresholds	50
Repaired or replaced ranch house screen catches	100
Replaced ranch house wardrobe tracks	24
Worked on remodelling fire truck	1½ days

C. Service Crew:

Tree removal orders completed	82
Stump and tree limb pickups	14

Snow removed from steps and walks at all dormitories 3 times.

LINOLEUM AND CARPENTER SHOP

November, 1955

FOREMAN: R. M. MARTIN

Replaced bath wall tile	11
Repaired bath wall tile	3
Replaced bath floor linoleum	8
Repaired bath floor linoleum	2
Replaced kitchen floor linoleum	42
Repaired kitchen floor linoleum	8
Replaced living room linoleum	3
Repaired living room linoleum	4
Replaced hall linoleum	1
Replaced steps and landing linoleum	35
Replaced sink top linoleum	72
Replaced cupboard top linoleum	2
Replaced work bench linoleum	10
Replaced kitchen sinks	6
Chempoints	112
Paint touch ups	88
Porches repaired	7
Jack and shim	11
Repaired threshold	26
Raised slab	1
Exterior doors repaired	6
Interior doors repaired	1
Interior carpentry repairs (prior to painting)	78
Repaired shakes	36
Repaired roofs	59
Replaced ranch window screens	18
Repaired ranch house ladders	10
Repaired street steps	3
Replaced screen doors	13
Repaired screen doors	12
Replaced prefab window screens	54
Repaired walls	7
Repaired ceilings	5
Replaced floor boards	17

COMMUNITY SECTION
RICHLAND POLICE DEPARTMENT
MONTHLY REPORT
NOVEMBER 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

CHIEF H. W. STROCK AND LIEUTENANT E. E. MILLER MADE TWO TELEVISION APPEARANCES THIS MONTH IN CONJUNCTION WITH SAFE DRIVING PROGRAMS.

DETECTIVE L. M. LINKOUS SPOKE TO THE KIWANIS CLUB, THE WEST SIDE UNITED PROTESTANT CHURCH, AND THE CARMICHAEL JUNIOR HIGH SCHOOL P-TA ON JUVENILE DELINQUENCY AND LAW ENFORCEMENT.

MEMBERS OF THE TRAFFIC CONTROL SECTION CONDUCTED FOUR TRAFFIC SAFETY MEETINGS THIS MONTH.

SERGEANT T. J. MCGUIRE WAS APPOINTED TO SERVE ON THE YOUTH COUNCIL. THIS APPOINTMENT CAME ABOUT FROM A DESIRE TO HAVE A MEMBER OF THE POLICE DEPARTMENT SERVE ON THE COUNCIL.

THE INVESTIGATION OF VANDALISM INVOLVING WINDSHIELD DAMAGE TO 40 VEHICLES, WHICH OCCURRED THIS MONTH, IS CONTINUING. TWO OFFICERS HAVE BEEN PLACED ON SPECIAL ASSIGNMENT TO FOLLOW UP LEADS WHICH COULD POSSIBLY RELATE TO THIS CASE. IN ADDITION, ALL OFFICERS HAVE BEEN INSTRUCTED TO BE ESPECIALLY ALERT FOR ANY POSSIBLE CLUES OR LEADS WHICH MIGHT ASSIST IN THE CLEARANCE OF THIS CASE.

THIS DEPARTMENT TOOK 24-HOUR TRAFFIC COUNTS AT 7 RICHLAND STREET INTERSECTIONS FROM NOVEMBER 1 TO NOVEMBER 11 AT THE REQUEST OF MR. STEVEN A. BARKER, EVALUATION SUPERVISOR OF THE FEDERAL HOUSING ADMINISTRATION. THE COUNTS WERE TAKEN IN FOUR DIRECTIONS AT FOUR INTERSECTIONS AND IN THREE DIRECTIONS AT THE REMAINING THREE INTERSECTIONS. THE INFORMATION IS BEING USED BY MR. BARKER'S GROUP AS A FACTOR IN EVALUATING PROPERTY.

TRAFFIC

RICHLAND	1955 Oct.	1955 Nov.	1954 Oct.	1954 Nov.	1955 Total To Date	1954 Total Same Period
Reportable Accidents	19	24	19	33	209	229
Property Damage Accidents	19	18	16	28	180	197
Injury Accidents	0	6	3	4	29	31
Total Persons Injured	0	6	4	7	33	35
Fatal Accidents	0	0	0	0	0	0
Accidents-Daylight Hours	13	17	12	20	157	158
-Darkness "	6	7	7	12	52	70
Accidents-Business District	6	6	12	19	64	70
-Residential "	6	14	6	20	105	125
-Other "	7	4	1	3	40	33
Accidents Investigated	15	15	13	23	144	149
Criminal Complaints Filed	9	8	8	18	83	111
Violations Contributing to Accidents:						
Negligent Driving	5	6	4	8	35	45
Fail. to Yield Right of Way	10	3	5	11	64	71
Following too Closely	2	3	4	4	30	38
Drunk Driving	0	0	1	1	3	4
Pedestrian Violation	0	2	1	0	7	7
Inattention to Driving	0	0	3	0	6	5
Reckless Driving	0	0	0	0	1	5
Speeding	0	0	0	0	1	1
Unsafe Speed	0	9	0	0	27	21
Improper Backing	0	1	0	2	7	10
Disregarding Stop Sign	1	0	0	1	5	3
Hit and Run	0	0	1	1	0	2
Improper Passing	0	0	0	1	6	2
Improper Turn	0	0	0	1	5	3
Failure to Signal	1	0	0	2	3	3
Wide Right Turn	0	0	0	0	1	1
Bicycle Violation	0	0	0	0	6	3
Defective Equipment	0	0	0	1	2	2
Wrong Side of Road	0	0	0	0	1	1
Animal in Road	0	0	0	0	2	0
Passenger Jumped from Car	0	0	0	0	1	0
Sideswipe	1	0	0	0	1	0

Richland	1955 Oct.	1955 Nov.	Ave. per Accident 1955 Oct.	Ave. per Accident 1955 Nov.	Ave. per Accident 1954 Oct.	Ave. per Accident 1954 Nov.
Accident Property Damage	$3630.00	$7155.00	$191.05	$298.13	$301.58	$365.90

TRAINING

ADVANCE TRAINING FOR RICHLAND POLICE MEMBERS AT THE SMALL ARMS RANGE FOR THE PERIOD IN FIELD INSTRUCTION WAS AS FOLLOWS:

.38 CALIBER REVOLVER	½ HOUR
TOTAL NUMBER OF MEN REPORTING AT THE RANGE	7
NUMBER OF MEN FIRED OVER THE ARMY-L COURSE	7

THIS FIRING WAS FOR PRACTICE AND NO SCORES WERE TAKEN.

ACTIVITIES	SEPTEMBER	OCTOBER	NOVEMBER
BICYCLES IMPOUNDED	0	10	9
BICYCLES REGISTERED	82	36	15
CHILDREN LOST OR FOUND	28	15	6
COMPLAINTS INVESTIGATED	89	102	87
DEATHS REPORTED	0	0	1
DOG, CAT, LOOSE STOCK COMPLAINTS	14	14	3
DOGS, CATS, ANIMALS REPORTED LOST/FOUND	5	15	17
DOORS, WINDOWS, FOUND OPEN IN FACILITIES	55	54	29
EMERGENCY MESSAGES DELIVERED	9	6	11
FIRES INVESTIGATED	12	13	11
GUNS REGISTERED	11	9	13
LAW ENFORCEMENT AGENCIES ASSISTED	3	4	5
LETTERS OF INQUIRY	151	195	137
MISCELLANEOUS ESCORTS AND DETAILS	5	4	8
PERSONS INJURED BY DOGS	1	1	0
PLANT DEPARTMENTS ASSISTED	23	32	90
PRISONERS PROCESSED THROUGH JAIL	7	5	11
PRIVATE INDIVIDUALS ASSISTED	44	17	31
PROPERTY LOST OR FOUND	19	19	22
RECORDS INQUIRIES	31	35	20
REPORTS PROCESSED THROUGH RECORDS	173	172	197
STREET LIGHTS OUT REPORTED TO ELECTRICAL	114	157	159
TRAFFIC SAFETY MEETINGS (NOV. ATTEND. 263)	3	13	5
TOTALS	879	928	887

MONTHLY REPORT
RICHLAND POLICE DEPARTMENT
NOVEMBER 1955

OFFENSES	KNOWN	UNFOUNDED	CLEARED OTHER*	CLEARED ARREST
PART I				
1. Criminal Homicide				
a. Murder & Non. Neg. Mans.				
b. Mans. by Negligence				
2. Rape				
3. Robbery				
4. Aggravated Assault				
5. Burg.-Break. & Entry	2	-	-	4**
6. Larceny Over $50.00	3	1	1**	1
Under $50.00	27	-	4	13**
7. Auto Theft	1	-	-	1
TOTAL PART I CASES	33	1	5	19
PART II				
8. Other Assaults	1	-	-	1
9. Forgery & Counterfeit	3	-	-	-
10. Embezzlement & Fraud	4	-	1	3
11. Stolen Prop:Buy:Receive	-	-	-	-
12. Weapons:Carry:Possessing	-	-	-	-
13. Prostitution	-	-	-	-
14. Sex Offenses	-	-	-	-
15. Offenses Ag. Fam. & Child	1	-	1	-
16. Narcotics	-	-	-	-
17. Liquor Laws	-	-	-	-
18. Drunkenness	4	-	-	4
19. Disorderly Conduct	1	-	-	1
20. Vagrancy	3	-	1	2
21. Gambling	-	-	-	-
22. Drunk Driving	2	-	-	2
23. Viol. Road & Driving Laws:				
Fail. to Stop & Identify	2	-	1	1
Speeding	25	-	12	13
Stop Sign	15	-	3	12
Right of Way	3	-	-	3
Negligent Driving	11	-	3	8
Reckless Driving	3	-	-	3

OFFENSES	KNOWN	UNFOUNDED	CLEARED OTHER*	CLEARED ARREST
PART IV				
30. Fat.M.V. Traff. Accid.	-	-	-	-
31. Pers. Inj. M.V. Traff. Accid.	6	-	-	-
32. Prop. Dam. M.V. Accid.	18	-	-	-
33. Other Traffic Accidents	-	-	-	-
34. Public Accidents)				
35. Home Accidents)	No Accurate Statistics Kept			
36. Occupational Accidents)				
37. Firearms Accidents	-	-	-	-
38. Dog Bites	-	-	-	-
39. Suicides	-	-	-	-
40. Suicide Attempts	1	-	-	-
41. Sud. Death & Bod. Found	2	-	-	-
42. Sick Cared For	-	-	-	-
43. Mental Cases	-	-	-	-
TOTAL PART IV CASES	27	-	-	-
COMPOSITE TOTALS				
PART I,II,III,IV CASES	278	1	128	86

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. ** There were three burglaries cleared arrest for the previous month, one grand larceny cleared other for the previous month, and one petit larceny cleared arrest for the previous month.

Property reported stolen Richland $2,290.85
Property recovered Richland $2,164.00

OFFENSES	KNOWN	UNFOUNDED	CLEARED OTHER	CLEARED ARREST
Defective Equipment	12	-	10	2
Illegal Passing	-	-	-	-
24. Parking	10	-	8	2
25. All Other Traffic Violations	13	-	5	8
26. All Other Offenses:				
Property Damage	1	-	1	-
Illegal Shooting	1	-	1	-
Malicious Mischief	6	-	4	-
Vandalism	6*	-	1	-
Bike Violations	8	-	8	-
Trespassing	1	-	1	-
Neighborhood Disturbance	1	-	1	-
Violation of Dog Ordinance	2	-	-	2
27. Suspicion	3	-	3	-
TOTAL PART II CASES	142	-	65	67
PART III				
28. Missing Persons	4	-	4	-
Lost Persons	2	-	2	-
Lost Animals	10	-	3	-
Lost Property	21	-	11	-
29. Found Persons	-	-	-	-
Found Property	33	-	33	-
Found Animals	6	-	5	-
TOTAL PART III CASES	76	-	58	-

* One case involved - $4100 damage to 41 automobiles. (rocks through windows)

MONTHLY REPORT RICHLAND POLICE DEPARTMENT JUVENILES INVOLVED DECEMBER 1955

OFFENSES	NO. CASES	JUVENILES	SEX	9	12	13	14	15	16	17
Mischief	4	16	M	1	1	1	4	7	2	-
Trespassing	1	3	M	-	-	-	-	1	1	1
Larceny	5	8	M	-	1	2	4	-	-	1
Pub. Intoxication	1	1	M	-	-	-	-	-	-	1
Burglary	1	2	M	-	-	1	-	1	-	-
Illegal Shooting	1	2	M	-	-	-	1	1	-	-
Vandalism	1	2	M	-	-	-	2	-	-	-
TOTALS	14	34		1	2	4	11	10	3	3

RICHLAND POLICE DEPARTMENT
RICHLAND JUSTICE COURT CASES
NOVEMBER, 1955

VIOLATIONS	NO. OF CASES	NO. OF CONV.	NO. OF FORF.	CASES CONT.	CASES DISM.	SENT. JAIL.	SENT. SUSP.	LIC. REV.	CASES ORIG. PREV. MONTH	BAIL FORF.	FINES	FINES SUSP.
INVALID VEHICLE LICENSE	1		1							$15.00		
NO DRIVER'S LICENSE	11	6	3	2						15.00	42.50	9.50 (2
NO CERTIF. OF REGIS.	2		1						1	5.00		
DEFECTIVE EQUIPMENT	2	2									27.50	10.00 (1
NEGLIGENT DRIVING	13	5	4	2				1	3	130.00	192.50	25.00 (1
DRUNK DRIVING	3	2		1		1	1	2	1		230.00	
RECKLESS DRIVING	4	2			1			2	3		105.00	50.00 (1
SPEEDING	15	7	7						2	90.00	89.50	14.50 (2
STOP SIGN	13	7	5	1						65.00	53.50	
FAIL. TO YIELD RIGHT OF WAY	4	2	1						1	15.00	22.50	
FOLLOWING TOO CLOSE	1	1									5.00	
FAIL. TO STOP AT ACCIDENT	1	1									2.50	
IMPROPEP PARKING	3	1	2							7.00	2.50	2.50 (1
FAIL. TO DIM LIGHTS	1	1									10.00	5.00 (1
PERMITTING CHILD TO OPR VEH	1	1									22.50	
JAYWALKING	1	1									2.50	
DISORDERLY CONDUCT	1	1					1					
PUBLIC INTOXICATION	3	1	2							25.00	12.50	
PUBLIC NUISANCE	2	2									32.50	5.00 (1
VIOLATION OF DOG ORDINANCE	2	1	1							5.00	2.50	
VAGRANCY	3		2		1					50.00		
3RD DEGREE ASSAULT	1		1							100.00		
TOTALS	88	44	30	6	2	1	2	5	11	$522.00	$855.50	$121.50 (10

1 NEG DRVG - DID NOT APPEAR
1 NEG DRVG - CASE CON'T. UNTIL DEFENDENT IS LOCATED
1 NEG DRVG - F & C $50, $25 SUSP, LIC SUSP 90 DAYS
1 RECKLESS DRVG - F & C $52.50, $50 SUSP, LIC SUSP 30 DAYS
1 RECKLESS DRVG - F & C $52.50, LIC SUSP 30 DAYS
1 RECKLESS DRVG - TO BE HEARD IN JUVENILE COURT
1 DRUNK DRVG - F & C $52.50, LIC SUSP 30 DAYS, 5 DAYS JAIL SUSP
1 DRUNK DRVG - FINED $177.50, LIC SUSP 6 MOS., 10 DAYS JAIL

1 FTYROW - CASE CON'T. UNTIL DEFENDENT IS LOCATED
1 NO CERTIF. OF REG. - CASE CON'T UNTIL DEF. IS LOC.
1 SPEEDING - CASE CON'T UNTIL DEFENDENT IS LOCATED
1 DISORDERLY CONDUCT - 10 DAYS JAIL SUSP PENDING GOOD BEHAVIOR FOR ONE YEAR.

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT
COMMUNITY SECTION
November, 1955

PERSONNEL - COMMERCIAL AND RESIDENTIAL PROPERTY UNIT:

	Exempt	Non-Exempt
Employees - beginning of month	7	25
Transfers In	0	0
Transfers Out	0	0
New Hires	0	0
Terminations	0	0
Employees - end of month	7	25

PERSONNEL - COMMERCIAL AND NONCOMMERCIAL FACILITIES:

	Commercial	Noncommercial	Total
October	1,596	102	1,698
November	1,603	99	1,702
Net Change	+ 7	- 3	+ 4

SUMMARY OF ROUTINE ITEMS PROCESSED:

	Commercial	Noncommercial	Total
Work Orders	32	3	35
Back Charges	0	1	1
FY Work Orders	164	14	178
FY Back Charges	7	2	9

CONTRACTS AND NEGOTIATIONS:

A. Commercial

1. Lease:

True's Oil Co. - a ground lease covering the construction and operation of an automotive service station.

2. Supplemental Agreements:

   a. L. R. Bailey No. 2 - to provide for new rent, separate payment for utilities and services, and incorporation of additional required articles in accordance with lease renegotiation.

   b. Kennell Ellis Studios - to provide for new rent, separate payment for utilities and services, and incorporation of additional required articles in accordance with lease renegotiation.

   c. Murphy Motors No. 1 - to provide for change in use of premises from automobile sales and service agency to furniture warehouse and used furniture store.

3. Arbitration:

   Spencer-Kirkpatrick Insurance - arbitration of the dispute resulting from renegotiation of rental payments.

4. Business Development:

   a. Invitations to bid were mailed to 17 prospective Lessees in connection with leasing the Government-owned building known as the 1125 Warehouse.

   b. Lease was awarded to Robley L. Johnson for space in the Government-owned building at 711 The Parkway.

GENERAL:

A. Commercial

1. Murphy Motors assigned their lease on the Government-owned building located at 615 Goethals Drive to the Pleiss-Davis Furniture Co., who opened a used furniture store.

2. McGahee Real Estate opened for business in the Diana Langevin Building.

3. Lee Barber and Beauty Shop opened for business in the Parker Hanson Building in the Westgate Shopping District.

4. Mildred Gibson sold her beauty shop to Mr. & Mrs. W. T. Foley who will operate it as Rina's Beauty Salon, in the Cannon & Joseph Building No. 2 in the Uptown Shopping District.

5. Richland Radio and TV Service terminated their sublease in the Richland Investment Co. Building.

6. Fission Chips closed in the McVicker No. 4 Building.

7. Dr. W. H. Allen terminated his lease in the Medical Dental Building.

8. R. A. Hutchinson terminated his sublease in the Richland Development Co. Building.

B. Non-Commercial

1. Final inspections were conducted on the following constructions:

   a. Assembly of God Church
   b. Labor Day Saints Warehouse
   c. Nazarene Church additional building

2. One new pasture permit was issued.

3. Five private boat dock permits were issued.

COMMERCIAL PROSPECTS:

Inquiries were received during the month concerning the establishment of the following types of enterprises in Richland:

Warehouse Facility Used Car Lot Trailer Court

SUMMARY OF OCCUPANCY AND EXPANSION STATUS:

A. Commercial:	OCTOBER	NOVEMBER
1. Number of Government-Owned Buildings	41	41
a. Number of Businesses operated by Prime Lessees	37	38
(1) Number opened	0	1
(2) Number closed	0	0
b. Number of Businesses operated by Sublessees	21	21
(1) Number opened	2	0
(2) Number closed	0	0
Total Businesses in Government-Owned Buildings	58	59
2. Doctors and Dentists in Private Practice	32	31

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT - COMMUNITY SECTION November, 1955

	OCTOBER	NOVEMBER
3. Number of Privately Owned Buildings	81	81
a. Number of Businesses operated by Prime Lessees	49	49
(1) Number opened	0	0
(2) Number closed	0	0
b. Number of Businesses operated by Sublessees	121	120
(1) Number opened	4	3
(2) Number closed	3	4
Total Businesses in Privately Owned Buildings	170	169
4. Privately Owned Buildings under Construction	10	10
5. Total Number of Businesses in Operation	228	228
a. Total openings	6	4
b. Total closings	3	4
B. Noncommercial:		
1. Government-Owned Buildings		
a. Churches	1	1
b. Clubs and Organizations	5	5
c. Government Agencies	2	2
Total	8	8
2. Privately Owned Buildings		
a. Completed and in Use	11	11
b. Under Construction	5	2
3. Church Plots and Buildings in Private Ownership	6	6
4. Pasture Land Permits	99	100
5. Private Boat Moorage Permits	69	74

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT

TENANT RELATIONS

PROGRESS REPORT

	Orders incomplete as of October 31, 1955	Orders issued 10-31 to 11-30	Total orders incomplete as of November 30, 1955
Service orders	1540	3061	1854
Work orders	1252	796	1438
Service charges		273	

Principal work order loads

	Incomplete as of October 31, 1955	Incomplete as of November 30, 1955
Kitchen cabinet linoleum	135	187
Kitchen floor linoleum	84	114
Bath tileboard	19	31
Shower stalls	4	10
Laundry trays	39	76

177 alteration permits were issued as compared to 341 issued in October.

Install automatic washer	33	Install automatic dryer	60
Install TV antenna	31	Install electric heat	24
Install outlet	3	Soundproof wall	1
Remove coal bin	3	Install tile	2
Install patio	1	Install stoker	1
Convert to oil	8	Build storage shed	1
Reverse range and refer	2	Install window	1
Install fence	3	Basement excavation	2
Change kitchen cupboard	1		

1458 inspections were made, as compared to 1357 in October.

Alteration permits	335	Basement	3
Bathroom	12	Doors	18
Floors	22	Laundry trays	33
Linoleum	244	Lot lines	9
Paint	133	Porch	4
Range and refer recall	9	Steps & walks	12
Sink	19	Shower stall	5
Toilet seat	12	Trees	31
Walls	15	Windows	33
Yard	8	Renovation rechecks	49
Dormitories	153	Miscellaneous	34
Cancellations	85	Renovations	89
Shows (new tenants)	91		

Water pipes were frozen up in 69 houses in the month of November.

COMMERCIAL AND RESIDENTIAL PROPERTY UNIT

TENANT RELATIONS

TENANT STORES

Merchandise Issued	Total Amount
Shades	622
Reflectors	28
Ice cube trays	19
Meat tender	11
Drip tray	12
Hydrator glass	6
Hydrator	1
Door stops	5
Cooker pot and lid	2
Caulking compound	2
Refer parts	5
Range parts	1
Furnace parts	3
Furniture recall	33
Furniture delivery	22
Space heaters recalled	33
Space heaters delivered	30

RECALL AND DELIVERY OF RANGES AND REFRIGERATORS -- MONTH OF NOVEMBER

	DELIVERY		RECALLED	
	Ranges	Refers	Ranges	Refers
A	9SC	6TA	3SC	2TA
B	3SC	4TA	2SC	5TA
F	1SC			
Q	1GE			
U	1GE			
V	1GE	2GE	1GE	
Y	3GE	1GM		1GM 1GE
1Br.				
2Br.	2SC	7TA	2SC	6TA
3Br.		2TA	2SC	3TA
Tract	1GE 1SC	1TA 1GE	1SC	
Total	23	24	11	18

IN WAREHOUSE:

Ranges ----------2 GE, 61 SC
Refers ----------6 TA, 2 GM 6', 2 GM 7', 3 GE
Refers to be repaired ----------14
Refers in 722 hangar to be repaired ---------25

COMMERCIAL & RESIDENTIAL PROPERTY UNIT
RESIDENTIAL LEASES

NOVEMBER 1955

DORMITORY REPORT

Dormitories:

	Beds Available	Vacant Beds	Occupied Beds
Men	477	105	372
Women	381*	119**	262*
Total	858*	224**	634*

*This includes 2 beds used for Dormitory Offices
**This includes 6 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-61 50 Beds W-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

CANCELLATIONS		ALLOCATIONS	
Voluntary terminations	16	Houses allocated to new tenants	58
R.O.F.	0	Exchanged houses	2
Discharge	0	Moves (within Richland)	35
Transfers	5	Turnovers	7
Retirement	1	Wherry house move to GE houses	1
Move off project	31	Total leases signed	103
Divorce	0	Total cancellations	107
Death	2	Houses assigned "As Is"	42
Move to W.H	2	Houses sent to "Renovation"	47
Military Service	0	Applications pending	623
Not Eligible	5		
Granted Leave	1		
Force Move (Excessed)	3		
Total	66		

RICHLAND HOUSING

HOUSING UTILIZATION AS OF MONTH ENDING NOVEMBER 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	2217	265	10	396	885	1127	7	56	60	206	28	5257
Comm. Fac.	101	17	0	26	51	49	0	5	4	8	4	265
AEC	63	27	0	17	35	26	3	3	5	9	2	190
Other Gov't.	11	2	0	0	3	3	0	0	0	0	0	19
Post Office	10	0	0	0	2	8	0	0	0	0	1	21
Schools	66	0	0	6	12	41	0	0	1	1	0	127
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	4	3	0	0	3	0	0	0	0	0	0	10
Minor Const.	0	0	0	0	0	1	0	0	0	0	0	1
Not Certified	1	1	0	0	1	1	0	0	0	0	0	4
Total	2486	331	10	446	999	1264	10	64	70	227	35	5942
Ready to Rent	3	1	0	0	1	2	0	0	0	1	1	9
In Renovation	11	1	0	4	0	10	0	0	0	2	0	28
	2500	333	10	450	1000	1276	10	64	70	230	36	5979

	Begin Month	Moved In	Moved Out	End of Month	Difference
Conventional Type	2485	+28	-27	2486	+1
A&J Type	333	+ 2	- 4	331	-2
"T" Type	10	+ 0	- 0	10	0
Precut Type	447	+ 9	-10	446	-1
Ranch Type	997	+12	-10	999	+2
Prefab Type	1261	+36	-33	1246	+3
Dorm Apts.	10	+ 0	- 0	10	0
A&J Apts.	64	+ 1	- 1	64	0
2BR Apts.	68	+ 3	- 1	70	+2
Fourth Housing	230	+ 1	- 4	227	-3
Tracts	38	+ 1	- 4	35	-3
Total	5943	+93	-94	5942	-1

COMMUNITY SECTION
RICHLAND FIRE DEPARTMENT
MONTHLY REPORT

November, 1955

Organization and Personnel	Exempt	Non-Exempt
Employees - Beginning of Month	17	33
Transfers In	0	0
Transfers Out	0	0
Terminations	0	0
New Hires	0	0
End of Month	17	33

Fire Protection

Fire Loss (Estimated):	Government	$ 134.00
	Personal	27.50
	November Total	$ 161.50
	Year's Total	$8,354.85

Response to Alarm	30
Investigations of Minor Fires and Incidents	2
Ambulance Responses	22
Inside Schools or Drills	29
Outside Drills	5
Safety Meetings	8
Security Meetings	4
Alarm Boxes Tested	210

Twenty-six members of three youth groups, together with eight adult leaders visited the Central Fire Station during November.

Fire Marshal's Monthly Report

A total of 249 buildings were inspected, resulting in 11 hazard reports being submitted.

Requested crash protection be installed around propane gas tank at Tim's Restaurant.

Recommended additional evacuation horn for reproduction room of 760 Building.

Compiled scrapbook of fire prevention week activities and turned it over to Chamber of Commerce sponsors for entry into the National Fire Protection Association contest in Boston. The general program far exceeded any campaign conducted in the past and the help received from community-minded citizens

citizens in compiling the book made Richland's entry the most outstanding in our history.

Started plans for a city-wide Christmas Fire Safety program and arranged for local sponsors.

COMMUNITY OPERATIONS SUB-SECTION
RICHLAND ELECTRICAL UNIT
MONTHLY REPORT
NOVEMBER 1955

ORGANIZATION AND PERSONNEL	Exempt	Non-Exempt
Employees Beginning of Month	5	15
Transfers In		
Transfers Out		
Terminations		
Total End of Month	5	15

SYSTEM MAINTENANCE AND OPERATION

Outside Lines:

Poles set	4
Poles transferred	2
Anchors installed	1
Guys installed	1
Street lights installed	0
Mast arms installed	0
Street lights relamped - 1100 Area	147
Street lights relamped - 700 Area	5
Flood lights relamped - 1100 Area	29
Flood lights relamped - 700 Area	5
Traffic signals relamped	1
Primary line footage added	0
Primary line footage removed	0
Transformer KVA added	598
Transformer KVA removed	310
New services installed	5
Services removed	5
Scheduled outages	17
Unscheduled outages	6
Trees trimmed	67
Stand by and Escort	1

TRAFFIC SIGNALS

Operational failures	0
Installations	0
Removals	0
Routine check R. R. signal at Van Giesen	6
Total signals in operation - automatic	19
Total signals in operation - manual	5
Total signals in operation - flasher	3

RICHLAND ELECTRICAL UNIT

PUBLIC WORKS ELECTRICAL MAINTENANCE

Electrical motors checked and serviced - irrigation	9
Electrical motors checked and serviced - water	68
Electrical motors checked and serviced - sewage	47

FIRE DEPARTMENT TEST AND MAINTENANCE

Inside circuit and equipment checks	6
Outside circuit checks	8
Inside faults repaired	0
New circuits placed in operation	0
Outside faults repaired	5
New boxes placed in operation	0

SUBSTATIONS

Main feeder and tie breaker checks - BB1S1	4
Main feeder and tie breaker checks - BB1S2	4
Secondary and pad located stations - checked jumpers, cutouts, grounds and general condition	26

METERING - OPERATION, MAINTENANCE, CONSUMPTION AND REVENUE

Voltage and load checks	8
Meters tested - customer's requests	1
New meters shop tested	0
Faulty meters replaced or repaired	3
Damaged meters and covers	2
Residential read-ins	169
Residential read-outs	183
Residential disconnects	3
Residential reconnects	3
Radio interference checks	1
Overloaded meters changed	0
Routine meter tests	133

Consumption and Revenue - October:

	No. of Meters	KWH	Revenue
Residential - Schedule 1	6,976	4,979,542	$52,668.97
Commercial - Schedule 2	419	3,120,661	$25,812.53
Total	7,395	8,100,203	$78,481,50

COMMENTS

STREET LIGHTING:

Made up and installed two floodlight poles in the 700 Area for use in parking lot. Performed the usual routine relamping and trimming of trees from circuit. Prepared sketches for proposed easements on all 18 constant current street light stations.

TRAFFIC SIGNAL SYSTEM:

Repaired one Streeter Amet traffic counter and performed routine maintenance on all traffic signals and controllers. Made up complete maintenance and instruction manual for traffic signal system. Placed lanterns in battery wells to keep voltage up on Rail Road crossing signal at Van Giesen.

FIRE PROTECTION SYSTEM:

Performed routine maintenance on all boxes and main board. Cleared #1 circuit of shorts at 1182 pump house and 1125 Warehouse. Cleared circuits #4 and #8 of grounds. Repaired fire alarm boxes #543, #564 and #812. Changed out defective master box at 703 Building. Made up complete maintenance and instruction manual for fire alarm system.

WATER SYSTEM:

Performed weekly routine maintenance and servicing of electrical installations at domestic wells.

SEWAGE TREATMENT AND DISPOSAL SYSTEM:

Performed weekly routine maintenance and servicing of all electrical installations.

GENERAL COMMUNITY MAINTENANCE:

Repaired portable light plant and chain saw. Revised controls on heating system at Library and installed new thermostat. Repaired defective circulation motor on furnace at #2 Fire Station.

SUBSTATIONS AND METER MAINTENANCE:

Performed routine transformer and substation maintenance as required. Prepared complete maintenance and instruction manual on watthour meter test panel. Performed routine meter maintenance and increased capacity of watthour meters, when meters were available, where required for replacement of smaller meters due to house heating installations. (50 ampere meters required for replacement of smaller meters due to house heating loads are not available although delivery of 90 has been promised for December 1.) Converted cardex filing system in business office to Cardineer electric files resulting in a considerable savings in floor space and a reduced capital investment of $1500. Tested ten drums of transformer oil for Central Stores. Checked 8 voltage complaints but found voltage as it should be in each case. 76 disconnects were made to houses so as to allow tenant to install electric heat.

OUTSIDE LINE MAINTENANCE:

Prepared layout drawing and work order for pole line rebuild #6 between Sanford and Smith and south of Lee Blvd. to Hoffman Street.
Transferred telephone cable as time permitted on pole line rebuilds #1, #2 and #3.
Six callouts were required because of blown fuses, broken wire and trees blown into secondary wires.
Removed services to tract houses at 1824 Thayer and 1006 Gillespie.
Replaced 11 transformers with transformers of a higher capacity and added 6 new transformers because of new electric heating loads.
Removed 1 bad transformer at Berlin Camp which had arced to ground internally.
Tightened hardware on service drops as requested by Housing.
Provided escort for moving of house from 1019 Lee to Columbia River.

CALLOUTS:

Twelve weekly men and seven monthly men were called out during the month for six callouts.

EVENTS INFLUENCING COSTS:

A new system peak demand was set (5:30 pm November 15, 1955) of 33,760 KW. This will materially increase our costs during the forthcoming year due to the minimum demand billing portion of our summer billing. This change will be taken into consideration in the forthcoming midyear budget review. This new peak demand of 33,760 KW is the highest since 1951 when it was 34,300 KW.

COMMUNITY OPERATIONS SUB-SECTION
ENGINEERING UNIT
MONTHLY REPORT
NOVEMBER 1955

PERSONNEL:	Exempt	Non-Exempt	Total
Employees Beginning of Month	6	4	10
Transfers Out	0	0	0
Transfers In	0	0	0
Terminations	0	0	0
Total End of Month	6	4	10

BUILDING PERMITS ISSUED IN NOVEMBER

2 Sign Permits

NEW MUNICIPAL CONSTRUCTION STARTED IN NOVEMBER

Supply Construction Dates for Commercial Facilities

NEW PRIVATE CONSTRUCTION STARTED IN NOVEMBER

NONE

PRIVATE CONSTRUCTION COMPLETED IN NOVEMBER, OR ON WHICH FINAL INSPECTION MADE

Associated Oil Company - Geo. Washington Way and Newton Streets
Associated Oil Company - Lee & Goethals
Continental Oil Company
Latter Day Saints Church Warehouse
Nazarene Church Addition
Parcell's Service Station - Williams & Goethals

ENGINEERING JOBS COMPLETED IN NOVEMBER

C-81384 - Plot Lot Lines on Utility Drawings from Plats of Richland
A-5159 - Supply Construction Dates for Commercial Facilities

STATUS OF ENGINEERING UNIT PROJECTS

G-01018 - Relocation of 20" Meter at 300-F Well - Construction 75% complete. Awaiting improved weather conditions to complete.

G-02171 - Automatic Bar Screens, Sewage Lift Station - 60% complete. Contractor working on final phase of work.

G-02197 - Water Meter Installation for 300 Area Supply Lines - 80% complete. Awaiting improved weather conditions to complete.

G-03629 - Replacement of Thin Wall Steel Water Lines (FY 1955) - 98% complete. Awaiting improved weather conditions to complete.

G-03641 - Harris Avenue, Gaillard Place & Hains Avenue Extension - Design complete. AEC approval pending.

STATUS OF ACTIVE ENGINEERING WORK ORDERS

C-0572 - Study of Drainage Ditch from Swift Blvd. to Origin on Wellsian Way - 80% complete. Design delayed for pressing construction work.

C-0580 - Design & Installation Water, Sewer on Wellsian Way - Scoping and project proposal complete.

A-5108 - Furnish Plat and Legal Description for 1125 Warehouse - 50% complete.

C-9455 - Retirement of Irrigation Canal - 75% complete. Delayed for other work.

C-9457 - Retirement of Separate Irrigation System - Drawings and specifications ready for approval.

C-11460 - Plat and Legal Description, Christian Science Society - 90% complete.

C-11461 - Revise Legal Description of 11 Churches - 81% complete.

C-81020 - "As Builts" - Phase III - 96% complete.

C-81578 - Basin Located West of No. Richland Recharge Basin - Design 100% complete. Plans and specifications to AEC November 14, 1955.

C-81767 - Disposal - Streets, Estimate of Cost - Streets to be included in disposal package still pending.

C-95450 - Replace Lot Line Corner Stakes - an open active file. Work being performed as requested.

C-98020 - Plat and Legal Description, Vacant Lot So. of Morgan's Warehouse - 90% complete.

C-98054 - Legal Description "Rose Garden" - 95% complete.

BUILDINGS UNDER CONSTRUCTION

Plans, Specs., Inspections, All Saints Episcopal Addition - Construction 80% complete. Work progressing on schedule.

First Baptist Church (Richmond & Raleigh Sts.) - 92% complete. No progress this month.

Plans, Specs., Inspections, Christ of King (Catholic) - Construction materially complete and building occupied.

Plans, Specs., Inspections, L. G. Cook Bldg. - 98% complete. Work progressing slowly.

Plans, Specs., Inspections, Johnny's Drive-In Farmers Market - 95% complete. Work progressing slowly.

Plans, Specs., Inspections, Parker Hansen Bldg. - Construction 40% complete. Work progressing slowly.

Plans, Specs., Inspections, Davis Furniture Company Addition - 70% complete. Work progressing slowly.

Plans, Specs., Inspections, Moore's Service Station - 50% complete. No progress this month.

Plans, Specs., Inspections, Parcell's Bulk Station, Wellsian Way - 75% complete. Work progressing slowly.

Plans, Specs., Inspections, True's Oil Company (Old "Rose Garden" site) - Plans reviewed. Construction 1% complete.

COMMUNITY OPERATIONS SUB-SECTION
PUBLIC WORKS AND RECREATION UNIT
MONTHLY REPORT
NOVEMBER 1955

ORGANIZATION AND PERSONNEL	Exempt	Non-Exempt
Employees Beginning of Month	6	33
Transfers Out	0	1
Transfers In	0	1
New Employees	0	0
Terminations	0	0
Total End of Month	6	33

ROADS AND STREETS

During the first two weeks of the month routine maintenance of roads and streets consisted of patching, cleanup of weeds along road shoulders and parking lots, and the application of soil sterilant along road shoulders.

A total of 106 yards of 3/4" minus rock and 7 tons of blacktop were used for street patching, and 6 miles of road shoulders were sterilized with C.M.U.

Cleanup was abruptly terminated on November 11 when this area experienced its first snow fall of the year. During the period from November 11 to the end of the month the entire time of the road and street crews was used for sanding of streets, blading snow, and maintenance of the storm sewer system.

During this period there were three (3) separate snow storms followed by thawing conditions which produced slush, ice, and heavy run-off. A total of 321 yards of sand was used on the streets for ice control during this period.

In order to keep streets open and passable for safe traffic, crews were worked overtime on seven (7) different days during this period. Total overtime hours amounted to 159 man hours.

270 yards of sand were hauled from the sand pit west of North Richland to the sand stock pile at the old labor yard east of George Washington Way and south of Bradley Road for future sanding of streets.

SANITATION

The total weight of garbage and trash collected and disposed of during the month was residential: 900 tons, commercial: 229 tons, and trash trailers: 129 tons, for a total of 1,258 tons.

PUBLIC WORKS AND RECREATION UNIT

SANITATION (Cont'd.)

The sanitation crews were relieved during the Thanksgiving Holidays, November 24 and 25, and a double crew used on November 26, which consisted of the regular sanitation crew, plus a relief crew, to collect garbage in Areas 4 and 5 and commercial trash.

Due to the inclement weather, extra work was done at the Disposal Pit consisting of construction of new burning pits for the trash collection, and clearing an unloading spot for both our own garbage trucks and the private cars that use the pit.

PARKS AND PUBLIC GROUNDS

General cleanup of open areas was accomplished during the first two weeks of November.

Rye was also seeded around the garbage disposal pits and the road shoulders to the Disposal Pit during the month.

A Roto-Beater, which was being excessed by the 200 Areas, was used in the shelterbelts for chopping weed growth in place of the sickle bar cutting done previously. The unit worked very well on a trial basis and will be retained by the Transportation Section for the use of the Public Works and Recreation Unit.

Some necessary pruning in the shelterbelts, in order to permit machine travel through the rows, was also done during the month.

General cleanup of the Riverside Park waterfront was also started. This work consisted of the removal of several large Poplar trees that were a hazard to boat moorage, and the clearing of a walk-way along the river bank.

Work was also started on reshaping of the river bank north and south of Bradley Road to be used for clubs, organizations, and private boat moorage.

Ground maintenance crews were used for snow and ice control on both sidewalks and streets, supplementing the regular road and street crews as required.

Tree planting program at Riverside Park, north of Lee, was completed during November. A total of twenty-three (23) Evergreens and sixty-one (61) Deciduous were planted in the area. Three (3) large Evergreens were transplanted from the north side of the Mart Building to the Village Plaza. Cost of preparing the trees for moving was financed by the Richland Rotary Club and all labor necessary to move and transplant the trees was furnished by the Hanford Atomic Metal Trades Council.

PUBLIC WORKS AND RECREATION UNIT

RECREATION

General

Due to the unusually cold weather experienced during the early part of the month of November, Wellsian Lake was sufficiently frozen so that a large number of people were able to ice skate in the area.

The Archery program was initiated at Columbia High School Girls' Gymnasium and is to be conducted the first Wednesday of every month throughout the remainder of the fall and winter. The Roving Bowmen Association of Richland provides instructors. Equipment and materials for instruction purposes are furnished by the Public Works and Recreation Unit.

Participation in the Fall and Winter Recreation Program continues to be very good. A total of twelve (12) separate programs are actively in progress, in addition to a large number of special events scheduled at the Community House.

Attendance Statistics - November 1955

	No. of Sessions	Youth	Adults	Sub Total
A. Community House				
American Red Cross	1		135	135
Arts & Crafts	8	154	8	162
Boy Scouts	1	14	6	20
Campfire Girls	1		30	30
City Council	2		130	130
Muscular Dystrophy (Col.Chapt.)	1		51	51
Community Planning Committee	3		53	53
Elementary Movies	3	346	41	387
Elem. & Jr. Square Dancing	3	406	35	441
Fencing	4		23	23
Games Room	21	1 070	196	1 266
Girl of the Month Panel	1		6	6
Hi Spot	8	2 449	31	2 480
International Folk Dancers	2	21	22	43
Junior Sportsmen	1	20	4	24
Laundry Workers Union	1		40	40
League of Women Voters	2		68	68
National Little League	1		11	11
Orthopedic Guild	1		65	65
Pony & Colt League	1		25	25
Rec-A-Teers	3		350	350

PUBLIC WORKS AND RECREATION UNIT

Attendance Statistics - November 1955 (Cont'd.)

	No. of Sessions	Youth	Adults	Sub Total
A. Community House (Cont'd.)				
Richland Basketball Assoc.	3		31	31
Richland Rod & Gun Club	2	13	123	136
Richland Women's Club	1		50	50
Safe Driving Day Meeting	1		15	15
Social Security	2		75	75
Stamp Clubs	2	8	14	22
Tumbling	5	269	80	349
Women's Amateur Basketball Ass.	2		27	27
Y.W.C.A.	2	96	121	217
Total Community House	89	4 866	1 866	6 732

	No. of Sessions	Youth	Adults	Sub Total
B. Parks and Playgrounds				
Wellsian Lake	31	930	300	1 230
Total Parks and Playgrounds	31	930	300	1 230
C. Summary				
Community House and Parks and Playgrounds total for November 1955	120	5 796	2 166	7 962
Calendar Year to Date				320 973

COMMUNITY OPERATIONS SUB-SECTION
WATER AND SEWERAGE UTILITIES UNIT
MONTHLY REPORT
NOVEMBER 1955

ORGANIZATION AND PERSONNEL

	Exempt	Non-Exempt
Employees Beginning of Month	6	23
Transfers Out	0	0
Transfers In	0	0
New Employees	0	0
Terminations	0	0
Total End of Month	6	23

DOMESTIC WATER

Normal operations and routine maintenance were continued throughout the month. The pipe work on the thin-wall pipe replacement contract was completed and all lines were returned to service. Shutdowns were made to facilitate work on 3000-F well meter change and for installation of meters on the 300 Area water supply lines. These installations were completed and contractor is now working on meter vaults.

Well pumps Number 3000-5, 3000-D, 3000-E and 3000-H were pulled for maintenance and overhaul. Routine overhaul work is being performed on pumps from 3000-5 and 3000-H wells. The pump from 3000-E well was found to have the two bottom impellers severely damaged; replacement impellers were ordered and have been received for this unit. The 3000-D well pump was found to be severely damaged. We are commencing plans to either correct a poor condition in this well casing or to install a new well casing in it's place.

A 3/4" water meter was installed at the Uptown Tavern during the month.

DOMESTIC WATER DATA

	Well Production	Av. Da. Prod.	Total Consumpt.	Av. Da. Cons.
Richland	54,800,000	1,826,600	90,013,200	3,000,400
North Richland	82,890,000	2,763,000	34,233,400	1,141,100
Columbia Field	60,919,200	2,030,600		
300 Area			75,617,600	2,520,500
Total	198,609,200	6,620,200	199,864,200	6,662,000

Maximum daily production 8,245,600 gallons on November 15, 1955

Maximum daily consumption 7,464,200 gallons on November 21, 1955

WATER AND SEWERAGE UTILITIES UNIT

SEWERAGE SYSTEM

At the sewage lift station a barminutor unit was installed in the Swift Blvd. sewer main inlet and sewage flow which had been diverted during the construction work, was returned through this inlet. Presently the sewage flow from the north main inlet is being diverted through the Swift Blvd. main inlet to permit necessary construction for installation of a barminutor unit in the north inlet.

The number two sewage treatment plant has remained out of service throughout the month as weather conditions have prevented completion of the maintenance painting. The work is approximately 95 percent complete, and will be completed as soon as weather conditions will permit.

SEWAGE DATA

Plant No. 1 Total Flow	95,500,000	Average Daily Flow	3,183,300
Plant No. 2 Total Flow	0	Average Daily Flow	0
Total Flow	95,500,000		3,183,300

IRRIGATION SYSTEM

Adverse weather conditions with below freezing temperatures caught us with the winterizing program about 75 percent completed. Some frost damage resulted. Several valve bodies in irrigation stations number 2 and 3 were broken. These are presently in the process of being repaired.

The irrigation canal cleaning program has progressed very well. The canal above Weedles spillway has been cleaned and flushed. Work is now progressing down stream from Weedles spillway.

COMMUNITY OPERATIONS SUB-SECTION
RICHLAND PUBLIC LIBRARY
MONTHLY REPORT
NOVEMBER 1955

ORGANIZATION AND PERSONNEL	EXEMPT	NON-EXEMPT
Employees beginning of month	4	9
Transfers in	0	0
Transfers out	0	0
New hires	0	0
Terminations	1	0
End of month	3	9

GENERAL

Circulation

Books	18,340
Magazines	519
Pamphlets	74
Records	1,346
Inter-library loans	27
Grand total	20,308

Current Book Stock

Books added this month	373
Books withdrawn this month	1
Grand total	36,760
Phonograph records added	22
Phonograph records withdrawn	0

Registration Added

Adult	146
Juvenile	65

Registration Dropped

Juvenile	33
Grand total	178
Total registered borrowers	20,528
Meetings in North Hall	9
Children's Story hour attendance	1,081 (924-pre-school; 157-elementary school age)

Mrs. Berniece Christiansen, Reference Librarian, terminated this month to move to California.

Approximately 1201 people visited the Library's Fifth Annual Book Fair during National Book Week, November 14-19. This includes 488 school-age children who attended the movie, "My Friend Flicka", which was shown Saturday, November 19, and 213 pre-school children who attended the movie, "Mother Goose Stories" and "Mother Duck's Surprize", which was shown with the pre-school story hours on Tuesday and Wednesday mornings, November 14 and 16. All children's movies were furnished by the American Association of University Women as part of their sponsorship of the Children's Special Activities Program. Awards for the "Book Comment" contest were presented to the 100 elementary school winners on Tuesday, November 22, by Miss Ann Peck, Columbia Book Store, who donated the prizes. There were 564 contestants. The awards for the two winners in the Junior High School character identification contest were also presented on November 22, by Mrs. Maggie Kuempel, Shield's Book and Stationery Store, who sponsored these prizes. There were 12 participants in this contest.

Library visits were made by a Brownie and a Cub Scout Group. Miss Marie Golubski, Children's Librarian, told the groups of library services and explained the arrangement and use of the library to them, as well as telling a story to each group.

Miss Marie Golubski, Children's Librarian, attended the regional meeting of the Washington State School Librarians Association in Pasco on November 16. She announced the book week activities at the Richland Public Library and participated in a discussion of "How can we work together to meet the library needs of children and youth". Miss Golubski also visited Carmichael and Chief Joseph Junior High Schools to explain the book week contest for junior high school students.

AUXILIARY OPERATIONS AND PLANT PROTECTION SECTION

MONTHLY REPORT -NOVEMBER 1955

ORGANIZATION AND PERSONNEL

Number of employees on payroll:

	Beginning of Month	End of Month	Increase	Decrease
Staff	2	2		
Administration Area Maintenance	103	103 (a)		
Security and Patrol	464	465	1 (b)	
Fire Protection	130	130		
Office Auxiliaries	115	113		2 (c)
Telephone	80	82	2 (d)	
TOTALS	894	895	3	2

NET INCREASE: 1

(a) - Administration Area Maintenance

1 Transferred in
1 Transferred out

(b) - Security and Patrol

4 New Hires
1 Transferred in
2 Transferred out
2 Terminations

(c) - Office Auxiliaries

11 New Hires
1 Deactivated
11 Transferred out
1 Termination

(d) - Telephone

2 New Hires
2 Transferred in
2 Deactivated

FIRE PROTECTION UNIT

Fire Responses

HAPO	10
Construction	1
TOTAL	11

LOSS: None

Description of Fires

Engineering-Minor Projects Sub-Section-Minor Construction, 200-E, 11:14 AM, 11/2/55

Cardboard carton containing empty cans of Potassium Permanganate and miscellaneous flammable scrap spontaneously ignited near entrance of 221-B Building. On arrival fire had been extinguished by Minor Construction personnel with water. No loss.

Radiological Sciences-Biology-Experimental Animal Farm, 100-F, 4:48 P.M., 11/9/55

On arrival it was found that routine disposal of carcasses in special containers located in the burial ground had been mistaken for an uncontrolled fire. No loss.

Engineering-Minor Projects Sub-Section-Minor Construction, 300, 8:39 AM, 11/15/55

Minor Construction employees, while constructing a wall in Building 306, jarred an auxiliary box thereby actuating master box 52.

Manufacturing-Separations-200-E Shops, 200-E, 11:47 AM, 11/15/55

Response made to box 27, 272-E Building. No fire was found but it was determined that the system has probably tripped due to ice on the dry valve. System restored to normal operation.

Manufacturing-Metal Preparations-Operations, 300, 12:33 PM, 11/16/55

An Operations employee had extinguished a combination of floor spills of Menthanol and a solution used in a washing process in the 313 Building with a CO_2 extinguisher. Fire confined to floors. No loss.

AEC-Construction-W. G. Clark Construction Company, 200-W, 9:31 AM, 11/16/55

Welder accidentally upset a salamander outside 224-UA Building. On arrival, found that employees had extinguished the fire with sand. No loss.

Engineering-Minor Projects Sub-Section -Minor Construction, 200-E, 11:40 AM, 11/17/55

Upon arrival found that box 252 had probably transmitted due to melting snow on Protect-O-Wire connections at the Pipe Shop.

Engineering-Minor Projects Sub-Section-Minor Construction, 200-E, 2:18 PM, 11/22/55

Box 252 was activated due to an electrician accidentally shorting out a line of the Protect-O-Wire system.

Description of Fires (Contin)

Engineering-Minor Projects Sub-Section-Minor Construction, 200-E, 1:45 PM, 11/24/55

A leak in the roof of Central Warehouse was penetrating Protect-O-Wire causing Box 424 to actuate. Auxiliary system was placed out of service and master box reset.

Manufacturing-Reactor-100-H Power Operations, 100-H, 2:33 PM, 11/25/55

Plant fatality. No fire.

Engineering-Minor Projects Sub-Section-Minor Construction, 200-E, 9:30 PM, 11/29/55

A leak in the roof of Central Warehouse was penetrating Protect-O-Wire, causing Box 424 to actuate.

Drills Held During November

Outside drills held	56
Inside drills held	176

18,200 feet of fire hose and 560 feet of ladders were used for drill purposes during November.

A Fire Protection Officer held one class on fire extinguishers with 21 Manufacturing people in attendance.

Contaminated sectors at 100-H Area were washed down by the Area Fire Department on November 1, 1955.

Fire Extinguishers

Inspected	1906
Installed	23
Delivered to new locations	21
Seals broken	36
Serviced	455
Weighed	680

Gas Masks

Inspected	65
Serviced	12

Inspected Hand Lines	96

OFFICE AUXILIARIES SUB-SECTION

Plant Mail Unit

Internal mail increased both in volume and weight over October. US postal outgoing mail increased also. Two mailings which were sealed and mailed for the AEC do not reflect in volume mailed due to franking. Incoming US postal mail shows only a slight increase.

Plant Mail (Contin)

Special assignments included two mailings to each home in Richland and the preparation for mailing of each job, and one hundred and six separate mailings of the routine work, i.e. Organization and Policy Guides, Monograms, Technical Information, Safety and Health Material, etc.

Office moves continued through the entire month of November and constant attention was necessary to provide uninterrupted mail service to the offices and personnel involved. At present the major moves appear to be finished and the mail runs have been timed with shifting work loads and board changes completed.

Addressograph work volume increased by approximately 30,000 impressions. 80,000 collated sheets of printed copy into 24,234 sets of finished work varying from 97-page sets of two sheets each were handled by the new collating machine during the start-up operations this month.

Plate making also increased in Addressograph due to the numerous moves in the various buildings in the 700-1100 areas.

Types and Pieces of Mail Handled	October	November
Internal	4,734,402	5,086,016
Postal	82,204	92,241
Special	2,158	2,183
Registered	9,266	11,713
	4,828,030	5,192,153
Total postage used	$2,901.46	$3,303.68
Total teletypes handled	2,933	3,053
Total store orders handled	554	615

Addressograph	Number of Runs	Total Copies	Number of Runs	Total Copies
Plate name list	121	162,527	122	184,927
Housing list	15	48,988	17	49,185
Payroll list	6	19,737	15	31,465
Total new plates	2,967		5,221	
Total corrected plates	3,286		4,165	
	6,253		9,386	
Machine Collating (sheets)			80,000	

Printing Unit

A marked increase in the number of orders for printing was evident during the month. A total of 62 more orders were completed and accounted for an increase of 250,452 printed copies over the previous month.

Printing Unit (Contin)

Requests for priority printing was very heavy during the month. Some examples of the larger orders processed are as follows:

2 orders	60 preprinted masters Quarterly Breakdown FY 19
8 orders	1000 copies each, two color and pre-number, Red Label Secret forms
	6000 Valuation of Resident Property, AEC
	2000 General Managers Letter to Employees
2 orders	500 of one, 1500 on second Appraiser Called Cards, AEC
	25,000 Report of Property, AEC
	1000 Job Hazard Tags
	6000 Letter to Tenants
	3000 Cover letter Exempt Employee Appraisal
	24,000 Guide for Completing Appraisal forms
	24,500 (2 sides) Exempt Employee Appraisal forms
	2000 weekly payroll voucher
2 orders	2400 each Move Tags
	1000 #6 Envelopes (Return Address)
	4 Copies each of 36 originals-Top Secret Product Cost Report, AEC
	10 copies each of 27 originals-HAPO Cost Charts
	40 copies each of 19 originals-Financial Statement, 3 x 5 cards.

A total of 36 Technical Reports, requiring half tones, graphs, charts and color over prints were completed during the month. One of these required 48 copies each of 43 originals, five of which required four different color over prints.

Work Completed	October	November
Orders received	370	464
Orders completed	365	427
Average orders on hand	70.5	89.6
Copies printed	900,468	1,239,418
Vacuum Frame plated masked	522	541
Negatives processed	725	743
Photo copy prepared	335	353
Litho plates processed	611	730

Stenographic Unit

Three Stenographers and five Stenographer-Typists were assigned to the Unit in November. Nine permanent transfers were effected and twenty-seven loan assignments made.

The Secretarial-Stenographic Training Program developed by Education and Training Section was presented for employees of Separations Section on November 15, and for employees of the Stores Sub-Section on November 1, 8, 22 and 29, the Supervisor, Stenographic Training Unit, acting as guest lecturer.

Loan requests were unusually heavy throughout the month and it was impossible to fill all such requests and still keep work current in the pool.

Stenographic Unit (Contin)

Heavier assignments throughout the month included 89 hours of work for Employee Services on mailings for GESA and Gen-Trics; 35 hours typing for Process Engineering Sub-Section; 43.5 hours typing Radiation Incident Investigations for Separations-Radiation Monitoring; 42 hours card typing for Purex - Maintenance; 40.5 hours typing of monthly reports for Manufacturing Cost; 54.5 hours miscellaneous work for Separations - SS Accountability and 44.5 hours rough draft typing for Industrial Hygiene. All work is current at month's end.

	October	November
Total Production Hours	2,100.5	2,081.5
Training Hours	311	501.5
Unassigned Hours	69	91
Meeting Hours	15.5	21
Absentee Hours	8	- - -
	2,504	2,695

Duplicating Unit

During the month, an agreement was reached with Separations Section Management in 200-East Area, authorizing the installation of a Duplicating office in 202-A Building. Justification has been submitted to the Supervisor, Office Equipment for the purchase of one Ozalid Machine to be used in this location. One Multilith Model 80 offset press will be transferred from 200-Weat Area, thereby eliminating the need for purchase of additional Multilith equipment at this time.

Design improvements made on Embosograf equipment located in the Duplicating office, 760 Building, have proven satisfactory and backlogs of Embosograf work have been reduced to a minimum.

New type jogger attachments for Model 1250 offset presses, were installed during the latter part of the month. The use of this equipment materially reduces setup time necessary in running card orders.

	October	November
Orders received	3,511	3,806
Orders completed	3,451	3,777
Orders on hand	150	189
Offset plates	14,492	16,412
Offset copies	1,072,602	1,034,358
Verifax masters	3,933	3,117
Verifax copies	10,042	10,614
Ditto masters	269	573
Ditto copies	5,915	7,543
Zerox plates	1,444	2,098
Ozalid masters	181	35
Ozalid copies	528	196
Embosograf orders	4	24
Embosograf copies	166	167
Number of copies duplicated	1,089,253	1,052,878

Office Equipment Unit

Office Furniture

The expendable office furniture inventory account 93 was valued at $9,355.00 on October 31, 1955, or an average of two months' supply on hand. Withdrawals for the month were $3,099.00 and receipts were $838.00. The average turnover of stock for the year to date is five times.

The following is a detailed list of pieces of furniture handled during the month:

Item	Issued	Received	Salvage
Bookcase	9	4	1
Blackboard	3	0	0
Cabinet	60	41	31
Card File	2	6	0
Costumer	10	11	0
Chair	139	118	50
Desk	57	37	13
Daveno	0	0	3
Table	53	36	8
Miscellaneous	194	89	0
	526	342	106

A total of 105 service orders were issued to repair office furniture and locks which were in need of minor repair. Six work orders were issued for special types of maintenance repairs.

There was a total of 497 debit and credit store orders processed during the month. This is an average of 25 orders per working day.

A purchase requisition was issued to procure lounge type settees and chairs to replace old worn household type divans in all ladies lounges throughout the plant.

A consolidated appropriation request in the amount of $60,932.00 was issued for additional and replacement office equipment required for FY '56.

Office Machines

A total number of machines in service and stock as of the 20th of November was 4,284 or a net decrease of 34 machines over previous month.

A total of 30 electric typewriters were transferred to Excess Unit. These machines were declared uneconomical to retain in service and were replaced with new machines purchased in 1955. A total of 37 machines were transferred to Excess Unit which were surplus to our needs.

One letter inserting machine was received and installed in the 703 building. Weekly payroll checks are now being inserted into envelopes automatically and it has proven to be a very satisfactory operation.

Office Machines (Contin)

An inventory of refrigerated air conditioning units, window type, has been completed. A total of 22 units were located and assigned a HW control number. A record of location will be maintained on these units for physical control purposes.

One Ditto machine was picked up and removed from service during the month. This leaves a total of 19 machines not located in a centralized duplicating facility.

Office Machine Repair Unit

The physical inventory of office machine parts completed with the exception of multilith parts which will be completed December 15, 1955. January 1, 1956 has been set as the date on which all office machine spare parts will be placed in inventory account.

Office machine repair work load has been heavy during the month, and due to this a backlog of repair calls has built up. A part of this increase work load was due to the large personnel move by AEC and GE to and from the 703 and 760 Buildings. Some equipment was put out of adjustment in the move and in a few instances, damage was incurred.

Instrument personnel put into operation two new water meters in the North Richland Army Camp Area. These meters will measure all water supplied to the 300 Area by the Richland City Water Department.

Ten attendance time recorders were exchanged during the month as a part of an upgrading program designed eventually to replace 45 old clocks.

Repair tickets processed:	October	November
	489	785

ADMINISTRATION AREA MAINTENANCE SUB-SECTION

Majority of AEC-GE office moves to provide the Commission with additional space in 703 Building were completed during November. This mass move involved relocation of personnel in approximately 300 individual office enclosures.

Nine Hauserman partition installations were made in the 700 Area and four installations were removed and relocated. In addition, enclosure for payroll records storage was provided in 703 fifth wing basement, using HK-type Hauserman partition obtained from outer areas.

Shipment of last order of movable partitioning is in transit and is expected to arrive shortly after December 1. Practically all of this shipment is committed. Purchase requisition to cover additional supply, using remainder of funds (approximately $5,500) approved under Appropriation Request 56-EX-1, is in process of preparation.

Knight Street hutments are practically all removed. Order is being issued to Transportation Section to remove concrete walls, and plans are under way to convert this ground space for parking use.

Maintenance Unit
Building and Equipment Maintenance

Alterations to office space in 703, 761, 713 and Central Stores, as necessary to provide for the relocation of AEC-GE personnel, required approximately 80% of the total man-hours available from the carpenter force and 50% of the man hours available from the electrical crew. Other crafts also assisted in the expeditious completion of the work involved in this mass relocation, so that a minimum of interruption to the office personnel involved would be occasioned by the alteration work. Included in the work completed on this program during November are the following: removal of 208 lineal feet of Hauserman partitions, and the erection of 350 lineal feet of Hauserman; fabrication and installation of 160 lineal feet of top-filler; the removal of 80 lineal feet of frame partition and erection of 48 lineal feet of frame partition; the cutting of 7 doorways and hanging doors on same; framing in and sealing of five doorways; installation of nine pass-windows; application of 1344 square feet of acoustic tile; installation of five radiators in 703 and alterations to three radiators in 760; and the removal, relocation or installation of numerous light fixtures and convenience outlets and buzzer systems, as made necessary by partition moves and/or changes in function of the office space involved. Also included were many miscellaneous items of work such as relocation of cabinets, blackboards, book cases and floor chair pads; changing of swing of doors; and related minor items.

A total of 1568 square feet of asphalt floor tile was laid in 703 early in the month and continuance of this program has been deferred because of the moves of office personnel. It is anticipated that additional floor tile can be installed, prior to discontinuance of swing shift about December 23, 1955.

Annual inspection and repair of the fire protection sprinkler system in Building 703 was performed on November 19, 1955 and tests of the alarm system at that time indicated satisfactory operation. However, on November 23, 1955, a false alarm, resulting in unnecessary evacuation of the building, was turned in by the third wing system, and this system again alarmed falsely on November 25, at which time the building was unoccupied. A complete investigation revealed that a small piece of cast iron, that had apparently carried in from the water main when the system was refilled on November 19 had lodged under the rubber of the clapper valve in such a manner that a very minute leak would allow the system pressure to drop sufficiently over a period of several days to cause an alarm. Corrections have been made and the system is now operating satisfactorily.

Semi-weekly tests of civil defense sirens have been continued in conjunction with personnel of the Transportation Section. An investigation of two false operations of No. 1 siren indicated that the most likely cause had been a low operating value of the relays which are located at the siren and operated over telephone lines from the Airport Control Tower. These relays at the three sirens have been readjusted to operate at 20 mils, non-operate at 19 mils, and release at 10 mils, and it is believed that this will preclude further false operation. A regular inspection on November 22 disclosed that high humidity and low temperature had caused the formation of ice on the slip-rings of No. 2 and No. 3 sirens and it was impossible to operate these sirens from the airport or from the local controls at the sirens. A temporary correction of this condition was made on November 23, 1955, by making the three sirens stationary through disconnecting the rotating drive and installing jumper sires from the slip rings to the brush terminals. This situation is a further indication that the present control system for this critical equipment is not completely dependable, and it has been recommended that a study for development of dependable controls be initiated immediately.

Building and Equipment Maintenance (Contin.)

Work completed at Transportation area includes: Installation of one more platform under zone blower; installation of new arch tiles in 1171 furnaces; repair of large steam coil in 1171 spray room; installation of 24 micro-switches in solenoid oil valve circuits of furnace burners with inflammable links which will open the circuit and shut down the burner should flame from a carbon blocked burner blow back through the door; repair of four Kim-start circuits; rewiring of a grinder; installation of pump switch circuit; and relamping of grease pits.

Electrical inspection and repair was completed on five used electric fork lift trucks received by Transportation from off-site.

Miscellaneous work completed in the 700 Area proper included: replacement of steam coil in 701-A; relocation of steam PRV at 761; replacement of 40 lineal feet of condensate line in 703; installation of a steam coil and thermostat to heat ladies lounge in 702-B; installation of duct work on three remaining coolers at 761; completion of overhaul of #2 boiler at 784; replacement of an under-sized cooler in second wing of 703 with a cooler removed from 762; electrical repair of two centrifuges and a glass washer in 747; installation of fire alarm actuated evacuation klaxons in 713; repair and relamping of perimeter security lights; and cycle painting of 30 offices.

Routine seasonal maintenance was provided for buildings and equipment in the 600 and 700 Areas, Central Stores and Transportation shops; and glazier and locksmith service was furnished to all areas.

Building Services

Protective floor seal was applied to all floors in Building 762, and a second coat was applied to floors in Building 761. Work is in progress on treating sections of floors where partitions have been removed in connection with relocation of AEC-GE office enclosures.

Routine janitorial service was continued according to schedule in all assigned buildings.

Steam Operation

Numbers 3 and 4 boilers were in service at the beginning of the month, with Number 1 in reserve and Number 2 approaching completion of biennial major overhaul.

Number 1 boiler was placed in service on November 12 to help carry the additional heating load.

At the close of the month, Numbers 1, 3 and 4 boilers were in service, with Number 2 in reserve.

The quantity of steam generated at 784 Plant was 37.1% greater than for the same period of the previous year.

All heating steam outlets to active buildings were in service at the close of the month

Discharge check valve on Number 1 boiler feed pump was replaced on November 3. The old valve was then repaired and returned to Spare Parts.

Steam Operation (Contin)

Three loads of sulfuric acid were sent to 384 Power House and one load to 200-E Area during the month.

Boiler at Central Stores was placed in continuous operation on November 11.

Stoppage problem experienced at Central Stores Heating Plant last year with the fuel oil suction and discharge lines appears to have been eliminated by the action taken last summer, i.e. cleaning of tank and lines and adjusting the setting of the discharge relief valves so as to return heated oil to the underground supply tank.

Coal consumed: 1,858.65 net tons.

Steam generated:	26,913.0 M. Lbs.
Steam leaving plant:	23,479.1 M. Lbs.
Steam delivered	21,175.1 M. Lbs.
Total water softened:	3,455,600 Gallons
Total soft water sent to Kadlec Hospital:	49,880 Gallons
Total soft water sent to 784 Heating Plant:	3,405,720 Gallons

TELEPHONE SUB-SECTION

Received from the Atomic Energy Commission approval of rate schedule 2-A covering the furnishing of PABX equipment to commercial telephone subscribers.

Approximately 350 official telephones were relocated on an overtime basis to coordinate with the extensive relocations of office personnel in the 703, 760 and 761 Buildings.

Telephone Sub-Section overtime for November greatly exceeded the amount budgeted. The cause for the overrun was an unanticipated requirement for moving and rearranging a large number of official telephones in the 703, 760 and 761 Buildings.

Plant Telephone Operations

Removed all equipment except storage batteries from the old 100-B area telephone exchange and stored the equipment in the basement of the 702-B Building.

Installed additional equipment to increase the capacity of the 300 area Crash Alarm system from 20 to 30 lines.

Installed additional trunk terminating equipment in the 300 area exchange and established six new trunks to the 700 area exchange and three new trunks to the BY tandem exchange. This increased the total number of trunks between the 300 and 700 areas to 39, and between the 300 area and the BY Exchange to 15.

Started the installation of equipment in the 300 Area exchange to increase its capacity from 500 to 600 lines.

Approximately 470 telephones were moved in the 700 area in connection with relocation of Atomic Energy Commission and General Electric personnel.

In accordance with an agreement between the Stores and Telephone Sub-Section, physical transfer was made from Spare Parts stock (0420-83) to telephone inventory stock (0420-952) of items which are essentially limited to telephone useage.

Plant Telephone Operations (Contin)

Located and cleared two moisture faults in the BY to White Bluffs trunk cable and two similar faults in the BY to Point "H" trunk cable.

Located and cleared a moisture fault in a 76-pair cable in the 200-W area which serves the Redox Plant.

Located and cleared a moisture fault in a 101-pair cable which serves the White Bluffs Central Shops area.

Installed an additional 16-pair cable terminal in each of the 105 buildings in the 100-K area to provide termination of cable facilities outside areas which require SWP work permits.

At the request of the Z-Plant Sub-Section, a moisture fault in a 51-pair alarm circuit cable between the 234-5 and 2720-W buildings was located and cleared.

Replaced a pole in the T-5 cable line on Stevens Drive on November 11 which had been broken off by a private automobile.

Started cable balancing work preparatory to transferring all T-1 cable circuits to a single 102 quad cable in the George Washington Way underground. These circuits are presently divided between two separate cables in a portion of the underground system.

Prepared job specification P-56-13 to cover the installation of equipment to increase the capacity of the 300 area exchange from 500 to 600 lines.

Prepared job specification P-56-14 to cover the installation ofequipment to increase the number of trunks between the 300 and 700 area exhanges and between the 300 area and BY exchange. All equipment required for these additions was available from surplus stock.

Prepared a preliminary draft of an appropriation request to cover the procurement and installation of rectifier type battery chargers in the 200-EW and White Bluffs telephone exchanges to replace existing motor generator type chargers.

Preparation and proofing of the December 1955 edition of the Plant telephone directory was completed during the month. It is planned that the new edition be distributed about December 20.

Commercial Telephone Operations

Seventy-two residence telephones were installed between October 20 and November 21 and the backlog of unfilled requests for new telephones was 63 at the latter date. During the same period 42 residence telephones were relocated on an outside move basis and there was a backlog of 20 similar requests at November 21.

Completed a cable replacement and expansion job in the vicinity of Wright and Van Giesen, removing a section of aerial cable to clear a new building site and providing facilities to serve all of the buildings in the new Westgate Shopping Center.

Completed cable work in manholes 12 and 20 necessary to the transfer of some residential service circuits in the Northeast part of Richland from a plant system trunk cable to Richland distribution cable No. 11.

Commercial Telephone Operations (Contin)

In the vicinity of Torbett and Wright, transferred a 51-pair branch cable from main cable No. 3 to cable No. 2 for the purpose of making additional cable circuits available in cable No. 3 to meet service requirements in the Northwest part of Richland. This transfer also will permit the removal of about 320 feet of 11-pair size and about 310 feet of 51-pair size aerial cable in the vicinity of Trippe, Torbett and Wright streets.

Reinstalled and rearranged a large number of service drop wires in the Southwest part of Richland in connection with pole change-out activities of the Richland Electrical Unit.

Installation of trunk grading panel (switch interconnecting frame) in the Richland exchange is now 50% complete.

Assisted Administration Area Sub-Section personnel in investigating causes for accidental operation of the No. 1 air-raid siren, and reported jointly on the results of the investigation. A telephone technician also readjusted all telephone type control relays installed at all three sirens.

Replaced a cordless type PBX switchboard in the Richland School Administrative offices with a larger cord type switchboard.

A defective battery-charging motor-generator (No. 3) in the Richland exchange was removed and sent to an area electrical repair shop to be repaired.

A dry-disc type battery charger, available from surplus equipment stock, was installed in the North Richland Exchange to be used instead of the motor-generator type charger in order to reduce maintenance.

A pole on George Washington Way, near the Yakima river bridge, broken off by an automobile on November 24 was replaced.

Radio System Operations

Shop-serviced 28 mobile receivers, 27 mobile transmitters, 4 fixed station transmitters, 4 fixed station receivers, 6 intercom units, 1 sound-movie projector, 4 Western Electric amplifiers, 1 record changer, and 10 pack-type radio transmitter-receiver units.

Field serviced 48 mobile transmitter-receiver sets and four fixed-station sets. Installed two mobile transmitter-receiver units and associated auxiliary items. Removed one mobile transmitter-receiver unit and associated auxiliary items.

Recorded Science Forum Programs on November 1, 9, 16 and 30.

Installed and operated public address and recording equipment in Carmichael School Cafeteria for Senator Jackson's talk November 11.

Installed and operated a public address system on the Village Green for Memorial Services November 11.

Relocated an intercom system (1 master and 3 remote stations) in the 703 Building for the Union Relations Section November 15.

Radio System Operations

Relocated one master intercom station in the 760 building.

Installed and operated public address and sound recording equipment in the Columbia High School Cafeteria for a meeting of the ASME November 15.

Radio Station KKE 624 #2 (Yakima Barricade) was out of service on November 14 from 7:00 AM to 9:18 AM due to a broken microphone cable.

Radio Station KKE 624 #15 (100-K Area) was out of service from 5:50 PM November 18 to 9:27 AM November 21 due to tube failure. This outage was reported at 7:55 AM November 21.

Statistical Data - 17th of November (Telephones) - 20th of November (Radio)

	At 17th of November	Change from Previous Month	Change from Year Ago
Residential Subscribers	6058	+ 24	- 3
Business Subscribers	465	+ 2	+ 21
Paystation Telephones	44		- 36
Official Subscribers:			
Richland Exchange	248	- 2	- 736
700-1100 Areas	889	+ 4	+ 889
Process Areas Exchanges	1645	+ 6	- 223
		+ 34	- 88

New Service Requests Received during the month:

For Residential Service	105
For Business Service	6
TOTAL	111

Backlog of Service requests:

For new residential telephones	60
For new business telephones	1
For residential outside moves	17
For business outside moves	1
TOTAL	79

Service Orders processed:

In connection with business and residential service	399
In connection with plant service	359
TOTAL	758

Telephone Facilities - Installed, In Service and Available:

	Exchange Lines			Party Lines
	Installed	In Service	Available	Available
Richland Community	4006	3651	355	890
700-1100 Areas	1230	870	360	
Process Areas	1950	1637	313	
	7186	6158	1028	890

Radio Stations - In Service:

	At 20th of November	Change from Previous Month	Change From Year Ago
Fixed Stations	34	0	0
Mobile Stations	156	+ 2	+ 3
	190	+ 2	+ 3

SECURITY AND PATROL SUB-SECTION

Document Report

Number of classified documents and prints unaccounted for as of November 1, 1955: 298
(101 of the above 298 documents are chargeable to du Pont Co.)

Number of classified documents and prints reported as unaccounted for during November: 0

Number of classified documents and prints either recovered or downgraded in classification during November: 1

Number of classified documents and prints remaining unaccounted for as of December 1: 297
(101 of the above 297 documents are chargeable to du Pont Co.)

The Non-Technical Document Review Board held two meetings during November and reviewed a total of 92 documents. Of this number

23 had their classification retained,
2 were downgraded to "confidential-undocumented",
1 was downgraded to "Official Use Only",
59 were declassified,
2 were referred to the Coordinating Organization Director, and
5 were not within the scope of the Board.

Security Education

Five security items appeared in the GE News during the month.

278 security meetings were held and attended by 4,009 Hanford Atomic Products Operation personnel. A representative of the Plant Protection Services Unit showed one of the security films at some of these meetings as indicated below:

Film Title	Number of Meetings	Average Attendance Per Meeting	Total
"The Living Contract"	14	28	392
"Handle With Care"	6	22	132

The film "The Living Contract" was just released for showings during November.

650 copies of the poster with the security slogan "The Atomic Parallel, Secure the Top Line...it is classified", were posted in the plant areas during this period.

1,100 leaflets with the slogan "Freedom can not be taken for granted -- it is based on a solid foundation of vigilant security...America's Security is your Security", were distributed to employees. These were similar to the posters posted during October.

Organization and Policy Guide No. 15.28, entitled "Foreign Travel" was revised and issued October 25, 1955

The Manufacturing Department, Metal Preparation Section, 300 Area, has designed and purchased paper napkins on which are printed security and safety slogans for use in the 303 Exclusion Area lunchrooms to promote the security education and safety programs.

Seventy-six 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 19 employees received the "L" security orientation lecture during the reporting period.

Statistical Report of Patrol Activities

	100-B	100-D	100-F	100-H	100-K	200-E	200-W	300
Pat Searches	90	90	60	90	90	0	0	2
Escorts	14	7	3	28	57	7	14	8
Ambulance runs	1	5	4	1	2	2	3	6
Passes issued:								
One Day Temporary	25	10	19	7	20	36	36	52
Travel	0	0	0	0	0	0	0	164
Red Tag	70	53	60	16	11	193	405	71
Telephonic	0	0	0	0	0	0	0	0
Supervisor's Post Contacts	434	178	162	147	379	236	441	211

Other Patrol Activities (Computed by Hours)

	100-B	100-D	100-F	100-H	100-K	200-E	200-W	300 & 700
File Check	209	234	211.7	434	355	280	280	2,220
Building Check	343	44	259.9	1,028	355	280	280	720

Arrest Report

Violations	Number of Violations	Cont. Cases from Oct.	Cases Cleared	Pending	Fined
Illegal Parking	0	2	0	2	0
Speeding	1	0	1	0	1
TOTAL	1	2	1	2	1

Citation Tickets issued: 1
Warning Tickets issued: 30
Verbal Warnings 0

Patrol Training Activities

493 Patrolmen attended classroom instruction during the reporting period. However, since we have only 388 Patrolmen, some of the men attended more than one session.

152 Patrolmen attended Firearms training during the same period.

Patrol Post Changes

On November 14, the Prosser Barricade and 3000 Area Post was established in the 100-F Area. Duties on this post were divided between 200-E and 100-F Areas.

The 700 Area straight swing shift file check post, one of the post assignments for 300 Area, was discontinued November 1. This check is now made by Patrolmen assigned to rotating shifts.

General

During the visit of the Atomic Power Development Association on November 3 and 4, Security personnel escorted a special tour by bus of the 100-F, 100-K, 200-E, and 300 areas.

Effective November 4, a five year contract was approved by the General Electric Company and the Hanford Guard's Union, Local #21. Included in a verbal agreement was a new patrol shift schedule which eliminated the staggered shifts and permitted shift change to be made on post at the main badge houses and area radio stations. To date, the new shift schedule has proven satisfactory, particularly in respect to providing manpower where it is most needed.

A comprehensive survey of all Security Patrol activities was started by the Security Audit and Investigation Unit on November 28. It is expected that this survey will be completed in approximately thirty days, at which time a compilation of findings will be made available.

Security Administration

Daily Badge Log Entries	3,359	
"Q" Clearances	76	
"L" Clearances	19	
Formal "P" clearances issued	26	
"P" Approval clearances issued	34	
Category access granted	24	
Category access withdrawn	50	
Category access revised	72	
Number of photos for "A" Badges	19	(747 from January 1 to date)
Number of photos for "B" Badges	91	(3,486 from January 1 to date
Number of persons rephotographed	13	

Total photo identification passes laminated and issued:	302
Total "A" badges assembled and distributed to areas:	751
Total "A" badges received from areas:	383
Total "A" badges received from areas for repair:	42

Top Secret Clearances

Top Secret clearances cancelled during November:	7
Clearances granted:	33
Clearances requested:	39

[redacted]

HANFORD ATOMIC PRODUCTS OPERATION
General Electric Company
Richland, Washington

REPORT OF VISITORS FOR PERIOD ENDING NOVEMBER 30, 1955

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
EMPLOYEE AND PUBLIC RELATIONS DEPARTMENT							
I. Visitors to this Works							
H. A. Beaudoin General Electric Company Schenectady, New York	Discuss current informational policies	L. L. German C. N. Gross W. A. Watts	11-9-55	11-11-55	X		100-F XXX 100-K 105-KE,105-KW 200-E 201-C, 202-A 300 303; 700
II. Visits to other Installations							
T. B. Farley to: Knolls Atomic Power Lab. Schenectady, New York	Security conference and consultation	R. H. Owen	11-2-55	11-3-55	X		
ENGINEERING DEPARTMENT - ENGINEERING ADMINISTRATION SECTION							
I. Visitors to this Works							
K. R. Geiser General Engineering Lab. Schenectady, New York	Consultation on services performed by GEL for HAPO	R. M. Smithers E. B. Montgomery	10-31-55	11-2-55	X		100-K 105-KW 300 303; 700 200-W XXX; 202-ACR
J. L. Michaelson General Engineering Lab. Schenectady, New York	Consultation on services performed by GEL for HAPO	R. M. Smithers E. B. Montgomery	10-31-55	11-2-55	X		100-K 105-KW,105-KE 300 303; 700 200-W XXX;202-ACR
ENGINEERING DEPARTMENT - ADVANCE ENGINEERING SECTION							
I. Visitors to this Works							
A. Butterworth U. S. Atomic Energy Comm. Washington, D. C.	Discuss program for mathematical modeling of AEC facilities	J. B. Work P. F. Gast W. R. Lewis	11-7-55	11-10-55	X		300 303

[redacted]

UNCLASSIFIED

[redacted]

Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
L. R. Fink Research Laboratory Schenectady, New York	Inspect facilities, and plant and consult on programs	F. W. Albaugh	11-2-55	11-2-55	X		100-D 105 200-E 202-A 200-W Redox 300 303; 700
J. L. Lawson Research Laboratory Schenectady, New York	Inspect facilities, and plant and consult on programs	F. W. Albaugh	11-2-55	11-2-55	X		100-D 105 200-E 202-A 200-W Redox 300 303; 700
G. Pleat Production Division U. S. Atomic Energy Comm. Washington, D. C.	Discuss combined operations and program for mathematical modeling of AEC facilities	J. B. Work P. F. Gast W. R. Lewis H. E. Hanthorn	11-7-55	11-10-55	X		300 303
C. D. W. Thornton U. S. Atomic Energy Comm. Washington, D. C.	Discuss program for mathematical modeling of AEC facilities	J. B. Work P. F. Gast W. R. Lewis H. E. Hanthorn	11-8-55	11-8-55	X		300 303

II. Visits to other Installations

F. W. Albaugh to: Division of Production U. S. Atomic Energy Comm. Washington, D. C.	Attend Production Planning Committee Meeting	R. L. Kirk	11-7-55	11-9-55	X		
F. W. Albaugh to: Division of Production U. S. Atomic Energy Comm. Washington, D. C.	Attend Production Planning Committee Meeting	R. L. Kirk	11-28-55	11-30-55	X		

ENGINEERING DEPARTMENT - DESIGN SECTION

I. Visitors to this Works

U. M. Staebler U. S. Atomic Energy Comm. Washington, D. C.	Discuss reactor proposal	A. B. Carson	11-3-55	11-3-55	X	700 300 303	

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
II. Visits to other Installations							
R. C. Hoffman to; Declassification Branch U. S. Atomic Energy Commission Oak Ridge, Tennessee	Civil application document declassification	H. F. Carroll	11-21-55	11-21-55			
L. E. Kusler to: Nuclear Metals Cambridge, Massachusetts	Discuss zirconium and fuel element fabrication techniques	P. Lowenstein	11-4-55	11-7-55	X		
B. O. Shaver to: Argonne National Lab. Lemont, Illinois	Attend Fourth AEC Air Cleaning Conference and Stack Gas Working Group Meeting	D. P. O'Neil	11-2-55	11-4-55	X		
F. E. Tippets to: Argonne National Lab. Lemont, Illinois	Discuss boiling burnout problems, reactor stability problems and natural convection in boiling reactors	A. L. London P. A. Lottes	11-17-55	11-18-55	X		
ENGINEERING DEPARTMENT - PILE TECHNOLOGY AND SEPARATIONS TECHNOLOGY SECTIONS							
I. Visitors to this Works							
A.E. Austin Battelle Memorial Inst. Columbus, Ohio	Research program on sub-contract work BMI will be doing for HAPO	M. Lewis W. A. Snyder	11-15-55	11-17-55	X	100-D 300	105 XXX
W. P. Bebbington E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Purex process discussion	F. W. Woodfield R. G. Geier	11-4-55	11-4-55	X	300	XXX
H. E. Brown General Electric Company Aircraft Nuclear Propulsion Cincinnati, Ohio	Discuss critical experimental facilities	D. E. Davenport	11-10-55	11-10-55	X	300	303

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
D. E. Chambers General Electric Company Schenectady, New York	Review Hanford operations	F. W. Woodfield A. E. Smith	11-10-55	11-10-55	X	300	XXX
W. Chubb Battelle Memorial Inst. Columbus, Ohio	Discuss metallurgy program and assistance to Hanford	J. J. Cadwell V. R. Cooper W. P. Wallace J. W. Riches	11-15-55	11-17-55	X	100-B 100-D 100-K 300	105-B,105-C 105 105-KE,105-KW 303
J. E. Evans Material Testing Reactor U. S. Atomic Energy Comm. National Reactor Testing Station Arco, Idaho	Discuss neutron cross section measurements	J. E. Faulkner	11-14-55	11-15-55	X	100-D 300	105 303
J. Farr National Lead Company Fernald, Ohio	Work on the broach machine and observe broaching experiment	W. P. Wallace G. S. Cochrane J. W. Riches	11-3-55	11-10-55	X	100-B 300	105-B,105-C 303
M. D. Fiske Research Laboratory Schenectady, New York	Consultant on operation of a helium liquifier	G. W. Stuart	11-14-55	11-15-55	X	300 100-K	XXX XXX
F. Forscher Westinghouse Atomic Power Div. Pittsburgh, Pennsylvania	Discuss physical and mechanical properties of zirconium alloys	S. H. Bush R. G. Wheeler	11-21-55	11-22-55	X	100-K 300	105-KE,105-KW 303; 700
K. R. Geiser General Engineering Lab. Schenectady, New York	General instrumentation consultation on analog computers	A. B. Greninger R. D. Schilling E. B. Montgomery	10-31-55	11-3-55	X	100-K 202-ACR 200-W 300	105-KW,105-KE XXX 303; 700
H. W. Gouldthorpe General Electric Company Schenectady, New York	Review Hanford operations	F. W. Woodfield A. E. Smith	11-10-55	11-10-55	X	300	XXX
E. T. Hayes U. S. Bureau of Mines Albany, Ohio	Discuss zirconium metallurgy	S. H. Bush R. S. Kemper W. P. Wallace	11-8-55	11-8-55	X	300 700	XXX

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Unclass.	Areas
A. N. Holden Knolls Atomic Power Lab. Schenectady, New York	Discuss uranium metallurgy	J. J. Cadwell S. H. Bush M. J. Sanderson	11-2-55	11-4-55	X	100-B 100-K 300	105-C 105-KE XXX
N. E. Huston North American Aviation Downey, California	Discuss NAA safety fuse experiments	R. L. Dickeman	11-22-55	11-23-55	X	100-D 100-K 300	105 105-KE,105-KW 303
J. H. Keeler Research Laboratory Schenectady, New York	Report on contract W-31-109-Eng-52 and consult on metallurgical problems on zirconium	S. H. Bush	11-15-55	11-18-55	X	100-D 100-K 300	105 105-KE,105-KW 303; 700
J. R. Keeler Battelle Memorial Inst. Columbus, Ohio	Discuss metallurgy program and assistance to Hanford	J. J. Cadwell V. R. Cooper W. P. Wallace J. W. Riches	11-15-55	11-17-55	X	100-B 100-D 100-K 300	105-B,105-C 105 105-KE,105-KW 303
R. E. Larson Knolls Atomic Power Lab. Schenectady, New York	Review KAPL-120 loop operations and data analysis	J. A. Berberet	10-19-55	12-31-55	X	100-D 100-H 100-K 300	XXX 105 XXX 303; 700
C. C. Leader General Electric Company Schenectady, New York	Review Hanford operations	F. W. Woodfield A. E. Smith	11-10-55	11-10-55	X	300	XXX
E. S. Lembersky Westinghouse Atomic Power Pittsburgh, Pennsylvania	Discuss irradiation of WAPD fuel samples in the KAPL-120 loop	J. A. Berberet	11-2-55	11-3-55	X	100-D 100-H 100-K 300	XXX 105 105-KW 303; 700
L. D. Loch Battelle Memorial Inst. Columbus, Ohio	Research program on sub-contract work BMI will be doing for HAPO	M. Lewis W. A. Snyder	11-15-55	11-17-55	X	100-D 300	105 XXX
P. Loewenstein Nuclear Metals Cambridge, Massachusetts	Consult on zirconium fabrication and metallurgy of zirconium	V. R. Cooper S. H. Bush	11-10-55	11-11-55	X	100-K 300	105-KE,105-KW 303

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
J. A. Marinsky Ionics, Incorporated Cambridge, Massachusetts	Discuss ion exchange membranes applied to AEC processes	F. W. Woodfield	11-2-55	11-3-55	X	300	XXX
L. G. Miller Material Testing Reactor U. S. Atomic Energy Comm. National Reactor Testing Station Arco, Idaho	Discuss neutron cross section measurements	J. E. Faulkner	11-14-55	11-15-55	X	100-D 105 300 303	
M. Nash Declassification Branch U. S. Atomic Energy Comm. Washington, D. C.	Possibility of de-classifying 321 Bldg.	F. W. Woodfield R. G. Geier	11-2-55	11-3-55	X	300	XXX
A. Pechukas General Electric Company Schenectady, New York	Review Hanford operations	F. W. Woodfield A. E. Smith	11-10-55	11-10-55	X	300	XXX
R. W. Porter General Electric Company Schenectady, New York	Review Hanford operations	F. W. Woodfield A. E. Smith	11-10-55	11-10-55	X	300	XXX
J. J. B. Rutherford Babcock and Wilcox Co. Beaverfalls, Pennsylvania	Discuss stainless steel specifications	W. P. Wallace	11-10-55	11-11-55	X	200-E 202-A 300 303	
J. R. Smith Material Testing Reactor U. S. Atomic Energy Comm. National Reactor Testing Station Arco, Idaho	Discuss neutron cross section measurements	J. E. Faulkner	11-14-55	11-15-555	X	100-D 105 300 303	
W. A. Smith, Jr. Knolls Atomic Power Lab. Schenectady, New York	Neutron irradiation of semi-conductors and vacuum canning	J. A. Berberet W. J. Ozeroff R. C. Roesch	11-9-55	11-11-55	X	100-K 105-KE,105-KW 300 XXX; 700	
H. A. Strickland General Electric Company Schenectady, New York	Review Hanford operations	F. W. Woodfield A. E. Smith	11-10-55	11-10-55	X	300	XXX

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
G. W. Watt University of Texas Austin, Texas	Calcination of uranium nitrate	R. E. Burns R. G. Geier R. B. Richards	11-1-55	11-4-55	X	300	XXX 200-W 234, 235, Redox
W. E. Winsche E. I. du Pont de Nemours & Co. Savannah River Plant Augusta, Georgia	Purex process discussion	F. W. Woodfield R. G. Geier	11-4-55	11-4-55	X	300	XXX
II. Visits to other Installations							
R. B. Abrams to: Oak Ridge National Lab. Oak Ridge, Tennessee	Document declassification review related to Civilian Application Document Declassification	H. F. Carroll	11-28-55	2-10-56	X		
J. A. Berberet to: U. S. Atomic Energy Comm. Idaho Falls, Idaho	Discuss assignment of space in Experimental Test Reactor	J. B. Philipson	11-18-55	11-18-55	X		
J. H. Brown to: Knolls Atomic Power Lab. Schenectady, New York	Discuss reactor problems and observe experimental work of assistance to HAPO	W. R. Kanne	11-21-55	11-21-55	X		
J. H. Brown to: Brookhaven National Lab. Upton, Long Island, New York	Discuss reactor problems and observe experimental work of assistance to HAPO	R. W. Powell	11-22-55	11-27-55	X		
R. E. Burns to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Purex process discussion	W. P. Bebbington J. W. Morris	11-14-55	11-18-55	X		
R. E. Burns to: Oak Ridge National Lab. Oak Ridge, Tennessee	UO_3 and Purex process discussions	D. Lang F. L. Culler	11-14-55	11-14-55	X		
J. J. Cadwell to: Radiation Laboratory University of California Livermore, California	Consultation on Hanford assistance to Whitney Project	K. Copenhagen	11-9-55	11-11-55	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
J. J. Cadwell to: U. S. Atomic Energy Comm. Idaho Falls, Idaho	Discuss assignment of space in Experimental Test Reactor	J. B. Philipson	11-18-55	11-18-55	X		
M. W. Carbon to: Material Testing Reactor U. S. Atomic Energy Comm. National Reactor Testing Station Arco, Idaho	Consultation on heat transfer problems of Engineering Test Reactor	J. Barnard S. Levy	11-10-55	11-11-55	X		
V. R. Cooper to: U. S. Atomic Energy Comm. Idaho Falls, Idaho	Discuss assignment of space in Experimental Test Reactor	J. B. Philipson	11-18-55	11-18-55	X		
J. M. Davidson, III to: Material Testing Reactor Phillips Petroleum Co. Idaho Falls, Idaho	Discuss proposed experiment in Material Testing Reactor	W. B. Lewis H. T. Watanabe	11-9-55	11-11-55	X		
T. W. Evans to: Material Testing Reactor Phillips Petroleum Co. Idaho Falls, Idaho	Observe Material Testing Reactor experiments	D. R. Alvord	11-1-55	11-2-55	X		
J. F. Fletcher to: Material Testing Reactor Phillips Petroleum Co. Idaho Falls, Idaho	Discuss proposed experiment in Material Testing Reactor	W. B. Lewis	11-9-55	11-11-55	X		
G. C. Fullmer to: Knolls Atomic Power Lab. Schenectady, New York	Discuss reactor problems and observe experimental work of assistance to HAPO	W. R. Kanne	11-21-55	11-21-55	X		
G. C. Fullmer to: Brookhaven National Lab. Upton, Long Island, New York	Discuss reactor problems and observe experimental work of assistance to HAPO	R. W. Powell	11-22-55	11-27-55	X		
R. G. Geier to: E. I. du Pont de Nemours Savannah River Plant Augusta Georgia	Purex process discussion	W. P. Bebbington J. W. Morris	11-14-55	11-18-55	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
R. G. Geier to: Oak Ridge National Lab. Oak Ridge, Tennessee	UO_3 and Purex process discussions	D. Lang F. L. Culler	11-14-55	11-18-55	X		
K. M. Harmon to: Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Discuss plutonium and weapons fabrication processing	B. Weidenbaum E. J. Walko R. D. Miller	11-7-55	11-9-55	X		
K. M. Harmon to: Los Alamos Scientific Lab Los Alamos, New Mexico	Discuss plutonium and weapons fabrication processing	G. H. Tenney R. D. Baker A. S. Coffinberry	11-8-55	11-11-55	X		
R. C. Hoffman to: Oak Ridge National Lab. Oak Ridge, Tennessee	Document declassification review related to Civilian Application Document Declassification	H. F. Carroll	11-28-55	2-10-56	X		
D. E. Johnson to: Bridgeport Brass Co. Bridgeport, Connecticut	Zirconium fabrication	R. M. Treco	11-22-55	11-22-55	X		
D. E. Johnson to: Chase Brass Company Waterbury, Connecticut	Zirconium fabrication	A. Blanc	11-23-55	11-23-55	X		
D. C. Kaulitz to: Material Testing Reactor Phillips Petroleum Co. Idaho Falls, Idaho	Discuss engineering factilities of Experimental Test Reactor	J. B. Philipson	11-18-55	11-18-55	X		
R. S. Kemper to: Oak Ridge National Lab. Oak Ridge, Tennessee	Document declassification review related to Civilian Application Document Declassification	H. F. Carroll	11-28-55	2-10-56	X		
H. A. Kramer to: Oak Ridge National Lab. Oak Ridge, Tennessee	Document declassification review related to Civilian Application Document Declassification	H. F. Carroll	11-28-55	2-10-56	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
M. C. Lambert to: Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss UO_3 research studies	H. Bernhardt	11-7-55	11-9-55	X		
M. C. Lambert to: Battelle Memorial Inst. Columbus, Ohio	Discuss X-ray diffraction studies UO_3	C. M. Schwartz	11-10-55	11-11-55	X		
B. R. Leonard, Jr. to: Los Alamos Scientific Lab. Los Alamos, New Mexico	Discuss problems of nuclear physics	C. Zabel	11-10-55	11-10-55	X		
M. Lewis to: Material Testing Reactor U. S. Atomic Energy Comm. Arco, Idaho	Attend policy meeting on L-42 position in Material Testing Reactor	W. B. Lewis	11-29-55	11-29-55	X		
R. K. Marshall to: North American Aviation Downey, California	Inspect customer assembled experiment before shipment	N. E. Huston N. E. Huston	11-29-55 12-1-55	11-30-55 12-2-55	X X		
C. L. Miller to: Knolls Atomic Power Lab. Schenectady, New York	Discuss reactor problems and observe experimental work of assistance to HAPO	W. R. Kanne	11-21-55	11-21-55	X		
C. L. Miller to: Brookhaven National Lab. Upton, Long Island, New York	Discuss reactor problems and observe experimental work of assistance to HAPO	R. W. Powell	11-22-55	11-25-55	X		
C. L. Miller to: Argonne National Lab. Lemont, Illinois	Discuss reactor problems and observe experimental work of assistance to HAPO	R. O. Brittan	11-28-55	11-28-55	X		
R. Neidner to: Material Testing Reactor Phillips Petroleum Co. Idaho Falls, Idaho	Establish contact at MTR in line with changed responsibility for liaison concerning HAPO experiment	D. R. Alvord	11-1-55	11-2-55	X		
R. M. Peekema to: Oak Ridge National Lab. Oak Rid Tennessee	Document declassification review related to Civilian Application Document Declassification [redacted]	H. F. Carroll	11-28-55	2-10-56	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
R. E. Peterson to: Argonne National Lab. Lemont, Illinois	Discuss carbon 12 cross section measurements.	Dr. Hess	11-28-55	11-28-55	X		
F. B. Quinlan to: Mallinckrodt Chem. Wks. St. Louis, Missouri	Conduct experiment on uranium shotting machines, their fabrication and techniques	J. A. Fellows W. M. Leaders	11-10-55	11-25-55	X		
O. W. Rathbun to: National Lead Company Fernald, Ohio	Process inspection for uranium fabrication techniques	A. G. Guay	11-1-55	11-4-55	X		
R. B. Richards to: Argonne National Lab. Lemont, Illinois	Technical discussion on Reactor Handbook	S. Lawroski	11-14-55	11-18-55	X		
R. B. Richards to: Carbide and Carbon Oak Ridge, Tennessee	Technical discussion on Reactor Handbook	D. M. Lang F. L. Culler	11-14-55	11-18-55	X		
R. B. Richards to: Knolls Atomic Power Lab. Schenectady, New York	Technical discussion on Reactor Handbook	R. D. Bennett R. D. Bennett	11-14-55 11-21-55	11-18-55 11-22-55	X X		
R. B. Richards to: Vitro Engineering Div. Vitro Corporation New York, New York	Technical discussion on Reactor Handbook	H. Lowenberg	11-14-55	11-18-55	X		
H. F. Soule to: Oak Ridge National Lab. Oak Ridge, Tennessee	Document declassification review related to Civilian Application Document Declassification	H. F. Carroll	11-28-55	2-10-56	X		
M. J. Stedwell to: National Lead Company Fernald, Ohio	Consultation on uranium refining and UO_3 calcination	T. C. Runion	11-30-55	12-2-55	X		
W. P. Stinson to: Oak Ridge National Lab. Oak Ridge, Tennessee	Document declassification review related to Civilian Application [redacted]	H. F. Carroll	11-28-55 11-28-55	12-9-55 2-10-56	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
J. T. Stringer to: National Lead Company Fernald, Ohio	Process inspection for uranium fabrication techniques	A. G. Guay	11-1-55	11-4-55	X		
A. W. Thiele to: Oak Ridge National Lab. Oak Ridge, Tennessee	Document declassification review related to Civilian Application Document Declassification	H. F. Carroll	11-28-55 11-28-55	12-9-55 2-10-56	X X		
O. J. Wick to: Radiation Laboratory University of California Livermore, California	Consultation regarding assistance to Whitney Project	K. Copenhagen	11-9-55	11-11-55	X		
F. W. Woodfield, Jr. to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Purex process discussion	W. P. Bebbington J. W. Morris	11-14-55	11-18-55	X		
F. W. Woodfield, Jr. to: Oak Ridge National Lab. Oak Ridge, Tennessee	UO_3 and Purex process discussions	D. Lang F. L. Culler	11-14-55	11-18-55	X		

FINANCIAL DEPARTMENT - CONTRACT COST SECTION

I. Visits to other Installations

J. L. Boyd to: U. S. Atomic Energy Comm. Oak Ridge, Tennessee	Review plant and equipment budgeting practices and routines	N. A. Shearon	11-7-55	11-8-55	X		
J. L. Boyd to: U. S. Atomic Energy Comm. Savannah River Plant Augusta, Georgia	Review plant and equipment budgeting practices and routines	W. A. Slaton	11-9-55	11-11-55	X		
W. Sale to: U. S. Atomic Energy Comm. Oak Ridge, Tennessee	Review plant and equipment budgeting practices and routines	N. A. Shearon	11-7-55	11-8-55	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
W. Sale to: U. S. Atomic Energy Comm. Savannah River Plant Augusta, Georgia	Review plant and equipment budgeting practices and routines	W. A. Slaton	11-9-55	11-11-55	X		
FINANCIAL DEPARTMENT - GENERAL							
I. Visitors to this Works							
F. W. Maguire General Electric Company New York, New York	Study financial reporting for Atomic Products Division	D. M. Johnson	11-28-55	12-3-55	X		
FINANCIAL DEPARTMENT - PROCEDURES AND COMPUTING SECTION							
I. Visitors to this Works							
J. E. Fesler Sandia Base Albaquerque, New Mexico	Review progress of GE in in integrated data processing, review application, and discussions	H. Tellier	11-9-55	11-10-55	X		
MANAGEMENT							
I. Visitors to this Works							
D. E. Chambers General Electric Company Schenectady, New York	Review Hanford operations	W. E. Johnson	11-9-55	11-11-55	X		100-D XXX 100-K 105-KE 200-E 202-A 300 303; 700
H. W. Gouldthorpe General Electric Company Schenectady, New York	Review Hanford Operations	W. E. Johnson	11-9-55	11-11-55	X		100-D XXX 100-K 105-KE 200-E 202-A 300 303; 700
C. C. Leader General Electric Company Schenectady, New York	Review Hanford operations	W. E. Johnson	11-9-55	11-11-55	X		100-D XXX 100-K 105-KE 200-E 202-A 300 303; 700

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Restricted Data Areas
C. H. Linder General Electric Company New York, New York	Review Hanford operations	W. E. Johnson	11-9-55	11-11-55	X		100-D XXX 100-K 105-KE 200-E 202-A 300 303; 700
A. Pechukas General Electric Company Schenectady, New York	Review Hanford operations	W. E. Johnson	11-9-55	11-11-55	X		100-D XXX 100-K 105-KE 200-E 202-A 300 303; 700
R. W. Porter General Electric Company Schenectady, New York	Review Hanford operations	W. E. Johnson	11-9-55	11-11-55	X		100-D XXX 100-K 105-KE 200-E 202-A 300 303; 700
H. A. Strickland, Jr. General Electric Company Schenectady,New York	Review Hanford operations	W. E. Johnson	11-9-55	11-11-55	X		100-D XXX 100-K 105-KE 200-E 202-A 300 303; 700
H. A. Beaudoin General Electric Company Schenectady, New York	Discuss current informational policies	W. E. Johnson	11-9-55	11-11-55	X		700
OPERATIONS RESEARCH STUDY SECTION							
C. A. Bennett to: Division of Research U. S. Atomic Energy Comm. Washington, D. C.	Discuss project "Blue-nose"	S. G. English	11-8-55	11-10-55	X		
MANUFACTURING DEPARTMENT							
A. L. Baietti Naval Radiological Defense Lab. San Francisco, California	Seek HAPO assistance for operation "Redwing" and observe radiation protective methods on site	P. C. Jerman J. G. Myers	11-1-55	11-1-55	X		100-K 105-KE

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Restricted Data Areas
J. E. Law Naval Radiological Defense Lab. San Francisco, California	Seek HAPO assistance for operation "Redwing" and observe radiation protective methods on site	P. C. Jerman J. G. Myers	11-1-55	11-1-55	X	100-K	105-KE
W. P. Bebbington E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Discuss research and development on separations processes	C. A. Priode W. R. DeHollander	11-3-55	11-4-55	X	100-B 200-E 300	108-B 202-A 303; 700
W. E. Winsche E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Discuss research and development on separations processes	C. A. Priode W. R. DeHollander	11-3-55	11-4-55	X	100-B 200-E 300	108-B 202-A 303; 700
II. Visits to other Installations							
W. G. Browne to: Carbide and Carbon Oak Ridge, Tennessee	Investigate operating problems of uranium dissolving facilities	F. C. Culler	11-16-55	11-17-55	X		
R. W. Harvey to: Aircraft Nuclear Propulsion Cincinnati, Ohio	Discuss measurements and examination of techniques of chart room	J. W. Darley R. L. Gartner	11-7-55	11-8-55	X		
L. M. Knights to: Carbide and Carbon Oak Ridge, Tennessee	AEC Accountability procedures and policies meeting	A. de La Garza	11-10-55	11-10-55	X		
L. M. Knights to: Argonne National Lab. Lemont, Illinois	AEC Accountability procedures and policies meeting	J. T. Bobbitt	11-11-55	11-11-55	X		
W. N. Mobley to: Dow Chemical Co. Rocky Flats Laboratory Denver, Colorado	Discuss product specifications on operations	F. H. Langell	11-7-55	11-8-55	X		
E. W. O'Rorke to: Carbide and Carbon Oak Ridge, Tennessee	Discuss production specifications and technical consultation	L. Emmett F. C. Culler	11-17-55	11-18-55	X		

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Name - Organization	Purpose of Visit	Person Contacted	Arrival	Departure	Restricted Data Class.	Restricted Data Unclass.	Areas
J. H. Palmer to: Argonne National Lab. Lemont, Illinois	Attend air cleaning conference	D. P. O'Neil	11-2-55	11-4-55	X		
O. C. Schroeder to: E. I. du Pont de Nemours Savannah River Plant Augusta, Georgia	Consultation on process control problems and mechanics relating to process standards in Reactor operation	A. A. Smith	11-9-55	11-11-55	X		
J. H. Warren to: Dow Chemical Company Rocky Flats Laboratory Denver, Colorado	Discuss product specifications on operations	F. H. Langell	11-7-55	11-8-55	X		
RADIOLOGICAL SCIENCES DEPARTMENT							
I. Visitors to this Works							
A. L. Baietti Naval Radiological Defense Lab. San Francisco, California	Discuss radiation protection for special project	A. J. Stevens W. A. McAdams	11-1-55	11-1-55		X	300 XXX
H. A. Beaudoin General Electric Company Schenectady, New York	Orientation of biology facilities	H. A. Kornberg R. F. Foster L. K. Bustad	11-10-55	11-10-55		X	100-F 108
J. E. Law Naval Radiological Defense Lab. San Francisco, California	Discuss radiation protection for special project	A. J. Stevens W. A. McAdams	11-1-55	11-1-55		X	300 XXX
W. A. Smith Knolls Atomic Power Lab. Schenectady, New York	Discuss neutron irradiation of semi-conductors	W. C. Roesch J. DePangher	11-9-55	11-11-55	X	300	XXX
II. Visits to other Installations							
C. R. Hilst to: Argonne National Lab. Lemont, Illinois	Attend air cleaning conference and discuss meteorology problems [redacted]	H. Moses	11-2-55	11-4-55	X		

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RADIOLOGICAL SCIENCES DEPARTMENT

NOVEMBER 1955

SUMMARY

Thirty informal, ten Class I, and one Class II radiation incidents were recorded. The Class II case involved quite localized irradiation of skin of 6 employees; although the doses were substantial, the limited areas involved makes the actual hazard small.

Emission of I^{131} was held to a satisfactory average of 5 curies per week.

A reactor incident led to particulate contamination of about 7 square miles around the 100-H site. Although cars and roads were contaminated, there was no significant exposure of personnel.

New data from the positive ion accelerator was applied to achieve a useful increase in time-limits in some neutron-hazardous work in the 234-5 Building.

Ground water contamination below a Redox crib will be corrected in time by availability of a new crib next month.

Studies on gut irradiation gave preliminary results that are badly needed for one phase of the river pollution problem.

Considerable work was done on dose systems and on permissible concentrations of radioisotopes in preparation for international reviews of these matters at Geneva and Mexico City in 1956.

The Business Review was presented.

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RADIOLOGICAL SCIENCES DEPARTMENT

NOVEMBER 1955

The month-end force of 419 included 34 supervisors, 96 engineers and scientists, 24 clerical and 265 other personnel.

Number of Employees on Payroll	
Beginning of Month	422
End of Month	419
Net Decrease	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
None	None

There were 41 radiation incidents, including 10 Class I and one Class II cases. The Class II case related to localized doses up to 20 rads over a few square centimeters of skin at the waist level, when six Minor Construction employees came in contact with a contaminated guard rail around a cell.

An unusual reactor incident led to release of radioactive particles from the 100-H reactor stack. Ground deposition over about 7 square miles resulted. Some private vehicles were contaminated and the traffic pattern outside the 100-H area had to be temporarily modified. Neither inside nor out of the reactor building was there undue exposure of personnel, the incident was promptly reported to the AEC. The residual contamination is expected to decay to negligible values in December.

The particle monitoring stations throughout the Northwest showed evidence of debris from the Russian nuclear detonations.

The newly formed field development unit has conceived a method of treating X-ray film to make it insensitive to visible light. If this should prove to stand up under rigorous field tests, it will make possible major improvements in film badges and finger rings.

Radiological Sciences Department

Another new development first heard of in England has been tested here. It refers to a Canadian method of partially separating plutonium and uranium in the air from the radon and thoron. The separation seems to be about 90% effective, so that important readings of air contamination can be significantly speeded up.

The average weekly emission of I^{131} from separations plant stacks was about 5 curies; this is within the target limit. On only one day was the maximum daily limit exceeded, and this incident had no bad effect.

A 10% power increase at the 100-H reactor resulted in a 50% increase in the gross activity of the effluent. It is this kind of relationship that makes difficult the forecasting of river conditions at future power levels. However, the work on this front is going ahead at a satisfactory pace. In support of the automatic isotope monitor that is proposed for the effluent analysis, a battery of separate but compatible analyses is being developed. In this month, interesting work was done on the exchange of Cu^{64} onto a specially prepared CuS surface; this already yields a purity of 97%, although total yield is not yet consistent enough.

In waste disposal, there are some current problems at a Redox Crib site due to penetration of radioactive material to the ground water. This contingency had been foreseen and a new crib is to be ready in January, 1956. This should be just in time to eliminate serious concern at the present site. The disposal of various wastes such as the scavenged TBP material proceeded satisfactorily. However, in some phases, this is still being controlled by soil science data obtained from soil columns too short for comfortable extrapolation. A new facility consisting of a long column supported in a well hole has been projected for these studies. This is an ingenious way of mechanically supporting a 60 ft. column and shielding it too.

The first practical benefits of the intensive neutron studies with the positive ion accelerator were gained when the calibration factor of BF_3 counters as used in the 234-5 Building were changed by a factor of 3. This will save many man-hours of operator time in certain critical operations.

In the biological work, the amount of P^{32} in the edible flesh of waterfowl is still causing some concern. Since restriction on hunting of such fowl would have far-reaching public relations consequences, the real hazard will receive the most careful attention before defensive action is proposed. As an aid to this, the department's researches on the uptake of P^{32} show considerably lower values than those currently used in nationally recommended permissible limits. This work is being extended. If the favorable results are confirmed, an energetic program to achieve modification of national and international limits for P^{32} will be undertaken. This would have equal value in the sensitive problem of whitefish contamination.

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Radiological Sciences Department

With the increasing work on pigs, which are admirable experimental animals for much of our radiobiological work, considerable attention is being given to the safety of the operation. The pig is a heavy muscular animal not nearly so tractable to having work done on him as is the sheep. Some excellent work is being done on immobilization by anesthesia, which is difficult without affecting the experimental data. The miniature pig is used wherever possible, but even here the mature animal approaches 200 lbs.

The important work on ruthenium uptake and deposition continues. The most recent longer-term results seem to establish kidney as the critical organ. There is a real probability here that sometimes kidney and sometimes bone will be the critical organ; this would complicate the development of reliable permissible limits.

Preliminary results are now available on the irradiation of gut experimentally relocated exterior to the laboratory animal. This work needs to be pushed because of the growing importance of human gut irradiation as one of the limiting factors in river pollution.

The survey boat sank at McNary Dam in bad weather, although it had been inspected shortly before the incident. Considerable difficulty was encountered in recovering it, although the Corps of Engineers gave the best possible assistance. Damage from the two-week immersion is yet to be ascertained.

The yield of salmon nests continued to be low, the total reaching only 25% of the anticipated total. Although this probably has nothing to do with Hanford operations, it is a finding that we could well have done without, because of the vulnerable relations problem created.

The department spent considerable time in preparing recommendations on dose units for the forthcoming international conferences on this field. The department has long had a position of leadership in this field, and there are several advantages in having the local systems accepted internationally. Substantial contributions were also made in proposed revisions to permissible limits for internal deposition of radioisotopes.

The Business Review of the department was presented.

H. M. Parker
KSS

Director,
RADIOLOGICAL SCIENCES DEPARTMENT

HM Parker:kss

Radiological Sciences Department

APPENDIX

1. Condensed Exposure Records

Type	Number of Readings	Potential High Results	Confirmed High Results
Pocket chambers - gamma	317,472	44	0
Pocket chambers - slow neutron	2,168	10	0
Film Badges - beta-gamma	57,030	36	0
Neutron film	733	1	0
Pu bioassay	1,173	60	7
F. P. bioassay	1,312	45	1
U bioassay	515	20	0
Alpha hand counts	46,044	0	0
Beta hand counts	50,897	0	0
Thyroid counts	160	0	0

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Radiological Sciences Department

2. Regional Monitoring Records

Sample Type and Location	Activity Type	Average Activity Density /uc/ml	Trend* Factor
Drinking Water and Related Materials			
Benton City Water Company Well	alpha	1.5×10^{-8}	--
Richland, N. Richland, Benton City Wells	alpha	$(<0.5 \text{ to } 1.5) \times 10^{-8}$	--
100 Areas	beta	$(<0.05 \text{ to } 2.2) \times 10^{-6}$	--
200 Areas	beta	$(<0.5 \text{ to } 8.0) \times 10^{-7}$	--
Pasco, Kennewick, McNary Dam	beta	$(<0.5 \text{ to } 8.9) \times 10^{-7}$	--
Backwash Solids - Pasco Filter Plant	beta	1.7×10^{-2} /uc/gm	-2
Backwash Liquids - Pasco Filter Plant	beta	2.3×10^{-7}	--
Sand Filter - Pasco Filter Plant	beta	6.8×10^{-6} /uc/gm	-5
Anthracite Filter - Pasco Filter Plant	beta	2.8×10^{-5} /uc/gm	-2
Other Waters and Related Materials			
300 Area Wells #1 and 3	alpha	$(<0.5 \text{ to } 10) \times 10^{-8}$	--
300 Area Well #4	alpha	1.1×10^{-7}	--
Well #4 measured as Uranium	U	1.1×10^{-7}	--
Other Wells on the Reservation	beta	$(<0.05 \text{ to } 4.9) \times 10^{-6}$	-55
Columbia River - Hanford Ferry	beta	1.2×10^{-5}	--
Columbia River - Below Reactors	beta	7.9×10^{-6}	--
Columbia River - Paterson to McNary	beta	1.8×10^{-7}	--
Columbia River - Short Mud	beta	$(1.6 \text{ to } 9.0) \times 10^{-5}$ /uc/gm	--
Raw Water - Operating Areas	beta	$(<0.05 \text{ to } 7.6) \times 10^{-6}$	--
Reactor Effluent Retention Basins to River	beta	7,800 to 19,000 /uc/sec/reactor $(0.95 \text{ to } 4.4) \times 10^{-3}$	--
Reactor Effluent Retention Basins to River	alpha	<0.04 /uc/sec/reactor $<5 \times 10^{-9}$	--

Radiological Sciences Department

Sample Type and Location	Activity Type	Average Activity Density /uc/ml	Trend* Factor
Other Waters and Related Materials (Contd)			
I-131 in Farm Wastes to River	I-131	19 /uc/day	--
	[illegible]	4.2×10^{-7}	--
I-131 in Columbia River - Hanford	I-131	$<7 \times 10^{-8}$	--
300 Area Pond Inlet	alpha	6.2×10^{-7}	-3
Atmospheric Pollution			
Gross Alpha Emitters	alpha	$(<4.0 \text{ to } 8.0) \times 10^{-15}$	+2
Gross Dose Rate - Separations Areas	beta - gamma	(0.37 to 2.32) mrad/day	--
Gross Dose Rate - Residential Areas	beta - gamma	(0.31 to 0.92) mrad/day	--
Active Particles - Separations Areas	beta	$(0.08 \text{ to } 1.8) \times 10^{-12}$	+3
I-131 Separations Areas	I-131	$(<0.4 \text{ to } 1.0) \times 10^{-13}$	--
I-131 Separations Stacks	I-131	0.75 curie/day	-2
Ruthenium - Separations Stacks	$Ru^{103-106}$	<0.02 curie/day	-2
Active Particles - Wash., Idaho, Ore., Mont.	--	<0.0003 to 0.001 ptle/m^3	--
Active Particles - HAPO	--	<0.0003 to 0.055 ptle/m^3	-5
Tritium (as oxides) - Reactor Stacks	T	0.59 curie/day	-2
Vegetation			
Environs of Separations Areas	I-131	$(<0.3 \text{ to } 1.5) \times 10^{-5}$ /uc/gm	--
Residential Areas	I-131	$<3.0 \times 10^{-6}$ /uc/gm	--
Eastern Washington and Oregon	I-131	$<3.0 \times 10^{-6}$ /uc/gm	--
Non-Volatile Beta Emitters - Wash. and Ore.	beta	$(1.5 \text{ to } 2.8) \times 10^{-5}$ /uc/gm	--
Alpha Emitters - Separations Areas	alpha	$(0.5 \text{ to } 12.0) \times 10^{-7}$ /uc/gm	--
Alpha Emitters - 300 Area	alpha	2.2×10^{-7} /uc/gm	+4

* The trend factor shows the n-fold increase (+) or decrease (-) from last month, where values of n less than 2 will not be noted.

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FINANCIAL DEPARTMENT MONTHLY REPORT
NOVEMBER, 1955

The schedule of meetings with key employees to review and explain provisions of the proposed prime AEC-GE contract was substantially completed in November, with a few sessions scheduled for December and early January. About 500 employees have attended these meetings to date. General "wind-up" meetings in January will be held for personnel who were unable to attend meetings scheduled for their groups because of vacations, the urgency of their work, or for other reasons. It is planned to hold follow-up meetings with certain groups after the effective date of the new contract.

Considerable time was spent during the month in determining operating funds required for the first six months of calendar year 1956 and funds required for plant and equipment as included in the FY 1956 Financial Plan. When these amounts have been finally determined, a modification to the prime contract will be executed. The modification obligating these funds is expected to be ready for execution during the latter part of December, 1955.

The annual physical inventory of spare parts, spare equipment and stand-by material in the custody of Stores Sub-Section, Manufacturing Department, was taken on November 28, 29 and 30. The physical count of stand-by was postponed until early December since this material is stored in open storage yards and adverse weather conditions made it impractical to inventory.

All 100 Area accounts have been converted to the new functional coding system effective with November business. A list of all buildings within the 100 Areas which apply to production was prepared indicating building number, name and use which is one of the primary factors in setting up and maintaining this type of a coding system. Ledger posting is progressing satisfactorily and new cards were prepared prior to change-over, therefore, no time has been lost. Concurrent with this change-over, all 100 Area records were changed eliminating pennies from records and dollar accounting applied.

Unitization reports for Project CG-549, Activate Task I-RMA Line - 234-5 Building, in the amount of $475,727 and Project CG-496, Recuplex Installation - 234-5 Building, in the amount of $1,780,799 were completed during November.

Directive No. HW-367 authorized $60,000 for Project CG-648, Auxiliary Radioiodine Removal and Nitric Acid Recovery Facilities - Redox. This project is to be financed from a specific line item in the FY 1956 Plant and Equipment Budget and, according to previous agreement, the directive should have been accompanied by an obligation letter. When such a letter was requested, objections to continuing the procedure were expressed. To facilitate further consideration of G.E.'s position on the question, the Commission requested that the basis for our legal interpretation be submitted in writing. This request has been passed on to the HAPO Legal Department, along with a request that we be promptly informed of the conclusions reached and any special procedures which may be required to ensure our contractual position.

[redacted]

Five project proposals and two informal requests representing an aggregate of $309,700 were reviewed, approved, and processed to the Commission during the month. After receipt and analysis of AEC directives and work authorities, ten project authorizations were issued for a total of $555,700.

Twenty-six appropriation requests totaling $82,107 were investigated and processed during the month. One hundred thirty-four requests for the disposal of property were investigated and processed during the month.

Final charges to the Washington-designated program, "Modification of KAPL-120 In-Pile Loop," have been made. Expenditures during FY 1956 amounted to $99,915.00. The operation of the loop during the remainder of FY 1956 will be financed by KAPL and billing procedures will be followed as set forth in the Hanford Irradiation Request Program.

The FY 1956 Midyear Budget Review for Plant and Equipment Projects has been completed and is presently being reviewed by the General Manager. Preliminary information has been furnished to the HOO-AEC Budget Branch.

A major activity during the month again centered around the business reviews. The Metal Preparations Section review was held November 2 in the 300 Area, Employee and Public Relations on November 16, Separations Section review was held November 23 in the 700 Area Civil Defense Conference Room and Radiological Sciences on November 30. These reviews covered the significant financial data of the past, present and forecasted future activities. A condensation of each review is prepared to serve as a Management Report.

The revised Insurance Plan which became effective November 1 bases benefits and contributions upon normal straight-time annual earnings. To avoid numerous adjustments because of changes in rates, the contribution deduction schedule has been changed from a monthly to a weekly basis for nonexempt employees. The change in the deduction schedule has the concurrence of the Union Relations Section.

Weekly salary checks were delivered on Tuesday to swing shift employees and on Wednesday to other employees during Thanksgiving Week. The cooperation of supervisors who followed the instructions contained in Office Letter No. 214 relative to time card completion during the short work-week contributed materially to the early availability of checks.

The change in policy in filing Withholding Exemption Certificates (Form W-4) by employees and the circumstances which require the filing of new certificates were explained in a letter to all supervisors dated November 23.

During November, wage increases and retroactive pay as the result of these increases under the Company's 32-point "Better Living" program, which became effective August 29, were calculated and paid to nonexempt employees. Payments to exempt employees were made in September.

To assist engineers in the Process Engineering Sub-Section in the evaluation of a new slug design, an extensive calculation of the slug's physical properties were carried out by use of the 702 electronic data processing machine. Some twenty cases of different cell geometries and properties were computed.

The work begun last summer by W. F. Engesser, professor of industrial engineering, Oregon State College, in establishing office work standards is being continued by Robert W. Dascenzo, recently engaged as an industrial engineer for the Procedural Analysis Unit.

At the request of the AEC, and on a back charge basis, the Computing Operations Unit is compiling all of the time worked by plumbers and pipe fitters on all construction jobs in the years 1952 to 1955, inclusive. About a million cards are to be punched and converted to a magnetic tape for processing. This work is scheduled for completion in December.

A formal reply was furnished the AEC on November 15 to its report on a plant-wide survey of plutonium (its Survey No. 12, Part III) for the period from July 1, 1954 to July 31, 1955. These "surveys" are comprehensive examinations, analyses and evaluations of all SS material accounting controls, including material records, inventory procedures, measurement and statistical methods in use, and independent tests of inventories.

Material Underaccounted For (M.U.F.) values for October were investigated and the results published by the SS Accountability Section in Document HW-39859.

A measurements evaluation study of the SS Accountability problems associated with the Metal Fabrication Building processes has been completed and the results published in Document HW-39781.

Charges from HAPO against the overhead allowance in November totaled $7,072, consisting of:

Nonreimbursable transfer expense	$4 166
Travel and living expense variation	1 249
Conference expense (entertainment)	1 467
Advertising in "Signs of the Pioneers" edition of the Columbia Basin News	87
Nonreimbursable interview expense	78
Expense in connection with Tri-City Army Advisory Committee	20
Expenses for Company-owned automobile	5
	$7 072

The October "Summary of Disbursements," transmitted to the Commission through the Director of its Finance Division, showed net expenditures of $6,814,598, summarized as follows:

Payrolls and payroll deductions disbursed	$4 291 973
Materials (including orders placed on requirements contracts) and freight	2 477 855
Subcontracts and agreements	89 519
Advances for traveling and living expense	88 211
Miscellaneous	324 356
Gross Disbursements	7 271 914
Less: Revenue	457 316
Net Disbursements	$6 814 598

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 - 25
Property Accounting Section	I - 26 through I - 31
SS Accountability Section	I - 32 through I - 36
Personnel and Organization Statistics	I - 37 through I - 38

SUMMARY OF CASH DISBURSEMENTS, RECEIPTS AND ADVANCES

A summary of cash disbursements and receipts (excluding advances of $7,300,000 by the Atomic Energy Commission for November and $6,800,000 for October) for the months of November and October, 1955, is shown below:

Disbursements	November	October
Payrolls (net)	$3 479 023	$3 131 296
Materials and Freight	1 868 654	1 890 714
Payroll Taxes	617 492	755 077
Payments to Subcontractors	552 875	676 670
United States Savings Bonds	326 511	218 435
Travel Advances to Employees	70 992	88 211
Group Insurance Premium	3 178	146 726
Pension Plan - Employees' Portion	-0-	109 917
Income from Invested Funds	-0-	93 502
All Other	185 089	161 366
Total	7 103 814	7 271 914
Receipts		
Rent	110 496	109 678
Electricity	67 593	58 015
Telephone	57 141	49 291
Hospital	42 177	51 495
Sales to AEC Cost-type Contractors	28 465	27 750
Sundry Accounts Receivable	26 331	37 491
Refund of Travel Advances to Employees	10 041	11 222
Bus Fares	9 239	9 302
Refunds from Vendors	952	425
Income from Invested Funds	-0-	93 502
Other	4 730	9 145
Total	357 165	457 316
Net Disbursements	$6 746 649	$6 814 598

Outstanding advances as of November 30, and October 31, 1955 were as follows:

	November	October
Cash in Bank - Contract Accounts	$2 443 572	$1 890 221
Cash in Bank - Salary Accounts	20 000	20 000
Total	$2 463 572	$1 910 221

AUDITING SECTION
MONTHLY REPORT - NOVEMBER, 1955

Reports were issued for the completed audits listed below:

Employee Awards and Recognition Plans
SS Accountability
Cost Accounting - Manufacturing

At month-end a report was being prepared for the audit of Telephone and Telegraph Administration.

Field work was continued on the following audits:

Overtime Administration
Employment Administration and Practices
Management of Capital Assets

The following audits were started during the month:

Reproduction and Engineering Files - Project Auxiliaries Sub-Section
Motor Pool Operations
Product Cost
Classified Files

Follow-ups were made to determine the extent of compliance with recommendations in reports of the following audits:

General Electric Suggestion Plan
Travel, Living and Entertaining Expenses

Four informational meetings for exempt employees were held during the month. A portion of one meeting attended also by exempt employees of the Property Accounting Section, was devoted to a film showing construction highlights of the Purex facilities.

BUDGETS AND MEASUREMENTS SECTION
MONTHLY REPORT - NOVEMBER 1955

General

Recruitment of university graduates from the December and March graduating classes for the BTC Program was undertaken during November. Interviews were held at Brigham Young University, University of Utah, Utah State College, Seattle University, and the University of Washington. Four positive offers were made and contacts established with several outstanding men who expect to graduate in June.

The Business Training Program is progressing well and will complete the first semester on December 17. Over-all student average is well above 90.

Budgets

The Midyear Budget Review occupied all employees in this group for the entire month. Data from other sections and departments were late, requiring some overtime by budget consolidations. As of the end of November, the schedule was restored, and it is expected to complete the budget by December 9, as requested by the Commission.

Progress on the General Manager's Data Book was very good. Work is on schedule and will be completed late in December.

Measurements

All efforts were devoted toward completion of the annual report of HAPO Measurement activities due to the General Manager the first week in January. Progress is good with first review of draft reports scheduled early in December.

CONTRACT COST SECTION
MONTHLY REPORT - NOVEMBER 1955

Considerable time was spent by all cost units in preparation of material for 1955 Business Reviews presently being conducted by the various sections and departments throughout HAPO.

Detailed budgets were completed during the month and submitted to Budget Consolidations. Every attempt was made to limit the amount of detail incorporated in this Midyear Review in an effort to keep overtime to an absolute minimum. Project budget was completed and submitted to GE management early in December for final approval prior to transmission to AEC.

As a result of discussions of the Finance Division, HOO-AEC, regarding monthly closing dates, a complete investigation was made of source information and reports required, with the result that despite machine accounting delays a previously agreed upon schedule was made. In addition, the Accountant, General Cost, was instrumental in preparing a standard form of report for use by all cost units in reporting plant and equipment changes to Plant Accounts. This move is expected to enable the latter group to meet deadline dates on their portion of the closing schedule.

Employee and Public Relations Cost Unit

The Supervisor of Plant Activities Cost and the Accountant - Employee and Public Relations Cost assisted in the preparation and presentation of business reviews covering five of the sections in the Employee and Public Relations Department held on November 16, 1955.

The Supervisor - Community Cost attended the State Meeting of the Municipal Finance Officers Association held in Wenatchee on November 18. While in Wenatchee he spent some time with the City Clerk examining records maintained by the municipality. The meeting was very informative, and it was learned that many cities, including Wenatchee, use a single entry bookkeeping system. As a result of the contact with the Wenatchee City Clerk, we were able to obtain samples of all forms used by them for accounting purposes.

Necessary documents to effect a room rate increase have been prepared by hospital administration and are being submitted to the Commission for approval. An increase of two dollars per day in all room rates has been recommended in order to bring Kadlec rates in line with those charged by other hospitals in the area which have recently been increased. It is estimated that this rate increase will produce approximately $20,000 in additional revenue during the remainder of FY 1956.

The adult patient day census at the hospital during November was extremely low (49.2) and a budget overrun of $8,000 was experienced. Budget figures referred to are those developed by the Midyear Budget Review. This more than offset the accumulated budget underrun reported last month, and on a year-to-date basis costs are $7,000 in excess of the budget. The unusually low census in November is at least

partially attributable to the change in insurance plan which apparently resulted in the deferment of certain elective surgery and treatment. The census in December, to date, shows a tendency to return to the level anticipated by the budget and the bogey through June calls for performance within budget. However, it is possible that the room rate increase referred to above may be necessary if we are to complete the year within budgeted limits.

Engineering Cost Unit

Over the week-end of November 6 the Engineering Cost Unit was re-located in Building 760. The Unit now occupies Rooms 501 - 511 and 502 - 518 in that building.

The Obligation of Funds Report at October 31, 1955 was issued during November. During the first four months of FY 1956, General Electric cash expenditures for Plant and Equipment projects are estimated at $6,454,000 for FY 1955 and prior year projects; and $251,000 for FY 1956 projects. The unexpended balance of General Electric obligations at October 31, 1955 are estimated at $34,693,000 for FY 1955 and prior year projects. Work is currently being done on a Contract Modification to revise the Obligation of Funds for Plant and Equipment Projects, based on the latest information developed in the Midyear Budget Review.

Issue of detail project reports was materially delayed due to lost time resulting from the move from 703 Building to 760 Building and the two holidays.

A letter reflecting the latest available information on the FY 1957 Plant and Equipment Projects, after review by the Bureau of the Budget, has been transmitted to Department Managers. The following summary reflects the overall reduction in the number of original projects and dollar volume by the AEC reviewing agencies and the Bureau of the Budget:

(Dollar Amounts in Thousands)	Submitted By G.E.	Approved By HOO-AEC	Approved By Wash.AEC	Approved By Bur. of Budget
9200 - Nuclear Materials Construction				
Number of line item projects - 22	$55,844			
17		$46,000		
7			$27,000	
6				$25,000
9700 - Community Construction				
Number of line item projects - 3	$ 975			
4		$ 1,090		
2			$ 270	
1				$ 220

Effective with cost for week ending November 13, 1955, Project Cost discontinued the hand posted ledgers for accumulating cost and commitments pertaining to work orders issued to plant forces. The weekly IBM cost-to-date run, augmented by a temporary card file, is being utilized as the plant forces work order ledger. It is expected that eventually the card file can be discontinued.

Physical inventories of Minor Construction Stores captions - Janitorial Supplies, Paint Supplies and Returnable Containers were conducted November 28, 29 and 30. Reconciliations are in process. When these reconciliations are completed all physical inventories of Minor Construction Stores scheduled for calendar year 1955 will be complete. Reconciliations for Heavy Equipment Parts, Metal Bars, Shapes and Plates and Small Tools Parts inventories on October 31, 1955 have been completed.

Minor Construction has received 170 pieces of major equipment from other AEC installations for the upgrading program. 20 pieces of the equipment have been transferred to Operations, 149 pieces have been assigned to Minor Construction, one water truck has not been assigned to date. Of the 149 pieces assigned to Minor Construction 130 pieces have been placed in service and 19 pieces are undergoing minor repair. Minor Construction has moved 111 pieces of old equipment to the Sales Yard and 34 pieces are receiving minor repair or awaiting favorable weather condition for Radiological Sciences clearance. The AEC is planning to conduct the sale of this equipment during January.

General and Consolidations Cost Unit

A meeting was held with personnel of Procedures and Computing, Stores, Cost and Inventory Accounting to determine the responsibility of making corrections on the weekly store order runs. It was determined that any corrections on orders that affect quantities or unit costs will be made by Stores, and corrections on cost distribution will be made by the appropriate cost unit.

A meeting was also held with interested members of the Procedures and Computing Section in the attempt to move up closing dates for November cost reporting. Inasmuch as the AEC had requested earlier closing dates and two working days were charged to holiday time off, it was necessary to request additional overtime to complete the cost closing schedule.

Manufacturing Cost Unit

The budget for the Manufacturing Department was completed during the month and submitted to Budgets and Measurements. The budget was based on the monthly forecast which covered the last eight months of the fiscal year. This eliminated much of the detail normally required for budget preparation and reduced overtime considerably, but will limit the amount of information shown on monthly operating reports.

Arrangements were made with the Electrical Utility Section to obtain an improved distribution of plant electricity charges based on contract demand. This will apply during the period in which billing demand exceeds actual demand. The revised distribution incorporates a combination of monthly kilowatt hour consumption by individual areas, plus additional electricity provided in the contract for specific areas which is not consumed but must be paid for if plant consumption remains below contract level.

The Financial Representative for the Reactor Section presented a talk on product cost accounting at HAPO in the cost meeting held November 21, 1955. This was part

of a program to add interest and include more of a variety of cost topics in the monthly section cost meetings.

Detailed information on certain incremental costs incurred as a result of a production test rupture and associated contamination at 100-H were obtained and arrangements made to transfer this expense out of Manufacturing Cost.

Two interviews were held as a part of the training and development of exempt personnel in Metal Preparations Section. Each employee added to the exempt roll receives copies of accounting guides and procedures which are reviewed and discussed with the Area Representative. Many of the common errors made in processing work orders, stores tickets, purchase requisitions and time cards will thus be eliminated.

A revised price list for the second quarter of FY 1956 was prepared for essential materials. Adjustments were made to bring current billing prices in line with prevailing market. Coal prices were adjusted to compensate for tentative changes in contract price due to pay increases granted miners. A revised list of essential material codes was also issued. This was done in order to bring up to date and summarize all additions and eliminations from the previous revision dated March 22, 19

The physical inventory of operations material was witnessed in Separations Area during the month. Consideration will be given in the near future to disposing certain material which is not expected to be used.

On November 30, 1955 the Financial Analyst for the Reactor Section witnessed the taking of the monthly physical inventory of operations essential material at 100-H Area. A report is being prepared on this activity.

Transportation liquidation rates were reviewed in order to avoid any major over or underliquidations for the Section at year-end. Consideration was given to estimated expenses for the remainder of the year as included in the Midyear Budget Review. Area bus rates have been reduced an average of 4.1% to more closely approximate operating expenses. Other revisions will be made in December.

Discussions were held with personnel of the AEC regarding the present method of billing for Army railroad car movements. It has been mutually agreed that even though the current charge of $35.00 per car is slightly higher than actual, no adjustment in the rate will be made during the fiscal year. However, at year-end an adjustment will be made with the AEC.

The format for presenting Purchasing and Stores information at the monthly cost meeting with W. K. MacCready has been discussed with Section personnel to insure early submission and uniformity with information prepared by Manufacturing Cost personnel. Effective with November business, the summary prepared by Manufacturing Cost and the monthly analysis letter will be used to prepare a summary for use in the meeting.

A meeting was held with Purex personnel to determine the codes, both account and expense, which will be needed to accumulate the desired costs after Purex completed operation. These codes were set up and are now in use.

Assistance is being given to the new Measurements Program for the Metal Preparations Section which is being expanded to cover all measurable areas.

GENERAL ACCOUNTING SECTION
MONTHLY REPORT--NOVEMBER, 1955

ACCOUNTS PAYABLE UNIT

Volume of work processed in Accounts Payable during the month remained at an average level, 4,294 vouchers amounting to $3,093,938 being recorded.

Cash discount earned during the month amounted to $8,502, and total discount earned fiscal year-to-date amounts to $39,672.

Active contracts handled by Accounts Payable, excluding requirements contracts, numbered 42 and commitments at the end of November amounted to $865,629. Payments on these contracts in November amounted to $77,783.

Requirements contract purchase orders placed during November numbered 11 in the amount of $549,690, and commitments at the month's end amounted to $1,024,912.

Payments under requirements contracts for the month were $473,487.54.

Following are statistics pertaining to Accounts Payable:

Accounts Payable:

	November	October
Balance at beginning of month	$ 704 121	$ 827 108
Vouchers entered	3 093 938	3 798 761
Cash receipts	952	424
	3 799 011	4 626 293
Less: Vouchers Paid	3 298 228	3 922 172
Balance at end of month	$ 500 783	$ 704 121
Number of vouchers recorded	4 294	4 406
Number of checks issued	2 569	2 635
Number of freight bills paid	1 350	1 687
Amount of freight bills paid	$268 904	$311 200
Number of purchase orders received	2 135	1 950
Amount of purchase orders received	$1 520 109	$2 598 104
Amount of cash discount earned	$8 502	$7 723

ACCOUNTS RECEIVABLE UNIT

The gross accounts receivable balance at November 30, 1955 amounted to $317,420, an increase of $3,403 over the balance at October 31, 1955. This increase results primarily from an increase in AEC Cost-type Contractors and Kadlec Hospital accounts. Balances in other accounts reflected decreases.

ACCOUNTS RECEIVABLE UNIT (Continued)

The balance in the Kadlec Hospital account reflects an increase of $1,251 resulting from decreased collections. Billing to University of California Radiation Laboratory amounting to $30,331 and Knolls Atomic Power Laboratory for $8,252 accounts for the increase of $12,292 in the Cost-type Contractor account.

In connection with the delinquent American Legion account of $4,690, assignments and related schedules were prepared and forwarded to the Atomic Energy Commission on November 9, 1955. All claims submitted by creditors under the Legion's reorganization proceedings were reviewed on November 21, 1955 at Yakima, Washington. The next hearing is scheduled for December 6, 1955.

Eviction notices were delivered to 21 house tenants and 11 dormitory tenants for non-payment of October rent on November 9, 1955. Except for two dormitory tenants who vacated premises, rent payments or satisfactory arrangements for future payments were received by November 15, the date specified in the eviction notice. The number of notices served in November shows a decrease of 15 when compared to October, when 47 notices were served.

Preliminary planning was commenced on the installation of a voucher system for recording financial activity in Accounts Receivable. By utilizing a voucher system, the number of Journal Entry Vouchers prepared each month will be greatly reduced. It is anticipated the voucher system will be placed into operation January 1, 1956.

In an effort to reduce the problems arising in effecting collection of amounts representing personal telephone calls placed from official telephones, a procedure has been established whereby the assistance of supervision will be requested. Under our present procedure, letters are addressed to the individual placing the call, but delivery of such letters has proved impractical. By requesting the assistance of supervision, it is felt collection efforts will be greatly improved.

Statistics pertaining to accounts receivable are summarized on the following page.

ACCOUNTS RECEIVABLE UNIT (Continued)

Account	Balance 10-31-55	Net Charges	Collec-tions	Balance 11-30-55	Active Accounts
Kadlec Hospital:					
Active	$ 94 805	$ 48 896	$ 48 307	$ 95 394	1 521
Collection Agencies (85 accounts)	7 415	722	60	8 077	
Electricity	31 112	67 371	69 855	28 628	3 846
Telephone	36 279	56 284	59 028	33 535	6 633
Sundry:					
Active	40 477	23 255	27 665	36 067	302
Collection Agencies (133 accounts-a)	6 668	830	753	6 745	
AEC Cost-type Contractors	32 975	40 757	28 465	45 267	24
Rents	42 647	380 804	380 640	42 811	6 864
Equipment Sales to Facilities (1 account)	19 893		349	19 544	
Safety Shoes	1 435	2 350	2 723	1 062	246
Loans to Employees (2 accounts)	311		21	290	
Sub-Total	314 017	$621 269	$617 866	317 420	19 436
Reserve for Bad Debts	(36 439)			(34 122)	
General Ledger Balance	$277 578			$283 298	

(a- Includes all utility and rental accounts.

ADMINISTRATIVE PLANNING

A total of 30 new or revised Organization and Policy Guides were distributed during November. Of these, six were Instruction or Policy guides; 24 were Organization guides. In addition, eight OPGs were in the process of duplication or distribution at the end of the month The six Instruction guides are as follows:

04.5 "Property Management"
This Policy guide was rewritten to add provisions prohibiting use of government property for personal business, or loan of government property without HOO-AEC approval.

05.3.4 "Authorization for Performance of Work and Procurement of Material and Equipment from Off-Site AEC Cost-Type Contractors"
This Policy guide was rewritten to revise the procedure through which these services are obtained. Whereas formerly HOO-AEC made arrangements for such work with the corresponding AEC office, now under this policy HAPO may make necessary arrangements directly with the AEC contractor involved.

15.28 "Foreign Travel"
This Instruction was revised to up-date nomenclature, to require additional information on the Notice of Foreign Travel and to include Hawaii, Alaska, Bermuda and the West Indies, in addition to Mexico and Canada, as areas excluded from the scope of this Instruction.

16.1 "Use and Control of Motor Vehicles"
This Instruction was rewritten to remove the prohibition against the use of private vehicles for official business on the plant, and to prohibit the use of government vehicles for regular travel between the outer areas and Richland.

16.6 "Use of Private Automobiles on Official Business"
This Instruction was revised to increase the rate of reimbursement to 8 cents per mile, to provide for the use of private cars on official business on the project, and to revise the requirements dealing with liability insurance coverage.

18.14.6 "Reactivation of Employees"
This Instruction was revised to clarify the responsibility of a department to return a reactivated employee to his former assignment or one of equal responsibility and salary. In addition, the employee selected for relief should be informed that it may be necessary for him to return to his former assignment or be transferred to one of equal responsibility and salary upon the return of the deactivated employee and this understanding must be documented.

A Summary of Organization and Policy Guides issued during October was sent to all section and department managers. The Manager - Reactor requested additional copies of this summary for distribution to sub-section managers each month.

A total of 611 extra copies of OPGs were distributed.

Two Office Letters were processed: No. 214, Thanksgiving Day Holiday and Friday After Thanksgiving Day; and No. 215, Appointment of HAPO Top Secret Document Custodian.

The following Organization and Policy Guides are currently being reviewed or revised:

04.1.1 "Performance of Project Work"
04.1.3 "Research and Development"
04.6 "Capital Plant and Equipment Accountability and Control"
04.7 "Issue and Control of Protective Clothing and Equipment"
04.9 "Radiation Monitoring Instruments"
06.6 "Approvals Required for Work Incidental to or Related to That Authorized by the Prime Contract"

ADMINISTRATIVE PLANNING (Continued)

13.1	"Vacation Plan"
13.15	"Disciplinary Action"
14.1	"Plant Area Evacuation"
14.2	"Hanford District Civil Defense"
18.2	"Absences and Tardiness"
18.5	"Holidays"
20.1	"Approval of News Releases, Magazine Articles, Speeches and Publications"
21.8	"Shipping, Receiving and Acceptance Procedures"

The following new Organization and Policy Guides are being circulated for review and approval:

"Issue and Control of Hand Tools"
"Reporting of Accidents to HOO-AEC"
"Notice of Labor Disputes"
"Collective Bargaining Agreements and Working Arrangements"

CONTRACT REIMBURSEMENTS

The Contract Reimbursements group has substantially concluded its schedule of information meetings on the provisions of the proposed prime contract for key personnel throughout the plant. All departments had been covered except for two sections of the Engineering Department and two in the Financial Department. About 500 employees have attended these meetings to date. The meetings required a considerable part of the group's time in November, not only in preparing for and conducting them, but in reviewing questions raised during the sessions.

The Commission's approval for reimbursement of expenditures was requested and obtained for the following:

Employment of a number of college students and professors for the summer of 1956, as has been done in past years.
Attendance of HAPO employee at a one-week advanced financial training seminar sponsored by General Electric.
Attendance of HAPO employee at a one-week course on cathodic protection sponsored by the National Association of Corrosion Engineers.

The October "Summary of Disbursements" transmitted to the Commission through the Director of its Finance Division, showed net expenditures of $6,814,598, summarized as follows:

Payrolls and payroll deductions disbursed	$4 291 973
Materials (including orders placed on requirements contracts) and freight	2 477 855
Subcontracts and agreements	89 519
Advances for traveling and living expense	88 211
Miscellaneous	324 356
Gross Disbursements	7 271 914
Less: Revenue	457 316
Net Disbursements	$6 814 598

CONTRACT REIMBURSEMENTS (Continued)

In addition to drafting five letters to the Commission on reimbursement matters, the Contract Reimbursements group handled 10 inquiries on reimbursement problems, including three originating outside the Financial Department.

Charges from HAPO against the overhead allowance in November were $7,072, consisting of:

Nonreimbursable transfer expense	$4 166
Travel and living expense variation	1 249
Conference expense (entertainment)	1 467
Advertising in "Signs of the Pioneers" edition of the Columbia Basin News	87
Nonreimbursable interview expense	78
Expense in connection with Tri-City Army Advisory Committee	20
Expenses for Company-owned automobile	5
	$7 072

GENERAL BOOKS UNIT

Considerable time was spent during the month in determining operating funds required for the first six months of calendar year 1956 and funds required for plant and equipment as included in the FY-1956 Financial Plan. When these amounts have been finally determined, a modification to the prime contract will be executed. The modification obligating these funds is expected to be ready for execution during the latter part of December, 1955.

A proposal by the Department of Labor and Industries was reviewed this month in which they recommend that HAPO accept a fair share of the administration costs of the Department of Labor and Industries in connection with Workmen's Compensation claims on the basis of checks issued for HAPO compensation claims to total checks issued by the State for all compensation claims. They also recommend that appeal costs incurred by the State Department of Labor and Industries be assessed to HAPO on the basis of HAPO appeal cases to total appeal cases. If the State's proposal is accepted by HAPO and the Commission, it will result in an increase in Workmen's Compensation costs of approximately $22,000 per year. Currently we are being billed administrative costs from the State on the basis of direct salaries paid to employees working on HAPO claims and office supplies, which amounts to approximately $8,000 per year. A study is currently being conducted by General Books, Legal, Suggestion System and Workmen's Compensation, and the Commission of the State's proposal, and recommendations are being formulated.

During the month, General Books reviewed work procedures of the Commission in relation to the sale of surplus, salvage and scrap and have held meetings with them preliminary to the transfer of this work to HAPO in order that adequate control procedures may be established over cash and the booking of transactions in connection with this work.

GENERAL BOOKS UNIT (Continued)

The General Ledger Chart of Accounts was revised during the month and will be issued the fore part of December. The revised chart of accounts includes all the additions and deletions and changes in titles of accounts that have taken place since February 1, 1955, the date of issuance of the last chart of accounts. Work progressed during the month on the preparation of a General Ledger Account Manual.

During November, 311 travel, living and conference expense reports were processed, representing an expenditure of $77,120 as compared to 238 reports in October for a total of $65,143. These may be classified as follows:

	November	October
Travel and Living Expenses		
HAPO Business	$66 735	$56 902
Billed to Others	8 817	7 456
Interview Expense Not Reimbursable	77	-0-
Conference Expense	1 467	785
Other	20	-0-
Cost of Company-owned Cars	4	-0-
	$77 120	$65 143

	November	October
Advances from AEC		
Balance at beginning of month	$1 910 221	$1 924 820
Advances received from AEC	7 300 000	6 800 000
Other cash receipts	357 165	457 316
	9 567 386	9 182 136
Less disbursements	6 746 649	7 271 915
Balance at end of month	$2 820 737	$1 910 221
Advances requested for subsequent month	$7 200 000	$7 000 000
Travel and Living Expenses		
Travel Advances to employees		
Balance at beginning of month	$ 93 501	$ 81 308
Advanced to employees	70 992	88 217
	164 493	169 525
Less:		
Travel, living, and conference expenses reported by employees	77 120	65 495
Cash refunded by employees	10 041	10 529
	87 161	76 024
Balance at end of month	$ 77 332	$ 93 501
Outstanding Travel Advances to Employees		
Current	$ 62 360	$ 67 860
Outstanding over 30 days	14 972	25 641
Total	$ 77 332	$ 93 501
Number of expense reports submitted by employees	311	238

PERSONNEL ACCOUNTING SECTION
MONTHLY REPORT - NOVEMBER 1955

Reimbursement Authorizations No. 252 and No. 253 were issued by the Atomic Energy Commission covering the establishment of a nonexempt classification entitled "Gauge Worker" and authorizing revision of salaries, holiday observation, and jury duty payments for Community Firemen.

The general salary increase and the increases in shift differential, isolation pay and area allowance were paid to employees on a current basis during November. In addition, all retroactive payments for the increases were paid during the month.

The revised Insurance Plan which became effective November 1 bases benefits and contributions upon normal straight-time annual earnings. To avoid numerous adjustments because of changes in rates, the contribution deduction schedule has been changed from a monthly to a weekly basis for nonexempt employees. The change in the deduction schedule has the concurrence of the Union Relations Section.

To provide better internal control over payroll checks before delivery to employees, the responsibility for signing and distributing weekly salary checks has been transferred from the Weekly Payroll Unit to Payroll Reports Unit. This segregation of functions is in accordance with AEC and GE audit recommendations.

Weekly salary checks were delivered on Tuesday to swing shift employees and on Wednesday to other employees during Thanksgiving Week. The cooperation of supervisors who followed the instructions contained in Office Letter No. 214 relative to time card completion during the short work-week contributed materially to the early availability of checks.

The change in policy in filing Withholding Exemption Certificates (Form W-4) by employees and the circumstances which require the filing of a new certificate were explained in a letter to all supervisors dated November 23.

The base for future calculations of cost-of-living salary adjustments applicable to nonexempt employees is the September 1955, Bureau of Labor Statistics U. S. City Averages - All Items Consumer Price Index (1947-1949=100). The Index figure for September 1955, was 114.9. The AEC has agreed that this figure will be used as the base for calculating future cost-of-living adjustments.

The educational program about the revised Insurance Plan has resulted in 17 employees who had signed waivers under the old Plan becoming participants during the month of November.

Revised Pension Plan contribution rates were used in calculating employee contributions for the month of November. Refunds equaling 1% of gross earnings for the period from August 15 through October 31 were included in weekly salary checks delivered to nonexempt employees on November 18 and were paid by separate check to exempt employees on December 6.

Complete verification of nonexempt salary rates resulting from the general salary increase was made by Weekly Payroll Records and Wage Rates, only two errors, immediately adjusted, were disclosed.

STATISTICS

Personnel Accounting Section

Number of HAPO Employees Changes during month	Total	Monthly Payroll	Weekly Payroll
Employees on payroll at beginning of month	9 321	2 259	7 062
Additions and transfers in	95	9	86
Removals and transfers out	(63)	(15)	(48)
Transfers from weekly to monthly payroll		23	(23)
Transfers from monthly to weekly payroll		-	-
Employees on payroll at end of month	9 353	2 276	7 077

Overtime Payments During Month	November Number	November Amount	October Number	October Amount
Weekly Paid Employees	7 495	$171 707-a)	7 061	$165 140-b)
Monthly Paid Employees	463	43 576	440	35 966
Total	7 958	$215 283	7 501	$201 106

Gross Payroll Paid During Month	November	October
Engineering	$ 792 488	$ 768 525
Manufacturing	2 755 626	2 541 462
Other	1 211 217	1 133 090
Total	$4 759 331-a)	$4 443 077-b)

(a- Payments to weekly paid employees are for four week periods.
(b- Payments to weekly paid employees are for four week periods.

Employee Benefit Plans Participation in Benefit Plans at Month End	Number Participating November	Number Participating October	Percent Participation November	Percent Participation October
Pension Plan	8 246	8 182	98.6%	98.5%
Insurance Plan				
Personal coverage	9 432	9 386	99.6	99.5
Dependent coverage	6 705	6 601	-	-
U. S. Savings Bonds				
Stock Bonus Plan	5 000	4 978	53.5	53.4
Savings Plan	1 051	1 050	11.2	11.3
Both Plans	5 483	5 460	58.6	58.6

Pension Plan	November	October
Number retired	2	6
Number who became eligible for participation	108	126
Number who applied for participation	106	106
Number who elected not to participate	2	20
Replies not received	-	-
Insurance Plan - Number of Claim Payments		
Employee Life Insurance	4	2
Employee accident and health insurance	513	427
Dependent accident and health insurance	480	408
Total	997	837
Good Neighbor Fund		
Number participating	6 567	6 570
Percent of participation	70.2%	70.5%
Suggestion Awards		
Number of awards	57	4
Total amount of awards	$1 445	$1 270
Preferential Rates		
Number (eliminated) or added	(1)	1
Number currently in effect	535	536
Number of Military Allowance Payments	1	3

PROCEDURES AND COMPUTING SECTION
MONTHLY REPORT - NOVEMBER 1955

GENERAL

An extensive calculation of the physical properties of a new slug design was carried out this month. Some 20 cases of different cell geometries and properties were computed on the 702. The work was done to assist engineers in the Process Engineering Sub-section in the evaluation of the new design for the issuance of a special report. This work was given high priority to make the results available on schedule.

Key punch machines and operators moved into a portion of the machine room. This move was made to make room for Auditing in the 713 Building. Special key punching of inventory of stoves and refrigerators and of earnings history of plumbers and pipe fitters was performed for the AEC during October. Motorized equipment (vehicle) reporting was converted to the 702 machine and reports to customers were made on schedule.

During November wage increases and retroactive pay for all non-exempt personnel were calculated and paid. This has been the most complicated wage increase yet handled on a mechanical system at HAPO. Retroactive accrual for salary was made weekly during October.

The microfilm contract is being modified to include additional records that were not anticipated when the contract was originally negotiated.

The first phase of conversion of inventory control from manual records to the 702 is now being processed by machine, beginning with Store Orders issued during the month of November. Weekly Stores runs have been prepared by machine for each week during the month, eliminating the posting of each store order to the Cardex and making it necessary to post only one entry per week per stock number.

PROCEDURAL ANALYSIS

Forms Control reviewed 471 orders during November covering 1,434,585 forms; 21 orders, amounting to 85,550 forms, were rejected; 91 new forms designed; 14 forms were obsoleted.

Work requests were prepared and procedurized for the calculations, listings and card files required in connection with the application of new insurance and pension deductions for exempt employees and for the pension deduction refund.

A work request was initiated for the preparation of a detail listing of selected supervisors.

A work request was initiated for the preparation of test and conversion cards from Office Machines Master Files and October activity cards, for use in testing 702 programs and implementing conversion.

The entire back log of type 884 tapes has been processed and proof listings furnished to Property Accountability. A transmittal and log form has been designed to provide a means of recording the progress and operating details of Property Accountability data from the creation of tapes on the type 884 to the delivery of proof listings and the typing of corrections.

Work was continued on the conversion of the APV and SO punched card procedure to 702. Stores pass 1 was completed and the processing of store orders on the 702 was begun with the disbursements for the week ended November 2, 1955.

During the month preliminary investigation was started on phase II of the Stores Inventory Control problem, the objective being to bring together all the receipts and disbursement data necessary to establish balance on hand.

702 logic was developed and completed for the AEC Quarterly and Annual Vehicle procedure routines. Programming will be completed in December and January.

Exploratory work, consisting of logic and minor programming, has been started on salary distribution. It is anticipated that there will be three passes plus a sort each week, and an extra pass at month end.

Detailed logic work on the inventory pass was 75% completed during November. The entire procedure for conversion of Classified Files to EDPM stands at 70% completion at month's end.

The EAM work of matching yellow file charges against old receipts was completed during November. The unmatched charges are being reconciled by clerical forces of Classified Files. Upon conversion to 702 processing, the yellow file will be much simpler to process because of this preparatory step.

Procedural work for conversion of office machine reports to EDPM was completed in November. Testing and debugging of the procedure is now in process. The reports from 702 processing will be available in December on a routine basis.

Robert W. Dascenzo, hired as an Industrial Engineer, reported to work on November 7, 1955. He has reviewed the work initiated by W. F. Engesser during the summer months of 1955, and made a trip to Oregon State College, Corvallis, Oregon, to consult with Mr. Engesser about his past work as related to future planning.

RECORDS OPERATIONS

Quantity of records received, processed and stored:

Employee and Public Relations Department	45	Standard	Storage	Cartons
Engineering Department	51	"	"	"
Financial Department	93	"	"	"
Manufacturing Department	113	"	"	"
Radiological Sciences Department	6			
	308			

Records Retention and Disposal Schedule Number 220, "Reactor Process Records", consisting of twenty-six individual records and Records Retention and Disposal Schedule Number 221, "Manufacturing Maintenance Records", consisting of thirty-four individual records, was developed and submitted for internal approval. Records Retention and Disposal Schedule Number 219, "Reactor Projects and Personnel Development Records", consisting of thirty-two individual records, was submitted to the Atomic Energy Commission for approval.

Thirty-six reels of microfilm, consisting of 116,121 images, were completed during the month. A total of 204 reels, consisting of 840,262 images, have been completed by Recordak Corporation to date.

NUMERICAL ANALYSIS

Report is included in Secret Document HW-40182-W.

COMPUTING OPERATIONS

Retroactive pay was made this month to all non-exempt employees. This required a number of special 702 passes and some revision of the routine payroll passes. The wage increases were also paid this month to the union employees.

Because of the change in the calculation method for employee and dependent insurance, the prepayroll pass #2 (submitted deductions) was revised in order to prepare and process insurance deductions each week.

Due to the short week for the double Thanksgiving holiday, the payroll processing schedule was revised. To provide delivery of checks to Payroll Accounting by 9 a.m. on Tuesday, November 22nd, checks were actually ready at 4:30 a.m.

About 80 percent of the work order cost has been programmed. The passes are all concerned with the weekly and monthly reports. It is planned that during December, all weekly and monthly reports will be prepared on the 702.

The AEC requested that we accumulate all times worked for plumbers and pipe fitters on all construction jobs for 1952, 1953, 1954 and 1955. This included all four major sub-contractors. To date all time cards have been processed and converted to magnetic tape for Blaw-Knox and Kaiser. Data has been punched for J. A. Jones and Guy S. Atkinson Companies since time cards were not available for these two companies. Part of the Blaw-Knox data has been completely processed and the Kaiser processing is ready to start. This problem is scheduled for completion in December. The total card volume for this problem has been about a million cards to be converted to magnetic tape and then processed.

A total of fifteen miscellaneous problems have been worked on in the past month, not including those mentioned above. Some of these have been primarily mathematical computing, scientific data processing, and some have been small commercial applications.

There has been considerable increase in staff and for the first time recently, the programming unit is fully staffed. Also, two people from the Property Accounting Unit and the Contract Cost Section, are on loan for EDPM programming training.

The 702 has been operating fairly well during the month of November. By scheduling Procedural and Numerical Analysts to man the machine on swing shift on an overtime basis, over 80 hours each week have been made available for machine operation. This has accelerated the conversion programs and the processing of work considerably.

There have been several cases of obvious machine trouble caused directly by power failure. Momentary surges and the power supply to the machine can cause serious operating failures and generally complete loss of memory. There have also been

similar incidents which could not be easily traced to power failure, but seem to be caused by such a failure.

During the month of November the following non-routine assignments were completed for customers:

Employee and Public Relations	3
Engineering	15
Financial	15
Manufacturing	6
Radiological Sciences	4
	43

Service charges for the month amounted to $107,851.31. Services, by customer, were as follows:

Atomic Energy Commission	$ 8 273.99	08%
Employee and Public Relations	621.24	*
Engineering	16 247.00	15
Financial	73 209.57	68
Manufacturing	6 440.10	06
Operations Research	341.95	*
Radiological Sciences	2 717.46	03
	$107 851.31	100

*less than 1%

PROPERTY ACCOUNTING SECTION
MONTHLY REPORT - NOVEMBER 1955

PROPERTY ACCOUNTABILITY UNIT

All 100 Area accounts have been converted to the new functional coding system effective with November business. Preparation for this changeover has required considerable time and a complete review of the current records was necessary to properly code all units of property. A list of all buildings within the 100 Areas, which apply to production, was prepared indicating building number, name and use which is one of the primary factors in setting up and maintaining this type of a coding system. Some discrepancies will be noted for the first couple months of operation but all entries will be reviewed for proper coding of accounts. Ledger posting is progressing satisfactorily and new cards were prepared prior to changeover, therefore, no time has been lost.

Concurrent with the above changeover, all 100 Area records were changed eliminating pennies from records and dollar accounting applied. A "Penny Variance Account" was established in Unclassified Property to accumulate pennies eliminated from records. As a result of applying dollar accounting to the 100 Areas, balances in the Penny Variance Account amounted to $0.04 (credit) asset and $0.79 (debit) reserve. Records converted recorded the first cost of plant valued at $318,326,000 (asset) and $127,152,000 (reserve).

Conversion to the new Subsidiary Functional Coding System and application of Dollar Accounting required changes of approximately 5200 individual detail records.

Posting to detail records for October business has been completed and November activity is now being processed. This will run about the same each month until we can convert all the uninstalled records to IBM operation, or unless we obtain another posting clerk.

Our backlog of transfers, property disposal requests and excess declarations is currently about 45 days behind. This is an improvement over last month, however, gains were due, primarily, to a decrease in the number of documents received during the month. Lack of information or proper nomenclature on these documents has resulted in additional work during processing.

A report was submitted to Manufacturing Department on the first cost reserve and net book value on all facilities, by area, used and maintained by production personnel. Time expended in preparation of this information consumed about 35 hours.

AEC Property Section was furnished a report on retirements, off-site shipments of excess equipment and transfers between contractors for fiscal year 1955. This report contained type of equipment and method of disposition.

Meetings were held with AEC and Cost Unit for the purpose of discussing more expedient methods of preparing and submitting the monthly cost report on changes in Plant and Equipment to the Commission. A standard form was devised by AEC for preparation of the report which was agreed upon by the cost units and which should eliminate time currently required in interpreting the various cost unit reports. Closing date is still the primary factor and unless this is changed to provide additional time for checking, it will be impossible to complete this report on schedule.

PROPERTY ACCOUNTABILITY UNIT (Continued)

Performance measurement data was compiled and submitted to Budgets and Measurements Section covering activities of the Property Accountability Unit for calendar year 1955. Of particular interest, was the amount of time spent for work which was not included in objectives or scheduled programs. Unscheduled activities represented an expenditure of 13% of total available manhours.

A meeting was held with Transportation Section to discuss the unusually large listing of unlocated heavy equipment as disclosed by the reconciliation of this category of equipment. It was agreed that personnel of the Transportation Section and Property Accountability Unit would continue to investigate these items to determine their disposition prior to their write-off. As a result of our investigation we have obtained additional information on six water pumps, one vacuum pump, and one bulldozer blade. The results of the Transportation Section's investigation of this missing equipment have not been obtained at this time.

Physical inventory of Spare Equipment was taken in conjunction with Spare Parts inventory during the last week of November. Five Property Accountability personnel were active in the inventory. Reconciliation activities were not started during the month.

CAPITALIZATION AND DEPRECIATION UNIT

Development of the measurement concept of investment per employee per megawatt of capability has continued into November. We have adjusted the data used on previous charts presented in draft form to reflect the decrease in the value of the dollar. It appears that the most meaningful way of charting this three-phase concept is to devise a method of assigning a weighted value to two of the three factors of employees, capability, and investment. It is possible that these values can be weighted in terms of dollars.

The Budgets and Measurements Section submitted a request for updating of a Completed Plant Study originally made for W. E. Bridges almost a year ago. This was completed on November 29. The required information is Gross Plant by Calendar Year (1947 through 1956), segregated by Production, Research, Community (including Medical), and General. Also requested was Total Net Plant for the same calendar years. Segregation by use status (In Service, etc.) was not requested.

During November the depreciation rates used in the report, Statement of Plant and Equipment - FY-1955, were analyzed. It was determined that certain inconsistencies were present in the report so we computed new individual and composite rates to be used in the revision of the report. A summary of the differences between the rates used in the 1954 report and the 1955 revised report has been completed and will be submitted when the revised report is issued.

Depreciation rates applicable under the functional account structure have been completed. These rates are based on previously approved unit rates and will be submitted for approval shortly.

CAPITALIZATION AND DEPRECIATION UNIT (Continued)

The Finance Division of the local AEC requested a complete reconciliation between the depreciation rates currently in use and those presented in the HOO Property Manual, dated June 20, 1950. This information was presented with supporting detail explaining deviations such as subsequent approvals for changes in rates.

Progress is continuing at a reasonable rate on the unitization of Project CG-558, Reactor Modification. It appears certain, however, that with existing personnel we will not meet the "In Service Dates" previously established as goals for completion of unitization of the various phases of this project. Project funds expended at November 30 were over $14,000,000. The total authorized funds for the project is $38,000,000. Total acquisition costs identified at November 30 was $3,100,000.

Unitization reports for Project CG-549, Activate Task I-RMA Line - 234-5 Building, in the amount of $475,727, and Project CG-496, Recuplex Installation - 234-5 Building, in the amount of $1,780,799 were completed in November.

A program was initiated during the month to familiarize the personnel who create source documents such as work orders, purchase orders, appropriation requests, and store orders with the capitalization requirement of this Unit. It has been requested that people in the field contact the Capitalization and Classification Sub-Unit to clarify what information is required. As these determinations are made, we are establishing a file for future reference as well as familiarizing personnel of this unit with the decisions reached. A meeting was held with Telephone and related cost personnel to discuss some of the problems arising in classification and capitalization of telephone charges. Further study will be necessary to establish units of property, the flow of information from the Telephone Sub-Section, and the control of documents initiated by them.

During the month, commodity coding was completed for Laboratory Equipment and Health Instruments (other than portable). The keys that have been prepared are the result of our efforts to obtain the proper nomenclatures and descriptions from people in the field and through the use of the catalogs we have at our disposal. Arrangements have been made to confer with qualified people during the first part of December to obtain their concurrence and assistance in these classifications. As a direct result of the reassignment to Z. B. Rose and the recently acquired assistance of J. H. Hummel, work in Commodity Code Classification and Standardization of Nomenclatures has been stimulated and the results have been most satisfactory. Police equipment and photographic equipment were classified and coded during the month of November. Police equipment is currently being typed on the 884 typewriter.

We are reviewing our cataloged equipment records in order to arrive at a conclusive listing for the Commodity Code and Uninstalled Plant Record Unit Catalog. Items have been cross referenced where necessary to facilitate identification and location. The analysis of our cataloged records was started November 18 after the list had been completed as far as possible using our present Plant Record Unit Catalog, Vendors' Catalogs, and other pertinent listings. The records of Uncataloged Equipment will also be screened for pertinent information.

INVENTORY ACCOUNTING UNIT

The annual physical inventory of spare parts, spare equipment and standby material in the custody of Stores Sub-Section, Manufacturing Department, was taken on November 28, 29 and 30, 1955. The physical count of standby was postponed until early December since this material is stored in open storage yards and adverse weather conditions made it impractical to inventory. Materials inventoried are physically located in warehouses and storage lots in the 100 B, 200 E and 1100 Areas.

The annual physical inventory of telephone materials on service trucks in the custody of Telephone Sub-Section was conducted on November 1 and 2, 1955. Materials inventoried are stored on eighteen service trucks located at the BY Telephone Exchange and the 744 Building. The reconciliation of physical to book value is in progress and a report covering results will be issued upon completion.

Maintenance materials on service trucks in the custody of the Administrative Area Maintenance Sub-Section was physically inventoried on November 8 and 9, 1955. Materials are stored on eight service trucks located at the 716 Building. The reconciliation of physical to book value is in progress and report covering results will be issued upon completion.

Preliminary preparations for taking the physical inventory of motor vehicle and heavy mobile equipment parts in the custody of Stores Sub-Section and the inventory of road materials in the custody of Community and Transportation Sections scheduled in December, 1955 have been made. Several pre-inventory meetings were held with custodial personnel and agreement has been reached on specific dates and procedures to be followed.

Considerable time was spent during the month in the development of measurements applicable to this Unit and in the consolidation of data in connection with the Financial Department business review.

A special study was performed in November in reference to materials being declared excess at HAPO. This review was made to determine reasons for past and contemplated future activity in the excess program.

Final documents covering the transfer of material and equipment from Kaiser Engineers and Blaw-Knox to GE custody were processed during November.

Stores Sub-Section personnel have begun preparation of the graphite for the inventory of this material scheduled in December 1955.

PROPERTY MANAGEMENT UNIT

During the week of November 13, Property Management offices were relocated with the Analysts being moved to rooms 610 and 614, Building 760 and the Unit Supervision to room 2101, Building 703.

Requests of the Commission for assistance in their property management appraisal now in progress were handled and required a number of field trips to inspect the location and use of capital plant and equipment, especially shop and machine tools.

PROPERTY MANAGEMENT UNIT (Continued)

Results of the plant wide property management evaluation have been very gratifying and most operating areas are continuing to review holdings of property and dispose of items not having a foreseeable need. Increased interest of field supervision is also noted in encouraging adequate controls on equipment which is to be retained. Meetings between field supervision and property analysts have been scheduled to aid in the property management education of field forces.

Twenty-six appropriation requests totaling $82,107 were investigated and processed during the month. The Pile Technology Section withdrew a request for $37,000 when the availability of other equipment was brought to their attention. The Biophysics Section withdrew a request for $2400 when two baloon sounding theodilites, not in use, were located in another activity and transferred to meet their requirements. A precision level was located and transferred to the Special Irradiations Unit for pile graphite measurements to replace an unsatisfactory instrument. Three items of shop equipment (a milling machine, band saw and lathe) were located and arrangements made for their transfer to meet the needs of the Hot Graphite Shop.

One hundred thirty-four requests for the disposal of property were investigated and processed during the month. Some of the items disposed of were:

All used equipment and supplies stored in the warehouse portion of the old M-6 warehouse at 100 F were reviewed and disposal instructions issued prior to the clean-up and removal of this material to facilitate disposal of this warehouse. Razing of the building will improve the general appearance of the 100 F Area.

Arrangements were made with the Separations Technology Section in the 300 Area to use a portion of the drums received at the 100 B Area containing dichromate. Dichromate handling procedures require cutting the tops out of the drums to gain access to the material thus rendering the drums useless. The Separations Technology Section had previously purchased drums and removed the tops for their purpose. Transfer of the 100 Area drums at no cost will save the Separations Technology Section approximately $40 per month. The remainder of the 100 Area drums will continue to be sold as scrap.

Assistance was given to the Minor Construction Section relating to their procedures for disposal of salvage and scrap. Previously scrap and salvage generated at the construction sites had been moved to White Bluffs for disposal and this had resulted in abnormal accumulations. Such salvage and scrap is now being delivered directly to the North Richland Stores Yard for disposal.

Disposal instructions were issued on two tract houses. These houses are being removed to clear the areas where they are located for other zoning purposes.

The Gantry crane, trackage and miscellaneous buildings associated with this equipment for the fabrication of cell blocks for Purex were inspected and disposal instructions issued to sell in place. This equipment was specially engineered for Purex and is not adaptable for general purpose use.

Disposal instructions were issued covering many of the obsolete spare parts and equipment items being held in inventory for 234-5 task lines. Included were spare hoods and other high book value stainless steel items which were designed especially for this work and have no other application.

APPROPRIATIONS UNIT

The fol ing Plant and Equipment projects were processed ough the Appropriations Unit during November. G nd AEC approval action was as indicated below

Project Number	Title	Amount of This Request	Total*	Date to AEC	Disposition
CG-554	Construction Progress Motion Picture Program	-	-	11- 4-55	Extension of completion date approved 11-23-55
CG-613 Rev. 3	Hanford 4X Program - Metal Conversion Plant	$1,000,000	4,000,000	10-25-55	Issuance of directive pending receipt of revised proposal for CG-603
CA-615	Mechanical Maintenance Shop Centralization - 100 Areas	92,000	92,000	7-18-55	Pending AEC-Washington approval
CG-621 Rev. 2	Redox Contamination Control Facilities	215,000	765,000	10-19-55	HW-351, Mod. 4, dated 11-10-55, auth. GE $765,000
CA-639	Painting the 100-DR Water Plant Structures	75,000	75,000	9-23-55	AEC-67, dated 10-13-55, auth. AEC $75,000
CG-640	Noise Reduction Program - 300 Area	45,000	45,000	10-19-55	Deferred for further study
CG-642	Continuous Charge-Discharge Equipment - C Reactor	200,000	200,000	10-31-55	HW-368, dated 11-15-55, auth. GE $200,000
CG-643	Redox Capacity Increase, Phase III	111,500	211,500	11-17-55	HW-364, Mod. 2, dated 11-30-55, auth. GE $211,500
CG-644	Silica Gel Tail-End Treatment Facilities, Purex	60,000	60,000	11- 8-55	Approved by AEC Board 11-17-55
CG-647	Back-Up Radioiodine Removal Facilities, Purex	60,000	60,000	10-20-55	HW-366, dated 11-4-55, auth. GE $60,000
CG-648	Auxiliary Radioiodine Removal and Nitric Acid Recovery Facilities, Redox	60,000	60,000	10-20-55	HW-367 dated 11-23-55, auth. GE $60,000
CG-649	FY-1956 Water Tank Replacement	58,500	58,500	11-17-55	AEC Agenda 12-1-55
CA-650	Replacement, Repair and/or Removal of Valve Houses - 100-B, D, and F Areas	65,000	65,000	11-30-55	AEC Agenda 12-8-55
IR-171	Installation of Automatic Bar Screens at Sewage Lift Station	-	-	11-10-55	Approved 11-17-55
IR-199	Augmented Intercycle Concentration Series Operation, Secs. 8 and 6, 221-U Bldg.	14,700	14,700	11-16-55	Approved 11-17-55

*Total previous authorizations plus this request

SS ACCOUNTABILITY SECTION
MONTHLY REPORT - NOVEMBER, 1955

Summary

A formal reply to the HOO-AEC Survey #12 Part III was furnished to the A.E.C. on 11-15-55.

Material Underaccounted For (M.U.F.) values for October were investigated and the results published in Document HW-39859.

A measurements evaluation study of the SS Accountability problems associated with the Metal Fabrication Building processes have been completed and the results published in Document HW-39791.

Metal Preparation Area-SS Accountability Unit

Forms Standardization

The standard transfer form for use in SS material transfers from Production-Operations to Engineering Department and for internal transfers within Engineering has been received on site, distributed and is in use. It replaces over ten different forms and provides standardization of source data. Inadequate copy coverage has been eliminated by the pre-carbon form which employs the "Write It Once" principle.

Account Revision

Further review indicates the revised forms and new accounting procedure will be adequate for the revised process for the Metal Preparation Area as of December 1, 1955. This is a major revision having over-all account influence. The procedures are being reviewed on the basis of the "Engesser Plan" as outlined in the series of lectures given during the summer months. This review continues.

Reactor Area-SS Accountability Unit

Relations

In the interest of working cooperatively with Reactor Section personnel, an arrangement is being made whereby certain production data will be more readily available at month end to Reactor Area-SS Accountability Unit and, at the same time, the Reactor Section will have additional time in which to develop other data for inclusion in the monthly report prepared by Production and Scheduling personnel.

Standardization of Accounts

Plans have been made for contacting the various area operations superintendents and area clerks to assist them, where necessary, in adopting generally-accepted inventory accounting methods for taking and reporting physical inventories

Separations Area-SS Accountability Unit

Parallel Accounts

T Plant - Bismuth Phosphate double entry accounting system was tested as a parallel account and found to provide satisfactory control. This procedure assumes full responsibility for the November report. It replaces the "batch by batch" control which has been employeed since start-up.

Review Progress

Following the Review of Redox-SS Accountability Control as conducted by the SS Accounting Unit, the SS Separations Unit has been conducting negotiations with Redox-Manufacturing-Operations and Process. The objectives have been to gain acceptance of those recommendations having specific reference to the custodians' procedures. In addition, certain recommendations directed towards our own performance could not be adopted without revisions in the custodians' procedures. These negotiations have been concluded with virtual complete acceptance by the custodian and have been marked by the mutual cooperation of all parties.

Suspense Account Activity

A suspense item of quite some standing relates to the UNH trailer spill material which is now being subjected to recovery operations. Recently, further delays have been encountered due to adverse weather conditions. The method of recovery is by leaching which is expected to continue for some time. On the basis of present data it does not appear advisable to attempt estimates of the recovery expected.

SS Accounting Unit

A.E.C. Requests

We were in receipt of a request from the Washington, D. C. office of the Division for SS Materials requesting our recommendations for potential replacement of the terms "Material Unaccounted For" and for the word "Accountability". We have provided a response indicating our agreement that the terms are undesirable and have offered more suitable substitutes.

A formal reply to the HOO-AEC Survey #12, Part III was furnished to the USAEC-Hanford Operations Office as of 11-15-55. In general, there appears to be complete agreement between the A.E.C. and G.E. Exceptions are noted in a few cases in which the USAEC appears to place a higher priority on certain items, particularly those relating to regulation compliance. We are arranging conferences with the local A.E.C. Accountability office for purposes of reconciliation.

SS Accounting Unit - continued

Intra-Unit Functions

Integration functions between SS Accounting and SS Measurement Units were directed towards a tie-in of the T-Plant physical inventory procedures to the SS Accountability accounts.

Review Report

The final draft of the Isolation Bldg. - 231 Bldg., Review Report has been issued as Document HW-39866 as of 11-9-55.

Reconciliation Items

Preliminary results of the HOO-AEC Survey 12 Part IV inventory verification bring to light a number of cases where custodian physical inventories and report inventories do not agree. In future Surveys a copy of the physical inventory will be furnished to the Area SS Accountability Units for reconciliation purposes.

SS Measurements Unit

Investigation

Due to the fact that the October Material Underaccounted For accounts for plutonium and Depleted Uranium indicated "significant" variances, a complete review was conducted. The results are covered in Document HW-39859.

Measurements Review

As a Section function, we have been investigating the SS Accountability Control system for the Metal Fabrication Process. The accounting and audit procedures have been conducted by the SS Accounting Unit. In cooperation with these activities, the SS Measurement Unit has completed its review of the same process based exclusively on measurement considerations. The latter approach has been formulated in Document HW-39891.

Shipper-Receiver Variance

As a follow-up on the conference with Dow personnel on measurement problems of mutual interest, conferences were held with Z-Plant personnel. The objective being the formulation of an over-all HAPO contribution to the proposed joint review. A program has been formulated and Dow advised of our position.

T-Plant Calculations

We have encountered some difficulties with respect to the accounting for the Depleted Uranium and for the U-235 content of material in the "Head End" of the Bismuth Phosphate Process. This is essentially a

SS Measurements Unit - continued

T-Plant Calculations - cont'd.

calculation procedure based on measurements and relates to material prior to batching where the first analysis is made. A standard procedure has been adopted for control of this problem.

Sub-division of Material Balance Areas

The Redox process between measurement points H-7 and L-6 has been re-divided into two material balance areas. This will become effective as of November 1,1955. The objective is to provide improved measurement control for plutonium.

Pile Calculation Data Processing

Due to the fundamental differences between the original piles (B, D, F) and those of more recent design (K and KW) we have been investigating the potential influences on the existing calculation procedures. As the result of extensive analysis, it is now evident that we must include the source of the irradiated material for the determination of the appropriate factors.

Redox Measurements

In order to firm up the reliability of weight factors used at key measurement points we have advocated closer control on scale performance. This has been accepted by Redox-Operations who are now maintaining a PR scale control procedure. Since this is the major credit item to the Redox Process, it should be reflected in improved source data for our accounting control.

T. S. Custodian

As of November 23, 1955, we assumed responsibility for the functions of the G.E.-HAPO Top Secret Document Control. This represented a transfer of responsibility from Engineering to the Financial Department and was made for purposes of centralizing the T.S. document procedure.

Purex - Calibration Data

In anticipation of routine operations of Purex, we requested improved controls over the calibration data for tank capacity at all liquid levels, particularly, at the bottom or dished portion of the tank. Inaccuracies in heel determinations have been shown to present measurement inaccuracies in other processes. We received excellent cooperation from Manufacturing-Operations and have since had the data subjected to Statistical review. The results have been published in Document HW-39907 and uses a calibration curve fitted by the method of least squares to the

SS Measurements Unit - continued

Purex-Calibration Data

liquid level (in inches of water) versus the volume reading.

Parallel to "Cent's-Less Accounting"

Due to the huge number of individual pieces of Normal Uranium machined slugs received and subsequently processed, we place all slugs on a uniform factor weight and accumulate the normal variances in a factor weight difference account. Under uniform process control the factor weight determined for specified material conforming to rigid purity specifications as well as size control provides a standard weight with net accumulations in the Factor Weight Difference account representing a very small accumulation for the total throughput. The situation, however, has been complicated by constant revision in the process controls. It has therefore become necessary to maintain a continuous review of the Factor Weight. Our most recent review indicates that the Factor for Normal Uranium machined slugs received requires downward revision of 0.01 lb/slug. This is to be made as of December 1, 1955. No revision of cored slug factor weight appears warranted at the present time.

FINANCIAL DEPARTMENT PERSONNEL AND ORGANIZATION

NOVEMBER, 1955

	Current Month	Prior Month
Personnel Changes During Month		
Employees at beginning of month	493	487
Additions and transfers in	17	15
Removals and transfers out	(11)	(9)
Employees at end of month	499	493
Personnel by Unit at Month-End		
General	10	10
Auditing Section	16	16
Budgets and Measurements Section	15	15
Contract Cost Section		
General and Consolidations Cost Unit	11	12
Engineering Cost Unit		
General	3	3
Design Cost	9	9
Project Cost	21	20
Technical Cost	11	11
Employee and Public Relations Cost Unit		
General	2	2
Plant Activities Cost	10	10
Community Cost	4	5
Medical Cost	3	3
Manufacturing Cost		
General	2	2
Financial Representatives	13	12
Budgets and Control	18	18
Reports and Records	15	15
Analysis and Studies	4	4
	126	126
General Accounting Section		
Accounts Payable Unit	26	24
Accounts Receivable Unit	20	20
General Books Unit	16	17
Administrative Planning	3	3
Contract Reimbursements	6	6
	71	70

	Current Month	Prior Month
Personnel Accounting Section		
Payroll Planning and Analysis Unit	6	6
Weekly Payroll Unit	18	17
Monthly Payroll Unit	12	12
Benefit Plans Accounting Unit	13	13
Payroll Reports Unit	7	6
Weekly Payroll Records Unit	8	8
	64	62
Procedures and Computing Section		
Computing Operations Unit	24	22
Numerical Analysis Unit	9	9
Procedural Analysis Unit	15	15
Scheduling Unit	24	23
Records Unit	8	8
	80	77
Property Accounting Section		
Appropriations Unit	5	5
Inventory Accounting Unit	12	12
Plant Accounting Unit	28	28
Property Management Unit	4	4
Capitalization and Depreciation Unit	21	21
	70	70
SS Accountability Section		
Reactor Area - SS Accountability Unit	4	4
Separations Area - SS Accountability Unit	19	19
Metal Preparation Area - SS Accountability Unit	7	7
SS Accounting Unit	7	5
SS Measurements Unit	8	8
	45	43
Rotational Trainees	2	4
	499	493

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PROCEDURES AND COMPUTING SECTION
MONTHLY REPORT - NOVEMBER 1955

GENERAL

An extensive calculation of the physical properties of a new slug design was carried out this month. Some 20 cases of different cell geometries and properties were computed on the 702. The work was done to assist engineers in the Process Engineering Sub-section in the evaluation of the new design for the issuance of a special report. This work was given high priority to make the results available on schedule.

Key punch machines and operators moved into a portion of the machine room. This move was made to make room for Auditing in the 713 Building. Special key punching of inventory of stoves and refrigerators and of earnings history of plumbers and pipe fitters was performed for the AEC during October. Motorized equipment (vehicle) reporting was converted to the 702 machine and reports to customers were made on schedule.

During November wage increases and retroactive pay for all non-exempt personnel were calculated and paid. This has been the most complicated wage increase yet handled on a mechanical system at HAPO. Retroactive accrual for salary was made weekly during October.

The microfilm contract is being modified to include additional records that were not anticipated when the contract was originally negotiated.

The first phase of conversion of inventory control from manual records to the 702 is now being processed by machine, beginning with Store Orders issued during the month of November. Weekly Stores runs have been prepared by machine for each week during the month, eliminating the posting of each store order to the Cardex and making it necessary to post only one entry per week per stock number.

PROCEDURAL ANALYSIS

Forms Control reviewed 471 orders during November covering 1,434,585 forms; 21 orders, amounting to 85,550 forms, were rejected; 91 new forms designed; 14 forms were obsoleted.

Work requests were prepared and procedurized for the calculations, listings and card files required in connection with the application of new insurance and pension deductions for exempt employees and for the pension deduction refund.

A work request was initiated for the preparation of a detail listing of selected supervisors.

A work request was initiated for the preparation of test and conversion cards from Office Machines Master Files and October activity cards, for use in testing 702 programs and implementing conversion.

PROCEDURAL ANALYSIS (continued)

The entire back log of type 884 tapes has been processed and proof listings furnished to Property Accountability. A transmittal and log form has been designed to provide a means of recording the progress and operating details of Property Accountability data from the creation of tapes on the Type 884 to the delivery of proof listings and the typing of corrections.

Work was continued on the conversion of the APV and SO punched card procedure to 702. Stores pass 1 was completed and the processing of store orders on the 702 was begun with the disbursements for the week ended November 2, 1955.

During the month preliminary investigation was started on phase II of the Stores Inventory Control problem, the objective being to bring together all the receipts and disbursement data necessary to establish balance on hand.

702 logic was developed and completed for the AEC Quarterly and Annual Vehicle procedure routines. Programming will be completed in December and January.

Exploratory work, consisting of logic and minor programming, has been started on salary distribution. It is anticipated that there will be three passes plus a sort each week, and an extra pass at month end.

Detailed logic work on the inventory pass was 75% completed during November. The entire procedure for conversion of Classified Files to EDPM stands at 70% completion at month's end.

The EAM work of matching yellow file charges against old receipts was completed during November. The unmatched charges are being reconciled by clerical forces of Classified Files. Upon conversion to 702 processing, the yellow file will be much simpler to process because of this preparatory step.

Procedural work for conversion of office machine reports to EDPM was completed in November. Testing and debugging of the procedure is now in process. The reports from 702 processing will be available in December on a routine basis.

Robert W. Dascenzo, hired as an Industrial Engineer, reported to work on November 7, 1955. He has reviewed the work initiated by W. F. Engesser during the summer months of 1955, and made a trip to Oregon State College, Corvallis, Oregon, to consult with Mr. Engesser about his past work as related to future planning.

RECORDS OPERATIONS

Quantity of records received, processed and stored:

Employee and Public Relations Department	45	Standard	Storage	Cartons
Engineering Department	51	"	"	"
Financial Department	93	"	"	"
Manufacturing Department	113	"	"	"
Radiological Sciences Department	6	"	"	"
	308			

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RECORDS OPERATIONS (continued)

Records Retention and Disposal Schedule Number 220, "Reactor Process Records", consisting of twenty-six individual records and Records Retention and Disposal Schedule Number 221, " Manufacturing Maintenance Records", consisting of thirty-four individual records, was developed and submitted for internal approval. Records Retention and Disposal Schedule Number 219, "Reactor Projects and Personnel Development Records", consisting of thirty-two individual records, was submitted to the Atomic Energy Commission for approval.

Thirty-six reels of microfil, consisting of 116,121 images, were completed during the month. A total of 204 reels, consisting of 840,262 images have been completed by Recordak Corporation to date.

NUMERICAL ANALYSIS

Two sets of data from H-Reactor have been processed under the reactivity accounting program for the reactor physicists. Plans to extend this program to other reactors are being made. In particular, data from C-reactor will be processed when the appropriate flow data is made available on a routine basis. Several factors will complicate the extension; these include the fact that the number of special columns in a reactor is variable, and that some reactors have faulty thermocouples for monitoring tube temperature, thus necessitating the calculation of tube power from the surrounding tube powers.

The first 702 processing of TBI (trip-before-instability) limits was made in November. The procedure is being set up on a routine basis. Additional work was done on the conversion of the Power and Exposure study calculation. The converted system will be identical to the present one, except for the inclusion of a cumulative discharge report. Flow charts have been completed.

The Production Planning and Scheduling Unit of the Manufacturing Department has requested certain tube data from KE-reactor. These data include tube orifices, temperatures, factors, flows, and exposures, which are being routinely computed in connection with the KE experiment. The data will be made available in punched-card form as soon as tape 70 of the experiment has been processed.

Investigations into an integrated system of reactor data processing are continuing. A list of data processing requirements of the Production Planning and Scheduling Unit has been received. Efforts are presently being made to determine the optimum interval for recording raw pile data (temperature and pressure) to meet the varying demands of the groups involved.

Processing of meteorological data taken from a portable mast has been undertaken. Variables recorded include anemometer readings, thermocouple readings, vane readings, and temperature difference readings. The processing of this data consists of converting meter readings to physically meaningful quantities, and computing averages. Approximately 3000 readings per field test are expected. A portion of this program has been written and report issued.

Additional work was performed on the five-year weather study. Programming has been completed and checked on three of the five passes required to prepare the requested tables. One of these passes was generalized to allow for missing data on an input tape. Further work was done in preparing some 60,000 cards of raw data for card-to-tape conversion.

NUMERICAL ANALYSIS (continued)

The linear programming techniques used in connection with production scheduling project are being documented for distribution to interested parties. The symbolic programming has been brought up-to-date, and the program will be re-assembled to provide listings. A complete write-up of the problem has been prepared.

Machine processing of data from an attitude survey being conducted by the Manufacturing Department has been requested. EDPM procedures have been developed and the program written. A number of generalized techniques for treating any type of survey questionnaire have been developed, and will be used in future machine processing of attitude surveys.

Work has been resumed on the tabulation of collision density functions. Tables of limited extent were previously prepared on the card-programmed-calculator, but because of the cost of this method of processing, it was decided to wait for the 702 to complete the job. The over-all problem logic has been analyzed, and the problem broken into a number of parts. Programs for several of these parts have been written and tested.

Work is continuing on the solution of the three-dimensional pile control problem. The problem has been broken into four parts, two of which have been programmed. Because of the very large number of arithmetic operations to be executed, fixed decimal point arithmetic will be used throughout.

Additional cases of the internally and externally (I and E) cooled slug problem were run. A discrepancy in the problem formulation was noted and corrected.

A request was received to calculate the elastic and plastic stresses in an externally-cooled slug and an internally-cooled slug. The mathematical model assumes a slug temperature distribution which increases linearly with time, to simulate start-up conditions, and varies parabolically with radius. After a certain period of time, the temperature will be held constant (as in equilibrium operation), and the manner in which the stresses disappear studied. The differential equations defining the stresses and associated quantities will be solved by step-by-step integration methods. Each time step involves several numerical integrations over the radius. The programming of the externally-cooled case has been completed.

An extensive investigation of the effect of corrosion on all tubes in D-Reactor is being planned. Approximately one temperature map per month (120 to 140 maps in all) from the time of the original start-up are to be transcribed to magnetic tape and processed on the 702 for the purposes of accurately computing tube wall thickness of all tubes, including replaced tubes. At the same time, the doubling temperature, i.e., the temperature rise which doubles the corrosion rate, will be precisely determined from experimental data taken from slected tubes. This information will permit a much more precise formulation of corrosion rate than is presently possible, which in turn will effect savings of considerable magnitude. The processing of D-Reactor data is scheduled for completion in February 1956, and will be followed immediately by the same processing of F-Reactor data.

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NUMERICAL ANALYSIS (continued)

A scheme for transcribing pile tube temperature maps to punched-cards has been devised which permits a standard pile map to be punched in 138 cards instead of the usual 2004. The scheme may be used when transcribing either manually by key-punching or automatically by means of Flexowriter. This scheme is made feasible through the increased flexibility of the 702, and will prove valuable in transmitting data by means of automatic transmitters.

A number of significant changes have been made in the SCRIPT assembly routine. These include the re-definition of several sub-operations to allow easier coding, the incorporation of programmed index registers into the floating-point mode to simplify the coding of loops, and a feature to allow for the selective assembly of lengthy sub-routines, to alleviate the problem of exceeding 702 high speed memory. Test programs have been written to test these changes.

During the month of November, a seven-week training course in 702 coding was completed by all machine operators. In addition, training has been started on three new groups of personnel, which include three EDPM Programmers, a technical graduate, an industrial engineer, and two customer trainees. These groups have received basic instruction in the 702, and are presently working on various applications.

COMPUTING OPERATIONS

Retroactive pay was made this month to all non-exempt employees. This required a number of special 702 passes and some revision of the routine payroll passes. The wage increases were also paid this month to the union employees.

Because of the change in the calculation method for employee and dependent insurance, the prepayroll pass #2 (submitted deductions) was revised in order to prepare and process insurance deductions each week.

Due to the short week for the double Thanksgiving holiday, the payroll processing schedule was revised. To provide delivery of checks to Payroll Accounting by 9 a.m. on Tuesday, November 22nd, checks were actually ready at 4:30 a.m.

About 80 percent of the work order cost has been programmed. The passes are all concerned with the weekly and monthly reports. It is planned that during December, all weekly and monthly reports will be prepared on the 702.

The AEC requested that we accumulate all times worked for plumbers and pipe fitters on all construction jobs for 1952, 1953, 1954 and 1955. This included all four major sub-contractors. To date all time cards have been processed and converted to magnetic tape for Blaw-Knox and Kaiser. Data has been punched for J. A. Jones and Guy S. Atkinson Companies since time cards were not available for these two companies. Part of the Blaw-Knox data has been completely processed and the Kaiser processing is ready to start. This problem is scheduled for completion in December. The total card volume for this problem has been about a million cards to be converted to magnetic tape and then processed.

COMPUTING OPERATIONS (continued)

A total of fifteen miscellaneous problems have been worked on in the past month, not including those mentioned above. Some of these have been primarily mathematical computing, scientific data processing, and some have been small commercial applications.

There has been considerable increase in staff and for the first time recently, the programming unit is fully staffed. Also, two people from the Property Accounting Unit and the Contract Cost Section, are on loan for EDPM programming training.

The 702 has been operating fairly well during the month of November. By scheduling Procedural and Numerical Analysts to man the machine on swing shift on an overtime basis, over 80 hours each week have been made available for machine operation. This has accelerated the conversion programs and the processing of work considerably.

There have been several cases of obvious machine trouble caused directly by power failure. Momentary surges and the power supply to the machine can cause serious operating failures and generally complete loss of memory. There have also been similar incidents which could not be easily traced to power failure, but seem to be caused by such a failure.

During the month of November the following non-routine assignments were completed for customers:

Employee and Public Relations	3
Engineering	15
Financial	15
Manufacturing	6
Radiological Sciences	4
	43

Service charges for the month amounted to $107,851.31. Services, by customer, were as follows:

Atomic Energy Commission	8 273.99	08%
Employee and Public Relations	621.24	*
Engineering	16 247.00	15
Financial	73 209.57	68
Manufacturing	6 440.10	06
Operations Research	341.95	*
Radiological Sciences	2 717.46	03
	$107 851.31	100

*less than 1%

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